Chapter 3

Environment, Impacts, & Mitigation Measures

This chapter describes the affected environment, potential impacts, and mitigation measures for the following topics:

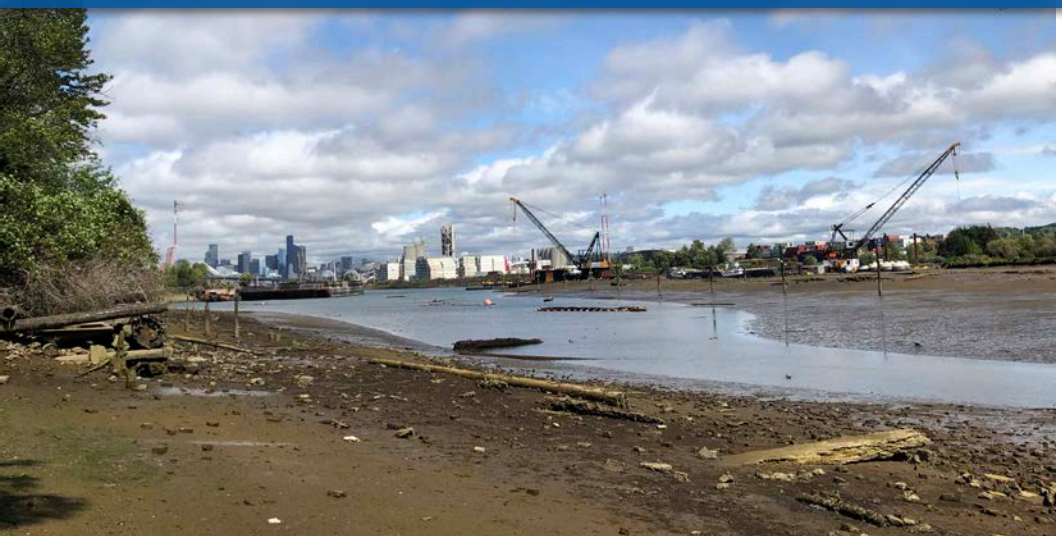
- Section 3.1 Soils/Geology
- Section 3.2 Air Quality & GHG
- Section 3.3 Water Resources
- Section 3.4 Plants & Animals
- Section 3.5 Contamination
- Section 3.6 Noise
- Section 3.7 Light & Glare
- Section 3.8 Land & Shoreline Use
- Section 3.9 Housing
- Section 3.10 Transportation
- Section 3.11 Historic, Archaeological, & Cultural Resources
- Section 3.12 Open Space & Recreation
- Section 3.13 Public Services
- Section 3.14 Utilities

Following a description of current conditions (affected environment), the analysis compares and contrasts the alternatives and provides mitigation measures for identified impacts. It also summarizes whether there are significant unavoidable adverse impacts.

The analysis is broad, areawide, and comparative, considering the non-project proposals. (WAC 197-11-442) Where there is a potential for more than a moderate adverse impact on environmental quality (WAC 197-11-794), existing or potential mitigation measures are posed. Consistent with the non-project analysis, mitigation measures are policy, plan, regulation, or program activities that the City could undertake to limit impacts.

Section 3.1

Soils/Geology



This chapter describes the affected environment for soils/geology conditions and presents the analysis completed to compare and contrast the alternatives. Mitigation measures for identified impacts and any significant unavoidable adverse impacts are also summarized. The study area for Soils/Geology is defined as the area that could be directly or indirectly affected by the construction activities or land uses that result from implementation of the industrial and maritime strategy.

Impacts of the alternatives on soils/geology conditions are considered significant if they result in:

- Erosion that could not be contained on future development sites.
- Exposure of people to risk of injury or substantial damage to structures and infrastructure due to the creation or acceleration of a geologic hazard, such as slope failure, liquefaction, settlement.

3.1.1 Affected Environment

Data & Methods

The project team collected data from the following sources to support analysis of existing soils and geologic conditions and potential effects of the project alternatives:

- Seattle Department of Construction & Inspections GIS (Seattle, City of 2021)
- Geology of Seattle, Washington (Galster and Laprade 1991)
- Quaternary geology of Seattle (Troost et al. 2003)
- Geologic Map of Seattle (Troost et al. 2005)
- Geology of Seattle and the Seattle area, Washington (Troost and Booth 2008)

Current Policy & Regulatory Frameworks

Geologic hazard areas and historical landfills that can impact site development are defined in the City's environmentally critical areas code (Seattle Municipal Code (SMC) 25.09.012 and include:

- Seismic hazard areas (include liquefaction-prone areas, areas subject to ground shaking from seismic hazards addressed by Building and Construction Codes under Title 22, the Seattle Fault Zone, shorelines that could be impacted by Tsunamis, and waterbodies that could be impacted by a seiche [a standing wave oscillating in a body of water])
- Sleep slopes (areas with an incline of 40% or more within a vertical elevation change of at least 10 feet).
- Landslide-prone areas (areas with indications of past landslide activity, and areas with signs of potential landsliding).

- Liquefaction-prone areas (areas typically underlain by cohesionless soils of low density, usually in association with a shallow groundwater table, which lose substantial strength during earthquakes)
- Peat-settlement-prone areas (sites containing peat and organic soils that may settle when the area is developed, or the water table is lowered)
- Historical landfills (includes areas with buried solid waste identified by the Seattle-King County Health Department, and areas within 1,000 feet of methane-producing landfills [Seattle-King County Department of Public Health. 1984])
- Seattle Municipal Code 25.09.220 (Environmentally Critical Areas Code) indicates that development on historical landfills is subject to Seattle-King County Health Department requirements. The code also specifies methane barriers or appropriate ventilation per Title 22, Subtitle I, Building Code, and the Seattle King County Health Department regulations.
- The Title 10 King County Board of Health Solid Waste Regulation governs construction standards and methane controls on historical landfills. Authority is established under RCW Chapter 70.05 and Washington State Administrative Code WAC 173-304, Minimal Functional Standards for Solid Waste Handling, and WAC 173-351, Criteria for Municipal Solid Waste Landfills.

Current Conditions

Geology

Seattle is located within the southwestern portion of the Puget Sound Lowland physiographic region, a basin located between the Olympic Mountains to the west and the Cascade Range to the east (Troost et al., 2003; Troost and Booth, 2008). Seattle's geology has been shaped by multiple processes with movement of materials caused by glaciers, rivers, volcanoes, earthquakes, landslides, coastal deposition and erosion, and human activities. A high degree of geological complexity and variation is frequently encountered on development projects within Seattle and subsurface conditions often change significantly and unpredictably over short distances. These conditions cause challenges for project planners who must consider multiple geological concerns for a single project.

At least seven glaciations have impacted the Seattle area within the last 2.4 million years (Troost and Booth, 2008). Near-surface geology in Seattle is dominated by sediments associated with the advance and retreat of Vashon Glaciation, the most recent icesheet that reshaped our region's topography around 15,000 to 13,500 years ago (Galster and Laprade 1991). As this icesheet advanced and retreated over the Puget Sound Lowland, it left behind a complex mix of geologic materials including advance outwash deposits (silt, sand, and gravel); dense glacial till (a random mixture of clay, silt, sand, and gravel); and recessional outwash (stratified deposits of sand and gravel).

The Ballard Subarea includes areas with Vashon till, recessional outwash, and artificial fill overlying the till, recessional outwash, and alluvium deposits. The Interbay Dravus Subarea

includes Pre-Fraser glacial deposits of firm interbedded sand, gravel, and silt on the north; alluvium deposits along the ship canal on the northeast, and large areas of artificial fill overlying tideflat deposits in the central part of the subarea. The Interbay Smith Cove Subarea is dominated almost entirely by artificial fill overlying tideflat deposits, with very small areas of Vashon till, recessional outwash, or other geologic units. The SODO/Stadium Subarea is similarly dominated by artificial fill overlying tideflat deposits, peat, and alluvium. The Georgetown/South Park Subarea is dominated by artificial fill overlying alluvium deposits, including younger alluvium containing peat lenses.

All of the subareas contain areas dominated by or with some history of artificial fill. These areas tend to contain alluvial or sandy soil conditions that could be subject to greater movement and/or liquefaction during major earthquake events.

Geologic Hazards or Limitations

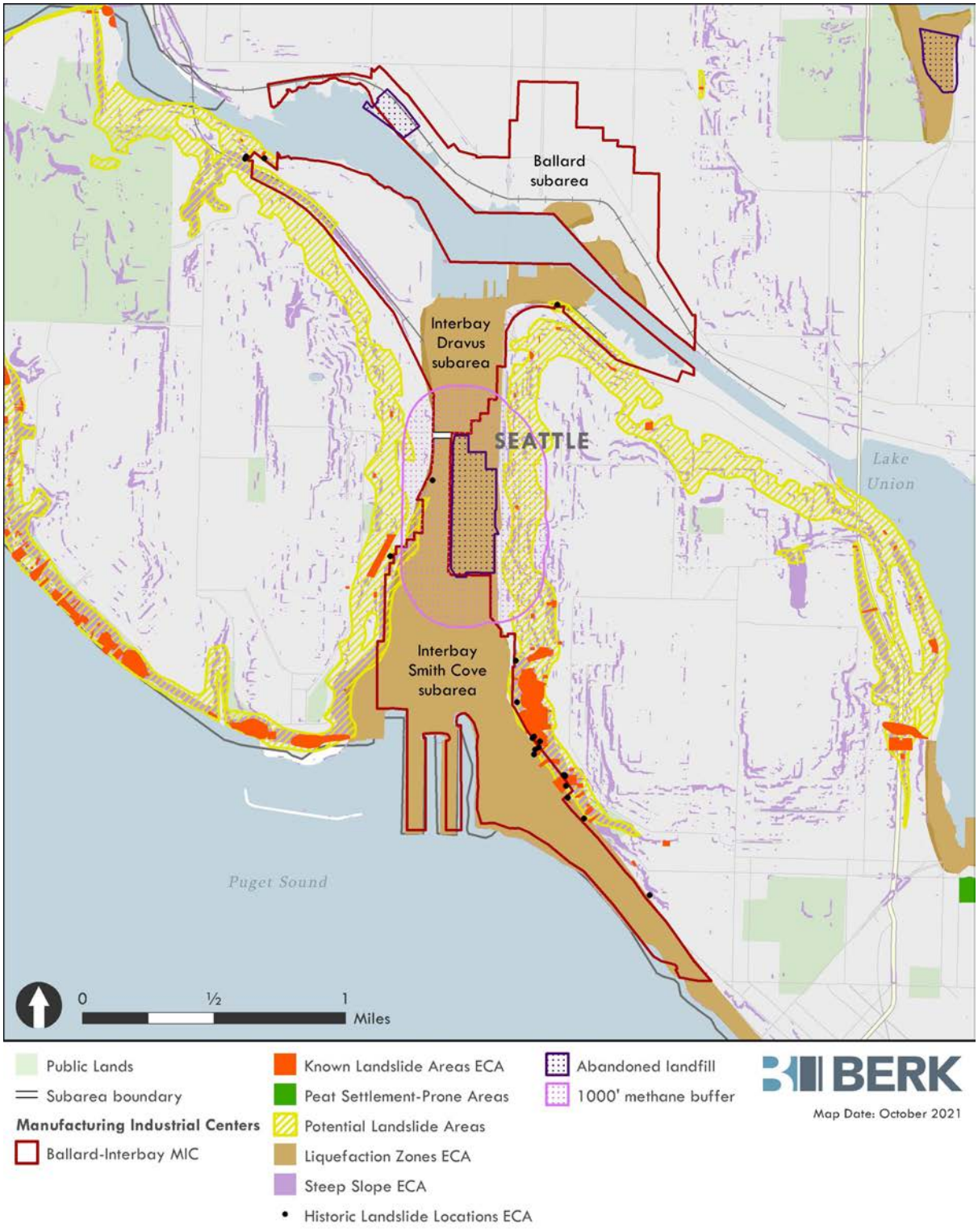
Geologic hazards defined under **Current Policy & Regulatory Frameworks** above are found in each of the subareas as summarized in **Exhibit 3.1-1**. Maps of the BINMIC and Greater Duwamish MIC and geologic hazards are shown in **Exhibit 3.1-2** and **Exhibit 3.1-3**. Descriptions of the hazards follow the table and maps.

Exhibit 3.1-1 Summary of Geologic Hazards Mapped in the BINMIC and Greater Duwamish MIC by Subarea

Subarea	Geologic Hazards or Limitations
Ballard	▪ Short steep slope area along Shilshole Avenue NW ▪ Known areas of historical artificial fill ▪ A small liquefaction-prone area south of Leary Way NW ▪ One historical landfill located just south of Shilshole Avenue NW (no methane buffer)
Interbay Dravus	▪ Several steep slopes and landslide-prone-areas along the east and west edges of the study area ▪ Known areas of historical artificial fill ▪ Nearly all of the study area is prone to liquefaction ▪ The Interbay Landfill located adjacent to the MIC at Interbay Golf Course, with 1,000-foot methane buffer extending into the MIC
Interbay Smith Cove	▪ Several steep slopes and landslide-prone-areas along the east and west edges of the study area ▪ Known areas of historical artificial fill ▪ Nearly all of the study area is prone to liquefaction ▪ The Interbay Landfill located adjacent to the MIC at Interbay Golf Course, with 1,000-foot methane buffer extending into the MIC
SODO/Stadium	▪ A few steep slopes along the west side of Harbor Island ▪ Known areas of historical artificial fill ▪ Nearly all of the study area is prone to liquefaction ▪ Two historical landfills: the West Seattle Landfill along Harbor Avenue SW (with 1,000-foot methane buffer), and a second unnamed landfill that straddles 6th Avenue South.
Georgetown/ South Park	▪ Several steep slopes and landslide-prone areas along the east and west edges of the study area ▪ Known areas of historical artificial fill ▪ Nearly all of the study area is prone to liquefaction ▪ One peat-settlement-prone area near the far southeast corner, just west of State Route 99 ▪ The South Park Landfill located south of the South Transfer Station with 1,000-foot methane buffer

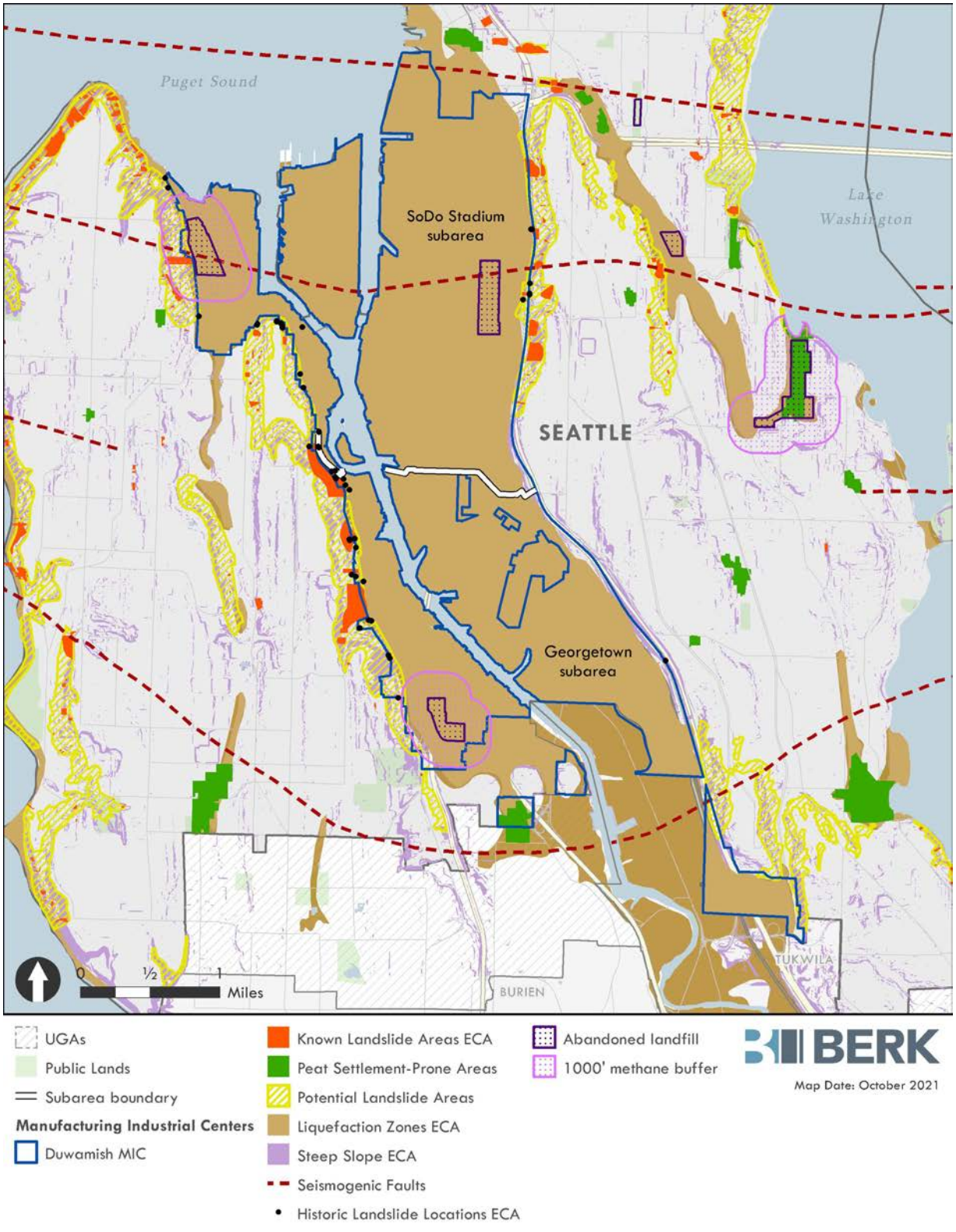
Source: Herrera, 2021.

Exhibit 3.1-2 Geologic Hazards Mapped in the BINMIC



Source: Seattle, City of 2021.

Exhibit 3.1-3 Geologic Hazards Mapped in the Greater Duwamish MIC



Source: Seattle, City of 2021.

Seismic Hazards

Seismic hazards exist within the study area. Seattle and the surrounding region are located in a seismically active region and Seattle sits atop the Seattle Fault Zone (SFZ), a major east-west trending fault zone (WDNR 2020a; USGS 2014). The SFZ consists of a series of closely spaced east-west faults with the exact locations unknown because few clear surface features are visible. The SFZ runs roughly parallel to Interstate 90 from southern Bainbridge Island, through south Seattle, across Lake Washington, and into the Bellevue area and beyond (**Exhibit 3.1-2** and **Exhibit 3.1-3**).

Earthquake recurrence in the Puget Lowland is also influenced by the Cascadia Subduction Zone (CSZ), where the ocean crust off the Pacific Coast is sinking beneath the North American continental plate approximately 70–100 miles off the shoreline. The CSZ has four segments, with the Juan de Fuca plate off the coasts of Washington and Oregon being the segment located closest to CHRLF. The magnitude of an earthquake located along the CSZ varies depending on how many sections of the plate boundary fault are involved, the depth and location of the earthquake epicenter, and the amount of seismic displacement (Rogers 1988; WGCEP 2003).

Steep Slopes

Steep slopes are mapped in several places along the east and west edges of the Interbay Dravus and Interbay Smith Cove subareas (i.e., along the edges of Southeast Magnolia, North Queen Anne, and West Queen Anne). Steep slopes are mapped only in a few small areas in the Ballard Subarea along Shilshole Avenue NW. A few steep slopes are mapped along the west side of Harbor Island in the SODO/Stadium Subarea, and several steep slopes are mapped along the east and west edges of the Georgetown/South Park Subarea above Airport Way South and West Marginal Way, respectively.

Landslide-Prone-Areas

Landslide-prone-areas overlap closely with the steep slope areas described above except for Harbor Island, but they are more extensive in the north-south extents where they present hazards to development.

Liquefaction-Prone Areas

Mapped liquefaction-prone areas include a small portion of the Ballard Subarea south of Leary Way NW, and nearly all of the Interbay Dravus, Interbay Smith Cove, SODO/Stadium, and Georgetown/South Park subareas.

Peat-Settlement-Prone Areas

Only one peat-settlement-prone area is mapped near the far southeast corner of the Georgetown/South Park Subarea, just west of State Route 99.

Historical Landfills

Five historical landfills are mapped within or directly adjacent to the subareas. An unnamed landfill is located in the Ballard Subarea just south of Shilshole Avenue NW and does not include a 1,000-foot methane buffer. The Interbay Landfill is located beneath Interbay Golf Course and includes a 1,000-foot methane buffer that extends into the Interbay Dravus and Interbay Smith Cove subareas. The West Seattle Landfill and an unnamed landfill are located in the SODO/Stadium Subarea along Harbor Avenue SW and straddling 6th Avenue South, respectively. The West Seattle Landfill has a 1,000-foot methane buffer, while the unnamed landfill beneath 6th Avenue South does not. And finally, the South Park Landfill is located along West Marginal Way and 5th Avenue South in the Georgetown/South Park Subarea.

The methane buffer is meant to allow for methane gas monitoring/mitigation. Landfills and other areas containing solid waste, refuse, or artificial fill soils, or lands substantially modified by humans can be challenging to develop due to poor or unpredictable soil characteristics. The construction potential of artificial fill areas depends on construction techniques and material type of the fill. Fill material unsuitable for construction may need to be removed or remediated to prevent problems such as settlement or expansion. Landfills may be unable to support the weight of buildings or structures and methane mitigation and monitoring may be required on and within 1,000 feet of landfills.

3.1.2 Impacts

Impacts Common to All Alternatives

None of the alternatives would accelerate or create geologic hazards; future development would need to be designed to respond to potential hazards consistent with adopted building codes to reduce risk of damage or injury. The study area is located within the Puget Sound Region, an area susceptible to moderately high seismic activity. During a seismic event, the study area might be subjected to high-level ground motions. Areas with steep slopes might experience seismic slope stability problems.

Portions of the Ballard and Interbay Dravus subareas, and all of the Interbay Smith Cove, SODO/Stadium and Georgetown/South Park subareas are susceptible to liquefaction. During an earthquake, vertical and lateral displacements of structures, embankments, and paved areas might occur due to seismic liquefaction hazard. The liquefaction potential of mapped liquefaction hazard areas would be confirmed during the design stage of proposed development, regardless of the alternative.

Development on or adjacent to any of the five historical landfills located within the study areas would require special planning and design. This could include installing methane barriers or appropriate ventilation per Title 22 of the Seattle Municipal Code 25.09.220 and the Seattle King County Health Department regulations. In addition, geotechnical studies would be completed

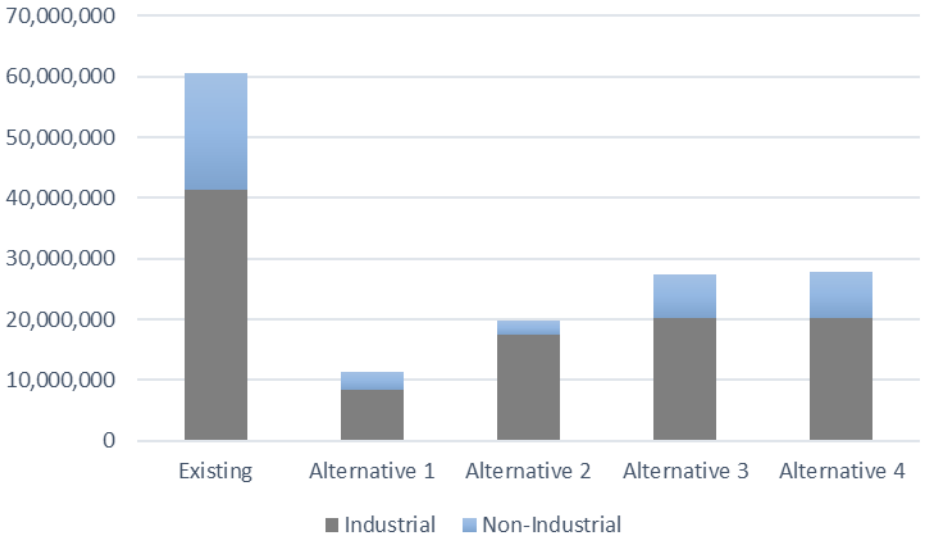
to inform the design of structures and account for poor or unpredictable soil characteristics that could cause settling. These structural features can include the use of pile-supported or floating foundations, depending on the building type.

A peat settlement-prone area in the southwest portion of the Georgetown/South Park Subarea could limit the possibility of development and maintenance of existing structures with any of the alternatives. In this area, compressible soils might need to be excavated and replaced, or planned structures, embankments, and pathways might need to be supported on deep foundations.

All alternatives would allow development that could disturb soils, but erosion would be minimized using erosion control measures per suggested BMPs prescribed in Construction Stormwater Pollution Prevention Plans prepared for each development project.

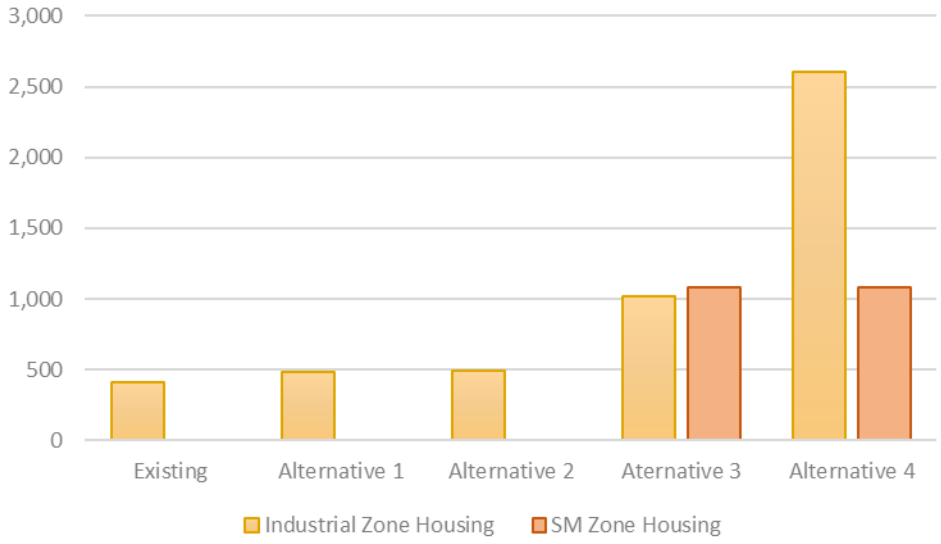
Alternative 1 would allow the least new jobs and housing and Alternative 4 the most in each subarea and across the whole subarea. See **Exhibit 3.1-4** and **Exhibit 3.1-5**.

Exhibit 3.1-4 Existing and Net Employment Building Space by Alternative



Note: Existing based on Assessor Records. Alternatives assume 700 square feet per industrial employee and 250 square feet per non-industrial employee similar to buildable lands assumptions.
Source: City of Seattle, 2021; BERK, 2021.

Exhibit 3.1-5 Total Housing in Study Area by Alternative



Source: City of Seattle, 2021; BERK, 2021.

Ballard

The Ballard Subarea would have the lowest growth under the Alternative 1 No Action and greatest under Alternative 4. This subarea has a small area prone to liquefaction and an historical landfill. The risk of erosion that could not be contained, or risk of damage to structures or injury from landslides, settlement, or seismic events is considered significant but avoidable with mitigation.

Interbay Dravus

The Interbay Dravus Subarea would have the lowest growth under Alternative 1 No Action and the most under Alternative 4. Approximately half of this subarea is prone to liquefaction and there are two areas with steep slopes and one area with potential landslide hazards. The southern portion of this subarea also lies within the 1,000-foot methane buffer of the Interbay Landfill. The risk of erosion that could not be contained, or risk of damage to structures or injury from landslides, settlement, or seismic events is considered significant but avoidable with mitigation.

Interbay Smith Cove

The Interbay Smith Cove Subarea would have the lowest growth under Alternative 1 No Action and the most under Alternative 4. All of this subarea is prone to liquefaction and potential landslide areas are located along the east and west edges. The Interbay Landfill and a large portion of the associated 1,000-foot methane buffer is located in the northern part of this subarea. The risk of erosion that could not be contained, or risk of damage to structures or injury from landslides, settlement, or seismic events is considered significant but avoidable with mitigation.

SODO/Stadium

The SODO/Stadium Subarea would have the lowest growth under Alternative 1 No Action and the most under Alternative 4. All of this subarea is prone to liquefaction and both known and potential landslide areas are located along the east and west edges. Two landfills are located within this subarea; the West Seattle Landfill has a 1,000-foot methane buffer, while the unnamed landfill beneath 6th Avenue South does not. The risk of erosion that could not be contained, or risk of damage to structures or injury from landslides, settlement, or seismic events is considered significant but avoidable with mitigation.

Georgetown/South Park

The Georgetown/South Park Subarea would have the lowest growth under Alternative 1 and the greatest under Alternative 4. All of this subarea is prone to liquefaction. Known and potential landslide areas are located along the east and west edges, and steep slopes are located along the west edge. The South Park landfill with 1,000-foot methane buffer, and a peat settlement-prone area are both located within this subarea. The risk of erosion that could not be contained, or risk of damage to structures or injury from landslides, settlement, or seismic events is considered significant but avoidable with mitigation.

Equity & Environmental Justice Considerations

The population in the BINMIC portion of the study area are less disadvantaged than the population in the Greater Duwamish MIC which has the highest and middle disadvantage per the Seattle Racial and Social Equity Index. See **Exhibit 1.7-7**.

Under any of the Action Alternatives, the primary equity and environmental justice concern for the proposal would be if development on lands subject to geologic hazards carries the risk of injury or damage to structures due to seismic activity. Although the proposal would allow development at sites in areas prone to landslides, liquefaction, or similar geologic hazards, modern building codes mitigate the risk of injury or economic losses for vulnerable communities.

Under Alternative 1 No Action, humans and animals could potentially feel the greatest impacts from geologic hazards in all subareas due to potentially less redevelopment of aging buildings and infrastructure not built to modern building codes to withstand seismic events compared to Action Alternatives.

The Ballard Subarea is less susceptible to seismic impacts than other subareas given nature of the geology that includes deposits of Vashon till, recessional outwash, and artificial fill overlying the till, recessional outwash, and alluvium deposits. The other four subareas are more susceptible to seismic impacts such as liquefaction given the prevalence of large areas of artificial fill overlying tideflat deposits and alluvium deposits, including younger alluvium containing peat lenses.

The Action Alternatives would generally have positive long-term benefits. The greatest benefits would be associated with Alternative 4 because it would result in the most sites developed to international building code standards.

Impacts of Alternative 1 No Action

Under Alternative 1 No Action, there would be similar building forms as found today with gradual densification in parts of all subareas. A total of 8,330,000 square feet (SF) of industrial space and 2,900,000 SF of non-industrial space would be developed. Existing dwellings would increase slightly from 413 to 488, or 75 net new units.

Due to the least amount of planned growth and development under the Alternative 1 No Action, there would be the least amount of soil disturbance but also the least number of structures built to modern building codes. The risk of damage or injury would be less in new buildings developed to international building code standards, but fewer buildings would be constructed to the latest standards compared to alternatives 2, 3, and 4.

Impacts of Alternative 2

The impacts of Alternative 2 are similar to those described under Impacts Common to All Alternatives. The total square feet of industrial space developed within the subareas would more than double, from 8,330,000 SF under the No Action Alternative to 17,430,000 SF under Alternative 2; there would be less non-industrial space of 2,375,000 SF under Alternative 2 compared to 2,900,000 SF with Alternative 1 No Action. In addition, the total housing units would increase from 488 under Alternative 1 No Action to 493 under Alternative 2 (80 above existing units, 5 more than Alternative 1 No Action).

This would mean more workers in industrial spaces and slightly more residents living in housing in the subareas. However, there should be less risk of injury or structural damage from geologic hazards than Alternative 1 No Action because structures would be designed to minimize risks consistent with building and construction standards.

Compared to Alternative 1 No Action, Alternative 2 could create more cut material to be hauled due to taller buildings that might require deeper foundations and potential increase in underground parking needs due to larger buildings. Cut materials in the area are potentially contaminated which would require special handling, storage, transportation, and off-site hauling. The cut materials in the region are known to be moisture sensitive (meaning difficult to compact if they are allowed by become wet) and therefore if not contaminated, cut material should be kept covered to facilitate reuse.

All these impacts together are considered significant but avoidable with mitigation.

Impacts of Alternative 3

The impacts of Alternative 3 are similar to those described under Impacts Common to All Alternatives and under Impacts of Alternative 2. Zoning would change to allow more development of residential properties and non-industrial mixed-use properties. Another 2,870,000 SF of industrial space, 4,725,000 SF of non-industrial space above Alternative 2 (total new 20,300,000 SF industrial and 7,100,000 SF non-industrial).

As well, 2,101 housing units would be developed within the subareas (610 new caretakers' quarters/makers' studios and 1,078 new units in mixed-use in areas removed from the MIC).

This would mean more workers in industrial spaces and more residents living in housing, and more structures that could be exposed to geologic hazards than Alternative 1 No Action, but structures would be designed to minimize risks consistent with building and construction standards.

All these impacts together are considered significant but avoidable with mitigation.

Impacts of Alternative 4

The impacts of Alternative 4 are similar as those described above under Impacts Common to All Alternatives and under Impacts of Alternative 3. The total square footage of industrial space would decrease slightly compared to Alternative 3, but an additional 500,000 SF of non-industrial space is possible (total new 20,160,000 SF of industrial space and 7,600,000 SF of non-industrial space). Additionally, 3,273 new housing units would be developed within the subareas (2,195 new caretakers' quarters/makers' studios and 1,078 new units in mixed-use in areas removed from the MIC).

Under Alternative 4, the greatest level of development could be subject to geologic hazards, compared to Alternative 1 No Action, but structures would be designed to minimize risks consistent with building and construction standards.

All these impacts together are considered significant but avoidable with mitigation.

3.1.3 Mitigation Measures

Incorporated Plan Features

There are no incorporated plan features related to geology and soils.

Regulations and Commitments

Building and Construction Codes under Title 22 contains construction code standards, including the International Building Code, which ensure buildings are designed to meet seismic safety standards.

Seattle Municipal Code 25.09.220 (Environmentally Critical Areas Code) indicates that development on historical landfills is subject to Seattle-King County Health Department requirements. The code also specifies methane barriers or appropriate ventilation per Title 22, Subtitle I, Building Code, and the Seattle King County Health Department regulations.

The Title 10 King County Board of Health Solid Waste Regulation governs construction standards and methane controls on historical landfills. Authority is established under RCW Chapter 70.05 and Washington State Administrative Code WAC 173-304, Minimal Functional Standards for Solid Waste Handling, and WAC 173-351, Criteria for Municipal Solid Waste Landfills.

Other Potential Mitigation Measures

Geotechnical investigations are required as part of the design phase for new development, especially for those buildings with greater heights or in close proximity to artificially created slopes. Specific recommendations for liquefaction mitigation, subgrade preparation, roadway embankment, cut and fill, slope stability, foundation design, retaining structures, and dewatering measures would be prepared prior to construction. Appropriate waste sites for unsuitable excavated soils would be identified prior to construction.

Potential impacts of soil liquefaction could be mitigated by removing and replacing the loose materials with compacted fill materials, by densifying or reinforcing the in-situ soils, or by supporting the proposed facilities on deep foundations or piles. The need for liquefaction mitigation would be evaluated on a case-by-case basis for the individual structural elements potentially impacted.

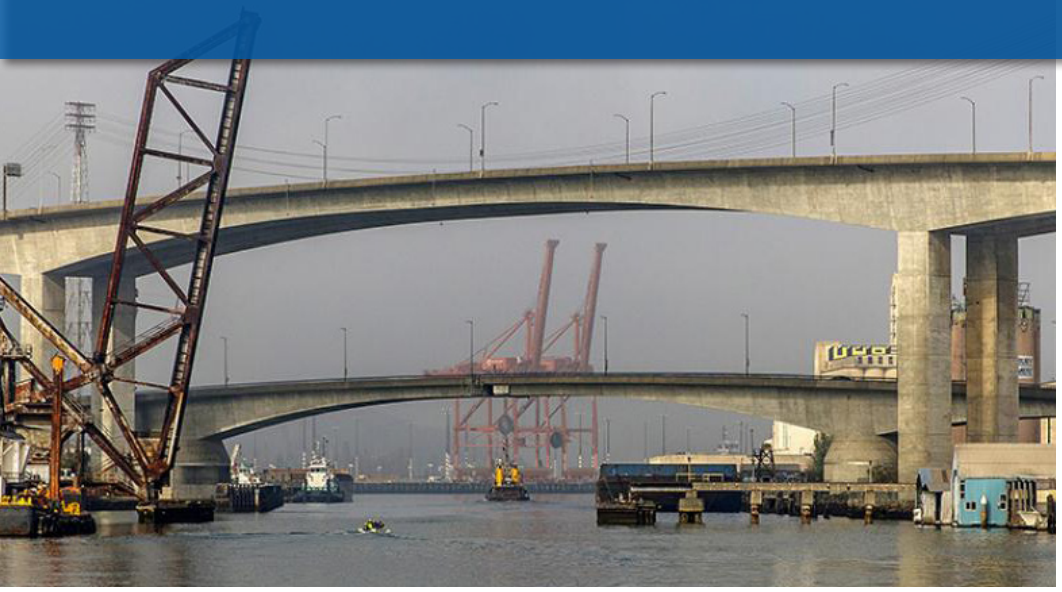
Potential impacts of vapor intrusion from historical landfills within the study area would be investigated by performing site-specific vapor intrusion assessments and/or by installing passive or active methane mitigation systems in structures developed on historical landfills, or within the 1,000-foot methane buffer.

3.1.4 Significant Unavoidable Adverse Impacts

Development in the study area, as with most locations in Central Puget Sound, would expose population and structures to geologic hazards, and would disturb soils. These impacts can be mitigated to a less than significant level by designing development to the City's adopted construction codes and applying any site-specific conditions (e.g., methane mitigation systems for buildings built near historical landfills) required by the City during permit review.

Section 3.2

Air Quality & GHG



This section assesses the potential air quality and greenhouse gas (GHG) emission impacts associated with implementing the alternatives under consideration.

The air quality section includes a description of regulatory standards for air quality, air emission sources and individual criteria pollutants of concern, with a focus on carbon monoxide (CO), particulate matter (PM) emissions, ozone precursors, and Toxic Air Pollutants (TAPs). The chapter also includes a discussion of potential sensitive populations in and near the industrial and maritime areas of Seattle, the methods used to assess air quality and impacts from those emissions, and an assessment of impacts associated with each alternative, as well as potentially feasible mitigation measures where appropriate. This analysis evaluates air quality conditions and potential impacts for each MIC on an area-wide cumulative basis and, and for PM2.5 and TAPs, a localized analysis is provided at specific areas to identify potential public health impacts from locating new sensitive receptors closer to or within MIC areas.

Under the SEPA Rules (see WAC 197-11-330, WAC 197-11-440 and WAC 197-11-794), the evaluation of the significance of potential impacts considers whether there is a reasonable likelihood of more than a moderate adverse impact on environmental quality (WAC 197-11-794). In making this assessment, the following are considered:

- The context of the proposal, including the physical setting
- The intensity of the impact, which depends on its magnitude and duration
- The likelihood of the impact's occurrence
- The duration of the impact.

In many cases, regulatory thresholds are used to judge significance, that is, if actions would meet regulatory thresholds (e.g., surface water quality standards, wetland/stream buffers, noise standards, endangered species) then the determination is typically that the level of impact is unlikely to be significant. For the purposes of this programmatic impact analysis, air quality is analyzed by examining whether:

- The alternative would prevent or deter achieving the National Ambient Air Quality Standards (NAAQS) for criteria pollutants.

The GHG section includes a description of community goals for GHG emissions and climate change, transportation, and land use emission sources in the industrial and maritime areas of Seattle, the methods used to measure GHG emissions, and how implementation of the alternatives considered may contribute to global climate change. This section also identifies potentially feasible emissions mitigation measures where appropriate. This analysis evaluates potential GHG emission impacts from each alternative on a cumulative basis.

There is no standard significance threshold for GHG emissions in the SEPA rules (WAC 197-11-330). However, Chapter 173-441 WAC requires mandatory GHG reporting for facilities that emit at least 10,000 metric tons of GHGs per year in Washington. For the purposes of this programmatic impact analysis, GHG emissions are analyzed by examining whether:

- The alternative would prevent or deter efforts to reduce emissions in comparison to local or regional goals or targets for GHG reductions.
- The alternative would cause the cumulative difference in GHG emissions between an alternative and Alternative 1 No Action to exceed Washington Department of Ecology's GHG reporting threshold of 10,000 metric tons per year.

The analysis confirms that changes to the MIC areas do not prevent or deter from meeting the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. It illustrates increases in greenhouse gases (GHGs) in comparison to local or regional goals or targets for GHG reductions and identifies mitigation that, if implemented and tracked, could reduce impacts to a less than significant level.

This chapter relies on information that is contained in the Seattle Comprehensive Plan (Seattle 2035) EIS, which incorporated by reference herein. (City of Seattle 2016)

The study area for air quality is defined as the area that could be directly or indirectly affected by the construction activities or land uses that result from implementation of the industrial and maritime strategy. Given that air emissions cross county and state lines, the assessment here is considered to apply to air quality effects over the entire Seattle-King County area. With respect to GHG emissions and its effect on climate, the study area is the global environment. The study area for indirect impacts is the area affected by the transport of construction workers and materials to the project area.

3.2.1 Affected Environment

Data & Methods

The project team collected data from the following sources to support analysis of existing air quality conditions and potential effects of the project alternatives:

- U.S. Environmental Protection Agency (EPA) Greenbook (EPA 2021)
- Puget Sound Clean Air Agency (PSCAA) and Ecology Air Monitoring Network
- 2019 PSCAA Air Quality Data Summary (PSCAA 2019)
- Duwamish Valley Regional Modeling and Health Risk Assessment (WDOH 2008)
- Washington State Greenhouse Gas Emissions Inventory 1990–2018 (Ecology 2021)
- 2018 Community Greenhouse Gas Emissions Inventory (Seattle 2018)
- Direct monitoring of eight sites within the BINMIC and Greater Duwamish MIC during 2021

Air Quality

Current Policy & Regulatory Frameworks

Air quality in the Puget Sound region is regulated and enforced by federal, state, and local agencies—the Environmental Protection Agency (EPA), Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA); each have their own role in regulating air quality.

U.S. EPA

The 1970 Clean Air Act established National Ambient Air Quality Standards (NAAQS), with primary and secondary standards, to protect the public health and welfare from air pollution. As required by the Clean Air Act, EPA identified Ozone, CO, PM, nitrogen dioxide (NO2), sulfur dioxide (SO2) and lead as the six criteria air pollutants. Since then, subsets of PM have been identified for which permissible levels have been established. These include PM10 (particles that are less than or equal to 10 microns in diameter) and PM2.5 (particles that are less than or equal to 2.5 microns in diameter).

The NAAQS set limits on concentration levels of the criteria pollutants in the air. Concentration levels of the criteria pollutants must not exceed the NAAQS over specified time periods. These ambient air quality standards are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people whose health is compromised from other illness or disease, or those engaged in strenuous work or exercise. Areas of the U.S. that do not meet the NAAQS for any pollutant are designated by the EPA as nonattainment areas. Areas that were once designated nonattainment but are now achieving the NAAQS are termed maintenance areas. Areas that have air pollution levels below the NAAQS are termed attainment areas. In nonattainment areas, states must develop plans to reduce emissions and bring the area back into attainment of the NAAQS.

The Clean Air Act also requires the EPA to regulate toxic air pollutants (or air toxics) from mobile sources and large industrial facilities. Air toxics are air pollutants known or suspected to cause health problems, including cancer. EPA's primary effort focuses on developing standards for controlling the emissions of air toxics from sources in industry groups (or source categories). These maximum achievable control technology (MACT) standards are based on emissions levels that are already being achieved by the controlled and low emitting sources in an industry.

Washington Department of Ecology

Ecology maintains an air quality program with a goal of safeguarding public health and the environment by overseeing the development and conformity of the State Implementation Plan (SIP), which is the state's plan for meeting and maintaining NAAQS. In addition to the NAAQS standards, Ecology has adopted state ambient air quality standards for 1-hour ozone

concentrations and its own more stringent air quality standards for annual NO2, SO2 and PM concentrations. Ecology also monitors air quality in the Puget Sound Region by measuring the levels of criteria pollutants found in the atmosphere and comparing them with the NAAQS. Ecology has also monitored 17 air toxics since 2000 in Seattle at a site on Beacon Hill.

Puget Sound Clean Air Agency

The PSCAA has local authority for setting regulations and permitting of stationary air pollutant sources and construction emissions. PSCAA also maintains and operates a network of ambient air quality monitoring stations measuring the levels of criteria pollutants found in the atmosphere throughout its jurisdiction. The NAAQS are summarized in **Exhibit 3.2-1**.

Exhibit 3.2-1 National Ambient Air Quality Standards

Pollutant	Averaging Times	Primary NAAQS	Secondary NAAQS
Carbon monoxide	8-hour a	9 ppm (10 mg/m3)	None
	1-hour a	35 ppm (40 mg/m3)	None
Lead	Rolling 3-Month Average	0.15 µg/ m3	Same as Primary
	Quarterly Average	1.5 µg/ m3	Same as Primary
NO2	Annual (Arithmetic Mean)	0.053 ppm (100 µg/m3)	Same as Primary
	1-hour b	0.100 ppm (188 ug/m3)	Same as Primary
PM10	24-hour c	150 µg/m3	Same as Primary
PM2.5	Annual d (Arithmetic Mean)	12.0 µg/m3	Same as Primary
	24-hour e	35 µg/m3	Same as Primary
Ozone	8-hour f	0.075 ppm (2008 std.)	Same as Primary
	8-hour f	0.070 ppm (2015 std.)	Same as Primary
SO2	3-hour a	none	0.5 ppm (1,300 µg/m3)
	1-hour g	0.075 ppm (196 ug/m3)	Same as Primary

Notes: µg/m3 = micrograms per cubic meter; NO2 = nitrogen dioxide; PM2.5 = particulate matter less than or equal to 2.5 micrometers in diameter; PM10 = particulate matter less than or equal to 10 micrometers in diameter; ppm = parts per million; ppb = parts per billion; SO2 = sulfur dioxide.
a Not to be exceeded more than once per year.
b Standard is attained when the 3-year average of the eighth-highest daily maximum 1-hour average NO2 concentration does not exceed 0.100 ppm (100 ppb).
c Not to be exceeded more than once per year on average over 3 years.
d To attain this standard, the 3-year average at any monitor must not exceed 12.0 µg/m3.
e To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3. PSCAA maintains a stricter standard for PM2.5 of 35 µg/m3
f To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed the standard. While both the 2008 and 2015 standards are still in place, the 2015 standard is the controlling one, given its greater stringency.
g Standard is attained when the 3-year average of the fourth-highest daily maximum 1-hour average NO2 concentration does not exceed 0.100 ppm (100 ppb).
Source: 40 Code of Federal Regulations part 50, EPA 2016.

Pollutants of Concern

This section discusses the main pollutants of concern and their impact on public health and the environment. Air quality is affected by pollutants that are generated by both natural and human sources. In general, the largest human sources of air emissions are transportation vehicles and power-generation, both of which typically burn fossil fuels. Criteria air pollutants are carbon monoxide (CO); particulate matter (PM); ozone, and the ozone precursors (volatile organic compounds [VOCs] and oxides of nitrogen [NOX]); sulfur dioxide (SO2); and lead. Both federal and state standards regulate these pollutants. Industrial sources such as metal processing are currently the primary source of lead emissions.

The largest contributors of pollution related to land development activity are construction equipment, motor vehicles and off-road construction equipment. The main pollutants emitted from these sources are CO, PM, ozone precursors (VOC and NOx), GHGs, and mobile source air toxics (MSATs). Motor vehicles and diesel-powered construction equipment also emit pollutants that contribute to the formation of ground-level ozone.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The largest sources of CO are motor vehicle engines and traffic, and industrial activity and woodstoves. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. The federal CO standards have not been exceeded in the Puget Sound area for the past 20 years (PSCAA 2019).

Lead

Lead is a highly toxic metal that was used for many years in household products such as paints, transportation fuel, and industrial chemicals. With lead now excluded from paint and most fuels, most lead emissions nationally are industrial processes and battery manufacturers though lead found in aviation fuel used by small aircraft remains a concern nationally. In October 2008, EPA strengthened the lead standard from 1.5 µg/m3 to 0.15 µg/m3 (rolling three-month average; PSCAA 2020).

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving VOCs and NOx. The main sources of VOC and NOx—ozone precursors—are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Ozone levels are usually highest in the afternoon because of the intense sunlight and the time required for ozone to form in the atmosphere. Ecology currently monitors ozone from May through September because this is the period of concern for

elevated ozone levels in the Pacific Northwest. No violations of the NAAQS for ozone have occurred at the Seattle monitoring station since monitoring commenced there in 1999.

Elevated concentrations of ground-level ozone can cause reduced lung function and respiratory irritation and can aggravate asthma. Ozone has also been linked to immune system impairment. People with respiratory conditions should limit outdoor exertion if ozone levels are elevated. Even healthy individuals may experience respiratory symptoms on a high-ozone day. The Puget Sound region is designated as an attainment area for federal ozone standards.

Nitrogen Dioxide

Nitrogen dioxide (NO2) is a reddish brown, highly reactive gas that forms from the reaction of nitrogen oxide (NO) and free radicals in the atmosphere. NO2 can cause coughing, wheezing and shortness of breath in people with respiratory diseases such as asthma and long-term exposure can lead to respiratory infections.[7]

The term NOx is defined as NO + NO2. NOx participates in a complex chemical cycle with volatile organic compounds (VOCs) which can result in the production of ozone. NOx can also be oxidized to form nitrates, which are an important component of fine particulate matter. On-road vehicles such as trucks and automobiles and off-road vehicles such as construction equipment, marine vessels and port cargo-handling equipment are the major sources of NOx in Seattle's industrial areas. Industrial boilers and processes, home heaters, and gas stoves also produce NOx (PSCAA 2020).

Particulate Matter

PM is a class of air pollutant that is a mix of solid and liquid particles from human and natural sources. PM is measured in two size ranges: PM10 and PM2.5. Fine particles are emitted directly from a variety of sources, including wood burning (both outside and indoor wood-burning stoves and fireplaces; and wildfire), vehicles and industry. They also form when gases from some of these same sources react in the atmosphere.

Exposure to particle pollution is linked to a variety of significant health problems, such as increased hospital admissions and emergency department visits for cardiovascular and respiratory problems, including non-fatal heart attacks and premature death. People most at risk from fine and coarse particle pollution exposure include those with chronic heart and lung disease (like asthma, bronchitis, and emphysema), children, and the elderly. It worsens these diseases, which can lead to hospitalization or even early death. Pregnant women, newborns, and people with certain health conditions, such as obesity or diabetes, also may be more susceptible to PM-related effects.

The federal annual PM2.5 standard has not been exceeded in the Puget Sound area since the U.S. EPA established its NAAQS in 2007. The daily federal PM2.5 standard has not been

[7] EPA Airnow, NOX Chief Causes for Concern; www.epa.gov/airquality/nitrogenoxides/.

exceeded in the Puget Sound dating back to the initiation of monitoring for this pollutant in 2001 (PSCAA 2014). The U.S. EPA adopted a more stringent federal standard for PM2.5 in December 2012, and Seattle-King County is designated as an attainment area. Portions of the Puget Sound region, including an area encompassing the Greater Duwamish MIC, were designated as a maintenance area for PM10 through May 2021.

Sulfur Dioxide

Sulfur dioxide (SO2) is a colorless, reactive gas produced by burning fuels containing sulfur, such as oil, coal, and diesel, and by industrial processes. Historically, the greatest sources of SO2 were industrial facilities that derived their products from raw materials such as metallic ore, coal, and crude oil, or that burned coal or oil to produce process heat (petroleum refineries, cement manufacturing and metal processing facilities). Marine vessels, on-road vehicles, and diesel construction equipment are the main contributors to SO2 emissions today. Historically, Washington has measured very low levels of SO2. Because the levels were so low, most monitoring was stopped.

SO2 may cause people with asthma who are active outdoors to experience bronchial constriction, the symptoms of which include wheezing, shortness of breath and tightening of the chest. People should limit outdoor exertion if SO2 levels are high. SO2 can also form sulfates in the atmosphere, a component of fine particulate matter (PSCAA 2020).

Toxic Air Pollutants

Air toxics are defined by Washington State and PSCAA to include hundreds of chemicals and compounds that are associated with a broad range of adverse health effects, including cancer. Many air toxics are a component of either particulate matter or volatile organic compounds (a precursor to ozone).

There are no ambient air quality standards for toxic air pollutants. PSCAA is working with state, local, and tribal governments to reduce air toxics releases. While there are no ambient standards, there are several regulatory tools that are used to reduce air toxics emissions. These tools include: national regulations on industrial sources that require emission reducing technology, “new source review” for sources in Washington State, local regulations for specific industries that require specific technology, and national regulations to reduce emissions from mobile sources (including cars, trucks, and buses as well as marine vessels and locomotives; WDOH 2008)

Ecology began monitoring air toxics at the Seattle Beacon Hill site in 2000. The Clean Air Act identifies 188 air toxics; the U.S. EPA later identified 21 of these air toxics as mobile source air toxics (MSATs) and then a subset of seven priority MSATs: benzene, formaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, naphthalene, polycyclic organic matter, and 1,3-butadiene. Exposure to these pollutants for long durations and sufficient concentrations increases the chances of cancer, damage to the immune system, neurological problems, reproductive, developmental, respiratory, and other serious health problems.

Diesel particulate matter poses the greatest potential cancer risk (70% of the total risk from air toxics) in the Puget Sound area (PSCAA 2011). This pollution comes from diesel-fueled trucks, cars, buses, construction equipment, rail, marine and port activities. Particulate matter from wood smoke (a result of burning in woodstoves and fireplaces or outdoor fires) presents the second-highest potential cancer health risk. Wood smoke and auto exhaust also contain formaldehyde, chromium, benzene, 1,3-butadiene and acrolein. Chromium is also emitted in industrial plating processes.

Current Conditions

Puget Sound Climate & Air Quality

The City of Seattle is in the Puget Sound lowland and the region has a relatively mild, marine climate with cool summers and mild, wet, and cloudy winters. The prevailing wind direction in the summer is from the north or northwest. The average wind velocity is less than 10 miles per hour. Persistent high-pressure cells often dominate summer weather and create stagnant air conditions. This weather pattern sometimes contributes to the formation of photochemical smog. During the wet winter season, the prevailing wind direction is south or southwest.

Although the Puget Sound region contains some of the most densely populated and industrialized areas in Washington, there is sufficient wind most of the year to disperse air pollutants released into the atmosphere. Air pollution is usually most noticeable in the late fall and winter, under conditions of clear skies, light wind, and a sharp temperature inversion. Temperature inversions occur when cold air is trapped under warm air, thereby preventing vertical mixing in the atmosphere. These can last several days. If poor dispersion persists for more than 24 hours, the PSCAA can declare an “air pollution episode” or local “impaired air quality.”

Regionally, weather conditions such as temperature, fog, rain, and snowfall can vary within short distances, influenced by such factors as the distance from Puget Sound, the rolling terrain, and air from the ocean moving inland. Wildfires typically occur during the warmer, drier summer months and recent years have seen increased incidence of more dense smoke episodes lasting days or weeks. Wildfire smoke carries the same health risks as wood smoke because of the presence of small particles, which can be especially dangerous for infants, children, and people over 65, or those that are pregnant, have heart or lung diseases (such as asthma or COPD), respiratory infections, diabetes, stroke survivors, and those suffering from COVID-19. (PSCAA 2021)

Full Study Area

Both Ecology and PSCAA operate ambient air quality monitoring stations to assess the levels of regulated pollutants and to verify continued compliance with the NAAQS. The monitoring stations used for this analysis are the nearest to the BINMIC and Greater Duwamish MIC areas and shown in **Exhibit 3.2-2** along with the criteria pollutants monitored.

Exhibit 3.2-2 Seattle Air Quality Monitoring Stations and Criteria Pollutants

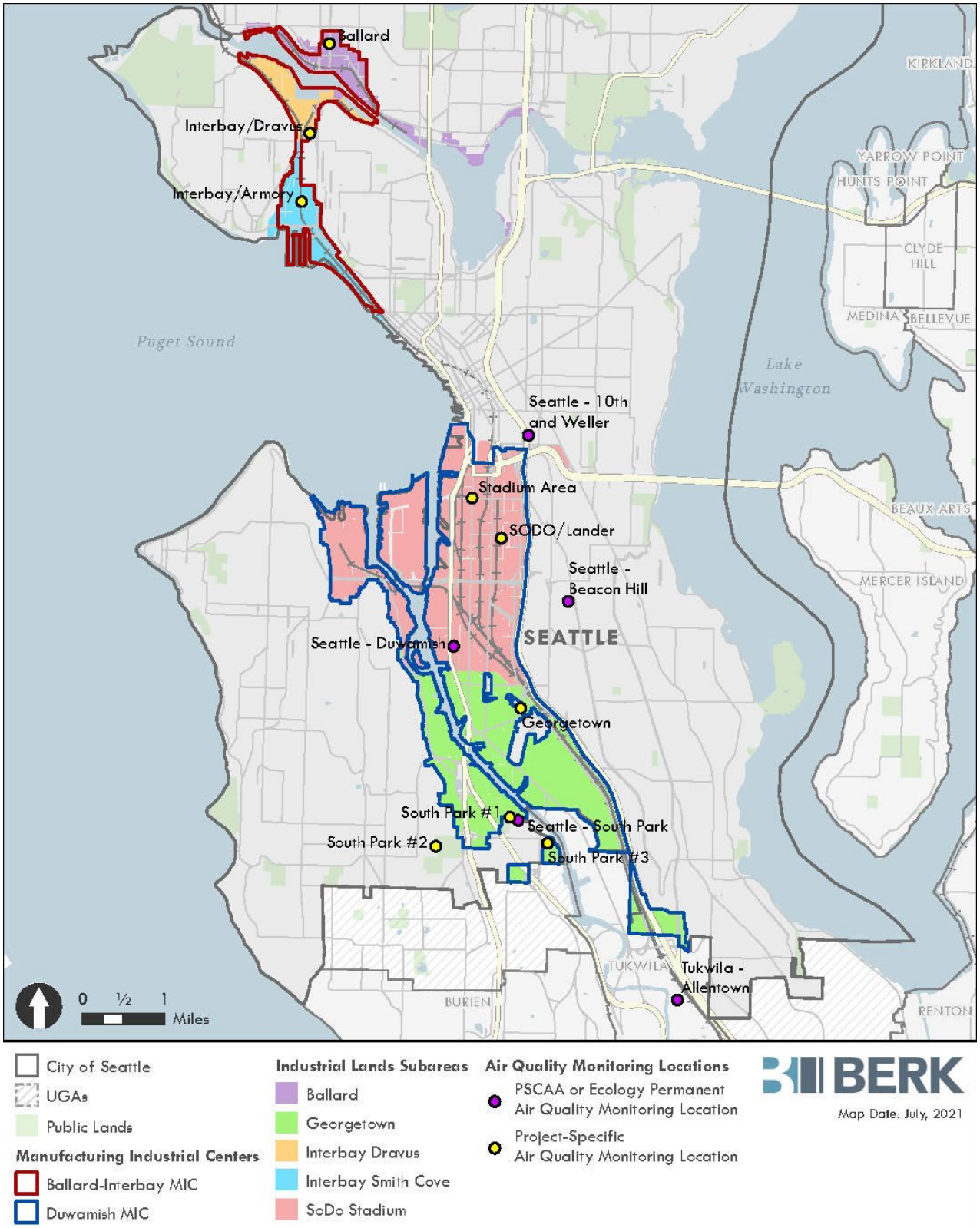
Site	Owner	PM2.5	Ozone	CO	SO2	NOy
10th & Weller	Ecology	●		●		●
Beacon Hill Site, 4103 Beacon Ave S	Ecology	●	●	●	●	●
Duwamish Site, 4700 East Marginal Way	PSCAA	●				
South Park Site, 8201 10th Ave S	PSCAA	●				
Tukwila Allentown Site, 11675 44th Ave E	PSCAA	●				

Source: PSCAA, 2021.

In addition, eight sites within the BINMIC and Greater Duwamish MIC were monitored directly to provide additional baseline data on ambient air quality conditions for this EIS. The sites are described below and **Exhibit 3.2-3** shows the site locations. They were selected due to the location of potential zoning changes in alternatives at the time of Scoping or due to their proximity to air quality emission sources.

1. Ballard: 5007 14th Avenue Northwest. This site is also close to the future Sound Transit light rail station.
2. Interbay/Dravus: 3425 16th Avenue West. This is also close to a future Sound Transit light rail station, a BNSF rail yard, and facilities.
3. Interbay/Armory site: 1561 W Armory Way. This is a site that is close to the BNSF rail yard.
4. Stadium area: 1730 1st Avenue South
5. Georgetown: 5707 Airport Way South.
6. South Park 1: 8620 16th Avenue South. An area close to the King County airport
7. SODO/Lander: 2437 6th Avenue South. An existing light rail station.
8. South Park 2: 8100 8th Avenue South. An area in proximity to SR 99 and SR 509.

Exhibit 3.2-3 Air Quality Monitoring Locations



Source: Herrera, 2021.

Air Quality Information and Trends

According to PSCAA, over the last two decades, many pollutant levels have declined, and air quality has improved overall. For Seattle area monitoring stations closest to the MICs, as it is within the Puget Sound area overall, the following trends exist:

- Carbon monoxide: CO has been declining, primarily due to improvements made to emission controls on motor vehicles and the retirement of older, higher-polluting vehicles. Reductions in motor vehicle emissions have occurred despite comparative increases in demographics (i.e., population, licensed drivers, registered vehicles) over the past 40+ years.
- Lead: Since the phase-out of lead in most fuels and the closure of the Harbor Island secondary lead smelter in Seattle in 1984, levels of lead in ambient air have decreased substantially.
- Ozone, and the ozone precursors (volatile organic compounds (VOCs) are at their highest concentrations in the communities downwind of large urban areas. In the Puget Sound region, the hot sunny days favorable for ozone formation also tend to have light north-to-northwest winds. Ozone levels remain a concern in the region, as measured ozone concentrations have remained fairly static since 2010 (PSCAA 2020)
- NOx: Motor vehicle and non-road engine manufacturers have been required by EPA to reduce NOx emissions from cars, trucks, and non-road equipment. As a result, emissions have declined dramatically since the 1970s. Nitrogen dioxide levels in the Puget Sound region, as currently monitored by Ecology, are typically below (cleaner than) EPA's 1-hour standard and are trending slightly downward in the last 10 years (PSCAA 2020). (PSCAA 2020)
- Particulate matter (PM): Elevated fine particle levels (PM2.5) pose the greatest air quality challenge in the region. Fine particle levels met the EPA's health-based standard of 35 micrograms per cubic meter in 2019 when days with wildfire smoke are excluded, though when wildfire is included some monitoring sites exceeded the federal standard in 2017 and 2018. There were no wildfire-impacted days in 2019.
- PSCAA's more stringent local PM2.5 health goal of 25 micrograms per cubic meter was exceeded on 22 days in winter months at Seattle monitoring sites (PSCAA 2020).
- Sulfur dioxide (SO2): The Puget Sound area has experienced a significant decrease in SO2 because control measures were added for some sources (e.g., cement plants), some larger SO2 sources shut down (e.g., pulp mills and smelters) and the sulfur content of gasoline and diesel fuel was cut by nearly 90% (Ecology 2011b) and continues to be far below the federal NAAQ Standard. (PSCAA 2020).
- Air toxics: Some air toxics continue to be measured at levels known to cause adverse health effects. These health effects include, but are not limited to, increased cancer risk, respiratory effects, and developmental effects. (PSCAA 2020)

Overall, the air quality in the Puget Sound has continued to improve to meet the standards, though the number of wildfire-impacted days has increased in the last five years.

Ambient air concentrations of the monitored pollutants for years 2018 through 2020 are summarized in **Exhibit 3.2-4** and shows that the air pollutant concentration trends for these pollutants remain below the NAAQS when wildfire is excluded. Ecology and PSCAA no longer collect particulate matter smaller than 10 microns in diameter (PM10) data in the Puget Sound Region.

Exhibit 3.2-4 Ambient Criteria Pollutant Concentration Levels Measured for the four Seattle Sites (10th & Weller, Beacon Hill, Duwamish, and South Park) from 2018-2020

Pollutant	Primary / Secondary	Averaging Time	NAAQS	Form	Wildfire Included			Wildfire Excluded		
					2018	2019	2020	2018	2019	2020
Carbon Monoxide (CO)	primary	8 hours	9 ppm	Not to be exceeded more than once per year	1.4	1.7	1.8	nc	nc	nc
		1 hour	35 ppm		1.8	2.3	2.1	nc	nc	nc
Lead (Pb)	primary and secondary	Rolling 3 month average	0.15 ug/m3	Not to be exceeded	nm	nm	nm	nm	nm	nm
Nitrogen Dioxide (NO2)	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	62.6*	62.1*	59.2	nc	nc	nc
	primary and secondary	1 year	53 ppb	Annual mean	20.0	18.1	15.8	nc	nc	nc
Ozone (O3)	primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	0.045	0.046	0.052	nc	nc	nc
PM2.5	primary	1 year	12.0 ug/m3	annual mean, averaged over 3 years	8.9**	9.3	9.1	7.9**	8.2	8.0
	secondary	1 year	15.0 ug/m3		8.9**	9.3	9.1	7.9**	8.2	8.0
	primary and secondary	25 hours	35 ug/m3	98th percentile, averaged over 3 years	37.2**	36.7	37.5	20.7	21.5	19.3
PM10	primary and secondary	24 hours	150 ug/m3	Not to be exceeded more than once per year on average over 3 years	nm	nm	nm	nm	nm	nm
SO2	primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	6.0***	7.0***	6.0	nm	nm	nm
	secondary	3 hours	0.5 ppm	Not to be exceeded more than 1x per year	0.011	0.006	0.037	nm	nm	nm

nc Not calculated

nm Not measured

nm Meets standard

Does not meet standard

*<75% data completeness for one quarter in 2017
**<75% data completeness for one quarter in 2016
***<75% data completeness for one quarter in 2016 and 2017

Source: Herrera, 2021.

Ambient air concentrations of PM10 at target sites throughout the MICs for 2021 are summarized in **Exhibit 3.2-5** and show that the PM10 concentration for these pollutants remain below the NAAQS.

Exhibit 3.2-5 Ambient PM10 Concentration Levels Measured in 2021

Pollutant	Station	Averaging Time	2021 Concentration	NAAQS
Particulate Matter (PM10)	Ballard	24-Hour (µg/m3)	17.25	150
	Interbay/Dravus	24-Hour (µg/m3)	16.46	150
	Interbay/Armory	24-Hour (µg/m3)	19.42	150
	Stadium	24-Hour (µg/m3)	20.17	150
	Georgetown	24-Hour (µg/m3)	14.96	150
	South Park 1	24-Hour (µg/m3)	8.92	150
	SODO/Lander	24-Hour (µg/m3)	8.33	150
	South Park 2	24-Hour (µg/m3)	7.08	150

Source: Herrera and Ramboll, 2021.

Ambient air concentrations of detected metals and VOCs at target sites throughout the MICs for 2021 are summarized in **Exhibit 3.2-6** and show that the concentration for these pollutants remain below the NAAQS.

Exhibit 3.2-6 Detected Pollutants and Measured Concentration Levels in 2021

Pollutant	Station	Constituent	2021 Max Concentration	NAAQS/RSL
Metals	Ballard	Lead	ND	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	0.0021	n/a
		Nickel	ND	0.015*
	Interbay/Dravus	Lead	ND	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	ND	n/a
		Nickel	ND	0.015*
	Interbay/Armory	Lead	ND	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	0.0025	n/a
		Nickel	0.0018	0.015*
	Stadium	Lead	0.0033	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3

Pollutant	Station	Constituent	2021 Max Concentration	NAAQS/RSL
		Chromium	0.0032	n/a
		Nickel	0.001	0.015*
	Georgetown	Lead	0.0018	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	0.0026	n/a
		Nickel	ND	0.015*
	South Park 1	Lead	0.0014	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	ND	n/a
		Nickel	ND	0.015*
	SODO/Lander	Lead	0.0015	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	0.0022	n/a
		Nickel	ND	0.015*
	South Park 2	Lead	ND	0.15 µg/m3
		Arsenic	ND	0.002 µg/m3
		Chromium	0.0024	n/a
		Nickel	0.0009	0.015*
VOCs	Ballard	Ethanol	15	n/a
		2-Proponal	ND	211 µg/m3
		Toluene	ND	520 µg/m3
		Heptane	ND	42 µg/m3
	Interbay/Dravus	Ethanol	ND	n/a
		2-Proponal	ND	211 µg/m3
		Toluene	2.7	520 µg/m3
		Heptane	ND	42 µg/m3
	Interbay/Armory	Ethanol	16	n/a
		2-Proponal	24	211 µg/m3
		Toluene	ND	520 µg/m3
		Heptane	ND	42 µg/m3
	Stadium	Ethanol	ND	n/a
		2-Proponal	ND	211 µg/m3
		Toluene	ND	520 µg/m3
		Heptane	ND	42 µg/m3
	Georgetown	Ethanol	13	n/a
		2-Proponal	36	211 µg/m3
		Toluene	ND	520 µg/m3

Pollutant	Station	Constituent	2021 Max Concentration	NAAQS/RSL
		Heptane	ND	42 µg/m3
	South Park 1	Ethanol	ND	n/a
		2-Proponal	ND	211 µg/m3
		Toluene	ND	520 µg/m3
		Heptane	ND	42 µg/m3
	SODO/Lander	Ethanol	38	n/a
		2-Proponal	8.5	211 µg/m3
		Toluene	3.7	520 µg/m3
		Heptane	3.5	42 µg/m3
	South Park 2	Ethanol	ND	n/a
		2-Proponal	10	211 µg/m3
		Toluene	ND	520 µg/m3
		Heptane	ND	42 µg/m3

Source: Herrera and Ramboll, 2021.
NAAQS=National Ambient Air Quality Standard; RSL=EPA Region 9 Regional Screening Level; ND= Not Detected
* Represents the RSL for Nickel Subsulfide

An area remains a nonattainment area for a particular pollutant until concentrations are in compliance with the NAAQS. Only after measured concentrations have fallen below the NAAQS can the state apply for redesignation to attainment, and it must then submit a 10-year plan for continuing to meet and maintain air quality standards that follow the Clean Air Act. During this 10-year period, the area is designated as a maintenance area.

The Puget Sound region, including the industrial and maritime areas of Seattle, is currently classified as an attainment area for ozone, NOx, lead, particulate matter and SO2. The region was designated as a maintenance area for CO until recently and is now considered in attainment. The U.S. EPA designated Seattle Duwamish area as a maintenance area for PM10 in 2000 and in 2002; the area is now in attainment.[8]

The Puget Sound Regional Council estimates that by 2050, the Puget Sound region population will grow by 1.6 million people, increasing 38%, to reach a population of 5.8 million people (PSRC 2021). The highest population increase is estimated to be in King County. Estimates such as this indicate that CO, PM2.5 and ozone emissions will increase, which could lead to future challenges meeting the NAAQS.

Air toxic pollutant emissions remain a concern because of the projected growth in vehicle miles traveled. The U.S. EPA has been able to reduce benzene, toluene, and other air toxics emissions from mobile sources by placing stringent standards on tailpipe emissions and requiring the use of reformulated gasoline.

[8] EPA 2021, https://www3.epa.gov/airquality/greenbook/anayo_wa.html

Sources of Air Pollution in Seattle's MIC Areas

For this analysis, the existing air pollution sources in the BINMIC and Greater Duwamish MIC are divided into several categories: transportation sources such as surface vehicle traffic; rail operations including freight and commuter trains, shipping and marine terminal operations, and aircraft overflights; point sources such as commercial/industrial equipment and processes; and construction vehicles and equipment sources.

Transportation sources include vehicles on highways and major arterial roadways, particularly those supporting a high percentage of diesel truck traffic. These include routes such as Interstate 5 (I-5), State Route 99 (SR 99), State Route 599 (SR 599), and the major arterials that traverse the MICs such as E. Marginal Way S., W. Marginal Way SW, and Airport Way S. in the Greater Duwamish MIC, and 15th Avenue W in the BINMIC. Diesel-fueled trucks, particularly older trucks that emit more pollutants than newer trucks, are the focus of federal, state, and local effort to reduce pollutant emissions (see previous section). Drayage trucking (local trucking that moves shipping containers between Port of Seattle ship terminals and distribution centers in Seattle, Kent Valley, and elsewhere) represent a sizeable portion of local trucking in the MICs. These trucks, which are often older and independent operations, are often required to queue and idle near port facilities. Older truck fleets are undergoing turnover to newer truck fleets and cleaner burning fuels.

MIC areas in Seattle are also affected by air pollution from freight and passenger rail operations. Additional transportation sources include railway lines supporting diesel locomotive operations BNSF Railway Company (BNSF) owns and operates a mainline dual-track from Portland through the Greater Duwamish MIC to Seattle, and then extends north from downtown Seattle through the BINMIC to Snohomish County. A connecting spur, operated by the Ballard Terminal Rail Company, serves the Ballard and the western ship canal area. Union Pacific owns and operates a single mainline track with two-way train operations between Tacoma and Seattle that also passes through the Greater Duwamish MIC. While these operations generate air emissions in the immediate vicinity of the railways, train operations, including both freight and Commuter rail such as Sound Transit's Sounder system are intermittent. The contribution of air emissions from rail compared to the overall ambient air quality environment in the Seattle MIC areas is relatively minor compared to other sources such as traffic. However, areas near train yards may experience higher exposure to air emissions from assembling railcars into long trains and idling engines (WDOH 2008).

Shipping and marine terminal operations include emissions from ocean-going vessels, harbor support vessels, ferries, and cargo-handling equipment at marine facilities near Interbay (Pier 90), along the Seattle waterfront, alongside Harbor Island, and in the Duwamish waterway. These marine sources also contribute to regional and localized pollutant concentrations. These vessels typically use a range of fuels, including marine diesel oil, Intermediate fuel oil, medium fuel oil, and heavy fuel oil (also known as bunker fuel). Implementation in 2015 of the North American Emissions Control Area (ECA) established by the International Maritime Organization (IMO) requiring that ocean going vessels use fuels with 0.1% sulfur within 200 miles from the

U.S. coast rather than the typical higher sulfur content bunker fuel (2.7%), SO_2 and diesel particulate emissions have been significantly reduced (PSMEI 2018).

Aircraft using King County International Airport, also known as Boeing Field and Seattle-Tacoma International Airport (Sea-Tac) frequently fly over Seattle MICs, with some arriving and departing flight paths at lower altitudes, depending on atmospheric conditions. These operations contribute to the overall ambient air quality environment. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft emissions distribution.

Point sources of air pollution in the Seattle MICs include a wide variety of industrial and other non-transportation air emissions sources and are almost always required to have a permit to operate from PSCAA. These include manufacturing plants, and other heavy and general industrial facilities, and others. Industrial turbines, paper and packaging manufacturing, building materials manufacturing, steel manufacturing and fabrication, airplane manufacturing and assembly, and cement manufacturing plants are examples of point sources of air pollution in the MICs. Wood smoke is also considered an important point source contributor, either from wood-burning fireplaces or wildfire.

Construction vehicles and equipment sources include diesel-powered construction equipment such as excavators, dump trucks, pile drivers, cranes, and small equipment such as conveyors, generators, and mixers. Industrial and equipment sources include industrial boilers, cleaning/solvent use, coating and printing, wastewater systems, VOC processes, cooling towers, leaking components, flares, storage tanks, and combustion.

Sensitive Populations in and Around Seattle's MIC Areas

A health risk assessment conducted by the Washington State Department of Health (DOH) found that point sources (e.g., manufacturing facilities, cement plants) make up only about 4% of the overall long-term health risk associated with air pollution in the region. Mobile sources (i.e., cars, trucks, buses, ships, planes, trains) and wood stove/fireplace emissions likely make up the bulk of air pollution health risk in the region. Diesel particulate, benzene and formaldehyde from car and truck emissions, and wood smoke were identified as being the toxic air pollutants that make up the bulk of risk (WDOH 2008). These on-road mobile sources contribute to the highest cancer and non-cancer risks near major roadways over a large area of south Seattle and those risks and hazards are greatest near major highways and drop dramatically about 200 meters (656 feet) from the center of highways (WDOH 2008).

However, residential communities that border industrial areas like the BINMIC and Greater Duwamish MIC may be at risk of increased impact from pollutants due to their proximity to both transportation and point sources of pollution. The majority of land use in the BINMIC and Duwamish Valley are commercial or industrial, with most areas surrounding those industrial and maritime areas zoned as residential. The exception is the two residential communities of Georgetown and South Park, which are in the Duwamish Valley and surrounded by industrial uses.

Populations that are more sensitive to the health effects of air pollutants include the elderly and the young; groups with higher rates of respiratory disease, such as asthma; and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Therefore, land uses and facilities such as schools, children's daycare centers, hospitals and nursing and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses are more susceptible to respiratory distress.

Open spaces and playgrounds are considered moderately sensitive to poor air quality because those engaged in strenuous work or exercise have increased sensitivity to poor air quality; however, exposure times are generally shorter in parks and playgrounds than in residential locations and schools. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with proportionally greater exposure to ambient air quality conditions. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupational Safety and Health Administration to ensure the health and well-being of their employees with regard to their own operations.

Maps indicating disparities in the potential exposure of populations in census tracts in the subarea are addressed in **Section 3.9 Housing**.

Greenhouse Gases & Climate Change

Background

The accumulation of greenhouse gases (GHGs) has been identified as a driving force in global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community. In general, however, climate change can be described as the changing of earth's climate caused by natural fluctuations and anthropogenic activities (i.e., activities relating to, or resulting from the influence of human beings) that alter the composition of the global atmosphere.

The principal GHGs of concern are Carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs). Electric utilities use SF6 in electric distribution equipment. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat-trapping ability of each of these gases varies significantly. CH4 is 25 times as potent as CO2 at trapping heat, while SF6 is 23,900 times more potent than CO2. Conventionally, GHGs have been reported as CO2 equivalents (CO2e). CO2e takes into account the relative potency of non-CO2 GHGs and converts their quantities to an equivalent amount of CO2 so that all emissions can be reported as a single quantity.

The primary human-made processes that release GHGs include combustion of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH4, such

as livestock production and crop residue decomposition; industrial processes that release smaller amounts of high global warming potential gases such as SF6, PFCs, and HFCs, and waste decomposition that releases CH4. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the earth's capacity to remove CO2 from the air and altering the earth's albedo (surface reflectance) thus allowing more solar radiation to be absorbed.

Global mean temperatures in the United States (U.S.) have warmed during the 20th century and continue to warm into the 21st century. According to data compiled by NOAA, the rate of warming for the entire period of record (1880–2020) is 0.13°F per decade across the contiguous 48 States. The 10 warmest years on record have all occurred since 2005, and 7 of the 10 have occurred just since 2014. (NOAA 2021)

Ecology estimated that in 2018, Washington produced about 99.6 million gross metric tons (MMTCO2e; about 109.7 million U.S. tons) of CO2e (Ecology 2021). Ecology found that transportation is the largest source, at 45% of the state's GHG emissions; followed by residential, commercial, and industrial (RCI) energy use at 23% and electricity generation (in-state and purchased from out-of-state) at 16%. The sources of the remaining 16% of emissions are fossil fuel and industrial processes, agriculture, and waste management.

Current Policy & Regulatory Frameworks

U.S. EPA

The U.S. EPA regulates emission of GHGs through two approaches: the first establishes Corporate Average Fuel Economy (CAFÉ) and GHG emission standards for light-duty vehicles (passenger cars and trucks), for medium and heavy duty commercial trucks and buses, and for commercial marine diesel engines above 30 Liters per cylinder (Category 3 Engines), which include large marine engines; the second covers GHG emissions from the largest stationary sources (buildings, structures, facilities, or installations) by the Prevention of Significant Deterioration (PSD) and title V Operating Permit Programs under the Clean Air Act (40 CFR 52.21(b)(3)).

Because the Action Alternatives propose land use changes to the Seattle MICs and do not propose construction of specific facilities or use of specific types of vehicles, federal regulatory requirements are not applicable to this impact analysis, though these standards will help reduce anticipated emissions in the future compared to existing conditions. Individual facilities and vehicle manufacturers will be responsible to ensure compliance in the MICs with EPA rules regarding GHG emissions.

Washington State

Washington has adopted a variety of regulations, programs, and initiatives designed to reduce GHG emissions.

Chapter 173-441 WAC—Reporting of Emissions of Greenhouse Gas, as adopted by Ecology, requires some facilities and transportation fuel suppliers to annually report their GHG emissions. The program uses the same emission calculation methods as EPA's GHG reporting program, and include:

- Facilities that emit at least 10,000 metric tons of carbon dioxide equivalent (CO2e) per year in Washington.
- Suppliers of liquid motor vehicle fuel, special fuel, or aircraft fuel that provide products equivalent to at least 10,000 metric tons of carbon dioxide per year in Washington.

In 2020, the Washington Legislature set new GHG emission limits (RCW 70A.45.020) in order to combat climate change. Under the law, the state is required to reduce emissions levels:

- 2020—reduce to 1990 levels.
- 2030—45% below 1990 levels.
- 2040—70% below 1990 levels.
- 2050—95% below 1990 levels and achieve net zero emissions.

The State Agency Climate Leadership Act (RCW 70.235.050 and 060) requires some state agencies to reduce their GHG emissions. The Act was updated in 2020 to require state agencies to reduce their carbon pollution to these targets:

- 2020—15% below 2005 levels
- 2030—45% below 2005 levels
- 2040—70% below 2005 levels
- 2050—95% below 2005 and achieve net-zero GHG emissions.

The 2019 Clean Energy Transformation Act (CETA) (SB 5116) requires all electric utilities in Washington to transition to carbon-neutral electricity by 2030 and to 100% carbon-free electricity by 2045. The Washington Department of Commerce and the Washington Utilities and Transportation Commission (UTC) are leading the implementation efforts.

The Motor Vehicle Emission Standards—Zero Emission Vehicles (ZEV) bill (RCW 70A.30.010) directs Ecology to adopt California vehicle emission standards, including zero emission vehicle standards that require a percentage of the vehicles sold in Washington to be zero emission. The 2021Clean Fuel Standard will require fuel suppliers to reduce the carbon intensity of their fuels 20% by 2038.

The 2021 Climate Commitment Act establishes a "cap and invest" program that sets a limit on the amount of GHGs that can be emitted in Washington (the cap) and then auctions off allowances for companies and facilities that emit GHGs until that cap is reached. Over time, the cap will be reduced, allowing total emissions to fall to match the GHG emission limits set in state law. Rulemaking will begin in 2021, and the program's first compliance period will begin in 2023.

Ecology adopted a rule in 2019 to transition away from using GHGs known as hydrofluorocarbons (HFCs) in products and equipment starting in 2020. A law passed in 2021

expands on that program, establishing a program to reduce leaks from large air conditioning and refrigeration equipment, limiting the impacts for refrigeration chemicals, and requiring Ecology to recommend options for capturing HFCs when equipment reaches the end of its useful life.

The Clean Buildings for Washington law (HB 1257), establishes energy use intensity (EUI) targets for large commercial buildings (over 50,000 square feet), which will be updated over time. Owners of these buildings must first meet these energy performance standards between 2026 and 2028, depending on square footage of the building.

There is no standard significance threshold for GHG emissions in the Washington SEPA rules (Washington Administrative Code [WAC] 197-11-330).

Seattle Climate Change Policies

Seattle is a member of the Carbon Neutral Cities Alliance, a collaboration of cities working to cut GHG emissions by 80-100% by 2050 or sooner—the most aggressive GHG reduction targets undertaken anywhere by any city. The City of Seattle is also a member of the King County-Cities Climate Collaboration (K4C). This Collaboration is working toward achieving shared countywide GHG reduction targets that reduce direct countywide sources of GHG emissions by at least 50% by 2030, and 80% by 2050, compared to a 2007 baseline. The City of Seattle is also a steering committee member of the Puget Sound Climate Preparedness Collaborative, a network of local and tribal governments, public agencies, and organizations working together towards regional climate resiliency.

Seattle Climate Action Plan

In 2011, the City Council adopted a long-term climate protection vision for Seattle (through Resolution 31312) which included achieving net zero GHG Emissions by 2050 and preparing for the likely impacts of climate change. To achieve these goals the City prepared a Climate Action Plan (2013 CAP) which detailed the strategy for realizing this vision. In 2017, the City Council adopted Resolution 31757, affirming Seattle's commitment to the goals established in the Paris Agreement, and resulting in the updated 2018 Climate Action Strategy, which identifies the actions necessary to limit atmospheric warming to 1.5 degrees Celsius.

City actions in the 2013 CAP and the updated 2018 Strategy focus on those sources of emissions where City action and local community action will have the greatest impact: road transportation and building energy, which comprise the majority of local emissions. With 2008 as the baseline year, the 2013 CAP identifies the following as targets by 2030. These goals remained unchanged by the updated 2018 Strategy:

- 82% reduction in passenger vehicle emissions
- 20% reduction in vehicle miles traveled
- 75% reduction in GHG emissions per mile of Seattle vehicles
- 45% reduction in commercial building emissions

- 10% reduction in commercial building energy use
- 32% reduction in residential building emissions
- 20% reduction in residential building energy use
- 39% reduction in building energy emissions
- 25% reduction in combined commercial and residential building energy use

City of Seattle Comprehensive Plan 2015-2035

The current City of Seattle Comprehensive Plan, Seattle 2035 addresses climate change within its Environmental Element (City of Seattle, 2020). Climate change-related goals and policies contained within the environmental element of the current Comprehensive Plan are listed below.

> *Goal EN G3 Reduce Seattle's greenhouse gas emissions by 58 percent from 2008 levels by 2030, and become carbon neutral by 2050.*
>
> - *Policy EN 3.1 Expand transit, walking, bicycling, and shared-transportation infrastructure and services to provide safe, affordable and effective options for getting around that produce low or zero emissions, particularly for lower-income households and communities of color.*
> - *Policy EN 3.2 Implement the urban village strategy with the goal of meeting the growing demand for conveniently located homes and businesses in pedestrian-friendly neighborhoods where residents can walk to a variety of recreation and service offerings, in order to increase the number of trips that do not require automobile use and increase access to opportunity for lower-income households and communities of color.*
> - *Policy EN 3.3 Implement innovative policies, such as road pricing and parking management, that better reflect the true cost of driving and therefore lead to less automobile use, while employing strategies that mitigate impacts on low-income residents.*
> - *Policy EN 3.4 Encourage energy efficiency and the use of low-carbon energy sources, such as waste heat and renewables, in both existing and new buildings.*
> - *Policy EN 3.5 Reduce the amount of waste generated while at the same time increasing the amount of waste that is recycled and composted.*
> - *Policy EN 3.6 Reduce the emissions associated with the life cycle of goods and services by encouraging the use of durable, local products and recycled-content or reused materials, and recycling at the end of products' lives.*
> - *Policy EN 3.7 Support a food system that encourages consumption of local foods and healthy foods with a low carbon footprint, reduces food waste, and fosters composting.*
>
> *Goal EN G4 Prepare for the likely impacts of climate change, including changing rain patterns, increased temperatures and heat events, shifting habitats, more intense storms, and rising sea level.*

- *Policy EN 4.1 Consider projected climate impacts when developing plans or designing and siting infrastructure, in order to maximize the function and longevity of infrastructure investments, while also limiting impacts on marginalized populations and fostering resilient social and natural systems.*
- *Policy EN 4.2 Prioritize actions that reduce risk and enhance resilience in populations nearest the likely impacts of climate change, including actions that are driven by the communities most impacted by climate change.*
- *Policy EN 4.3 Focus strategies to address the impacts of climate change, in particular, on the needs of marginalized populations and seniors, since these groups often have the fewest resources to respond to changing conditions and therefore may be more severely impacted.*
- *Policy EN 4.4 Partner with communities most impacted by climate change to identify local community assets, including infrastructure, cultural institutions, community centers, and social networks that can be supported and leveraged in adaption planning.*

Building & Energy Policies

In 2021, the City of Seattle adopted new energy code updates for commercial and large multifamily buildings that:

- Eliminate all gas and most electric resistance space heating systems
- Eliminate gas water heating in large multifamily buildings and hotels
- Improves building exteriors to improve energy efficiency and comfort
- Requires electrical infrastructure necessary for future conversion of any gas appliances in multifamily buildings

Energy code updates do not apply to single family homes or low-rise multifamily homes, as the state prohibits city amendments to the residential energy code; nor does it apply to equipment used by a manufacturing, industrial or commercial process other than for conditioning spaces or maintaining comfort and amenities for the occupants (Seattle 2021c). Seattle also has a variety of other policies and programs specific to reductions in building energy use, including:

- Energy Benchmarking Program requires owners of non-residential and multifamily buildings (20,000 sf or larger) to track energy performance and annually report to the City of Seattle.
- Tune-ups aim to optimize energy and water performance by identifying low- or no-cost actions related to building operations and maintenance, that generate 10-15% in energy savings, on average.
- Passage of a new law to help phase out oil heat by 2028 in order to reduce climate pollution, prevent soil and groundwater contamination, and improve air quality.
- Adoption of policies addressing new construction and major renovations, as well as day-to-day operations of buildings owned and maintained by the City.

Maritime Policies

Seattle City Light and the Port of Seattle are committed to reducing the GHG emissions from marine activities. In 2020, the Northwest Ports, of which the Port of Seattle is a member, committed to phase out seaport related air and GHG emissions and transition to zero-emission operations by 2050 as part of the Northwest Ports Clean Air Strategy (NWP 2020). The commitment covers all of the activities that are included in each participating port's emissions inventory, which includes direct emissions from port operations, as well as emissions from seaport-related activities.

Greenhouse Gas Emissions in Seattle

Seattle updated its GHG emissions inventory in 2018, documenting 5.7 million metric tons (MMTCO2e; about 6.3 million U.S. tons) of CO2e. Primary sources (core emissions) of GHG emissions include on-road buses, cars, light/medium/heavy duty trucks, residential and commercial building energy use, waste (residential, commercial, and self-haul) generation, and credits for offsets. Expanded sources of GHG emissions include core emissions plus marine, rail, and air transportation, waste (construction and demolition, wastewater) generation, industrial energy use and processes, and credits for offsets and sequestration of waste.

Overall, total emissions rose from 5.75 MMTCO2e in 2008 to 5.76 MMTCO2e in 2018, a 0.2% increase, despite an overall increase in population of over 25%. Per capita emissions dropped from 9.7 metric tons (MTCO2e) in 2008 to 7.7 MTCO2e per person in 2018, a decrease of over 20%. Core GHG emissions of GHGs declined from 3.2 MMTCO2e in 2008 to 3.1 MMTCO2e CO2e in 2018, a 4% decline (Seattle 2020).

Like Washington State, emissions in Seattle from transportation represent the largest percentage of overall emissions at 61%. The second largest emission source is building energy use at 24%, followed by emissions from industrial processes at 18%. City Light achieved GHG neutrality in 2005 through eliminating and reducing emissions, inventorying remaining emissions and purchasing offsets to offset the remaining emissions (SCL 2012) and has maintained GHG neutrality since that date.

Transportation Related GHG Emissions

Core transportation emissions decreased around 3% since 2008—from 2 MMTCO2e in 2008 to 1.94 million MMTCO2e in 2018. Road transportation has been the largest category of emissions since Seattle started tracking emissions in 1990. Total emissions in this sector increased through 2008; however, they have been decreasing since 2008 due to changes in the fuel economy of vehicles and changes in miles traveled. Most emissions from road transport, greater than 85%, are from gasoline fuel sources. Advances in vehicle technology have increased the average fuel economy for cars and light-duty trucks (including SUVs) in Seattle from about 20 miles per gallon of fuel in 2008 to about 23.6 miles per gallon in 2018 (Seattle 2020). Medium and heavy-duty truck diesel fuel sources contributed about 15% of the road transport emissions in 2008 and have increased about 2.5%—from 0.289 MMTCO2e in 2008 to

0.297 million MMTCO2e in 2018. This increase has occurred despite freight emissions per mile decreased 8% between 2008 and 2018, due largely to more vehicle miles traveled. Expanded GHG emissions increased almost 10% since 2008, with most of the increase attributed to greater air travel. Air transport emissions increased by 40% from 972,000 MTCO2e to 1.37 MMTCO2e in 2018 (Seattle 2020).

Shipping and marine terminal operations include GHG emissions from ocean-going vessels, harbor support vessels, ferries, and cargo-handling equipment at marine facilities near Interbay (Pier 90), along the Seattle waterfront, alongside Harbor Island, and in the Duwamish waterway.

Building Related GHG Emissions

Core building GHG emissions decreased 5.9% since 2008—from 1.27 MMTCO2e to 1.19 MMTCO2e in 2018. Expanded building emissions decreased 1.9% since 2008—from 1.43 MMTCO2e in 2008 to 1.40 MMTCO2e in 2018. However, both core and expanded building sector emissions increased by about 8% between 2016 and 2018, primarily as a result of an increase in fossil gas use.

About 90% of the electricity that Seattle City Light (SCL) provides to consumers in Seattle comes from low-carbon hydroelectric dams. SCL purchases local carbon offsets equal to the GHG emissions resulting from all other aspects of SCL's operations, including those created by fossil fuels included in the mix of power the utility buys, employees' travel, and the trucks and other equipment used in its operations. Because of variation in hydroelectricity production from year to year, SCL's external power purchases and the consequent amount of carbon offsets purchases varies annually. While electricity consumption is trending down, it is the largest source of energy for Seattle's buildings (54%) but is responsible for only 9% of emissions in the building sector before offsets. Fossil gas is currently responsible for 86% of building sector emissions, none of which are offset. (Seattle 2020)

Industrial Emissions

Industry emissions decreased 22.6% since 2008—from 1.36 MMTCO2e in 2008 to 1.05 MMTCO2e in 2018. This decrease in process emissions was largely due to reduction in cement process emissions which was halved since 2008. Meanwhile fossil gas use has increased 24.9% since 2008 from .27 to .33 million MTCO2e (Seattle 2020).

Maritime Activities Related Emissions

Maritime activities taking place within and adjacent to the MICs emit GHG emissions, including from ocean-going vessel hoteling (operations while stationary at dock) and maneuvering, harbor vessel movements, ferry transits, recreational vessels, and shore-side cargo handling equipment.

SCL is working with the Port of Seattle, Washington Department of Transportation (WSDOT), and the U.S. Coast Guard (USCG) to install electrical infrastructure along the Seattle waterfront

(including in the MIC areas), at Fisherman's Terminal, and in the Port to provide shore power to cargo vessels, cruise ships, ferries, USCG vessels, and some recreation/commercial fishing vessels. This work will eliminate the necessity for those vessels to run their engines while dockside. The U.S. EPA indicates that under the right circumstances when a vessel is connected to shore power, overall pollutant emissions can be reduced by up to 98% when utilizing power from the regional electricity grid (EPA 2017). The Port of Seattle is also actively replacing diesel-powered cargo handling equipment with electric power equipment over time.

3.2.2 Impacts

Air quality impacts related to each alternative were evaluated by reviewing proposed land use changes and anticipated changes in employment, vehicle miles traveled (VMT), and commercial, industrial, and housing construction and post-construction activities. Because construction is considered a temporary activity, a qualitative analysis of construction impacts common to all alternatives is presented.

For impacts related to longer-term changes in land use, the proposed alternatives would increase housing, employment, and vehicle miles traveled (VMT) in the study area in increments through the horizon year (2044) compared to the baseline year (2021). The projected area-wide increases in vehicle miles traveled (VMT) for the p.m. peak periods were used as a basis for comparison of the alternatives to the base year.

This section also describes how implementation of any of the Action Alternatives could affect GHG emissions in the study area compared to Alternative 1 No Action, primarily through changes in transportation patterns and land uses. Transportation systems contribute to climate change primarily through the emissions of carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) primarily from gasoline and diesel fuels used to operate cars, trucks, and rail vehicles. Land use changes contribute to climate change through construction and operational use of electricity and natural gas. GHG emission impacts related to each alternative were evaluated by reviewing proposed land use changes and anticipated changes in employment, vehicle miles traveled (VMT), and commercial, industrial, and housing construction and post-construction activities.

For impacts related to longer-term changes in land use, the proposed alternatives would increase housing, employment, industrial and non-industrial building space, and VMT in the study area in increments through the horizon year (2044) compared to the baseline year (2018-2021 depending on source). The projected area-wide increases in VMT for the p.m. peak periods were used as a basis for calculation of road transportation sources of GHG. The projected total and incremental increases in industrial and non-industrial building space and housing units were used as a basis for calculation of building related GHG emissions. The sum of these emissions were used as a basis for comparison of the alternatives to the No Action.

Impacts Common to All Alternatives

Air Quality

This discussion of impacts common to all alternatives covers all of the industrial lands subareas due to the regional nature of air quality, the mobility of transportation sources, and the dispersion of air pollutants. Air quality impacts specific to industrial lands subareas and for the locations targeted for air sampling, are discussed in the individual alternative discussions.

Construction Related Emissions

Future growth under any alternative would result in development of new maritime, industrial, design and research, and office uses, and some industry-supportive housing. Most development projects in the study area would entail a combination of demolition and removal of existing structures or parking lots, excavation and site preparation, construction of new buildings, and retrofit or adaptive reuse of existing buildings. Emissions generated during construction activities would include exhaust emissions from construction equipment, commuting workers, trucks used to haul construction materials to and from sites, asphalt paving and painting, as well as fugitive dust emissions associated with soil-disturbing activities, demolition and construction work, and grading. Increased vehicle emissions associated with increased traffic congestion during construction could also occur.

The pollutants of concern from fugitive dust are PM2.5 and PM10. The PSCAA requires dust emission control measures on construction projects through Article 9, Section 9.15, including:

1. Using control equipment, enclosures or wet suppression techniques, and curtailment during high winds
2. Surfacing roadways and parking areas with asphalt, concrete, or gravel as soon as possible
3. Treating construction sites with water or chemical stabilizers, reducing vehicle speeds, installing pavement rip rap exit aprons, and cleaning vehicle undercarriages before entering public roadways
4. Covering or wetting truck loads or providing freeboard in truck loads.

With implementation of these requirements, impacts related to construction dust are expected to be less than significant.

Criteria air pollutants would be emitted during construction activities from construction equipment, much of it diesel fueled. Other emissions during construction would result from trucks used to haul construction materials to and from sites, and from vehicle emissions generated during worker travel to and from construction sites. Engine and motor vehicle exhaust produce emissions of VOCs, NOX, PM2.5, PM10, air toxics, and GHGs (assessed in Section 3.2.4). The primary emissions of concern with regard to construction equipment and trucking are NOx and PM2.5. NOx is primarily an air quality concern with respect to its role in (regional) ozone formation.

A number of federal regulations require emission and fuel standards that have or will lead to cleaner light- and heavy-duty truck and nonroad diesel equipment emissions. U.S. EPA Tier 3 Motor Vehicle Emission and Fuel Standards, established in 2014, set new vehicle emissions standards and a new gasoline sulfur standard beginning in 2017. The vehicle emissions standards reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. Tier 4 emission standards, established in 2004 and fully phased in by 2014, targeted a reduction in NOx and PM emissions of more than 90% from nonroad diesel engines and sulfur reductions in nonroad diesel fuel (U.S. EPA 2004).

The Puget Sound air shed is currently designated as an attainment area with respect to ozone. Construction-related NOx emissions are not expected to generate significant adverse air quality impacts nor lead to violation of standards under any of the alternatives. The same conclusion is reached for diesel-related emissions of PM2.5, which could generate temporary localized adverse impacts within a few hundred feet of construction sites.

Consequently, given the intermittent and temporary nature of construction-related emissions and regulatory improvements that have been or are scheduled to be phased in, construction related emissions associated with all alternatives would be considered only a minor adverse air quality impact.

Land Use Change-Related Emissions

Under all alternatives, redesignation of some areas from strictly industrial land uses to those that support increased employment density, multi-story mixed-uses, and multi-modal access around future light rail stations would change growth and development patterns.

Anticipated total square footage of building space for industrial and non-industrial uses in each MIC under existing conditions and each of the four alternatives are presented in **Exhibit 3.2-7.**

Exhibit 3.2-7 Estimated Industrial and Non-Industrial Square Footage for All Alternatives Compared to the Existing Conditions (2019), 2044 (million square feet)

Geographic Area	Existing		Alt. 1 No Action		Alt. 2		Alt. 3		Alt. 4	
	I	NI	I	NI	I	NI	I	NI	I	NI
BINMIC	6.8	5.4	9.2	6.5	12.1	6.3	14.5	8.3	14.6	8.6
Greater Duwamish MIC	34.6	13.9	40.4	15.7	46.7	15.4	47.2	18.1	46.9	18.3
Total	41.4	19.3	49.7	22.1	58.8	21.6	61.7	26.4	61.6	26.9

Estimates for the MIC areas under all alternatives are approximate. Rounding error may cause total not to sum. Industrial employment estimated based on the 2019 share of industrial employment by sector based on the 2015 PSRC Industrial Lands Study NAICs-based definition of industrial activities.
I=Industrial; NI=Non-Industrial
Sources: CAI, Herrera, 2021.

Anticipated development resulting from all alternatives would alter the proximity and number of future workers in the study area to mobile and stationary sources of air toxics and particulate matter PM2.5. The degree of potential for adverse impacts on sensitive receptors would depend on proximity to sources, the emissions from these sources and the density of future development. In addition, areas surrounding the MICs could be subject to any emissions from increased employment density, new industrial development, and any additional traffic arising from worker commute or commercial transportation activity. However, because all the alternatives include some focus on increased employment density and land uses changes around light rail stations, some emission increases associated with growth in background traffic, worker commuting, and commercial activities may be muted.

Vehicle emissions for all of the alternatives would be minor relative to the overall regional vehicle emissions in the Puget Sound air shed. Photochemical smog (the regional haze produced by ozone and fine particles) is caused by regional emissions throughout the Puget Sound region, rather than localized emissions from any individual neighborhood. As discussed previously, the Puget Sound region was designated a maintenance area for ozone, with the 20-year maintenance period ending in 2016. Since that time, the region has been a designated attainment area for ozone. In addition, the U.S. EPA Tier 3 Motor Vehicle Emission and Fuel Standards and Tier 4 Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel (discussed in the previous section) have reduced vehicular emissions further. During the maintenance period, regional transportation emission budgets were set for three pollutants: CO, nitrogen oxides (NOx), and PM2.5. Based on the latest Puget Sound Regional Council (PSRC) air quality conformity analysis, forecasted regional emissions for its 2040 planning year are below the allowable budgets (PSRC 2018):

- CO: 38% of 2040 budget
- NOx: 62% of 2040 budget
- PM2.5: 83% of 2040 budget

Numerical forecasts of increased area wide vehicle miles traveled (VMT) during the PM Period are shown in **Exhibit 3.2-8**, below. Estimated road transportation emissions for each alternative are presented in the individual alternative's sections.

Exhibit 3.2-8 Estimated VMT During the PM Period for Action Alternatives (2044) Compared to Existing (2019) and Alternative 1 No Action (2042)

Geographic Area	2019 Existing	2042 No Action	2044 Alt. 2	2044 Alt. 3	2044 Alt. 4
BINMIC	54,840	56,100	56,900	58,540	58,980
Greater Duwamish MIC	641,560	643,440	648,480	658,050	657,900
Seattle	2,964,540	3,083,140	3,094,870	3,121,270	3,121,420

Sources: Fehr & Peers, 2021; Herrera, 2021.

Population growth and VMT can be used as indicators of future transportation-related emissions. For each alternative, the forecasted VMT from the MIC area-wide modeling (see Transportation Chapter) is only a small fraction of the Puget Sound regional totals. Therefore, the forecasted similar VMT for all the Action Alternatives compared to Alternative 1 No Action would not alter PSRC's conclusion that future Puget Sound regional emissions will be less than the allowable emission budgets that were mandated by the air quality maintenance plans when they were in effect. It appears that neither of the alternatives would result in a significant impact on regional air quality.

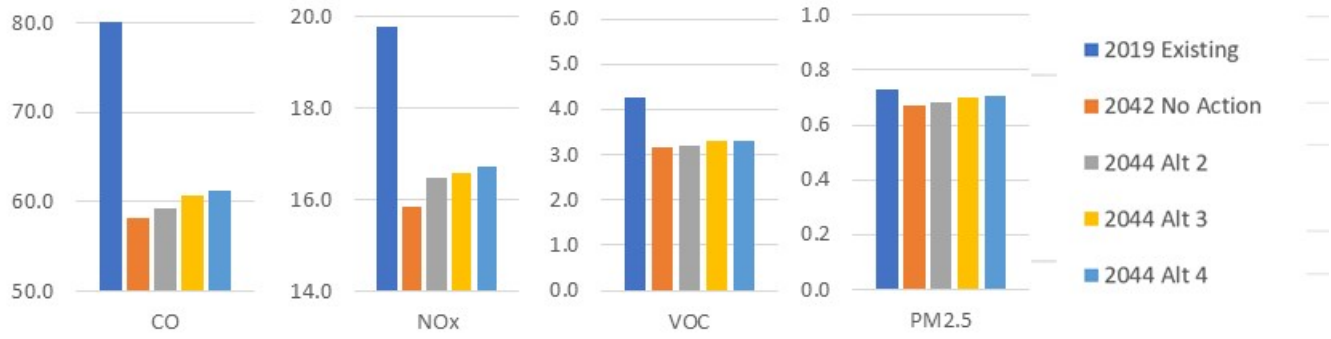
Road transportation-related air pollutant emissions in each MIC under existing conditions and each of the four alternatives are presented in **Exhibit 3.2-9, Exhibit 3.2-10**, and **Exhibit 3.2-11**. Anticipated for Seattle overall are shown for comparison. These emissions are based on existing and projected VMT.

Exhibit 3.2-9 Estimated Tons of Criteria Pollutant Emissions from Road Transportation for Action Alternatives (2044) Compared to Existing and Alternative 1 No Action (2042)

Geographic Area	Pollutant	2019 Existing	2042 No Action	2044 Alt 2	2044 Alt 3	2044 Alt 4
BINMIC	CO	85.7	58.2	59.2	60.7	61.2
	NOx	19.8	15.9	16.5	16.6	16.7
	PM10	3.7	3.7	3.8	3.9	3.9
	PM2.5	0.7	0.7	0.7	0.7	0.7
	VOC	4.3	3.2	3.2	3.3	3.3
	SOx	0.2	0.2	0.2	0.2	0.2
Greater Duwamish MIC	CO	1,078.1	794.5	800.7	809.6	809.5
	NOx	641.2	552.8	557.1	557.2	557.2
	PM10	58.0	57.2	57.7	58.2	58.2
	PM2.5	15.0	12.5	12.5	12.6	12.6
	VOC	62.5	47.2	47.6	48.0	48.0
	SOx	3.8	3.4	3.4	3.4	3.4
Seattle	CO	4,783.0	3,459.5	3,474.2	3,498.9	3,499.0
	NOx	1,900.8	1,643.6	1,654.4	1,654.8	1,654.8
	PM10	229.6	234.5	235.6	237.1	237.1
	PM2.5	52.9	46.9	47.1	47.4	47.4
	VOC	256.6	196.3	197.2	198.5	198.5
	SOx	14.7	13.1	13.2	13.2	13.2

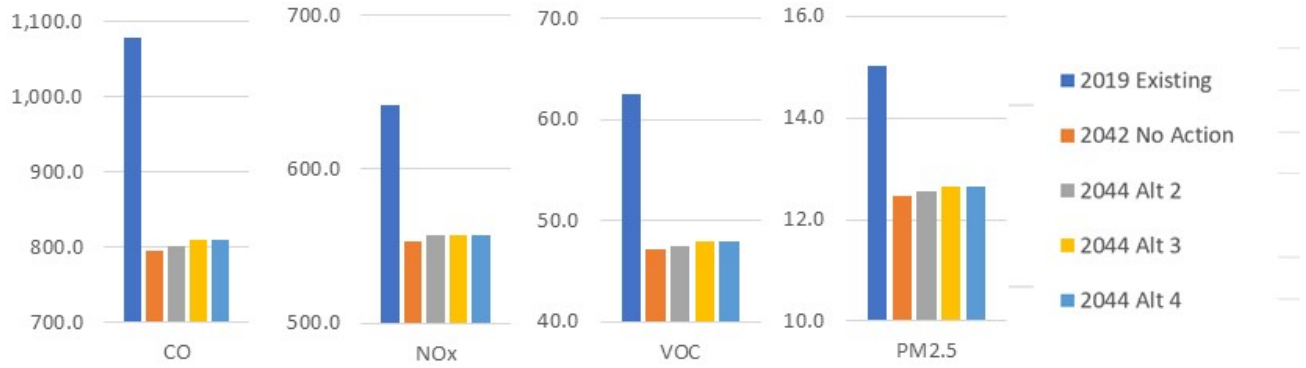
All measurements in Tons.
Sources: Fehr & Peers, 2021; Herrera, 2021.

Exhibit 3.2-10 Estimated Tons of Criteria Pollutant Emissions from Road Transportation in BINMIC, All Alternatives



Source; Herrera, 2021

Exhibit 3.2-11 Estimated Tons of Criteria Pollutant Emissions from Road Transportation in Greater Duwamish MIC, All Alternatives



Source; Herrera, 2021

The Seattle Comprehensive Plan (Seattle 2035) EIS discusses the health risk associated with stationary emissions sources, including those near maritime uses where ship emissions and diesel locomotive emissions and diesel forklift emissions can all occur. Likewise, distribution centers that involve relatively high volume of diesel truck traffic can also represent a risk hazard to nearby sensitive land uses. That discussion is relevant to the proposal for the MICs and is incorporated here by reference. Land use changes that promote new or additional industrial and maritime uses of this type could add to the associated health risk of increased emissions associated with these uses, including the potential for criteria air pollutants and TAPs. Subarea plans developed for the MIC areas could consider setbacks for adjacent sensitive land uses from industrial sources and identify measures for receptors proposed in areas nearby such sources to reduce the potential risk.

The Washington State Department of Health (DOH) health disparities map (DOH 2021) indicates the Greater Duwamish MIC and the BINMIC census tracts rank among the highest for a

comparison of pollution burden from Diesel NOx emissions and social factors that may contribute to disparities across the state. Where housing within the industrial zones is established under all alternatives, those residents would experience higher emissions resulting from industrial and other non-transportation air emissions. In addition, some of the housing units and anticipated growth could be placed near major highways, rail lines, or port facilities that produce greater vehicle emissions, particularly from diesel sources. Despite this potential, the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle emissions control, fuel economy, technology improvements, and overall fuel mix, local emissions under the alternatives would likely be lower than under existing background conditions and the alternatives would result in a less than significant impact to air quality, and a moderate but less than significant impact on health related to air quality.

Local emissions of particulates could, however, impact residents of new residential development anticipated within the subareas, especially under alternatives 3 and 4 if the new residential development occurs adjacent to major arterials. It would be prudent to consider risk-reducing mitigation strategies such as setbacks, improved building materials and structures, and improved air purification systems for residential and other sensitive land uses from major traffic corridors, rail lines, port terminals and similar point sources of particulates from diesel fuel.

Overall, given the regulatory improvements that have been or are schedule to be phased in, and the marginal increase in VMT associated with all of the alternatives, land use-related emissions would be considered only a less than significant impact adverse air quality impact.

Maritime Activities

Maritime activities taking place within and adjacent to the MICs, including ocean-going vessel (OGV) hoteling (operations while stationary at dock) and maneuvering, commercial harbor, and government vessel movements (including ferry transits), recreational vessels, and shore-side cargo handling equipment would continue to produce emissions under all alternatives.

Exhibit 3.2-12 shows 2016 air emissions in total annual tons associated with maritime sources in and adjacent to the study area.

Exhibit 3.2-12 Maritime Activities Air Emissions, Tons per Year, 2016

Source	NOx	VOC	CO	SO2	PM10	PM2.5	Black Carbon*
OGV, hoteling**	450.2	15.2	40.8	22.9	10.5	9.9	0.6
OGV, maneuvering*	70.0	4.8	7.0	2.0	1.2	1.2	0.0
Recreational Vessels	138.2	13.6	87.7	0.1	4.6	4.2	3.2
Locomotives	167.0	10.7	29.1	0.1	5.1	4.7	3.6

Source	NOx	VOC	CO	SO2	PM10	PM2.5	Black Carbon*
Cargo-handling equipment	115.0	8.5	45.0	0.1	6.0	5.8	4.4
Heavy-duty vehicles	73.3	8.2	22.4	0.1	3.5	3.3	1.7
Fleet vehicles	1.9	0.4	6.6	0.0	0.0	0.0	0.0
Commercial Harbor/Govt. Vessel	2,105.0	92.0	599.0	1.0	77.0	71.0	54.0
Total	3,120.6	153.4	837.6	26.4	108.0	100.1	67.5

Notes: *Black Carbon is soot, part of PM 2.5. **Ocean-going vessel (OGV)
Source: 2016 Puget Sound Maritime Emissions Inventory

The U.S. EPA has established Tier 4 emission standards for commercial marine diesel engines above 30 Liters per cylinder (Category 3 Engines), which align with International Maritime Organization (IMO) Annex VI marine engine NOx standards and low sulfur requirements. These standards require the use of exhaust aftertreatment technology, phased in between 2022 and 2024. In addition, SCL and the Port of Seattle are committed to reducing the air emissions from the marine activities they interact with and have embarked on a widespread effort to reduce or eliminate them by installing electrical infrastructure to provide shore power to cargo vessels, cruise ships, and ferries. The Port of Seattle is also actively replacing diesel-powered cargo handling equipment with electric power equipment over time. With these additional regulatory requirements and local infrastructure improvements, these maritime emissions are expected to drop significantly under all alternatives, even if cargo volumes and cruise ship visits increase.

Greenhouse Gases & Climate Change

Like the air quality section, this discussion of impacts common to all alternatives covers all of the industrial lands subareas due to the global nature of climate change, and the mobility and dispersion of GHG emissions. It is unlikely that a series of land use changes, even on the areawide scale of the alternatives under consideration, would have a perceptible impact on global climate change. It is more appropriate to conclude that GHG emissions from changes in future development in the Greater Duwamish MIC and the BINMIC would combine with emissions across the city, state, country, and planet to cumulatively contribute to global climate change.

Construction Related Emissions

Future growth under any alternative would result in development of new maritime, industrial, design and research, and office uses, and some industry-supportive housing. Most development projects in the study area would entail a combination of demolition and removal of existing structures or parking lots, excavation and site preparation, construction of new buildings, and retrofit or adaptive reuse of existing buildings. GHG emissions would occur as "embodied emissions" related to material extraction, manufacturing, transportation, building construction, maintenance, demolition or deconstruction, and disposal. Also included are emissions

from demolition and construction equipment, and from vehicle emissions generated during worker travel to and from construction sites. Increased vehicle emissions associated with increased traffic congestion during construction could also occur. Construction-related GHG emissions from any individual development project that may occur by 2044 would be temporary and would not represent an on-going source of emissions.

However, any accumulation of CO2 in the atmosphere, even if from a temporary source, can influence climate change when considered cumulatively with other global emissions. Over the course of the proposal's implementation, varying levels of construction activities within the MICs would be ongoing under any of the alternatives. Cumulatively, construction related emissions would be more than an insignificant contributor to GHG emissions within the study area between 2018 and 2044. An estimate of the GHG emissions resulting from 20 years of construction envisioned under the alternatives was calculated using research data from the Carbon Leadership Forum (CLF 2017) as a comparative tool. The total additional "embodied" emissions is estimated at between about 340,000 MTCO2e to 647,000 MTCO2e compared to Alternative 1 No Action, and includes emissions related to material extraction, manufacturing, transportation, building construction, maintenance, demolition or deconstruction, and disposal.

A number of federal regulations require emission and fuel standards that have or will lead to cleaner light- and heavy-duty truck and nonroad diesel equipment emissions (see Section 3.2.3.2.1). These standards also facilitate the adoption of new technologies necessary to meet GHG standards already promulgated by EPA (CRC 2014). The 2013 Seattle CAP and the updated 2018 Climate Action Strategy recognized the relevance of construction related GHG emissions and included several actions to be implemented by 2030 to address them, along with general actions to address transportation emissions.

Consequently, although construction related emissions would not be negligible, because of the combination of regulatory improvements and Climate Plan Actions under way, construction related GHG emissions associated with all alternatives would be considered a moderate adverse air quality impact.

Transportation Related GHG Emissions

Under all alternatives, redesignation of some areas from strictly industrial land uses to those that support increased employment density, multi-story mixed-uses, and some additional housing around future light rail stations would change growth and development patterns. These changes in development would result in changes in VMT, which were derived from the transportation analysis in **Section 3.10 Transportation**.

Existing and projected changes in VMT are estimated for cars, trucks, and buses and reflect all trips that start or end within the study area. GHG emissions from vehicle transportation were calculated based on estimated increases in VMT, emission factors reflecting future improvements to the vehicle fleet, and projected fuel economy for each vehicle class. Increased employment density and land uses changes around light rail stations may mute GHG emissions

associated with worker commuting, and commercial activities, but these changes are reflected in VMT estimates.

Exhibit 3.2-13 shows GHG emissions in total annual metric tons of CO2e (MTCO2e) associated with road transportation sources in the study area under existing conditions and resulting from each of the four alternatives.

Exhibit 3.2-13 Estimated Road Transportation GHG Emissions for All Alternatives Compared to Existing Conditions (2019) and Alternative 1 No Action (2042) (MTCO2e)

MIC	2019 Existing	2042 No Action	2044 Alt 2	2044 Alt 3	2044 Alt 4
Ballard Interbay Northend	41,497	35,523	36,192	36,988	37,254
Greater Duwamish	662,025	577,635	582,056	586,450	586,381
Total	703,522	613,158	618,248	623,438	623,635
Seattle	2,582,481	2,290,282	2,300,999	2,313,120	2,313,189

Sources: Fehr & Peers, 2021; Herrera, 2021.

The transportation analysis generally assumed continuation of current economic and demographic trends, with minor shifts toward shorter trips and more trips made by modes other than automobile travel. This reduces VMT per capita, but total VMT in the study area would continue to rise due to employment growth and some resident population growth.

A number of federal regulations require emission and fuel standards that have or will lead to cleaner light- and heavy-duty truck emissions (see **Section 3.2.1 Affected Environment**). These standards also facilitate the adoption of new technologies necessary to meet GHG standards already promulgated by EPA (CRC 2014). In addition, in August 2021, EPA proposed to revise existing national GHG emissions standards for passenger cars and light trucks for model years 2023–2026. The proposed standards would achieve significant GHG emissions reductions along with reductions in other criteria pollutants (U.S. EPA 2021). The proposed revised standards would result in substantial reductions in both GHG emissions and fuel consumption. According to the proposed standards, GHG emissions would decrease roughly 6% for new passenger cars and light trucks entering the vehicle fleet (U.S. EPA 2021).

Fuel economy for buses was also considered and fuel consumption were assumed to be reduced by 20% between 2018 and 2044. This is a conservative assumption given that King County Metro has targeted replacement of much of its fleet with battery-electric buses (Metro 2021).

All four future year alternatives produce similar annual GHG emissions, as shown in **Exhibit 3.2-13**. Alternative 1 No Action is expected to have the lowest GHG emissions among the alternatives. Alternative 2, which includes limited land use changes, is expected to have the

lowest GHG emissions among the proposed alternatives, with Alternative 4 having the highest. All of the 2044 alternatives are expected to generate lower road transportation GHG emissions than in 2019. This is because the projected improvements in fuel economy outweigh the projected increase in VMT.

When compared to the Alternative 1 No Action, road transportation emissions under alternatives 2, 3 and 4 would be higher, but only Alternative 4 would exceed the 10,000 MTCO2e mandatory reporting threshold for the State of Washington for facilities.

Maritime Activities Related Emissions

Maritime activities taking place within and adjacent to the MICs, including ocean-going vessel hoteling (operations while stationary at dock) and maneuvering, commercial harbor, and government vessel movements (including ferry transits), recreational vessels, and shore-side cargo handling equipment would continue to produce GHG emissions under any of the alternatives. **Exhibit 3.2-14** shows current GHG emissions in total annual metric tons of CO2e (MTCO2e) associated with maritime sources in and adjacent to the study area.

Exhibit 3.2-14 Estimated GHG Emissions from Maritime Activities, 2016 (MTCO2e)

Source	CO2e
OGV, hoteling	36,129
OGV, maneuvering	3,147
Recreational Vessels	8,616
Locomotives	10,894
Cargo-handling equipment	15,924
Heavy-duty vehicles	8,128
Fleet vehicles	463
Commercial Harbor / Government Vessel	138,019
Total	221,320

Source: 2016 Puget Sound Maritime Emissions Inventory

Because changes to Comprehensive Plan policies, development standards and land use designations under all alternatives would protect and enhance industrial and maritime uses within the MICs, some of the increased employment and industrial and non-industrial space would likely include businesses that support maritime activities, which could indirectly increase GHG emissions from vessels, shore-side cargo handling equipment, and waterfront visitors. These potentially small and indirect increases are not quantified due to uncertainty.

With the existing and additional regulatory requirements and local infrastructure improvements such as shore power, future maritime GHG emissions are expected to decrease under all alternatives, even if cargo volumes and cruise ship visits increase.

Buildings & Energy Related Emissions

Under all alternatives, increased use of electricity could be generated in the MIC areas from any increases or changes in building space that result in heating and cooling, lighting, cooking and refrigeration, commercial and industrial equipment /machinery and processes, office equipment and computers, public transit operations (light rail), and streetlights and signal operations. In the MIC areas, all electricity is supplied by Seattle City Light. Seattle City Light is carbon neutral and, consistent with the 2013 CAP, no GHG emissions related to electricity would be generated from the alternatives and none are included in this analysis, as it is assumed that City Light would continue to produce carbon neutral electricity through 2044.

GHG emissions could be produced in the MIC areas from additional industrial and non-industrial building space and housing that combusts natural gas for heating, cooking, or other industrial purposes. 2021 Seattle Energy Code changes that prohibit new natural gas connections would reduce GHG emissions from some of the anticipated development in the MIC where the code applies, such as commercial developments and some multi-family housing.

GHG emissions from anticipated industrial and non-industrial building space, and housing units, for the alternatives was calculated using the City of Seattle's Energy Benchmarking data and CO2 emission coefficients from the U.S. Energy Information Administration (EIA). Because SCL is assumed to be carbon neutral through 2040, building emissions estimates include only those from combusted natural gas. The calculations use weather-normalized energy use intensity factors per square foot to estimate the GHG emissions from natural gas usage, adjusted to account for reductions due to planned and anticipated changes to Seattle's energy code.

Exhibit 3.2-15 shows existing and potential 2044 GHG Emissions from natural gas use in the study area under all alternatives.

Exhibit 3.2-15 Estimated Building-Related GHG Emissions for Action Alternatives Compared to Existing Conditions (2017) and Alternative 1 No Action (2042) (MTCO2e)

Building Type	2017 Existing	2042 No Action	2044 Alt 2.	2044 Alt 3.	2044 Alt 4.
Industrial	40,877	49,098	58,080	60,913	60,774
Non-Industrial	8,488	9,766	9,535	11,616	11,836
Total	49,365	58,864	67,615	72,528	72,610

Source: Herrera, 2021.

Exhibit 3.2-16 shows existing and potential 2044 GHG Emissions from housing units in the study area under all alternatives.

Exhibit 3.2-16 Estimated Housing-Related GHG Emissions for All Alternatives Compared to Existing Conditions (2021) and Alternative 1 No Action (2042) (MTCO2e)

Subarea	2021 Existing	2042 No Action	2044 Alt. 2	2044 Alt. 3	2044 Alt 4.
Ballard	537	558	559	1,263	2,745
Interbay Dravus	8	29	31	218	498
Interbay Smith Cove	3	24	25	45	3
SODO/Stadium	59	143	148	618	2,826
Georgetown/South Park	548	611	615	716	1,219
Total	1,154	1,364	1,378	2,859	7,289
Added MU Housing					
With MIC Adjustments—Seattle Mixed-Use Zone Housing				3,013	3,013
Grand Total	1,154	1,364	1,378	5,872	10,302

Source: Herrera, 2021.

Future building related GHG emissions from the use of natural gas are expected to increase under all alternatives, in line with increases in employment, building spaces, and housing. These results assume only the most recent changes to Seattle's energy code are in place in 2044, though it is reasonable to assume that future changes to the Code would further seek to reduce GHG emissions in line with updated climate action planning and that these future increases may be overestimated.

Other GHG Emissions

Because employment and some population would increase under all three Alternatives, waste generation and its associated GHG emissions would also increase. GHG emissions from solid waste generation were estimated using emission factors from the EPA's WARM model and the most recent (2018) waste generation rates from SPU. These emissions were then adjusted to account for waste diversion implemented through waste reduction, recycling, and composting fostered by the City's carbon-neutral goal target of 70 percent waste diversion by 2030.

Exhibit 3.2-17 shows existing and potential 2044 GHG Emissions from waste in the study area under all alternatives.

Exhibit 3.2-17 Estimated Waste-Related GHG Emissions for All Alternatives Compared to Existing Conditions and Alternative 1 No Action (MTCO2e)

Subarea	Existing	2042 No Action	2044 Alt. 2	2044 Alt. 3	2044 Alt 4.
C&D	—	(3)	(6)	(8)	(8)
Industrial	(950)	(1,176)	(1,282)	(1,503)	(1,521)
Non-Industrial	(526)	(640)	(766)	(805)	(803)
Housing	(424)	(536)	(516)	(698)	(717)
Total	(1,900)	(2,356)	(2,569)	(3,015)	(3,050)

Source: Herrera, 2021.

Equity & Environmental Justice Considerations

Air Quality

While air quality impacts under all alternatives are expected to be less than significant, the primary equity and environmental justice concern for the proposal would be the emissions associated with industrial activities and road transportation emissions on vulnerable communities in the study area, on the periphery of industrial zones, and alongside higher-volume transportation routes. Depending on the transportation routes that are used, emissions of air pollutants from mobile sources could concentrate along routes that pass through vulnerable communities, leading to inequitable exposure to air pollution. Similar effects could be experienced with activities related to employee and material transport during the construction phase of any of the alternatives.

At various thresholds of exposure, pollutants from mobile source operation can cause health effects such as cancer, asthma, and cardiovascular diseases, among others. Sensitivity to air pollution can depend on factors such as age, sex, and access to healthcare, the latter being correlated to income level. By race, asthma prevalence in the United States is greatest among American Indian/Alaska Natives and Black Americans (CDC 2019). Populations with preexisting conditions that make them more sensitive to air pollution could be at greater risk from the activities associated with the alternatives.

The incremental traffic-related emissions of the proposed alternatives would represent a minor portion of all traffic emissions on any transportation route near vulnerable communities. In addition, due to EPA emission standards for motor vehicles and clean fuel standards, the total emissions from road transportation are expected to drop even as traffic levels increase in the study area. Thus, exposures to air pollution in the study area are expected to continue trending downward.

Greenhouse Gases & Climate Change

GHG emissions under all alternatives are expected to have a potentially significant impact when combined with other global emissions, though mitigation opportunities, local and state climate actions, and expected continued regulatory changes would likely decrease the incremental contribution from the proposal to a moderate level of impact. The primary equity and environmental justice concern for the proposal would be the potential effect of emissions to accelerate climate change, which could disproportionately harm vulnerable communities in the study area. This could occur as the result of emissions from both the construction and operational phases of the proposal.

A new EPA analysis (EPA 2021) shows that the most severe harms from climate change fall disproportionately on vulnerable communities who are least able to prepare for, and recover from, exposure to extreme temperatures, poor air quality, flooding, sea level rise, and other impacts. EPA's analysis indicates that racial and ethnic minority communities are particularly vulnerable to the greatest impacts of climate change.

The incremental emissions of the proposed alternatives would represent a minor portion of all emissions that cumulatively contribute to climate change. However, planning for climate change should place emphasis on shoreline areas at risk from sea-level rise (see **Section 3.3 Water Resources**), among other risks, and prescribe adaptation measures that would help existing and new employees and residents, particularly vulnerable populations, in the MIC areas to reduce risks.

Impacts of Alternative 1 No Action

Air Quality

Under Alternative 1 future growth would continue based on current land use designations and comprehensive plan policies. No new land use concepts nor changes to MIC boundaries are proposed.

Transportation Related Emissions

Population and employment increases would continue, and area-wide VMT would increase in proportion. Projected changes in VMT were extracted from the projected travel demand model for cars, trucks, and buses. The travel demand model generally assumes existing economic and demographic trends continue with minor changes due primarily to mode share shifts and shortened trips due to increased traffic congestion. These changes cause projected VMT per capita to decline slightly by 2042. However, total VMT would continue to rise modestly due to population and employment growth.

The area wide estimated VMT for each of the MICs for the baseline year (2019) and the Alternative 1 No Action are presented in **Exhibit 3.2-18**.

Exhibit 3.2-18 Estimated VMT For the Baseline Year (2019) And Alternative 1 No Action (2042)

Geographic Area		PM Period VMT			PM Peak Hour VMT		
		2019 Existing	2042 No Action	Increase / Decrease	2019 Existing	2042 No Action	Increase / Decrease
BINMIC	Cars	51,370	52,420	1,050	18,750	19,130	380
	Trucks	2,550	2,760	210	930	1,010	80
	Buses	920	920	0	340	340	0
	Total	54,840	56,100	1,260	20,020	20,480	460
Greater Duwamish MIC	Cars	531,320	516,020	-15,300	193,930	188,350	-5,580
	Trucks	105,980	123,310	17,330	38,680	45,010	6,330
	Buses	4,260	4,110	-150	1,550	1,500	-50
	Total	641,560	643,440	1,880	234,160	234,860	700

PM Period = 3-6 PM
Net increase/decrease compares Alternative 1 with the Baseline year.
Sources: Fehr & Peers, Herrera, 2021.

Under the Alternative 1 No Action, overall area-wide VMT could increase in the Greater Duwamish MIC by roughly 1,880 VMT during the PM period and 700 during the PM peak hour compared to the baseline year, and in the BINMIC by roughly 1,260 VMT during the PM period and 460 during the PM peak hour compared to the baseline year. In the Greater Duwamish MIC, the overall slight increase in total VMT includes an anticipated decrease in car VMT for the PM period and the PM peak hour, and a similar anticipated increase in truck VMT for the PM period and the PM peak hour. Overall slight increases in VMT for the BINMIC are also reflected across vehicle types.

Road transportation-related air pollutant emissions in each MIC for Alternative 1 No Action compared to existing conditions are presented in **Exhibit 3.2-19**. Anticipated for Seattle overall are shown for comparison.

Exhibit 3.2-19 Estimated Tons of Criteria Pollutant Emissions from Road Transportation for Alternative 1 No Action (2042) Compared to Existing Conditions (2019)

Geographic Area	Pollutant	2019 Existing	2042 No Action	Increase / Decrease
BINMIC	CO	85.7	58.2	-27.5
	NOx	19.8	15.9	-3.9
	PM10	3.7	3.7	0.0
	PM2.5	0.7	0.7	-0.1

Geographic Area	Pollutant	2019 Existing	2042 No Action	Increase / Decrease
	VOC	4.3	3.2	-1.1
	SOx	0.2	0.2	0.0
Greater Duwamish MIC	CO	1,078.1	794.5	-283.6
	NOx	641.2	552.8	-88.5
	PM10	58.0	57.2	-0.8
	PM2.5	15.0	12.5	-2.6
	VOC	62.5	47.2	-15.3
	SOx	3.8	3.4	-0.5
Seattle	CO	4,783.0	3,459.5	-1,323.4
	NOx	1,900.8	1,643.6	-257.2
	PM10	229.6	234.5	4.9
	PM2.5	52.9	46.9	-6.0
	VOC	256.6	196.3	-60.3
	SOx	14.7	13.1	-1.6

Sources: Fehr & Peers, Herrera, 2021.

In addition to the road transportation emissions in **Exhibit 3.2-19**, vehicle travel would also generate PM2.5 through tire and brake wear and, more significantly, from entrained road dust. These non-vehicle emissions would not benefit from future improvements to the vehicle fleet as a whole or from improvements to fuel economy.

Regional emissions under Alternative 1 would be substantially lower than under existing background conditions. This is because the projected improvement in fuel economy, emission reduction, and new technology implementation would offset the projected increase in VMT. Therefore, the No Action Alternative would result in a less than significant impact to air quality.

Land Use Change-Related Emissions

Under Alternative 1 No Action, existing Comprehensive Plan policies, development standards and zoning maps would dictate the patterns of development and the density of employment in the MIC areas. Alternative 1 No Action would result in continued growth in employment in the study area in 2044 compared to the baseline year of 2018 (see **Exhibit 3.8-12** in **Section 3.8 Land & Shoreline Use**). **Exhibit 3.2-7** on page 3-46 shows the square footage of industrial and non-industrial space in each MIC for existing conditions (2018) and anticipated under Alternative 1 No Action.

Where development occurs as current land use designations and Comprehensive Plan policies allow, and depending on the types of industry, those areas and employees would encounter

the emissions resulting from existing and new industrial and other non-transportation air emissions. However, with existing requirements for operating permits from PSCAA, these manufacturing plants, and other heavy and general industrial facilities are expected to remain compliant with air pollution control regulations that assure criteria air pollutant and TAP emissions meet standards, as they do currently.

Alternative 1 No Action would also result in some continued growth in housing in the study area in 2044 compared to the baseline year of 2018. **Exhibit 3.2-20** shows the number of housing units in each MIC for current conditions (2021) and anticipated under Alternative 1, No Action.

Exhibit 3.2-20 Estimated Number of Housing Units for Industrial Subareas Under Alternative 1 No Action (2044) Compared to the Current Conditions (2021)

	Current Conditions (2021)	Alternative 1 No Action Existing Policies (2044)		
Subarea	Existing	Total	Growth	% Growth
Ballard	192	199	7	3.9%
Interbay Dravus	3	11	8	250.0%
Interbay Smith Cove	1	9	8	750.0%
SODO/Stadium	21	51	30	142.9%
Georgetown/South Park	196	218	22	11.5%
Total: Ind Zone Housing	413	488*	75*	18.2%

* Rounded
Sources: Fehr & Peers, 2021; Herrera, 2021.

Where housing within the industrial zones is established, those residents would experience higher emissions resulting from industrial and other non-transportation air emissions. In addition, some of the housing units and anticipated growth, particularly in South Park, could be placed near major highways, rail lines, or port facilities that produce vehicle emissions in the highest concentrations. The DOH health disparities map (DOH 2021) indicates the South Park census tracts, including those surrounding SR 99 and SR509, as currently ranking a 10 out of 10 for a comparison of pollution burden from Diesel NOx emissions and social factors that may contribute to disparities across the state. Despite this potential, the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle emissions control, fuel economy, technology improvements, and overall fuel mix, local emissions under Alternative 1 would be lower than under existing background conditions and Alternative 1 No Action would result in a less than significant impact to air quality, and a moderate but less than significant impact on health related to air quality.

Given this, it would be prudent to consider risk-reducing mitigation strategies such as setbacks for residential and other sensitive land uses from major traffic corridors, rail lines, port terminals and similar point sources of particulates from diesel fuel and/or to identify measures for sensitive populations proposed to be in areas near such sources.

Maritime Activities

Maritime activities that emit criteria pollutants within and adjacent to the MICs would be similar to those discussed and shown in **Exhibit 3.2-12**. With existing and planned regulatory requirements and local infrastructure improvements, these maritime emissions are expected to decrease under all alternatives, even if cargo volumes and cruise ship visits increase.

Greenhouse Gases & Climate Change

Changes in operational GHG emissions associated with development under Alternative 1 No Action would result from increases in VMT and improvements to the vehicle fleet, increased natural gas usage associated with new industrial and non-industrial development, and solid waste generation. These developments would be guided by existing Comprehensive Plan policies and existing land use designations. Potential operational GHG emissions from the Alternative 1 No Action are presented in **Exhibit 3.2-21**.

Exhibit 3.2-21 Total Estimated Annual MTCO2e Emissions Under Alternative 1 No Action Compared to Existing Conditions

Source	Existing MTCO2e	2042 No Action MTCO2e
Transportation	703,522	613,158
Ind. and Non-Ind. Building—Gas	49,365	58,864
Housing	1,154	1,364
Waste	-3,799	-4,709
Total	750,242	668,677
Difference from Existing	*0*	*-81,565*
Difference from No Action	*0*	*0*

Source: Herrera, 2021.

Total annual GHG emissions under Alternative 1 No Action could decrease by over 80,000 MTCO2e as compared to the baseline, which is the smallest increase in GHG emissions of all the alternatives when compared to existing conditions. However, this alternative contributes the least towards supporting growth and development for industrial and maritime uses, with less emphasis on development near existing and planned light rail transit. Growth that might otherwise be accommodated in the MIC buffer areas would occur in peripheral areas of the city

or region where there are fewer jobs and services in close proximity, or fewer emission reduction policies driving change, resulting in greater net GHG emissions than are shown here.

Alternative 1 No Action would result in a less than significant impact for GHG emissions. None of the sources increases compared to the existing conditions by more than the 10,000 MTCO2e mandatory reporting threshold for the State of Washington for facilities. In fact, the increase in building natural gas emissions may be overestimated. Emissions associated with housing could also increase but by a small margin over existing conditions. In any case, taken as a whole, the individual source increases in GHG emissions are offset by decreases in all other source categories.

Impacts of Alternative 2

Air Quality

Alternative 2 could result in a very slight growth in overall VMT in the study area in 2044 compared to Alternative 1 No Action, and air quality impacts would be similar.

Transportation Related Emissions

Estimated VMT for the Greater Duwamish MIC and the BINMIC are presented in **Exhibit 3.2-22** comparing Alternative 1 No Action and Alternative 2.

Exhibit 3.2-22 Estimated VMT For Alternative 2 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area		PM Period VMT			PM Peak Hour VMT		
		2042 No Action	2044 Alt 2	Increase/ Decrease	2042 No Action	2044 Alt 2	Increase/ Decrease
BINMIC	Cars	52,420	53,080	660	19,130	19,370	240
	Trucks	2,760	2,900	140	1,010	1,060	50
	Buses	920	920	0	340	340	0
	Total	**56,100**	**56,900**	**800**	**20,480**	**20,770**	**290**
Greater Duwamish MIC	Cars	516,020	520,080	4,060	188,350	189,830	1,480
	Trucks	123,310	124,290	980	45,010	45,370	360
	Buses	4,110	4,110	0	1,500	1,500	0
	Total	**643,440**	**648,480**	**5,040**	**234,860**	**236,700**	**1,840**

PM Period = 3-6 PM
Net increase/decrease compares Alternative 1 with the Baseline year.
Sources: Fehr & Peers, Herrera, 2021.

Under Alternative 2, VMT in the Greater Duwamish MIC could increase by roughly 5,040 in the PM period compared to Alternative 1 No Action and by 1,840 in the PM peak hour compared to Alternative 1. Most of those slight increases are from passenger cars. In the BINMIC, VMT could increase by roughly 800 in the PM period compared to Alternative 1 No Action and by 290 in the PM peak hour compared to Alternative 1.

Road transportation-related air pollutant emissions under Alternative 2 compared to Alternative 1 No Action are shown in **Exhibit 3.2-23** for both the Greater Duwamish MIC and the BINMIC. Anticipated for Seattle overall are shown for comparison.

Exhibit 3.2-23 Estimated Tons of Criteria Pollutant Emissions from Road Transportation for Alternative 2 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area	Pollutant	2042 No Action	2044 Alt 2	Increase/ Decrease
BINMIC	CO	58.2	59.2	1.0
	NOx	15.9	16.5	0.6
	PM10	3.7	3.8	0.1
	PM2.5	0.7	0.7	0.0
	VOC	3.2	3.2	0.1
	SOx	0.2	0.2	0.0
Greater Duwamish MIC	CO	794.5	800.7	6.2
	NOx	552.8	557.1	4.3
	PM10	57.2	57.7	0.4
	PM2.5	12.5	12.5	0.1
	VOC	47.2	47.6	0.4
	SOx	3.4	3.4	0.0
Seattle	CO	3,459.5	3,474.2	14.7
	NOx	1,643.6	1,654.4	10.8
	PM10	234.5	235.6	1.1
	PM2.5	46.9	47.1	0.2
	VOC	196.3	197.2	0.9
	SOx	13.1	13.2	0.1

Sources: Fehr & Peers, Herrera, 2021.

Area wide road transportation pollutant emissions under Alternative 2 would also be substantially lower than under existing conditions, but slightly higher than Alternative 1. As with Alternative 1, this is because the projected improvement in fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT. Air emissions from the MIC areas under Alternative 2 as a percentage of overall City road transportation emissions would remain at or below that anticipated for Alternative 1 No Action. Therefore, Alternative 2 would likely result in a less than significant impact to air quality.

Land Use Change-Related Emissions

Under Alternative 2, revised Comprehensive Plan policies, development standards and land use designations would result in generally more employment and additional development in the study area in 2044 compared to Alternative 1 No Action 2042. **Exhibit 3.2-7** on page 3-46 shows the square footage of industrial and non-industrial space in each MIC anticipated under Alternative 2 compared with Alternative 1 No Action, including the amount of anticipated growth.

As with Alternative 1 No Action, existing and new employees, depending on the types of businesses locating in the MICs, may encounter the emissions resulting from existing and new industrial and other non-transportation air emissions.

This alternative would place the emphasis for growth in industrial and maritime uses within appropriate land use zones, with a slight decrease in space devoted to non-industrial uses. Potentially a greater portion of projected growth in the MICs would be closer to and access major highway, rail line or port terminals, and contribute to the emissions from those sources. However, as shown in **Exhibit 3.2-24**, with existing requirements for operating permits from PSCAA, these manufacturing plants, and other heavy and general industrial facilities are expected to remain compliant with air pollution control regulations that assure criteria air pollutant and TAP emissions meet standards, as they do currently.

Alternative 2 would also result in some continued growth in housing in the study area in 2044 compared to Alternative 1 No Action 2044. **Exhibit 3.2-24** shows the number of housing units in each MIC for Alternative 2 compared to those anticipated under Alternative 1, No Action.

Exhibit 3.2-24 Estimated Number of Housing Units for Industrial Subareas Under Alternative 2 (2044) Compared to Alternative 1 No Action (2044)

	Alternative 1 No Action (2044)	Alternative 2 Future of Industry—Limited (2044)		
Subarea	Total Units	Total Units	Growth	% Growth
Ballard	199	200	1	0.3%
Interbay Dravus	11	11	0	4.8%
Interbay Smith Cove	9	9	0	5.9%
SODO/Stadium	51	53	2	3.9%
Georgetown/South Park	218	220	2	0.7%
Total: Ind Zone Housing	488*	493*	5	1.0%

* Rounded
Source: City of Seattle, 2021.

Impacts to existing and new residents within and adjacent to the MICs under Alternative 2 would not be appreciably different from impacts under Alternative 1 No Action. Where housing within the industrial zones is established, those residents would experience higher emissions resulting from industrial and other non-transportation air emissions. As with Alternative 1, the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle emissions control, fuel economy, technology improvements, and overall fuel mix, local emissions under Alternative 2 would be lower than under existing background conditions and Alternative 2 would result in a less than significant impact to air quality. Similar mitigation strategies should be considered.

Maritime Activities

Maritime activities and their impact on the Puget Sound air shed, including the MICs, would continue similarly as they would under Alternative 1 No Action. With existing and planned regulatory requirements and local infrastructure improvements, these maritime emissions are expected to decrease under all alternatives, even if cargo volumes and cruise ship visits increase.

Greenhouse Gases & Climate Change

GHG emissions under development of Alternative 2 were calculated using the same methodologies as those described previously but reflect the land use differences of increased industrial and non-industrial building space, added industry-supportive housing, and corresponding increased VMT in each of the MICs. These developments would be guided by changes to Comprehensive Plan policies and land use designations as outlined in the City's Industrial and Maritime Strategy and the resulting subarea plan policies to be developed. Operational GHG emissions from Alternative 2 are presented in **Exhibit 3.2-25**.

Exhibit 3.2-25 Total Estimated Annual MTCO2e Emissions Under Alternative 2 Compared to Alternative 1 No Action

Source	No Action MTCO2e	Alt. 2 MTCO2e
Transportation	613,158	618,247
Ind. And Non-Ind. Building—Gas	58,864	67,615
Housing	1,364	1,378
Waste	-4,709	-5,132
Total	668,677	682,108
Difference from Existing	*-81,565*	*-68,134*
Difference from No Action	*0*	*13,431*

Source: Herrera, 2021.

Alternative 2 could decrease GHG emissions by approximately 68,000 MTCO2e per year compared to existing conditions but would represent an increase of over 13,000 MTCO2e compared to Alternative 1 No Action, which is above the 10,000 MTCO2e mandatory reporting threshold for the State of Washington. This is due largely to the GHG emissions associated with natural gas use with new industrial and non-industrial space increases compared to No Action conditions. As stated previously, these emissions may be overestimated.

Growth in the MICs that would otherwise be accommodated within other parts of the city would result in greater progress toward reducing overall transportation related emissions because the MICs have a high concentration of industrial and industry supporting jobs and services in close proximity with each other. This suggests that VMT per job could be lower in these areas than in most neighborhoods in the city. To the extent that Alternative 2 attracts growth that would otherwise occur outside of Seattle, it would result in an increase in total VMT within the city, making it more difficult to achieve City goals for a net reduction in citywide VMT over time.

It should be noted that despite the moderate increase in transportation-related emissions associated with VMT, Alternative 2 would support higher density growth patterns, particularly near planned light rail stations consistent with regional planning, as well as the long-term planning goals of the City's Comprehensive Plan and 2013 CAP, which are expected to assist in controlling GHG emissions. The Seattle Comprehensive Plan Final EIS (2016) presented analysis that showed that the VMT per job and resident in Seattle would be approximately 40% lower than VMT per job and resident outside of Seattle (City of Seattle, 2016b). Therefore, by increasing employment density in the MICs, Alternative 2 could contribute to regional efforts to limit vehicular GHG emissions.

Overall, Alternative 2 could result in an increase in GHG emissions compared to Alternative 1—No Action that could be considered potentially significant and additional mitigation measures would be warranted.

Impacts of Alternative 3

Air Quality

Alternative 3 could result in more robust growth in the study area in overall employment, industrial and non-industrial development, and in housing compared to Alternative 1 No Action and Alternative 2.

Transportation Related Emissions

Alternative 3 could result in a slight growth in overall VMT in the study area compared to Alternative 1 No Action and Alternative 2, but air quality impacts would be similar. Estimated VMT for the Greater Duwamish MIC and the BINMIC are presented in **Exhibit 3.2-26** comparing Alternative 1 No Action and Alternative 3.

Exhibit 3.2-26 Estimated VMT for Alternative 3 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area		PM Period VMT			PM Peak Hour VMT		
		2042 No Action	2044 Alt 3	Increase/ Decrease	2042 No Action	2044 Alt 3	Increase/ Decrease
BINMIC	Cars	52,420	54,700	2,280	19,130	19,970	840
	Trucks	2,760	2,920	160	1,010	1,070	60
	Buses	920	920	0	340	340	0
	Total	56,100	58,540	2,440	20,480	21,380	900
Greater Duwamish MIC	Cars	516,020	529,650	13,630	188,350	193,320	4,970
	Trucks	123,310	124,290	980	45,010	45,370	360
	Buses	4,110	4,110	0	1,500	1,500	0
	Total	643,440	658,050	14,610	234,860	240,190	5,330

PM Period = 3-6 PM
Net increase/decrease compares Alternative 1 with the Baseline year.
Sources: Fehr & Peers, Herrera, 2021.

Under Alternative 3, VMT in the Greater Duwamish MIC could increase by roughly 14,610 in the PM period compared to Alternative 1 No Action and by 2,440 in the PM peak hour compared to Alternative 1. Like Alternative 2, most of those increases are from passenger cars. In the BINMIC, VMT could increase by roughly 5,330 in the PM period compared to Alternative 1 No Action and by 900 in the PM peak hour compared to Alternative 1.

Road transportation-related air pollutant emissions under Alternative 3 compared to Alternative 1 No Action are shown in **Exhibit 3.2-27** for both the Greater Duwamish MIC and the BINMIC. Anticipated for Seattle overall are shown for comparison.

Exhibit 3.2-27 Estimated Tons of Criteria Pollutant Emissions from Road Transportation for Alternative 3 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area	Pollutant	2042 No Action	2044 Alt 3	Increase/ Decrease
BINMIC	CO	58.2	60.7	2.5
	NOx	15.9	16.6	0.7
	PM10	3.7	3.9	0.2
	PM2.5	0.7	0.7	0.0
	VOC	3.2	3.3	0.1
	SOx	0.2	0.2	0.0

Geographic Area	Pollutant	2042 No Action	2044 Alt 3	Increase/ Decrease
Greater Duwamish MIC	CO	794.5	809.6	15.1
	NOx	552.8	557.2	4.4
	PM10	57.2	58.2	1.0
	PM2.5	12.5	12.6	0.2
	VOC	47.2	48.0	0.8
	SOx	3.4	3.4	0.0
Seattle	CO	3,459.5	3,498.9	39.4
	NOx	1,643.6	1,654.8	11.3
	PM10	234.5	237.1	2.5
	PM2.5	46.9	47.4	0.5
	VOC	196.3	198.5	2.2
	SOx	13.1	13.2	0.1

Sources: Fehr & Peers, 2021; Herrera, 2021.

Area wide road transportation pollutant emissions under Alternative 3 would also be substantially lower than under existing conditions, but slightly higher than alternatives 1 and 2. As with the other alternatives, this is because the projected improvement in fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT. Air emissions from the MIC areas under Alternative 3 as a percentage of overall City road transportation emissions would remain at or below that anticipated for Alternative 1 No Action. Therefore, Alternative 3 would likely result in a less than significant impact to air quality.

Land Use Change-Related Emissions

Compared to Alternative 2, this alternative would increase the acreage within the MICs that would be redesignated for use in proposed Industry / Innovation and Urban Industrial zones in targeted geographies, including an estimated 1/2 mile from planned light rail stations. Some of the projected growth would likely be closer to existing and future sources of industrial, transportation, and non-transportation emissions and associated risks. Like the other alternatives, this growth includes new development for industrial and non-industrial employment. **Exhibit 3.2-7** on page 3-46 shows the square footage of industrial and non-industrial space in each MIC anticipated under Alternative 3 compared with Alternative 1 No Action, including the amount of anticipated growth.

As with the other alternatives, existing and new employees, depending on the types of businesses locating in the MICs, may encounter the emissions resulting from existing and new industrial and other non-transportation air emissions.

This alternative would also place the emphasis for growth in industrial and maritime uses within appropriate land use zones, as well as allowances for moderate growth in space devoted to non-industrial uses. Potentially a greater portion of projected growth in the MICs would be closer to and access major highway, rail line or port terminals, and contribute to the emissions from those sources. However, as shown in **Exhibit 3.2-28**, with existing requirements for operating permits from PSCAA, these manufacturing plants, and other heavy and general industrial facilities are expected to remain compliant with air pollution control regulations that assure criteria air pollutant and TAP emissions meet standards, as they do currently.

Alternative 3 would result in a much greater growth in housing in the study area in 2044 compared to Alternative 2 and Alternative 1 No Action. **Exhibit 3.2-28** shows the number of housing units in each MIC for Alternative 3 compared to those anticipated under Alternative 1, No Action.

Exhibit 3.2-28 Estimated Number of Housing Units for Industrial Subareas Under Alternative 3 (2044) Compared to Alternative 1 No Action (2044)

	Alternative 1 No Action (2044)	Alternative 3 Future of Industry—Targeted (2044)		
Subarea	Total Units	Total Units	Growth	% Growth
Ballard	199	452	253	126.6%
Interbay Dravus	11	78	67	642.9%
Interbay Smith Cove	9	16	7	88.2%
SODO/Stadium	51	221	170	333.3%
Georgetown/South Park	218	256	38	17.2%
Total: Ind Zone Housing	488*	1,023	535	109.6%

* Rounded
Sources: City of Seattle, 2021.

In addition to increased industrial zone caretakers' quarters/makers' space of 535 units there would be an increase in residential development in land removed from the MIC that would be rezoned to Seattle Mixed. This would mean an increase in dwellings of 1,078 units in the Georgetown and South Park areas.

Impacts to existing and new residents within and adjacent to the MICs under Alternative 3 have the potential to be greater than the impacts under both Alternative 2 and Alternative 1 No Action. This is due mostly to the greater number of employees and residents within the MICs resulting from anticipated development. Where housing within the industrial zones is established, those residents would experience higher emissions resulting from industrial and other non-transportation air emissions. In SODO/Stadium, where over 30% of the housing growth is to occur is also adjacent to areas of high-capacity highways, major commute arterials, and a busy rail corridor.

However, as with alternatives 1 and 2, the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle emissions control, fuel economy, technology improvements, and overall fuel mix, local emissions under Alternative 3 would be lower than under existing background conditions. While rail emissions were not calculated for this assessment as they are not affected by the proposed action, they do contribute to the overall cumulative air emissions in the MICs. Nonetheless, Alternative 3 would likely result in a less than significant impact to air quality. Similar mitigation strategies as have been mentioned for the other alternatives should be considered.

Maritime Activities

Maritime activities and their impact on the Puget Sound air shed, including the MICs, would continue similarly as they would under Alternative 1 No Action. With existing and planned regulatory requirements and local infrastructure improvements, these maritime emissions are expected to decrease under all alternatives, even if cargo volumes and cruise ship visits increase.

Greenhouse Gases & Climate Change

GHG emissions under development of Alternative 3 reflect greater increases in industrial and non-industrial building space, added industry-supportive housing, added mixed-uses, and corresponding increased VMT in each of the MICs. These developments would also be guided by changes to Comprehensive Plan policies and land use designations as outlined in the City's Industrial and Maritime Strategy and the resulting subarea plan policies to be developed. Operational GHG emissions from Alternative 2 are presented in **Exhibit 3.2-29**.

Exhibit 3.2-29 Total Estimated Annual MTCO2e Emissions Under Alternative 3 Compared to Alternative 1 No Action

Source	No Action MTCO2e	Alt. 3 MTCO2e
Transportation	613,158	623,437
Ind. and Non-Ind. Building—Gas	58,864	72,528
Housing	1,364	5,872
Waste	-4,709	-6,022
Total	668,677	695,816
Difference from Existing	*-81,565*	*-54,425*
Difference from No Action	*0*	*27,139*

Source: Herrera, 2021.

Alternative 3 could decrease GHG emissions by approximately 54,000 MTCO2e per year compared to existing conditions but would represent an increase of over 27,000 MTCO2e compared to Alternative 1 No Action, which is above the 10,000 MTCO2e mandatory reporting threshold for the State of Washington. As with Alternative 2, this is due largely to the GHG emissions associated with natural gas use with new industrial and non-industrial space but also includes increases from the addition of approximately 1,600 housing units compared to Alternative 1.

Like Alternative 2, reducing transportation related emissions through increasing density of employment growth in the MICs rather than in other Seattle neighborhoods or regionally would be consistent for Alternative 3. It should be noted for Alternative 3 also that despite the moderate increase in transportation-related emissions associated with VMT, Alternative 3 would support higher density growth patterns, particularly near planned light rail stations consistent with regional planning, as well as the long-term planning goals of the City's Comprehensive Plan and 2013 CAP, resulting in contributions to regional efforts to limit vehicular GHG emissions.

Overall, Alternative 3 could result in an increase in GHG emissions compared to Alternative 1—No Action that could be considered potentially significant and additional mitigation measures would be warranted.

Impacts of Alternative 4

Air Quality

Alternative 4 could also result in more robust growth in the study area in 2044 in overall employment, industrial and non-industrial development, and the most growth in housing compared to Alternative 1—No Action and the other alternatives.

Transportation Related Emissions

Alternative 4 could result in a slight growth in overall VMT in the study area in 2044 compared to Alternative 1—No Action and Alternative 2 and similar to Alternative 3; air quality impacts would also be similar. Estimated VMT for the Greater Duwamish MIC and the BINMIC are presented in **Exhibit 3.2-30** comparing Alternative 1—No Action and Alternative 4.

Exhibit 3.2-30 Estimated VMT For Alternative 4 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area		PM Period VMT			PM Peak Hour VMT		
		2042 No Action	2044 Alt 4	Increase/ Decrease	2042 No Action	2044 Alt 4	Increase/ Decrease
BINMIC	Cars	52,420	55,110	2,690	19,130	20,120	990
	Trucks	2,760	2,950	190	1,010	1,080	70

Geographic Area		PM Period VMT			PM Peak Hour VMT		
		2042 No Action	2044 Alt 4	Increase/ Decrease	2042 No Action	2044 Alt 4	Increase/ Decrease
	Buses	920	920	0	340	340	0
	Total	56,100	58,980	2,880	20,480	21,540	1,060
Greater Duwamish MIC	Cars	516,020	529,500	13,480	188,350	193,270	4,920
	Trucks	123,310	124,290	980	45,010	45,370	360
	Buses	4,110	4,110	0	1,500	1,500	0
	Total	643,440	657,900	14,460	234,860	240,140	5,280

PM Period = 3-6 PM
Net increase/decrease compares Alternative 1 with the Baseline year.
Sources: Fehr & Peers, 2021; Herrera, 2021.

Under Alternative 4, VMT in the Greater Duwamish MIC could increase by roughly 14,460 in the PM period compared to Alternative 1 No Action and by 2,880 in the PM peak hour compared to Alternative 1. Like the other alternatives, most of those increases are from passenger cars. In the BINMIC, VMT could increase by roughly 5,280 in the PM period compared to Alternative 1 No Action and by 1,060 in the PM peak hour compared to Alternative 1.

Road transportation-related air pollutant emissions under Alternative 4 compared to Alternative 1 No Action are shown in **Exhibit 3.2-31** for both the Greater Duwamish MIC and the BINMIC. Anticipated for Seattle overall are shown for comparison.

Exhibit 3.2-31 Estimated Tons of Criteria Pollutant Emissions from Road Transportation for Alternative 4 (2044) Compared to Alternative 1 No Action (2042)

Geographic Area	Pollutant	2042 No Action	2044 Alt 4	Increase/ Decrease
BINMIC	CO	58.2	61.2	3.0
	NOx	15.9	16.7	0.9
	PM10	3.7	3.9	0.2
	PM2.5	0.7	0.7	0.0
	VOC	3.2	3.3	0.2
	SOx	0.2	0.2	0.0
Greater Duwamish MIC	CO	794.5	809.5	15.0
	NOx	552.8	557.2	4.4
	PM10	57.2	58.2	1.0
	PM2.5	12.5	12.6	0.2

Geographic Area	Pollutant	2042 No Action	2044 Alt 4	Increase/ Decrease
	VOC	47.2	48.0	0.8
	SOx	3.4	3.4	0.0
Seattle	CO	3,459.5	3,499.0	39.5
	NOx	1,643.6	1,654.8	11.3
	PM10	234.5	237.1	2.6
	PM2.5	46.9	47.4	0.5
	VOC	196.3	198.5	2.2
	SOx	13.1	13.2	0.1

Sources: Fehr & Peers, 2021; Herrera, 2021.

Area wide road transportation pollutant emissions under Alternative 4 would also be substantially lower than under existing conditions, but slightly higher than the other alternatives. As with the other alternatives, this is because the projected improvement in fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT. Air emissions from the MIC areas under Alternative 4 as a percentage of overall City road transportation emissions would remain at or below that anticipated for Alternative 1 No Action. Therefore, Alternative 4 would likely result in a less than significant impact to air quality.

Land Use Change-Related Emissions

Compared to Alternative 2, Alternative 4 would increase the acreage within the MICs that would be redesignated for use in proposed Industry / Innovation and Urban Industrial zones in targeted geographies, including an estimated 1/2 mile from planned light rail stations. Alternative 4 would designate slightly less than Alternative 3 in this regard. As with Alternative 3, some of the projected growth under Alternative 4 would likely be closer to existing and future sources of industrial, transportation, and non-transportation emissions and associated risks. Like the other alternatives, this growth under Alternative 4 includes new development for industrial and non-industrial employment. **Exhibit 3.2-7** on page 3-46 shows the square footage of industrial and non-industrial space in each MIC anticipated under Alternative 4 compared with Alternative 1 No Action, including the amount of anticipated growth.

As with the other alternatives, existing and new employees, depending on the types of businesses locating in the MICs, may encounter the emissions resulting from existing and new industrial and other non-transportation air emissions.

This alternative would also place the emphasis for growth in industrial and maritime uses within appropriate land use zones, as well as allowances for moderate growth in space devoted to non-industrial uses. Like Alternative 3, Alternative 4 projected growth in the MICs would be

closer to and use access to major highway, rail line or port terminals, and contribute to the emissions from those sources. However, as shown in **Exhibit 3.2-32**, with existing requirements for operating permits from PSCAA, these manufacturing plants, and other heavy and general industrial facilities are expected to remain compliant with air pollution control regulations that assure criteria air pollutant and TAP emissions meet standards, as they do currently.

Alternative 4 would result the greatest growth in housing in the study area in 2044 compared to the other alternatives and Alternative 1 No Action. **Exhibit 3.2-32** shows the number of housing units in each MIC for Alternative 4 compared to those anticipated under Alternative 1, No Action.

Exhibit 3.2-32 Estimated Number of Housing Units for Industrial Subareas Under Alternative 4 (2044) Compared to Alternative 1 No Action (2044)

	Alternative 1 No Action (2044)	Alternative 4 Future of Industry—Expanded (2044)		
Subarea	Total Units	Total Units	Growth	% Growth
Ballard	199	982	783	392.2%
Interbay Dravus	11	178	167	1595.2%
Interbay Smith Cove	9	1	-8	-88.2%
SODO/Stadium	51	1011	960	1882.4%
Georgetown/South Park	218	436	218	99.5%
Total: Ind Zone Housing	488*	2,608	2,120	434.4%

* Rounded
Sources: City of Seattle, 2021.

In addition to increased industrial zone caretakers' quarters/makers' studios of 2,120 units above Alternative 1 No Action there would be an increase in residential development in land removed from the MIC that would be rezoned to Seattle Mixed. This would mean an increase in dwellings of 1,078 units in the Georgetown and South Park areas.

Impacts to existing and new residents within and adjacent to the MICs under Alternative 4 have the potential to be greater than the impacts under all other alternatives and Alternative 1 No Action. This is due mostly to the highest number of employees and residents within the MICs resulting from anticipated development. Where housing within the industrial zones is established, those residents would experience higher emissions resulting from industrial and other non-transportation air emissions. In SODO/Stadium, where 45% of the housing growth is to occur is also adjacent to areas of high-capacity highways, major commute arterials, and a busy rail corridor.

However, as with all other alternatives, the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle

emissions control, fuel economy, technology improvements, and overall fuel mix, local emissions under Alternative 4 would be lower than under existing background conditions. Similar cumulative air emissions from rail would occur in the MICs under all alternatives. Nonetheless, Alternative 3 would likely result in a less than significant impact to air quality. Similar mitigation strategies as have been mentioned for the other alternatives should be considered.

Maritime Activities

Maritime activities and their impact on the Puget Sound air shed, including the MICs, would continue similarly as they would under Alternative 1 No Action. With existing and planned regulatory requirements and local infrastructure improvements, these maritime emissions are expected to decrease under all alternatives, even if cargo volumes and cruise ship visits increase.

Greenhouse Gases & Climate Change

GHG emissions under development of Alternative 4 reflect the greatest increases in industry-supportive housing, office uses in places served by light rail, and added mixed-uses, along with increases in industrial and non-industrial building space slightly smaller than Alternative 3. VMT increases for Alternative 4 are anticipated at about the same as Alternative 3 for the Greater Duwamish MIC and slightly greater than Alternative 3 for the BINMIC. Operational GHG emissions from Alternative 2 are presented in **Exhibit 3.2-33**.

Exhibit 3.2-33 Total Estimated Annual MTCO2e Emissions Under Alternative 3 Compared to Alternative 1 No Action

Source	No Action MTCO2e	Alt 4. MTCO2e
Transportation	613,158	623,635
Ind. and Non-Ind. Building—Gas	58,864	72,610
Housing	1,364	10,302
Waste	-4,709	-6,091
Total	668,677	700,456
Difference from Existing	*-81,565*	*-49,785*
Difference from No Action	*0*	*31,779*

Source: Herrera, 2021.

Alternative 4 could decrease GHG emissions by approximately 50,000 MTCO2e per year compared to existing conditions but would represent an increase of almost 32,000 MTCO2e compared to Alternative 1 No Action, which is above the 10,000 MTCO2e mandatory reporting threshold for the State of Washington. Compared to the other alternatives, Alternative 4 results

in increases in all source categories except waste, most notably different from the other alternatives those associated with increased housing.

Like alternatives 2 and 3, reducing transportation related emissions through increasing density of employment growth in the MICs rather than in other Seattle neighborhoods or regionally would be consistent for Alternative 4, despite the moderate increase in transportation-related emissions in the MIC areas.

Overall, Alternative 4 could result in an increase in GHG emissions compared to Alternative 1—No Action that could be considered potentially significant and additional mitigation measures would be warranted.

3.2.3 Mitigation Measures

It is notable that it is anticipated that the amount of development and activity projected under the alternatives, if confined within the MICs, would result in less GHG emissions than if that same development and activity were spread out to other parts of the city or region. While Alternative 1 No Action would result in lower GHG emissions within the MICs, it is likely that the population and employment growth anticipated to occur under the alternatives would occur elsewhere and those GHG emissions are not quantified but are expected to be greater than if focused in the MICs as proposed by the industrial and maritime strategy alternatives. The alternatives under the Industrial and Maritime Strategy serve to structure residences, employment, and activities in relatively efficient ways so that the GHG emission associated with their activities are less than what they would be if those people and jobs were more dispersed, and their activities conducted less efficiently.

Nonetheless, GHG emissions from future projects need to be mitigated so that future projects do not result in a significant environmental impact. A list of potential mitigation measures is given below; some measures would need to be integrated into Subarea Plan policies or codes as requirements and incentives to apply to future development.

Incorporated Plan Features

Air Quality

All Action Alternatives would change land use designations and development regulations applicable to the study area to target enhancement of industrial and maritime uses, and to allow a wider latitude of commercial/industrial development and industry supportive housing, while protecting adjacent residential areas. Increasing density in some areas of the MICs around light rail stations and with access to multiple mobility options could lead to more use of public transportation, biking, and walking, and less use of cars. These policies and actions recognize the value of planning for the type and density of future industries and employment

as a way to reduce the need for future residents and workers to travel by automobile, thereby reducing transportation-related emissions in the region.

Greenhouse Gases & Climate Change

All alternatives—in particular alternatives 3 and 4—contribute to increased GHG emissions through future growth and development in the study area. All Action Alternatives result in GHG emissions above the 10,000 MTCO2e mandatory reporting threshold compared to Alternative 1 No Action.

All Action Alternatives would change land use designations and development regulations applicable to the study area to target enhancement of industrial and maritime uses, and to allow a wider latitude of commercial/industrial development and industry supportive housing, while protecting adjacent residential areas. These policies and actions recognize the value of planning for the type and density of future industries and employment as a way to optimize the coordination of complementary industries, and to reduce the transportation demand of businesses activities. The policies also allow increasing density in some areas of the MICs around light rail stations and with access to multiple mobility options, which could lead to more use of public transportation, biking, and walking, and less use of cars; and to reduce the need for future residents and workers to travel by automobile, thereby reducing transportation-related emissions in the region.

The Industrial and Maritime Strategy includes policy concepts particularly relevant to Air Quality/GHG:

- Introduce new or strengthened policies into chapters of the Comprehensive Plan that may include the Transportation, Environment, or Container Port elements encouraging transitions to clean fuels and decarbonization of industrial and maritime activities.

Regulations & Commitments

Air Quality

Several federal, state, and regional regulations apply to construction and allowed land uses (see also **Section 3.2.1 Affected Environment**):

- NAAQS: As described above, the EPA established NAAQS and specifies future dates for states to develop and implement plans to achieve these standards.
- Washington State: Ecology established state ambient air quality standards for the same six pollutants (CO, VOCs, NO2, PM, SO2, and ozone) that are at least as stringent as the national standards.
- PSCAA Regulations: All construction sites in the Puget Sound region are required to implement emission controls to minimize fugitive dust and odors during construction, as required by PSCAA Regulation 1, Section 9.15, Fugitive Dust Control Measures.

PSCAA manages permitting of stationary air pollutant sources and all industrial and commercial air pollutant sources in the Puget Sound region are required to register with the PSCAA.

Greenhouse Gases & Climate Change

- Washington State Energy Code: Development in the study area would be subject to the requirements of the Washington State Energy Code, which regulates the energy-use features of new and remodeled buildings.
- The City's 2013 CAP and the 2018 Climate Action Strategy includes strategies and actions to limit atmospheric warming to 1.5 degrees Celsius. The strategies and actions focus on road transportation and building energy, which comprise the majority of local emissions, and which drive the GHG emissions in the study area.
- All buildings with 50,000 square feet or more of nonresidential space (excluding parking) must comply with the Building Tune-Ups requirement every five years (SMC 22.930). Building Tune-Ups involve assessment and implementation of operational and maintenance improvements to achieve energy (and water) efficiency, which helps to reduce GHG emissions.
- The Port of Seattle is increasing shore power available at terminals to reduce maritime emissions (Starcrest 2018). Upcoming projects within the SODO/Stadium Subarea include planned shore power improvements in Terminal 15, Terminal 18, and possibly the electrification of Terminal 30 and the Coast Guard Station.

Other Potential Mitigation Measures

Air Quality

Mitigation strategies are not required due to a lack of significant adverse impacts, however potential for exposure of existing and new employees, residents, and visitors to potential air emissions in areas around arterials, along industrial buffers, and near port operations should be considered in future planning:

The Seattle Comprehensive Plan and MIC Subarea Plans could:

- Include policy guidance that recommends that residences and other sensitive land uses (i.e., schools, day care) be separated from freeways, railways, and port facilities, and new MML, II, and UI zones by a buffer area of no less than 500 feet, and possibly as much as 1,000 feet, depending on the height of the source, to reduce the potential exposure of sensitive populations to air toxics. (US Department of Transportation 2015)
- Include policy guidance that recommends and supports the electrification of industrial and maritime activities that currently rely on fossil fuels, including the transportation related assets that are an integral part of those land uses.

- Incorporate new development standards that include requirements that recommend that residences and other sensitive land uses (i.e., schools, day care) include enhanced air filtering and circulation to address pollutant transportation generated particulates. Specifically, U.S. EPA identifies that mechanical ventilation/filtration systems with a Minimum Efficiency Reporting Value (MERV) of 9 through 12 are adequate for removing 25 to 80% of automobile emission particles (U.S. EPA 2009a).
- Consider locations for schools, daycares, and residential uses that increases buffers from high-volume roadways or other measures to reduce exposure to criteria pollutant emissions.
- Assure design standards for parks in proximity to high-volume roadways and industrial areas incorporate landscaping with full bottom to top of canopy coverage, higher canopy heights, and multiple rows of vegetation types, including denser tree canopies, that help reduce exposure to criteria pollutant emissions.
- Add a denser tree canopy near high-volume roadways and industrial areas.

Greenhouse Gases & Climate Change

- Subarea Plan Policies: As part of Subarea Plan development, the City could establish policies that incentivize use of electrical infrastructure to serve industrial process needs, industrial, commercial, and residential space heating needs, rather than natural gas.
- Green Building Standards: To lower the GHG contribution from industrial and commercial uses, policies that encourage or mandate new construction projects in the study area to:
  - Achieve one of the following green building standards: LEED In Motion: Industrial Facilities, Built Green, the Living Building Challenge, or the Evergreen Sustainable Development Criteria.
  - Use low-embodied carbon construction material types, such as low-carbon concrete mixes.
  - Limit carbon-intensive materials or incentivize use of lower carbon alternatives such as a wood structure instead of steel and concrete, or agricultural products that sequester carbon.
  - Salvage materials like brick, metals, broken concrete, or wood.
  - Use high-recycled content materials.
  - Prioritize adaptive reuse for existing buildings to avoid additional embodied carbon emissions.
  - Include embodied carbon goals in building codes (AIA, 2021).
- Building Demolition Waste Reduction: The City could consider programs to require or encourage building deconstruction rather than bulk demolition for older industrial buildings demolished in the study area.
- Puget Sound Energy (PSE): Seattle is served by PSE for natural gas service. PSE has established a target to reach net zero carbon emissions for natural gas used in customer homes and businesses by 2045, with an interim target of a 30% emissions reduction by

2030. The City could promote or incentivize PSE and/or study area employers to integrate greater volumes of renewable natural gas into their systems or processes. Coordination with King County Wastewater Treatment Division and with SPU' Solid Waste Division could enhance efforts.

- Electric Vehicles: The City could adopt regulations for the study area that support the placement of infrastructure for charging of electric vehicles (including commercial and industrial vehicles) in applicable new developments. Seattle Public Utilities is exploring the creation of a city-owned electrical vehicle charging facility in the Duwamish MIC intended for drayage trucks. The City and Port of Seattle could expand on the effort to establish multiple such facilities in strategic locations in proximity to Port terminals that require drayage.
- Trees: The City could adopt regulations/incentives for the study area that preserve and/or replace on-site trees and encourage planting of more trees. Trees and shrubs can provide shade and lower temperatures in urban areas and can assist with GHG reductions.
- Expand electrification of marine terminals: The City, Port of Seattle and private partners could accelerate the extension of shore power to terminals and docks throughout the Seattle waterfront, including at Coleman Dock and Terminals 5, 18, 30, 46, and 66, and where appropriate for US Coast Guard vessels, and other research vessel berths. Consider commitment of public funding for the infrastructure investment. Consider regulations requiring vessels to connect to shore power if it is present.

3.2.4 Significant Unavoidable Adverse Impacts

Because of the combination of existing requirements for industrial operating permits from PSCAA, and ongoing requirements for improvements in vehicle emissions control, fuel economy, and technology improvements, and overall changes in fleet and fuel mix toward electrification and cleaner fuels, respectively, no significant unavoidable adverse impacts to air quality are anticipated.

Potentially significant impacts to GHG emissions could be expected for all alternatives as they could have the potential for increased GHG emissions above the 10,000 MTCO2e mandatory reporting threshold. However, through mitigation implementation, local and state climate actions, and expected continued regulatory changes, the alternatives may result in a decrease of the growth in GHG emissions such that the impacts from future development allowed by the changes in plans and zoning could be considered less than significant for SEPA. As proposed, the alternatives would not prevent or deter efforts to reduce emissions in comparison to local or regional goals or targets for GHG reductions.

While each alternative would create a net increase in GHG emissions generated from growth and development in the study area, the region-wide benefit of capturing development that might otherwise occur in peripheral areas of the city or region could serve to offset these impacts.

Section 3.3

Water Resources

This section discusses water resources in the study area, including:

- Longfellow, Puget, and Wolfe Creeks
- Elliott Bay
- Duwamish River
- Ship Canal / Salmon Bay
- Groundwater

Impacts described in the following sections are broad evaluations based upon the details available at the time of analysis; each future planned action will be subject to City of Seattle code, regulations, and ordinances and will need to demonstrate consistency with applicable critical area requirements.

Thresholds of significance utilized in this impact analysis include:

- Development that results in discharges to surface waters that do not meet water quality or flow control standards.
- Development that eliminates groundwater recharge or results in groundwater that does not meet water quality standards.
- Development that increases vulnerability to sea level rise.

3.3.1 Affected Environment

Study Areas

The study area consists of the primary and secondary study areas. The primary study area encompasses all industrial land in the city and includes the Ballard Interbay Northend Manufacturing Industrial Center (BINMIC) and the Greater Duwamish Manufacturing and Industrial Center (Greater Duwamish MIC). The primary study area is divided into five subareas:

- Ballard
- Interbay Dravus
- Interbay Smith Cove
- SODO/Stadium
- Georgetown/South Park

The primary study area also includes other industrial zones lands within the city.

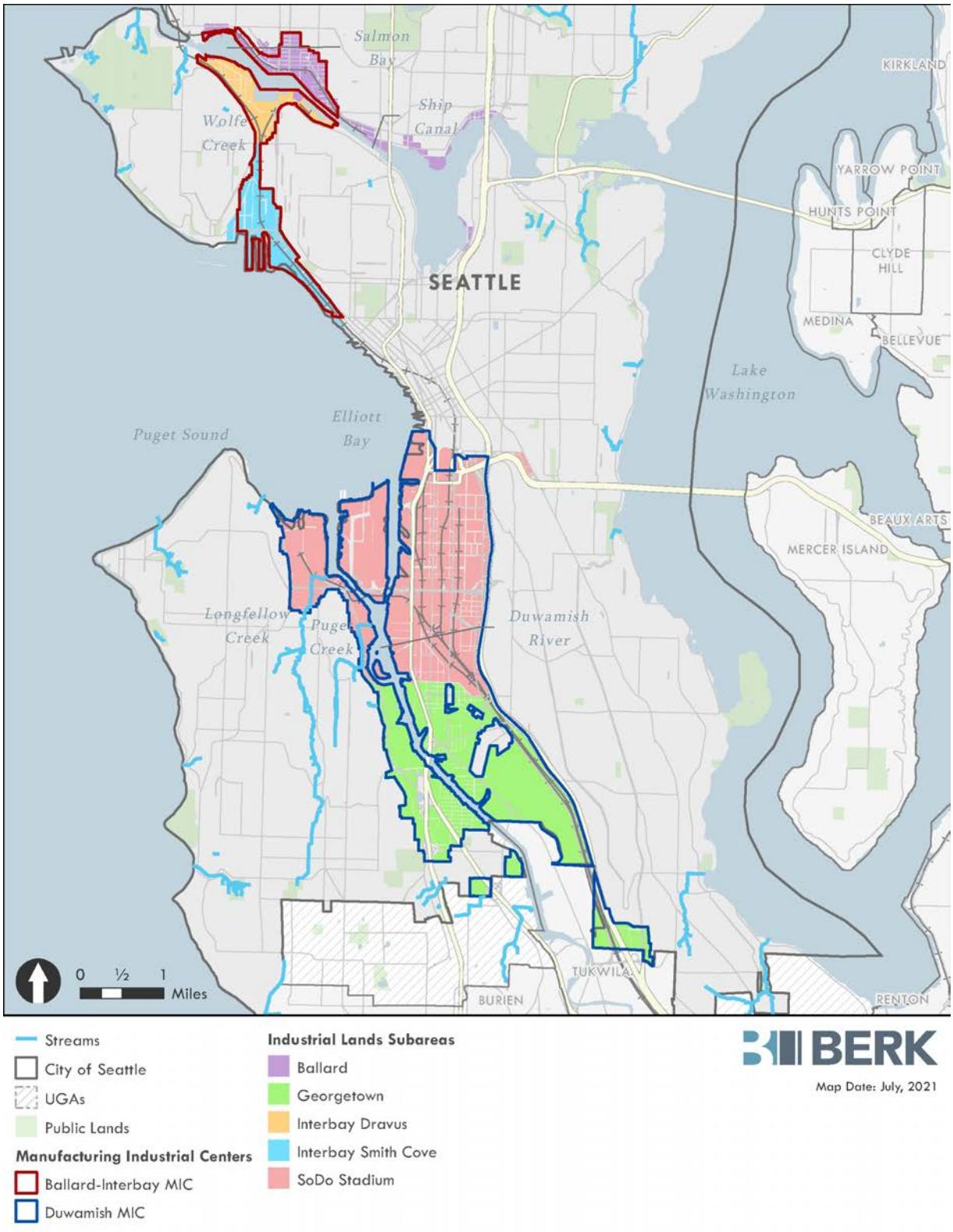
The secondary study area is defined as the area 500 feet from the primary study area because development of the Seattle Industrial and Maritime Lands could affect adjacent water resources.

Exhibit 3.3-1 lists surface water bodies located in each of the subareas, and **Exhibit 3.3-2**, **Exhibit 3.3-3** shows surface water bodies and watersheds of natural streams relative to the Secondary Study Area.

Exhibit 3.3-1 Surface Water Bodies Located in each Subarea

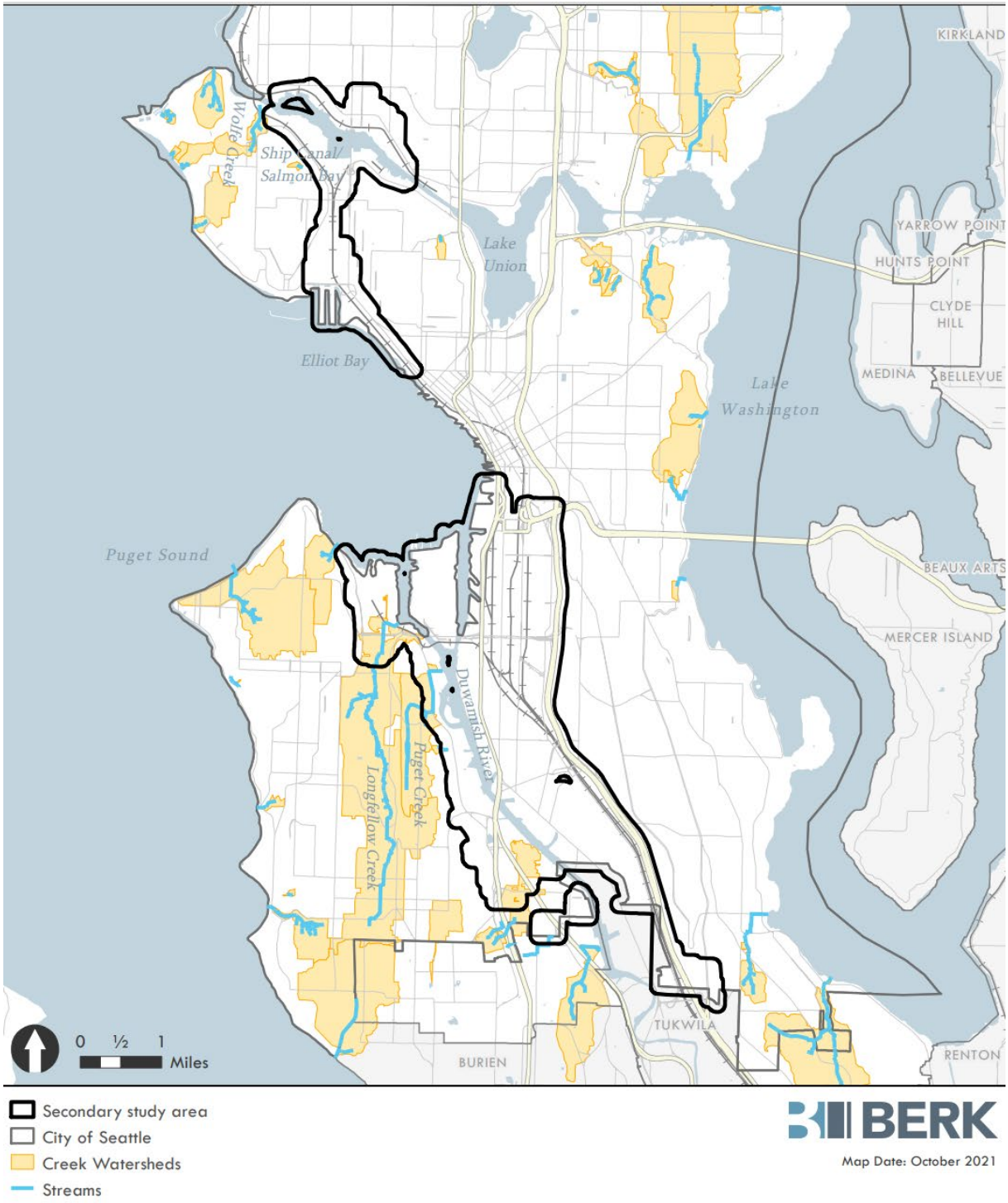
Subarea	Surface Water Bodies
Ballard	Ship Canal/Salmon Bay
Interbay Dravus	Ship Canal/Salmon Bay, Wolfe Creek
Interbay Smith Cove	North Elliott Bay, Puget Sound
SODO/Stadium	Duwamish River, Longfellow Creek, Puget Creek
Georgetown/South Park	Duwamish River

Exhibit 3.3-2 Surface Water Bodies in the Primary Study Area



Sources: Herrera, 2021.

Exhibit 3.3-3 Location of Surface Water Bodies and Watersheds of Natural Streams



Sources: Herrera, 2021.

Data & Methods

Current water quality was determined based upon the Ecology list of Category 5 impaired waters, and existing focus studies of surface, groundwater, and climate change performed in the study area and more broadly in the region.

The project team collected data from the following sources to support analysis of surface and groundwater conditions:

- Ship Canal Water Quality Project Final Facility Plan Prepared for Seattle Public Utilities (CH2M March 2017)
- Seattle Creeks State of the Waters Report (City of Seattle 2007)
- Ecology Water Quality Assessment Database (Ecology 2014)
- Duwamish Basin Groundwater Pathways Conceptual Model Report (Hart Crowser, Inc. 1998)
- Draft EIS Magnolia Bridge Replacement (KPFF Consulting Engineers Shannon and Wilson, Inc. 2005)
- Assessment of Existing Groundwater Quality Data in the Green-Duwamish Watershed, Washington Report 2019-1131 (USGS 2019)
- Wolfe Creek Drainage Feasibility Study Final Report (WR Consulting 2008)
- Projected Sea Level Rise for Washington State (Miller 2018)
- Preparing for Climate Change (City of Seattle 2017)

Current Policy & Regulatory Frameworks

Surface water quality is based upon the Washington State Department of Ecology beneficial uses for each water body in the plan area. Use designations differ for marine and fresh waters. Designated uses for marine waters in WAC 173-201A and for freshwaters in WAC 173201A-600. Aquatic life use is rated higher in Puget Sound (extraordinary) than Elliott Bay (excellent). These marine water bodies are both designated for shellfish harvesting and primary contact recreation (such as swimming), although shellfish harvesting is prohibited for all marine beaches in Seattle due to potential contamination by fecal bacteria and other pollutants.

Aquatic life and recreational uses for the freshwater bodies are highest (core summer habitat and extraordinary primary contact) for the Ship Canal/Lake Union, and the Duwamish River (rearing/migration and secondary contact). All freshwater bodies are designated for water supply uses with the exception that the Duwamish River is not designated for domestic water supply.

Water quality standards developed by Ecology under the Washington Administrative Code 173-201A set limits that are intended to protect aquatic life and recreational uses. The standards depend on the specific use designation for each water body, and they vary for fresh waters (streams, rivers, and lakes) and marine waters (Ecology, 2012a). Numeric standards are established for conventional parameters (common pollutants such as high temperature, low

dissolved oxygen, pH, and turbidity), some toxic substances (mostly metals and some organic chemicals), and fecal bacteria. Under Section 303(d) of the Clean Water Act, Ecology is required to prepare a water quality assessment and develop a list of surface waters (marine and fresh water) that are impaired. This list is periodically prepared by Ecology and submitted to EPA for review and approval. The current active list was published in 2014 (Ecology, 2014).

The Section 303(d) list identifies five categories of water quality impairments:

- Category 1—meets tested standards for clean waters
- Category 2—waters of concern
- Category 3—insufficient data
- Category 4—polluted waters that do not require the establishment of a total maximum daily load (TMDL) for targeted pollutant(s) to allow the achievement of the surface water quality standards
- Category 5—polluted waters that require a TMDL program to establish maximum allowable pollutant discharges.

Groundwater quality is regulated by the Washington State Department of Ecology (Ecology) under the Water Quality Standards for Groundwaters of the State of Washington (Washington Administrative Code 173-200). These standards list the maximum concentrations of contaminants that are allowed in groundwater and prohibit further groundwater contamination.

Shoreline development is regulated at the local level by the Shoreline Master Program (SMP; Seattle Municipal Code 23.60A), which mandates that all shoreline modifications be constructed and managed to achieve no net loss of ecological functions. Shoreline setbacks in the SMP are based on the Ordinary High Water Mark (OHWM) as defined by WAC 173-22-030. The Washington Department of Ecology also provides regulatory oversight of shoreline development through the State Environmental Policy Act (WAC 197-11) and Habitat Project Approval process (WAC 220-660), both of which also use the OHWM as a jurisdictional boundary.

Section 10 of the Rivers and Harbors Act, administered by the US Army Corps of Engineers (USACE), provides for permitting of any work in, over, or under navigable waters of the United Sates, or which affects the course, location, conditions, or capacity of such waters. Regulated activities include docks and piers, marinas, intake and outfall pipes, transmission lines, and dredging. The USACE Seattle District recently redefined its jurisdictional boundary to be the High Tide Line, defined as the “maximum height reached by a rising tide,” which encompasses spring high tides, but not storm surge.

The City of Seattle adopted the 2013 Climate Action Plan (CAP), 2018 Climate Action Strategy and 2017 Preparing for Climate Change includes City actions that will increase resilience to the likely impacts of climate change. Acknowledging that preparing for climate change impacts is a complex challenge, the CAP includes proactive planning for major infrastructure to include future projected conditions to prevent costly repairs or retrofits. The CAP also provides for

community equity in planning for climate impacts, with priority given to actions that help vulnerable populations moderate potential impacts. Sea level rise projections that apply to the BINMIC and Greater Duwamish MIC are described below.

Section 3.14 summarizes stormwater related policies and regulations that pertain to new development and redevelopment within the BINMIC and Greater Duwamish MIC, including City policies related to accounting for climate change in utility planning.

Current Conditions

Full Study Area

Surface Water

Water bodies located solely in the BINMIC study area include the Ship Canal (and Salmon Bay) and Wolfe Creek. Water bodies located solely in the Greater Duwamish MIC study area include the Duwamish River, Wolfe Creek, Longfellow Creek, and Puget Creek.

Puget Sound is a fjord-like estuary that stretches from Hood Canal to north of Admiralty Inlet. Freshwater flows influence water circulation in this portion of Puget Sound. Two main freshwater bodies flow into Puget Sound in the study area, the Green/Duwamish River, which enters Elliott Bay, and the Cedar River (Lake Washington drainage basin), which flows into the Sound through Lake Washington and the Ship Canal.

Elliott Bay is a partially enclosed embayment that is bordered on the north, east, and south sides by urbanized areas of Seattle and by Puget Sound on the west. The northern shoreline borders the Interbay Smith Cove Subarea, and the southern shoreline borders the SODO/Stadium Subarea. Both the southern and northern portions of Elliott Bay are heavily altered by industrial facilities.

The Lake Washington Ship Canal system is an 8.6-mile-long navigable waterway, completed in 1934, connecting Shilshole Bay in Puget Sound to Union Bay in Lake Washington. The system is bordered by the Ballard Subarea to the north and Interbay Dravus Subarea to the south. The Ship Canal includes several interconnected waterways—Hiram M. Chittenden Locks (Ballard Locks), Salmon Bay, Salmon Bay Waterway, Fremont Cut, Lake Union, Portage Bay, and Montlake Cut. The Ship Canal borders the Ship Canal Neighborhoods on the west end and the Lake Washington Neighborhoods on the east end. Lake Union is a freshwater lake that receives most of its inflow from Lake Washington via the Montlake Cut and Portage Bay.

Wolf Creek is a small stream located in the Dravus Bay subarea, with a watershed of approximately 90 acres, located in the Magnolia Neighborhood, which flows into Salmon Bay. It is highly modified with approximately 3,100 feet of open channel.

The Duwamish River originates at the confluence of the Green and Black Rivers near Tukwila and flows northwest for approximately 12 miles, splitting at the southern end of Harbor Island

to form the East and West Waterways before discharging into Elliott Bay. The Duwamish River extends through both the SODO/Stadium and Georgetown/South Park subareas. The downstream portion of the Duwamish River serves as a major shipping route for bulk and containerized cargo. A portion of the lower Duwamish River is maintained as a federal navigation channel by the Corps of Engineers.

Longfellow Creek is approximately 3.5 miles in length and is a tributary of the Duwamish River discharging to the Duwamish River in the SODO/Stadium Subarea. It is one of the four largest streams in the City of Seattle with a watershed size of 2,685 acres. The creek originates in the Roxhill Park neighborhood, flows north along the valley of the Delridge Neighborhood of West Seattle, and then flows into the Duwamish Waterway.
Puget Creek is located in the SODO/Stadium Subarea on the eastern side of West Seattle and drains to the Duwamish River.

Groundwater

Because of the presence of a municipal water system in the Seattle area and the sources not located in the study area, groundwater use is generally limited to emergency and industrial supply wells for non-drinking use. No drinking water wells, wellhead protection areas, critical aquifer recharge areas, or sole source aquifers are identified in the study area. Numerous observation and test groundwater quality monitoring wells are present in the study areas due to historical industrial contamination and monitoring of clean-up projects.

Sea Level Rise

Seal levels in Elliot Bay have been monitored by the National Oceanic and Atmospheric Administration since 1899 (gauge #9447130). Observations are representative of the unrestricted tidal regions in the study area, but not the waterways within the Ship Canal system, which are controlled by the system of locks. Sea levels at the gauge have historically risen at a rate of 0.68 feet in 100 years. By comparison, recent work by the UW Climate Impacts Group (Miller et al. 2018) provide central to high-end estimates of future sea level rise of 2.3-5.1 feet by 2100. Sea level rise projections apply to all tidally influenced water bodies including Puget Sound, Elliott Bay, and the Duwamish River and may also affect water levels near the outlets of creeks in the primary study area. Ship Canal and Lake Union are above the Hiram M. Chittenden Locks so they are not affected by sea level rise. Sea level rise may also affect groundwater levels in the study area, which has the potential to cause flooding and affect underground infrastructure, including the wastewater, combined sewer, and stormwater infrastructure described in **Section 3.14 Utilities**.

Subareas

Ballard & Interbay Dravus

King County has characterized water in the Ship Canal and Lake Union as “fair” for most parameters important to fish and wildlife (temperature, dissolved oxygen, pH, and nutrients) and to humans (fecal coliform bacteria). The water in these areas is flushed rapidly with good quality outflow from Lake Washington. Salmon Bay is on the 303(d) list for total phosphorus, fecal coliform bacteria, lead, and aldrin.

There is no summary water quality data for Wolfe Creek and no 303(d) category 5 listings.

Groundwater elevation in the Ship Canal area is generally a shallow confined aquifer and ranges from 10 to 30 feet below the ground surface. Groundwater discharge from the shallow unconfined aquifer is primarily into the Ship Canal. Shallow groundwater wells have shown contamination for petroleum hydrocarbons (oil and gasoline), heavy metals (such as arsenic, chromium, lead, and mercury), dry cleaning and degreasing solvents (such as trichloroethylene and tetrachloroethylene) and asbestos.

Interbay Smith Cove

In general, the overall water quality in Puget Sound and Elliott Bay is good based on water quality parameters such as bacteria, nutrients, temperature, chlorophyll, dissolved oxygen, solids, and transparency. However, fecal coliform bacteria have exceeded allowable levels in some areas of these marine waters, most notably Elliott Bay, that are included on the 303(d) list of impaired waters.

The predominant groundwater flow system area consists of a shallow unconfined aquifer system. A lesser predominant system includes a deep artesian aquifer located approximately 300-400 feet below sea level (KPFF Consulting Engineers Shannon and Wilson, Inc. 2005). Groundwater elevations in the north Elliott Bay area is generally a shallow unconfined aquifer that ranges from 5 to 15 feet below the ground surface. Groundwater discharge from the shallow unconfined aquifer is primarily into Elliott Bay to the south. Contaminants detected in shallow groundwater include petroleum hydrocarbons, volatile organic compounds (VOC's), polycyclic aromatic hydrocarbons (PAH's), polychlorinated biphenyls (PCBs), and dissolved metals (KPFF Consulting Engineers Shannon and Wilson, Inc. 2005).

SODO/Stadium

The Duwamish River is included on Ecology’s 303(d) category 5 list as impaired waters for fecal coliform bacteria, temperature, pH, and dissolved oxygen.

Longfellow Creek is included on Ecology’s 303(d) category 5 list as impaired waters for fecal coliform bacteria, temperature, pH, and dissolved oxygen.

There is no summary surface water quality data for Puget Creek and no 303(d) category 5 listings.

The groundwater flow system is common between the Georgetown/South Park and SODO/Stadium subareas. Groundwater is generally a regional discharge due to its low elevation and surface water outlet at Elliott Bay. Groundwater is typically 5 to 15 feet below the ground surface. Tidal influence is present within 300 to 500 feet of the river where groundwater may fluctuate several feet and may rise in elevation as a result of sea level rise. Groundwater flow is generally to the Duwamish River (Hart Crowser, 1998). A recent summary of shallow groundwater wells by USGS showed contamination for all classes of chemicals selected for research. Contaminants researched and confirmed were petroleum hydrocarbons (oil and gasoline), heavy metals (arsenic, zinc, and copper), polychlorinated biphenyls (PCBs), and phthalates (USGS 2019).

The shoreline of the SODO/Stadium Subarea surrounding the Lower Duwamish River and the mouths of Longfellow Creek and Puget Creek are vulnerable to sea level rise.

Georgetown/South Park

The Duwamish River and groundwater system extends through both the Georgetown/South Park and SODO/Stadium subareas so that the current conditions described above for that subarea apply in the Georgetown/South Park Subarea. Significant portions of both the Georgetown and South Park neighborhoods are susceptible to sea level rise. Areas in Georgetown are primarily vulnerable to rising groundwater levels, including areas northeast and southwest of Marginal Way, while South Park is primarily vulnerable to water overtopping the banks of the Duwamish River.

3.3.2 Impacts

Impacts Common to All Alternatives

Surface Water & Groundwater

Rainfall runoff from a portion of the Study Area discharges to natural streams including, Longfellow Creek, Puget Creek, and Wolf Creek, which are sensitive to increased flow rates or water quality impacts that could result from increases in impervious surfaces. Other water bodies including the Duwamish River, Puget Sound, and Ship Canal / Salmon Bay are only sensitive to changes in water quality that could be caused by increases in impervious surfaces or changes in land use. However, nearly all the Study Area that is feasible to develop has already been covered with a high percentage of impervious surface. Therefore, redevelopment expected under all Alternatives is not expected to significantly increase total impervious area or result in significant increases in flow rates or water quality impacts.

The Seattle Stormwater Code (SMC Title 22, Subtitle VIII) requires redevelopment projects in the Study Area to implement on-site stormwater management to infiltrate, disperse, and retain stormwater runoff to the maximum extent feasible. Where the developed site's stormwater flow rates or pollutant generation potential is expected to exceed the allowable thresholds, flow control and/or water quality treatment are required. As a result of these requirements and given that much of the existing development predates modern stormwater requirements, it is expected that there would be a reduction in uncontrolled flow rates and an increase in water quality in the Primary Study Area under all of the alternatives where new construction is anticipated.

The 2021 Stormwater Code also supports incentives for retrofitting existing development, such as opportunities for property owners to reduce their drainage rate if they install flow control and/or treatment facilities designed per the Code, which can include reducing impervious surfaces.

Under all Alternatives, including Alternative 1 No Action, implementation of on-site stormwater management and continuation of retrofit incentives would continue to reduce adverse impacts to all surface water bodies in the Study Area.

Under all alternatives, development and redevelopment projects have the potential to generate stormwater pollution during construction. The Seattle Stormwater Code requires all projects to implement Temporary Erosion and Sediment Control (TESC) stormwater management best management practices (BMPs) during construction that will minimize these impacts.

Under all Alternatives, traffic would increase within the Study Area, which has the potential to introduce metals and other pollutants to ground surfaces, which could contribute to surface water or groundwater pollution. In portions of the Study Area where stormwater discharges to the combined sewer system, these pollutants would be treated by the West Point Wastewater Treatment Plant, so no water resource impacts are expected from these areas. In areas where stormwater discharges to surface water bodies, improvements in vehicle standards and the application of stormwater requirements described above as parcels and roadways are redeveloped and upgraded is expected to offset the increase in traffic and potentially lead to a net decrease in surface water pollution.

The Seattle Stormwater Code requires redevelopment projects in the Study Area to consider infiltration as a means of managing stormwater, which could improve groundwater recharge under all Alternatives. The Code also requires review of the existing site conditions for potential soil or groundwater contamination, which would make infiltration infeasible in cases where the infiltration could mobilize existing pollutants in the soil (see **Section 3.5 Contamination**). In places where infiltration is feasible, the 2021 Stormwater Code requires infiltration facilities to protect groundwater quality.

With growth there is the potential for increased risk of spills from industrial activities, industrial processes, or use of industrial chemicals or other organics (see **Section 3.5 Contamination**). The Seattle Stormwater Code and Washington State Industrial Stormwater General Permit

require implementation of source control measures for developments that store liquids that could be spilled and impact groundwater. The use of source control BMPs would limit that risk, and any spills would be cleaned up quickly consistent with applicable state and local requirements and no significant impacts to surface or groundwater are anticipated. None of the Alternatives are expected to reduce groundwater recharge, increase the potential for groundwater contamination, or increase mobilization of groundwater pollutants relative to existing conditions.

Sea Level Rise

Under all alternatives, low-lying areas adjacent to tidally influenced water bodies (Puget Sound, Elliott Bay, the Duwamish River, and the mouths of Longfellow Creek and Puget Creek) have the potential to be affected by sea level rise. These areas include portions of the Interbay Smith Cove, SODO/Stadium, and Georgetown/South Park subareas. Sea level rise vulnerability mapping is available from the City of Seattle and through the project StoryMap. Both maps portray results of the 2018 Washington Coastal Resilience Project report ("Projected Sea Level Rise for Washington State"). King County has infrastructure in these areas including wastewater pump stations, wastewater regulator stations, and wastewater odor control facilities that could be affected by sea level rise. The Interbay Dravus and Ballard Subareas are above the Hiram M. Chittenden Locks so they are not affected by sea level rise.

Under all Alternatives, proposed development in areas that are susceptible to impacts from extreme high tides would be required to comply with critical areas regulations for frequently flooded areas, which is regulated through the City's Environmentally Critical Areas (ECA) Code; the requirements of the Shoreline Master Program (SMP; Seattle Municipal Code 23.60A) also apply to development along the shoreline. Compliance with these codes may reduce vulnerability of those developments to sea level rise impacts relative to existing conditions.

Subarea Impacts

As described above, all alternatives are expected to result in a net improvement in water resources as newer development with modern stormwater management facilities replaces older development that lacks onsite stormwater management or flow control and water quality facilities. In general, alternatives that would result in more redevelopment would result in more improvements to water resources. Based on the square footage of new employment space and housing units added under each alternative, improvements to water resources are expected to be highest under Alternative 4 and lowest under the No Action Alternatives (see **Exhibit 3.3-4**).

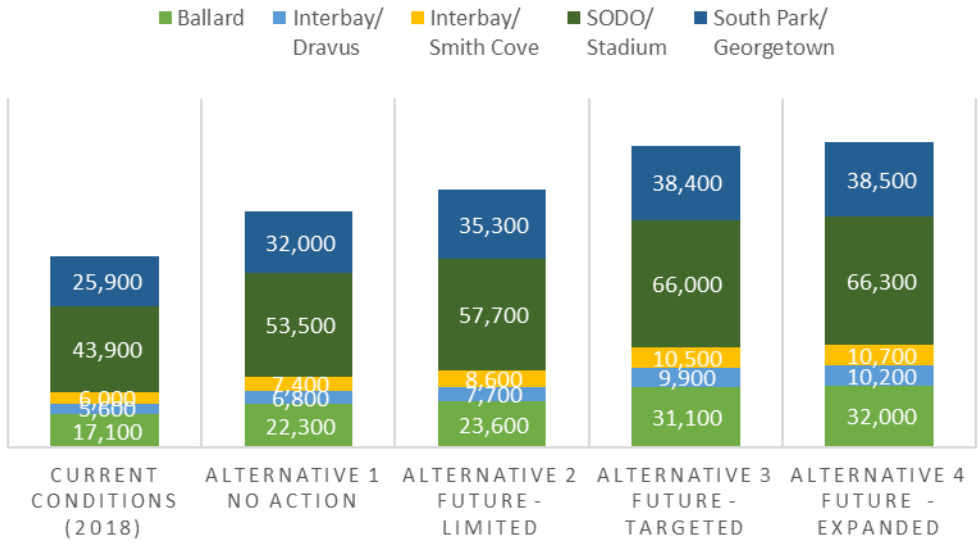
Exhibit 3.3-4 Comparison of Relative Water Resource Improvements Between Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Square Footage of New Employment Space	11,230,000	19,805,000	27,400,000	27,760,000
Housing Units Added	75	80	1,688	3,273
Relative Rank of Improvements to Water Resources	4th	3rd	2nd	1st

Sources: City of Seattle, 2021; BERK, 2021; Herrera, 2021.

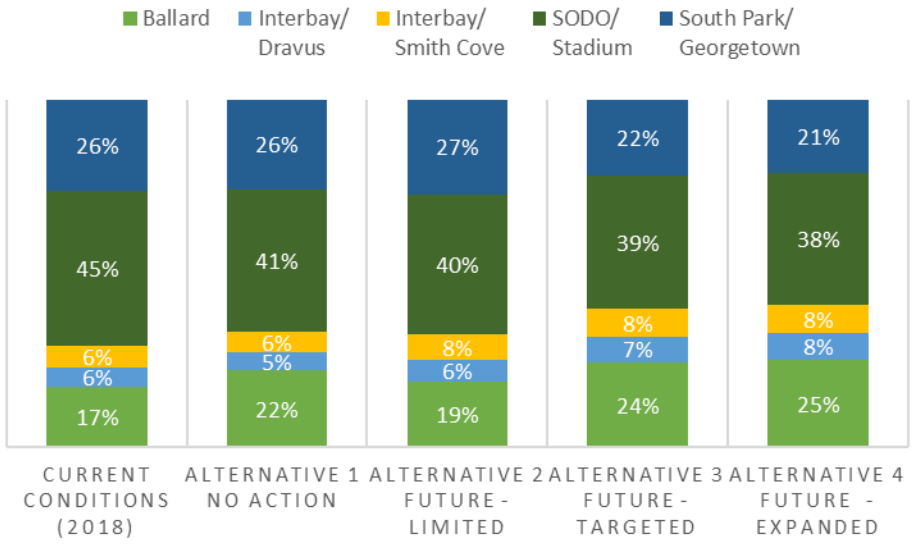
Total jobs in each subarea shows that the SODO/Stadium and Georgetown/South Park subareas have the most jobs currently and would still have the most jobs in the future. See **Exhibit 3.3-5**. The Ballard Subarea would increase its share of jobs particularly in alternatives 3 and 4 compared to other alternatives. See **Exhibit 3.3-6**. To a smaller degree the Interbay Dravus and Interbay Smith Cove subareas would also increase their share of jobs under the Action Alternatives compared to current or Alternative 1 No Action conditions.

Exhibit 3.3-5 Total Jobs by Subarea Current and Future



Sources: City of Seattle, 2021; BERK, 2021.

Exhibit 3.3-6 Share of Job Growth by Subarea Compared to Existing



Sources: City of Seattle, 2021; BERK, 2021.

Ballard

Salmon Bay is listed as an impaired water body for total phosphorus and fecal coliform bacteria. Redevelopment sites may be required to provide phosphorus treatment if discharging to Salmon Bay. Water quality treatment at redevelopment sites will reduce fecal bacteria impacts at sites that redevelop. Ballard is not expected to be vulnerable to sea level rise because it is above the Ballard Locks.

Interbay Dravus

Salmon Bay is listed as an impaired water body for total phosphorus and fecal coliform bacteria. Redevelopment sites may be required to provide phosphorus treatment if discharging to Salmon Bay. Water quality treatment at redevelopment sites will reduce fecal bacteria impacts at sites that redevelop. Interbay Dravus is not expected to be vulnerable to sea level rise because it is above the Ballard Locks.

Interbay Smith Cove

Elliott Bay is listed as an impaired water body for fecal coliform bacteria. Water quality treatment at redevelopment sites will improve fecal bacteria impacts at sites that redevelop. Minor portions of Interbay Smith Cove at Pier 90 and Elliott Avenue are vulnerable to sea level rise.

SODO/Stadium

The Duwamish River and Longfellow Creek are each listed as an impaired water bodies for fecal coliform bacteria, temperature, pH, and dissolved oxygen. Water quality treatment at

redevelopment sites will reduce fecal bacteria and other pollutant impacts. The shoreline of the SODO/Stadium Subarea surrounding the Lower Duwamish River and the mouths of Longfellow Creek and Puget Creek are vulnerable to sea level rise and all alternatives, including the No Action Alternative, would increase the concentration of people in these vulnerable areas. Compliance with requirements of the SMP and frequently flooded areas requirements at redevelopment sites, in addition to adaptation measures listed in the mitigation section, may help reduce vulnerability to sea level rise in some portions of the subarea.

Georgetown/South Park

The Duwamish River and Longfellow Creek are each listed as an impaired water body for fecal coliform bacteria, temperature, pH, and dissolved oxygen. Water quality treatment at redevelopment sites will reduce fecal bacteria and other pollutant impacts at sites that redevelop.

Significant portions of both Georgetown and South Park neighborhoods are susceptible to sea level rise and all Alternatives, including the No Action Alternative, would increase the concentration of people in these vulnerable areas. Compliance with requirements of the SMP and frequently flooded areas requirements at redevelopment sites, in addition to adaptation measures listed in the mitigation section, may help reduce vulnerability to sea level rise in some portions of the subarea.

Other Industrial Zoned Lands

Growth would result in mitigation of stormwater at redevelopment sites. Lake Union is listed as an impaired water body for fecal coliform bacteria and temperature. Elliott Bay is listed as an impaired water body for fecal coliform bacteria. Water quality treatment at redevelopment sites will reduce fecal bacteria and other pollutant impacts at sites that redevelop.

Equity & Environmental Justice Considerations

Increases in impervious surface can negatively affect surface water quality, which can disproportionately affect populations with a higher reliance on water resources for sustenance, such as subsistence fishers or Tribes. Poor water quality also poses health risks for populations that come in physical contact with surface water bodies. As described above, all Alternatives are expected to result in a net improvement in water quality and therefore reduce negative impacts on these populations as they relate to water resources.

The Seattle Mapping Inventory of Changing Coastal Flood Risk provides a screening level picture of the impacts of sea level rise on Seattle. The analysis reveals that the communities most impacted by flooding are also disproportionately characterized by high levels of social vulnerability, most notably in the Georgetown/South Park Subarea.

Impacts of Alternative 1 No Action

Surface Water & Groundwater

Impacts resulting from Alternative 1 No Action would be the same as described in the discussion of Impacts Common to All Alternatives. Compared to the Action Alternatives, there is likely to be less redevelopment in the Primary Study Area and the least improvements in surface water and groundwater that would result from installation of onsite stormwater management, flow control, and water quality treatment at redevelopment sites.

Sea Level Rise

Impacts resulting from Alternative 1 No Action would be the same as described in the discussion of Impacts Common to All Alternatives.

Impacts of Alternative 2

Surface Water & Groundwater

Alternative 2 includes greater change and densification of industrial zones than Alternative 1 which would result in increased implementation of on-site stormwater management and improvements to water resources on sites that redevelop. Alternative 2 would apply a mix of II and UI zone concepts in approximately 10% of current MIC areas. These concepts would increase the number of trees and landscaping, and green spaces, which would provide opportunities for stormwater treatment and water resource improvements. Water quality and flow control improvements would be less than alternatives 3 and 4.

Sea Level Rise

Alternative 2 includes more growth in the SODO/Stadium and Georgetown/South Park subareas than Alternative 1. These areas are substantially susceptible to sea level rise so Alternative 2 may increase vulnerability to sea level rise more than Alternative 1 by bringing more people into vulnerable areas. Through compliance with SMP and frequently flooded areas requirements, some of the development could reduce sea level rise vulnerability in areas near the shoreline more than Alternative 1, but less than alternatives 3 and 4.

Impacts of Alternative 3

Surface Water & Groundwater

Alternative 3 increases job growth and housing units in industrial and non-industrial areas more than alternatives 1 and 2 but less than Alternative 4. Implementation of on-site stormwater management at redevelopment sites would continue to reduce adverse impacts to

all surface water bodies in the Study Area. Alternative 3 would apply a mix of II and UI zone concepts in approximately 14% of current MIC areas, the most of any alternative, which would increase the number of trees and landscaping, and green spaces, which would provide opportunities for stormwater treatment and water resource improvements. Alternative 3 has greater residential growth than Alternatives 1 or 2 but less than Alternative 4. With increased residential units, pet waste and fecal coliform pollution may be increased.

Relative water resource improvement under Alternative 3 would be greater than alternatives 1 and 2 but less than Alternative 4.

Sea Level Rise

Alternative 3 includes more growth in the SODO/Stadium and Georgetown/South Park subareas than alternatives 1 and 2. These areas are substantially susceptible to sea level rise so Alternative 3 may increase vulnerability to sea level rise more than alternatives 1 and 2 by bringing more people into vulnerable areas. Through compliance with SMP and frequently flooded areas requirements, and incorporation of adaptation measures, some of the development could reduce sea level rise vulnerability in areas near the shoreline more than alternative 1 and 2, but less than Alternative 4.

Impacts of Alternative 4

Surface Water & Groundwater

Alternative 4 has the greatest increase of job growth and housing units in industrial and non-industrial areas. Because this alternative has the highest potential for redevelopment, it would also likely have the highest increase in on-site stormwater management flow control or water quality treatment, which could result in the greatest improvements in surface water and groundwater. Alternative 4 would apply a mix of II and UI zone concepts in approximately 13% of current MIC areas, only slightly less than Alternative 3, and would result in the creation of green spaces and landscaped areas that provide similar opportunities for stormwater retrofits and water resource improvements.

Alternative 4 has the greatest increase in residential units and therefore the highest potential for pet waste and fecal coliform pollution.

Sea Level Rise

Alternative 4 targets the highest growth in the SODO/Stadium and Georgetown/South Park subareas. These areas are substantially susceptible to sea level rise so Alternative 4 may increase vulnerability to sea level rise more than other Alternatives bringing the most people into vulnerable areas. Through compliance with SMP and frequently flooded areas requirements, and incorporation of adaptation measures, some of the development could reduce sea level rise vulnerability in areas near the shoreline more than the other Alternatives.

3.3.3 Mitigation Measures

Incorporated Plan Features

There are no incorporated plan features.

Regulations & Commitments

Regulatory requirements for addressing water resource impacts would be met under each Alternative, as discussed above in **Section 3.3.1 Affected Environment**, below, and in the Utilities Section. If thresholds listed in the City's stormwater management standards are exceeded as redevelopment occurs, projects would be required to provide BMPs to the maximum extent feasible to infiltrate, disperse, or retain stormwater runoff. Projects would also be required to provide water quality treatment to reduce pollution levels in stormwater, and flow control to reduce flow rates as thresholds are exceeded. Compliance with these regulations is anticipated to result in a net benefit to water resources under all Alternatives.

A majority of development and redevelopment projects would be parcel-based and require source control BMPs to the extent necessary to prevent prohibited discharges and to prevent contaminants from coming in contact with drainage water or being discharged to the drainage system, public combined sewer, or directly into receiving waters (City of Seattle Stormwater Manual, Volume 1, Chapter 2).

An individual project's plan for the type of surface that is new and replaced determines the requirement for water quality treatment. In general, pollution-generating hard surfaces (vehicular traffic, industrial activities, storage of wastes or chemicals) require a higher level of treatment over pollution-generating pervious surfaces (lawns, landscaping areas, parks).

Development and redevelopment projects would be required to conduct a downstream analysis of the runoff leaving the project site. This analysis is based upon the receiving water or point of discharge and is subject to review and approval or disapproval by the SPU Director. Due to the complexity of the City drainage system (creeks, ditches, combined sewer with capacity, combined sewer without capacity, small lakes, and designated receiving water) each project will be unique for the analysis and result.

Surface and groundwater quality at industrial and business sites are protected through ongoing inspection programs, which also applies to new development. Industrial permits issued and managed by the Washington State Department of Ecology and held by individual properties are inspected and held to source control BMPs. In some cases, depending on the industrial activity, properties are held to chemical discharge limits. Seattle Public Utilities conducts site inspections of all industrial and business properties with the potential to pollute surface and groundwaters through its NPDES Stormwater Phase 1 permit-requirements and local code (SMC 22.803.040).

Other Potential Mitigation Measures

Alternatives 3 and 4 result in the greatest increase in housing in portions of the Ballard and SODO/Stadium Subareas, which could create a larger concentration of pets and associated animal waste and a potential to impact local surface water quality. An increased emphasis on pet waste management through education and outreach and increased pet waste disposal stations should be implemented in areas surrounding these housing developments to prevent negative impacts on water quality.

All Alternatives, including the No Action Alternative, would increase the concentration of people in SODO/Stadium and Georgetown/South Park Subareas, which have large geographic areas that are vulnerable to sea level rise impacts. The City of Seattle Office of Sustainability and Environment (2017) has identified the following adaptation strategies that should be prioritized by the City and partner agencies as a means of reducing vulnerability to sea level rise in the Study Area:

- Explore further opportunities to incentivize or require existing building upgrades to improve preparedness for future climate conditions.
- Develop mechanisms to incorporate climate preparedness and passive survivability into the planning and development processes for new development.
- Consider the disproportionate impacts of climate change on communities of color and lower income communities in planning, policies, and programs, and prioritize programs and incentives that mitigate those impacts.
- To reduce flood risk and reduce flood insurance rates, evaluate the benefits and costs of participating in the National Flood Insurance Community Rating System program.
- Evaluate the requirements of the Floodplain Development Ordinance to identify additional opportunities to reduce food hazards, including the base flood elevation threshold, the definition of a substantial improvement, and the regulation of footbridges and other potential obstructions to stream flow.
- Regularly update flood prone area maps to incorporate the latest data near creeks, shorelines, and other emerging urban flooding areas.
- Conduct a detailed coastal study of the Duwamish River to better delineate the current and increasing risk of flooding and identify a range of mitigation strategies to pursue.
- Assess the benefits of incorporating rolling easements into the next update of the Shoreline Master Plan.
- Continue to incorporate Green Stormwater Infrastructure (GSI) into development regulations.
- The City should also evaluate vulnerability of underground infrastructure to higher groundwater levels.

3.3.4 Significant Unavoidable Adverse Impacts

Under all proposed alternatives, any redevelopment or new development will require compliance with all applicable regulations to avoid, minimize, or mitigate any impacts to water resources. Development will need to meet stormwater requirements to protect surface and groundwater from increased flow or water quality impacts. Therefore, no significant unavoidable adverse impacts are anticipated on water resources under any of the proposed alternatives.

Section 3.4

Plants & Animals

The study area is highly urbanized, but still provides habitat for numerous plant and animal species. Many of these are nonnative introduced species, and most of them are well-adapted to the urban environment and high levels of human disturbance.

Thresholds of significance used for this impact analysis include:

- The potential to reduce or damage rare, uncommon, unique, or exceptional benthic, marine, wetland, riparian, or fish and wildlife habitat.
- The potential to harass, harm, wound or kill any species listed as federally threatened or endangered.
- The potential to adversely affect critical habitat for any federally threatened or endangered species.
- The potential to block migration corridors for special status species.
- Terrestrial noise levels generated exceed any established injury thresholds for any special-status species.

3.4.1 Affected Environment

Study Area

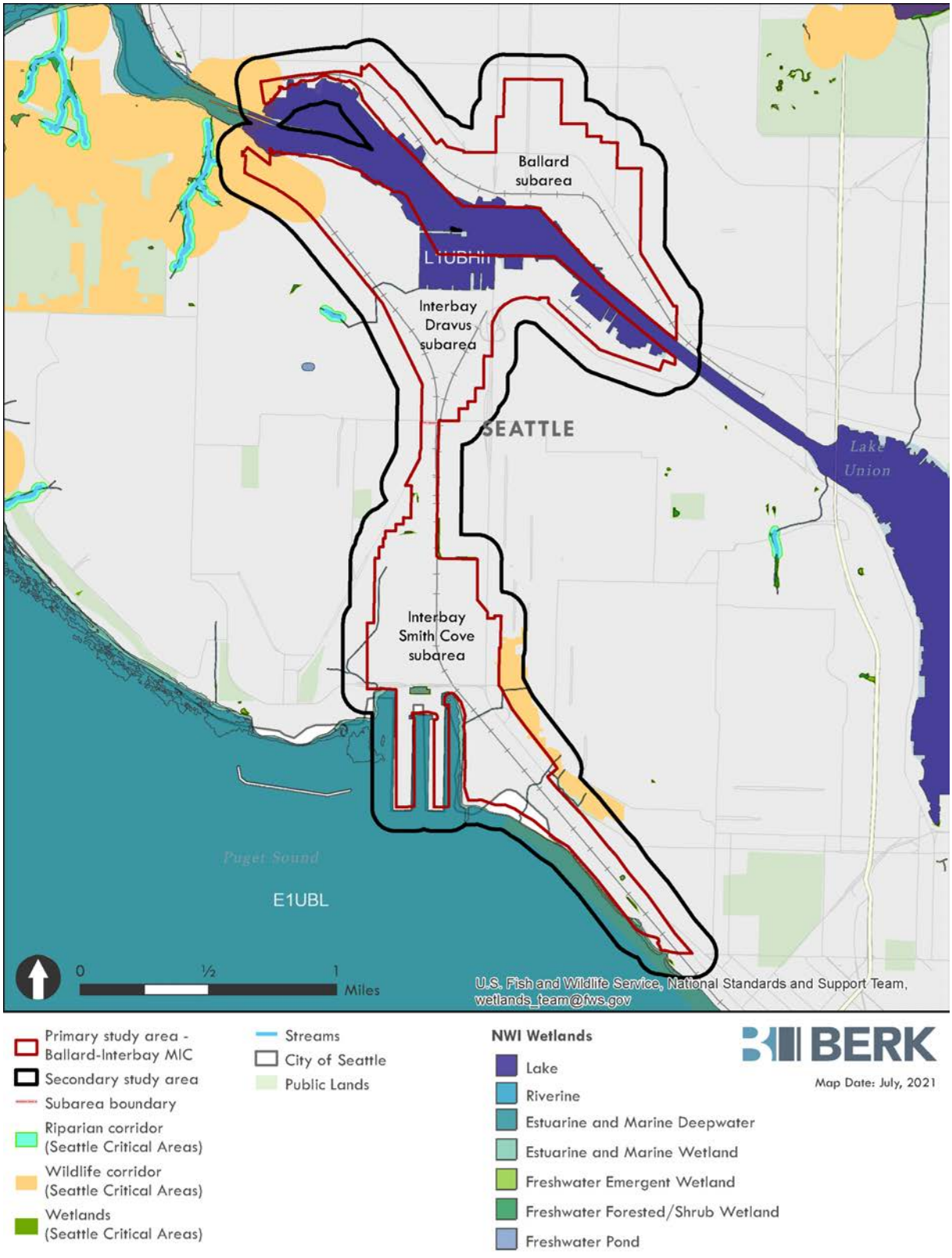
The study area consists of primary and secondary study areas. The primary study area encompasses all industrial land in the City and includes the Ballard Interbay North Manufacturing Industrial Center (BINMIC; **Exhibit 3.4-1**) and the Greater Duwamish Manufacturing and Industrial Center (Greater Duwamish MIC; **Exhibit 3.4-2**). The primary study area is divided into five subareas as follows:

- Ballard
- Interbay Dravus
- Interbay Smith Cove
- SODO/Stadium
- Georgetown/South Park

The primary study area also includes other industrial zones lands within the city.

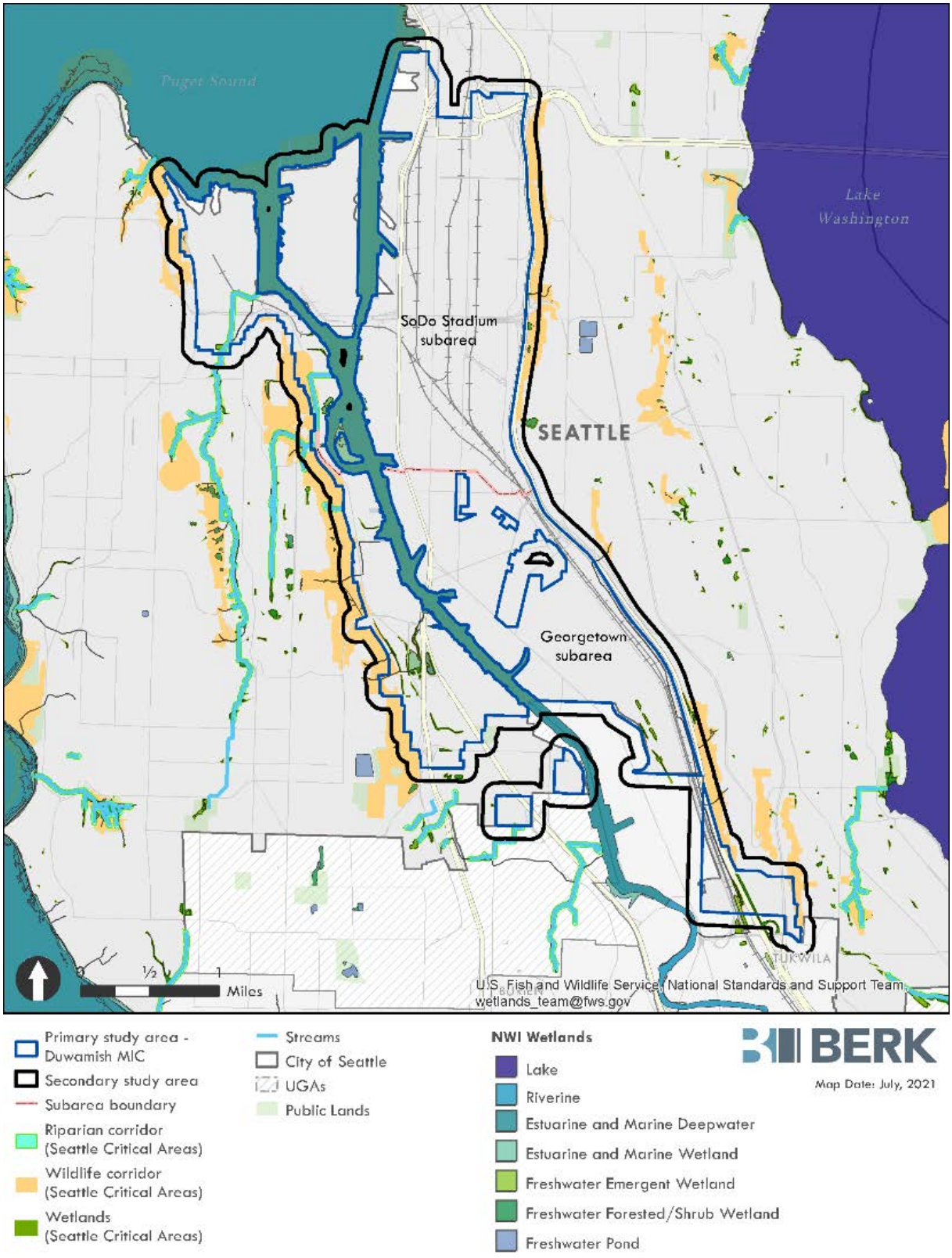
The secondary study area is defined as the area 500 feet from the primary study area, including any waterward areas because development of the Seattle Industrial and Maritime Lands could affect species in the nearshore (**Exhibit 3.4-1** and **Exhibit 3.4-2**). Water quality affecting plants and animals is discussed below as well as in **Section 3.3 Water Resources**.

Exhibit 3.4-1 BINMIC Study Area and Critical Areas, 2021



Source: Herrera, 2021.

Exhibit 3.4-2 Greater Duwamish MIC Study Area and Critical Areas, 2021



Source: Herrera, 2021.

Data & Methods

To characterize plants and animals for each alternative, the project team reviewed GIS data for the primary and secondary study areas identified for each alternative. Data sources included aerial imagery, national wetlands inventory, the City's GIS data for environmentally critical areas (wetlands, streams, wildlife habitats and riparian corridors) and the Washington Department of Fish and Wildlife's Priority Habitats and Species (PHS) information, as well as existing reports.

This review is a general summary for the purposes of identifying plants and animals that could be affected by implementation of the program. As with most construction projects conducted in the city, projects proposed under the program would require site-specific analysis to determine the presence of sensitive or protected plants, habitats, fish, or wildlife.

Current Policy & Regulatory Frameworks

Several federal, state, and local regulations and permits relate to the protection of plants and animals within the study areas (**Exhibit 3.4-3**). Projects that involve federal funding, land, or permits from a federal agency trigger the need to comply with federal regulations.

Exhibit 3.4-3 Federal, State, and Local Regulations and Permits Related to the Protection of Plants and Animals

Statute	Lead Agency	Regulated Activity
Federal		
Endangered Species Act	National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS)	Protects species identified as endangered or threatened along with critical habitat required for the conservation of those species. NMFS has authority over anadromous fishes, marine mammals, marine reptiles, and other fish species, while the USFWS has authority over terrestrial wildlife and resident fish species that inhabit inland waters. Requires that federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat. To comply with the Act, project proponents are required to consult with the federal agencies regarding the effect of their projects on listed species.
Magnuson-Stevens Fishery Conservation Act	NMFS	Requires federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat for federally managed fish species within a 200-mile zone offshore of the United States.
Marine Mammal Protection Act	NMFS	Prohibits injury or harm to marine mammals in U.S. waters. NMFS has authority over whales, dolphins, porpoises, seals, and sea lions, while the USFWS has authority over otters. The USDA is responsible for managing marine mammals in captivity.
Migratory Bird Treaty Act	USFWS	Protects many of the most common birds in the study area as well as birds that are listed as threatened or endangered. USFWS has authority to regulate most aspects of the taking, possession, transportation, sale, purchase, barter, exportation, and importation of migratory birds. As of

Statute	Lead Agency	Regulated Activity
		March 2010, there are 1,007 species protected under the Act (Federal Register Vol. 75, No. 39). Species whose occurrences in the United States are strictly the result of intentional human introduction are not protected under the Act. Of particular concern are activities that affect birds nesting on bridges, buildings, signs, illumination poles, and other structures in areas planned for construction.
Bald and Golden Eagle Protection Act	USFWS	Specifically protects bald and golden eagles and makes it unlawful to take, import, export, sell, purchase, or barter any bald or golden eagles, their parts, products, nests, or eggs. "Take" includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing eagles. To avoid potential disturbance to bald eagles, the National Bald Eagle Management Guidelines (USFWS, 2007) provide recommendations that will likely avoid take for a list of activities.
Fish and Wildlife Conservation Act	USFWS	This Act authorizes financial and technical assistance for states to develop, revise, and implement conservation plans and programs for nongame fish and wildlife.
Section 404 of the Clean Water Act	U.S. Army Corps of Engineers	Regulates the placement of dredged or fill material into waters of the United States, including special aquatic sites such as wetlands.
State of Washington		
State Hydraulic Code (Chapter 220-110 WAC)	Washington Department of Fish and Wildlife (WDFW)	Protects fish and their habitat through regulation of activities in streams and lakes. WDFW administers state rules through its Hydraulic Project Approval (HPA) program. An HPA must be obtained from WDFW before work is conducted that uses, obstructs, diverts, or changes the natural flow or bed of state waters. The conditions of an HPA can be designed to protect fish, shellfish, and their habitat.
Priority Habitats and Species Program	WDFW	Provides information on documented locations of fish and aquatic resources, terrestrial plants and animals, and habitats that are listed or defined as priority. Priority species are those species that are: state endangered, threatened, sensitive, or candidate species; animal aggregations considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable (WDFW, 2008). Priority habitats are habitat types or elements of habitat with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type (e.g., shrub-steppe) or dominant plant species, a described successional stage (e.g., old-growth forest), or a specific habitat feature (e.g., cliffs).
Natural Heritage Program	Washington Department of Natural Resources (WDNR)	Provides information for listed plant species or those that are defined as rare. Also maintains information on rare ecological communities and priority species.
Clean Water Act Section 401	Washington State Department of Ecology (Ecology)	Requires certification for any projects that may result in a discharge into waters of the United States to ensure that the discharge complies with applicable state water quality requirements.

Statute	Lead Agency	Regulated Activity
Washington State Water Pollution Control Act (RCW 90.48)	Ecology	Regulates placement of dredge or fill material within non-federally regulated wetlands or waters of the State
Furbearer Regulations	WDFW	Furbearers may not be taken from the wild and held alive for sale or personal use without a permit pursuant to WAC 232 12 064.
Water Quality Standards for Surface Waters of the State of Washington	Ecology	Aquatic life uses are designated based on the presence or protection of species. Ecology provides general water quality standards based on aquatic life use categories.
Washington Regulations for Fish and Wildlife	WDFW	Washington State has its own criteria for listing species as endangered, threatened, sensitive, and candidate. Washington has developed rules to provide for additional protection of some species and their habitat. The state has defined suitable habitat, dispersal habitat, habitat buffers, critical habitat, and critical nesting season and nesting areas.
City of Seattle		
Environmentally Critical Areas Ordinance (Seattle Municipal Code [SMC] 25.09)	City of Seattle Department of Planning and Development (DPD)	Protects and regulates activities on or adjacent to critical areas in the City. Critical areas include geologic hazard areas, flood-prone areas, wetlands, fish and wildlife habitat conservation areas (FWHCAs), and abandoned landfills. FWHCAs are wildlife habitats that are mapped or designated by WDFW, corridors connecting priority habitats, or areas that support species of local importance. FWHCAs and wetlands are typically protected by a buffer in which development, including clearing and other land disturbing activities, is prohibited or restricted. Riparian corridors, a type of FWHCA, include all areas within 100 feet of the ordinary high water mark of a watercourse. Parcels containing riparian corridors and shoreline habitat are also subject to the general development standards in SMC 25.09.060 and specific development regulations in SMC 25.09.200, as well as regulations regarding tree and vegetation alteration and pesticide use.
Shoreline Master Program (SMC 23.60)	DPD	Regulates water bodies above a threshold size as well as lands within 200 feet of the ordinary high water mark of those water bodies. Regulations include restrictions on development in the shoreline zone, requirements for maintaining native vegetation, and development standards.
Tree Protection Ordinance (SMC 25.11) and specific environmental policies related to trees (SMC 25.05.675)	DPD	Trees in Seattle are specifically valued and legally protected under various regulations in addition to the environmentally critical areas code. "Exceptional trees" are specifically protected and defined as a tree or group of trees that constitutes an important community resource because of its unique historical, ecological, or aesthetic value. Prior to construction at any site, a survey for exceptional trees would need to be conducted by a licensed arborist as required under SMC 25.11.
SEPA Plants and Animals Policy (SMC 25.05.675.N)	DPD	City policy to minimize or prevent loss of wildlife habitat. Allows DPD to grant, condition or deny construction and use permit applications for public or private proposal that are subject to environmental review.

Source: Herrera, 2021.

Full Study Area

Current conditions for plants and animals are defined as the conditions that exist within the study area in 2021 when the desktop analysis was conducted. Mapping for critical areas within the study areas are shown in **Exhibit 3.4-1** and **Exhibit 3.4-2**.

Plants

The heavily urbanized habitats in the study areas include streets, parking lots, commercial and industrial properties, high-density residential buildings, and railroad rights of way. Over the last 150 years, urban development has eliminated nearly all the native vegetation. Small pockets of native vegetation remain within protected park areas, protected shorelines, and undeveloped steep slopes. Additional vegetation exists as street trees and related streetscape vegetation in the right of way, and yards associated with private homes. Streetscape vegetation has been installed and is maintained by the City's Urban Forestry section or by private development projects under permit from SDOT.

Non-native invasive species, such as English ivy (*Hedera helix*) and Himalayan blackberry (*Rubus armeniacus*), are common in unmaintained portions of the study areas. These invasive species are well adapted to urban environments and out-compete native plant species. Non-vascular plants, such as mosses and lichens, grow on a variety of hard surfaces such as concrete, treated wood, and occasionally metal in the study areas.

The study areas for the BINMIC can be broken down into the following landscapes:

- approximately 20% vegetation
- approximately 62% hardscape
- approximately 18% water

The study areas for the Greater Duwamish MIC can be broken down into the following landscapes:

- approximately 22% vegetation
- approximately 68% hardscape
- approximately 10% water

Shorelines and nearshore areas within the study area include streams and riparian corridors, lakes, estuaries, and marine waters, as described below. Upland habitat consists of forests, natural areas, and landscaped areas.

Riparian Corridors

Riparian corridors are vegetated corridors present along streams. Within the study areas, riparian corridors are typically vegetated with deciduous trees and shrubs with a few conifer trees. Native plants common to riparian corridors in the study areas include red alder (*Alnus rubra*), big-leaf maple (*Acer macrophyllum*), Indian plum (*Oemleria cerasiformis*), vine maple (*Acer*

circinatum), willow (*Salix* spp.) and horsetail (*Equisetum* spp.). Common aquatic plants include rushes (family Juncaceae), sedges (family Cyperaceae), common cattail (*Typha latifolia*), duckweed (*Lemna* spp.), water lily, and pondweed. Nonnative invasive aquatic plants such as Eurasian watermilfoil (*Myriophyllum spicatum*) are present in some areas.

Some riparian corridors in the City are wide and densely vegetated, but most are narrow and constrained by urban development. Riparian areas provide important wildlife habitat including forage, cover, and complex habitat structure. This habitat supports a wide variety of terrestrial species such as songbirds, woodpeckers, and raptors. Riparian corridors also benefit aquatic habitats by providing shade, large wood, and organic material to streams. Streams in the study area are fed by surface runoff, groundwater, and drainage pipes that convey stormwater from impervious surfaces (Seattle 2010).

Riparian corridors are identified by the City in both the BINMIC and the Greater Duwamish MIC. Corridors within the BINMIC are connected streams that discharge to the Lake Washington Ship Canal and those in the Greater Duwamish MIC are connected to streams that discharge into the Duwamish Waterway.

Freshwater Wetlands

Freshwater wetlands in Seattle are associated with lake edges, streams and their riparian corridors, and scattered low-lying areas. Emergent, scrub-shrub, and forested wetlands are present. Plant species common to emergent wetlands include reed canarygrass (*Phalaris arundinacea*; nonnative), common cattail, and soft rush (*Juncus effusus*). Scrub-shrub and forested wetlands support many of the same plant species as riparian corridors, but also include red-osier dogwood (*Cornus sericea*), willow, and other water-tolerant species.

Freshwater wetlands are identified in both the BINMIC and the Greater Duwamish MIC study areas.

Lakes

The BINMIC study areas contain portions of Lake Union and the Ship Canal. These are open freshwater environments that have aquatic vegetation associated with them such as pondweeds (*Potamogeton* spp.) and hornwort (*Ceratophyllum demersum*). Eurasian watermilfoil and Brazilian elodea (*Egeria densa*) are invasive aquatic plants also well established in this area. The Ship Canal connects the Puget Sound to Lake Union and provides a corridor for aquatic species to travel between these two environments. Lake Union and the Ship Canal are on the Washington Department of Ecology (Ecology) 303(d) list for bacteria, temperature, and pesticides (Ecology 2021).

Estuaries

Estuaries are semi-enclosed bodies of water where freshwater and marine water mix (Hobbie 2000). These ecosystems are shaped by tidal fluctuations and freshwater flows and are among

the most highly productive and complex ecosystems in the state where quantities of sediments, nutrients and organic matter are exchanged among terrestrial, freshwater, and marine communities. In Puget Sound, salinity fluctuates with seasons and tides, making it difficult to differentiate between marine habitat and estuarine habitat. Marine nearshore areas within the study area can all generally be characterized as estuarine habitat and include Elliott bay and the Duwamish Waterway (Encyclopedia of Puget Sound 2020).

Shorelines in Elliott Bay and the Duwamish Waterway have been extensively modified by the placement of seawalls, bulkheads, and levees (Seattle 2015). Both the bay and the waterway are on the Washington Department of Ecology 303(d) list for water quality and sediment due to elevated contaminant concentrations (Ecology 2021). Estuarine wetlands in Seattle are associated with Puget Sound marine nearshore areas where enough light penetrates the water to support persistent aquatic vegetation. Estuarine wetlands are identified around Port of Seattle Terminal 91 and Smith Cove within the BINMIC study areas and in restored areas of the lower Duwamish Waterway within the Greater Duwamish MIC study areas. The Washington Department of Natural Resources identifies the presence of eelgrass (*Zostera marina*) in or around Smith Cover and the Duwamish Waterway (DNR 2021). Eelgrass provides important habitat for numerous Puget Sound species.

Forests

Forested communities are present in scattered patches throughout the city. Forests can be dominated by conifers (such as Douglas fir [*Pseudotsuga menziesii*]) or deciduous trees (such as big-leaf maple) or support a mixture of conifer and deciduous species. City of Seattle has mapped tree canopy coverage throughout the City. Forested areas are typically associated with steep slopes, top of bluffs, greenbelts, parks, and other pockets of undeveloped land. Tree canopy mapped by the City of Seattle also includes street trees. Plant species common to forested habitats in Seattle include Douglas fir, western red cedar (*Thuja plicata*), vine maple, and sword fern (*Polystichum munitum*). Forested habitats are important for woodpeckers, raptors, songbirds, crows, and jays. These forested areas are generally identified by City of Seattle critical area mapping as riparian corridors or wildlife habitat areas.

The patches of forest occur primarily within restored areas along the Duwamish Waterway, along the western edge of the Interbay neighborhood, and along W. Commodore Way leading to Commodore Park and Kiwanis Memorial Preserve Park.

Natural Areas

Natural areas support intact or natural vegetation (both native and nonnative) that is not formally landscaped. Parks and other public lands in the City support natural areas. Natural areas can contain mapped and unmapped riparian corridors and wetlands as well as forested habitats, but they can also contain grass or shrub areas that are not maintained or mowed.

Landscaped Areas

Landscaped areas provide some habitat for wildlife despite their level of development and human presence. Landscaped gardens, golf courses, and recreational parks provide food and water sources, shelter, and other habitat elements important for terrestrial wildlife. Species that use landscaped areas are usually those that can tolerate some level of ongoing human disturbance.

Animals

The study area contains a variety of fish and wildlife habitats and species. Terrestrial animals in the study areas are generally limited to those well adapted to living in a highly altered urban landscape. Examples include birds and mammals that tolerate or benefit from human disturbance, urban habitat features, and trash, such as various gulls (Family Laridae), crows (*Corvus brachyrhynchos*), coyotes (*Canis latrans*) racoons (*Procyon lotor*), opossums (*Didelphis virginiana*). Both marine and freshwater environments are present in the study areas, resulting in substantial diversity for aquatic species.

Special status species are identified in **Exhibit 3.4-4** with PHS mapping shown in **Exhibit 3.4-5** and **Exhibit 3.4-6**. Several of these species are listed as endangered or threatened under the Endangered Species Act. Lake Union, the Ship Canal, and nearshore areas of Elliott Bay are designated critical habitat for bull trout (*Salvelinus confluentus*) and Chinook salmon (*Oncorhynchus tshawytscha*), and the Duwamish Waterway provides critical habitat for bull trout, Chinook, and steelhead (*O. mykiss*). Elliott Bay is also designated critical habitat for yelloweye rockfish (*Sebastes paucispinis*) and bocaccio (*Sebastes paucispinis*). Deeper waters (great than 20 feet deep) of Elliott Bay are designated critical habitat for the Southern Resident killer whale (*Orcinus orca*) (NMFS 2021), but the species itself is extremely unlikely to occur in the study area.

The Ship Canal, Lake Union, and Elliott Bay are Essential Fish Habitat (EFH) for groundfish, Chinook, and coho salmon (*O. kisutch*). Elliott Bay and the Duwamish Waterway are EFH for Chinook, coho, pink salmon (*O. gorbuscha*), and coastal pelagic species.

Bald eagles (*Haliaeetus leucocephalus*), which are protected under the Bald and Golden Eagle Protection Act, forage in Lake Union, the Ship Canal, Elliott Bay, and the Duwamish River. Almost all other bird species are protected under the Migratory Bird Treaty Act. Although PHS data list historical occurrences of western pond turtle (*Actinemys marmorata*) in the study area, this species is extremely rare and highly unlikely to occur in the study area.

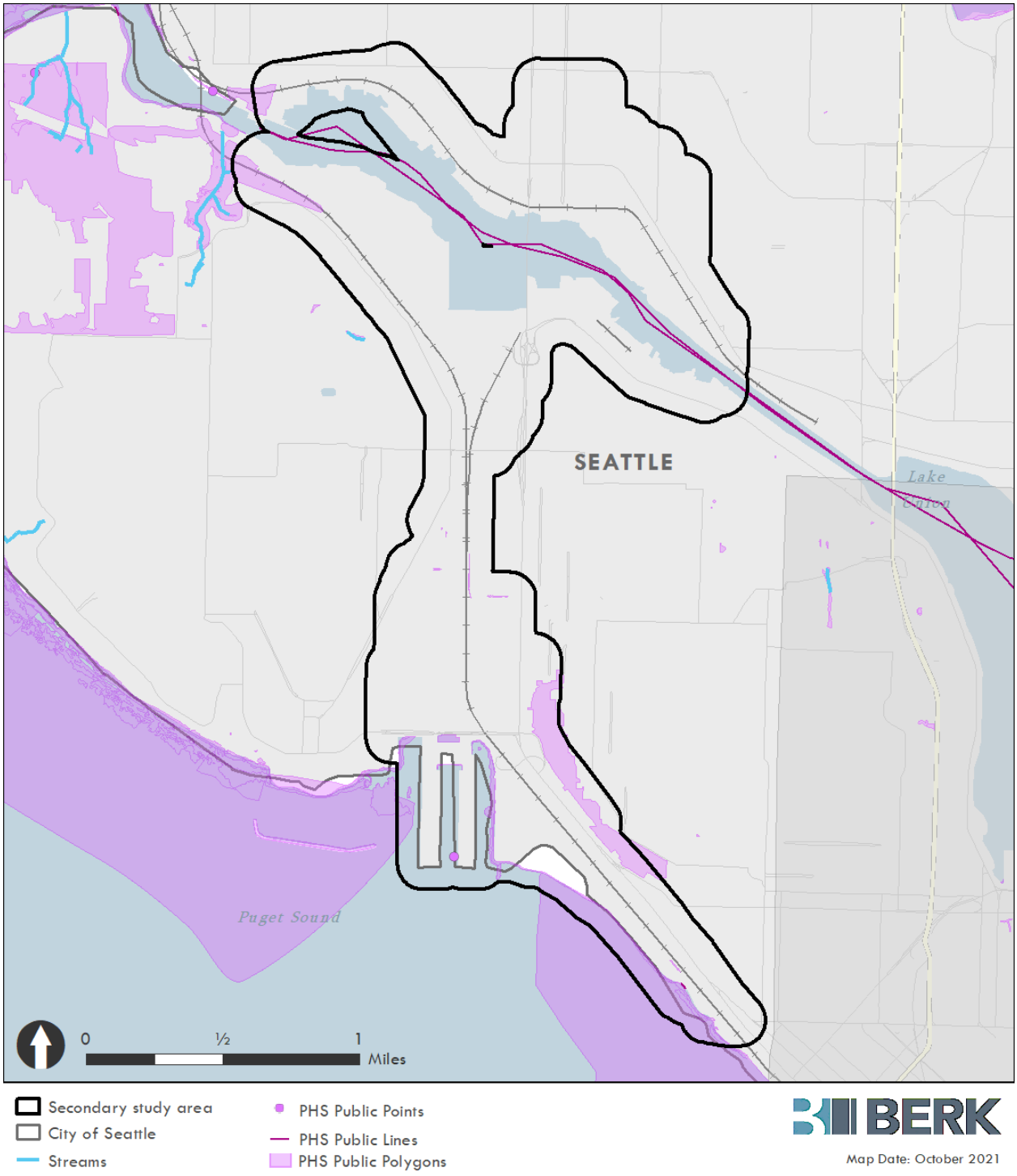
Exhibit 3.4-4 Special Status Species and Habitats Occurring in the Study Areas

Common Name	Scientific Name	Federal Status/Protection	State Status	Use of Study Area	Occurrence in Study Area
Dungeness crab	*Cancer magister*	N/A	N/A	Presence	BINMIC
Pacific Herring	*Clupea pallasi*	N/A	Candidate	Breeding Area	BINMIC
Dolly Varden/Bull Trout	*Salvelinus malma/S. confluentus*	Threatened	Candidate	Foraging/Migration	BINMIC Greater Duwamish MIC
Bull trout critical habitat	N/A	N/A	N/A	N/A	BINMIC Greater Duwamish MIC
Chinook	*Oncorhynchus tshawytscha*	Threatened	Candidate	Foraging/Migration	BINMIC Greater Duwamish MIC
Chinook critical habitat	N/A	Designated	N/A	N/A	BINMIC Greater Duwamish MIC
Chum	*Oncorhynchus keta*	Not Warranted	N/A	Foraging/Migration	Greater Duwamish MIC
Resident Coastal Cutthroat	*Oncorhynchus clarki*	N/A	N/A	Foraging/Migration	BINMIC Greater Duwamish MIC
Coho	*Oncorhynchus kisutch*	Candidate	N/A	Foraging/Migration	BINMIC Greater Duwamish MIC
Pink Salmon	*Oncorhynchus gorbuscha*	N/A	N/A	Foraging/Migration	Greater Duwamish MIC
Steelhead	*Oncorhynchus mykiss*	Threatened	Candidate	Foraging/Migration	BINMIC Greater Duwamish MIC
Steelhead critical habitat	N/A	Designated	N/A	N/A	BINMIC Greater Duwamish MIC
Sockeye	*Oncorhynchus nerka*	Not Warranted	Candidate	Foraging /Migration	BINMIC Greater Duwamish MIC
Pacific Sand Lance	*Ammodytes hexapterus*	N/A	N/A	Breeding Area	BINMIC
Yelloweye rockfish	*Sebastes ruberrimus*	Threatened	N/A	Presence	BINMIC Greater Duwamish MIC

Common Name	Scientific Name	Federal Status/Protection	State Status	Use of Study Area	Occurrence in Study Area
Yelloweye rockfish critical habitat	N/A	Designated	N/A	N/A	BINMIC Greater Duwamish MIC
Bocaccio	*Sebastes paucispinis*	Endangered	N/A	Presence	BINMIC Greater Duwamish MIC
Bocaccio critical habitat	N/A	Designated	N/A	N/A	BINMIC Greater Duwamish MIC
Purple martin	*Progne subis*	MBTA[1]	N/A	Foraging/Nesting	BINMIC Greater Duwamish MIC
Great blue heron	*Ardea herodias*	MBTA	N/A	Foraging/Nesting	BINMIC Greater Duwamish MIC
Bald eagle	*Haliaeetus leucocephalus*	BGEPA[2]	N/A	Foraging	BINMIC Greater Duwamish MIC
Other bird species	N/A	MBTA	N/A	Foraging, nesting	BINMIC Greater Duwamish MIC
Southern resident killer whale critical habitat	N/A	Designated	N/A	N/A	BINMIC Greater Duwamish MIC

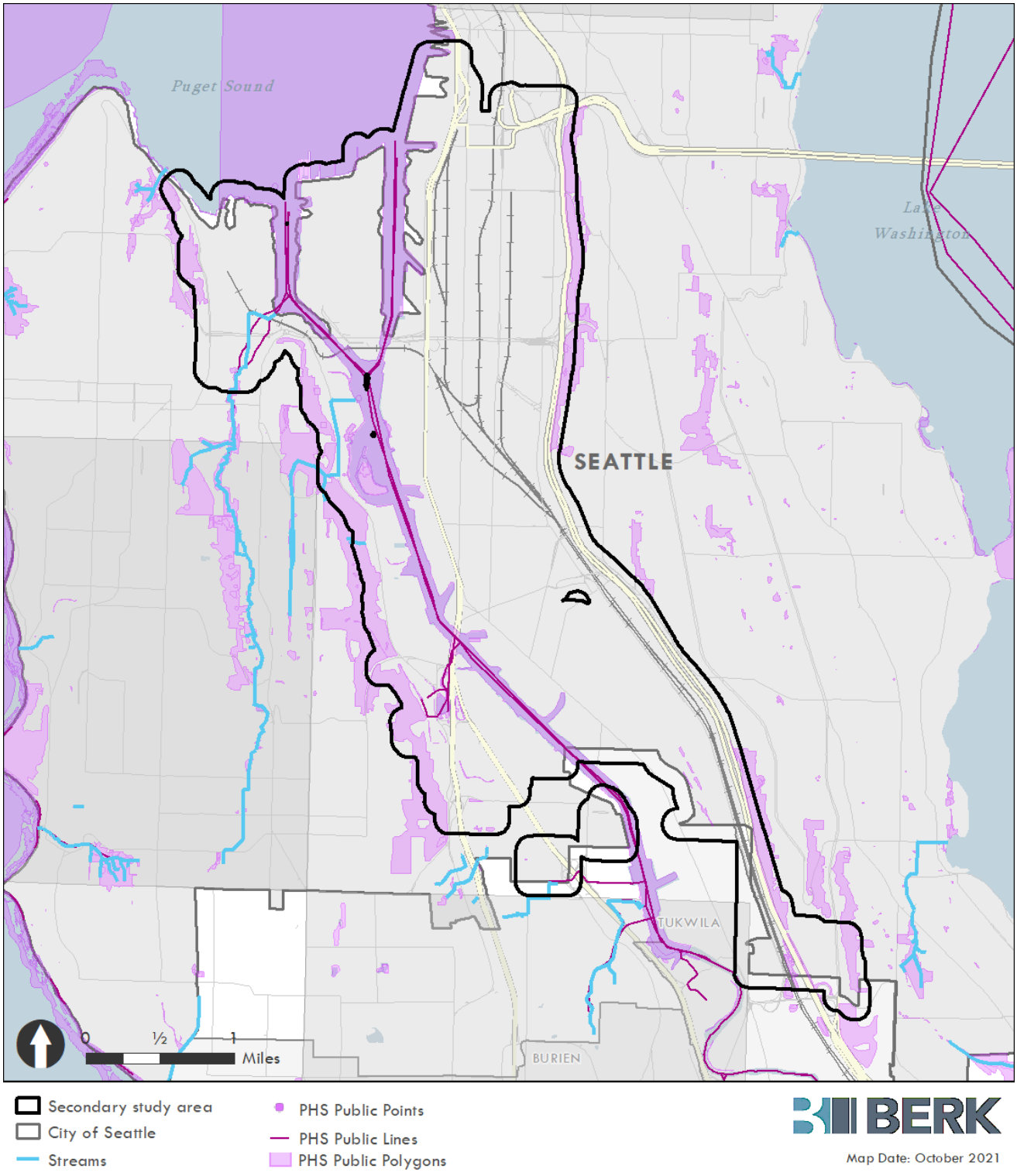
[1] MBTA = Migratory Bird Treaty Act
[2] BGEPA = Bald and Golden Eagle Protection Act
Source: Herrera, 2021.

Exhibit 3.4-5 BINMIC Study Areas PHS Mapping, 2021



Source: Herrera, 2021.

Exhibit 3.4-6 Greater Duwamish MIC Study Areas PHS Mapping, 2021

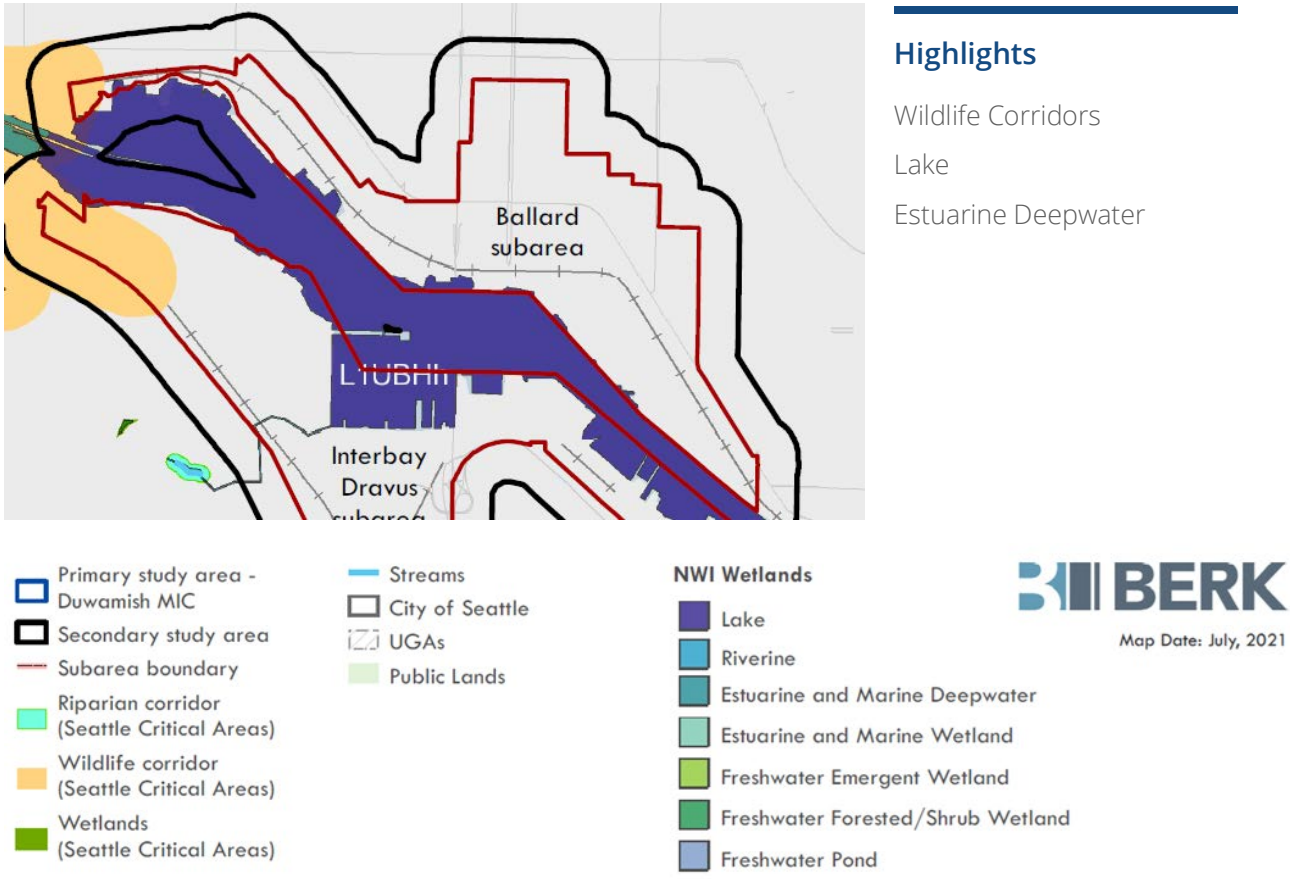


Source: Herrera, 2021.

Ballard

Critical areas identified within the Ballard Subarea are mapped in **Exhibit 3.4-7**. For further descriptions of plants in these areas please see the **Plants** section above. Areas that provide animal habitat are discussed in the **Animals** section above.

Exhibit 3.4-7 Critical Areas—Ballard Subarea, 2021



Highlights

Wildlife Corridors

Lake

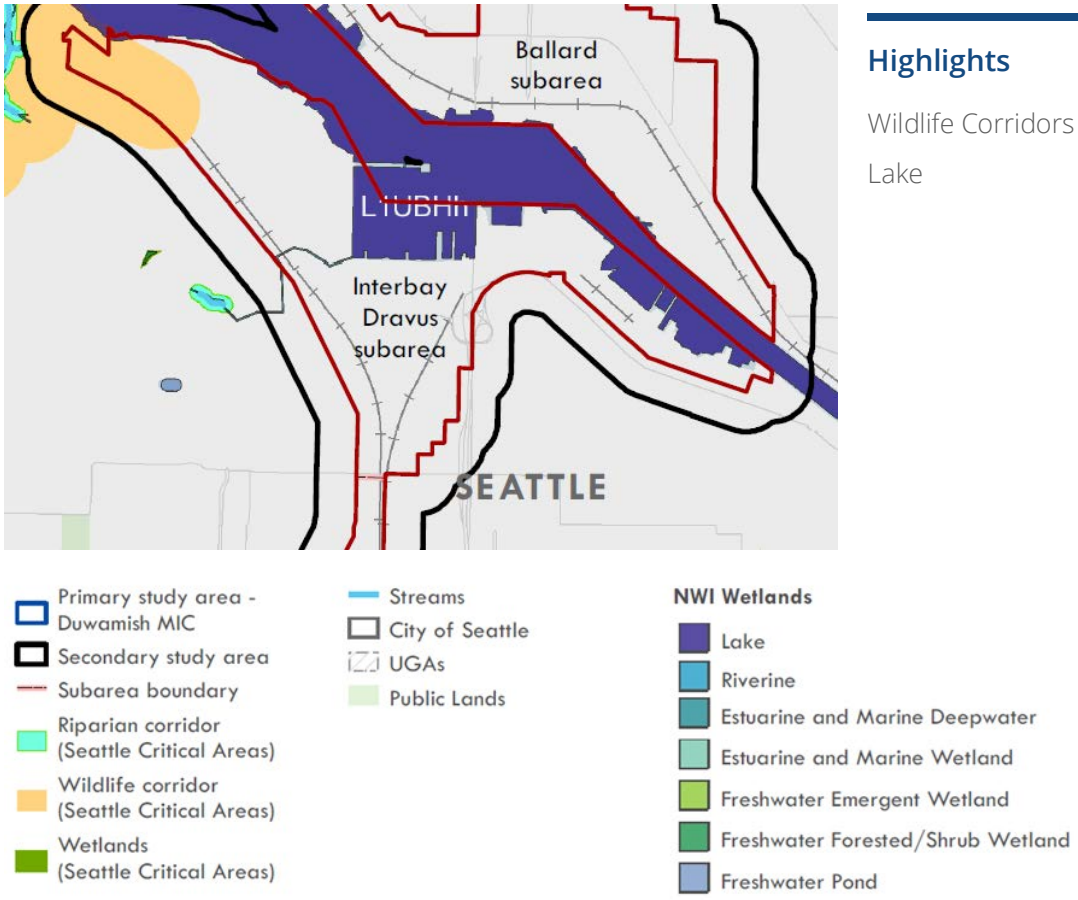
Estuarine Deepwater

Source: Herrera, 2021.

Interbay Dravus

Critical areas identified within the Interbay Dravus Subarea are mapped in **Exhibit 3.4-8**. For further descriptions of plants in these areas please see the **Plants** section above. Areas that support animals are discussed in the **Animals** section above.

Exhibit 3.4-8 Critical Areas—Interbay Dravus Subarea, 2021



Highlights

Wildlife Corridors

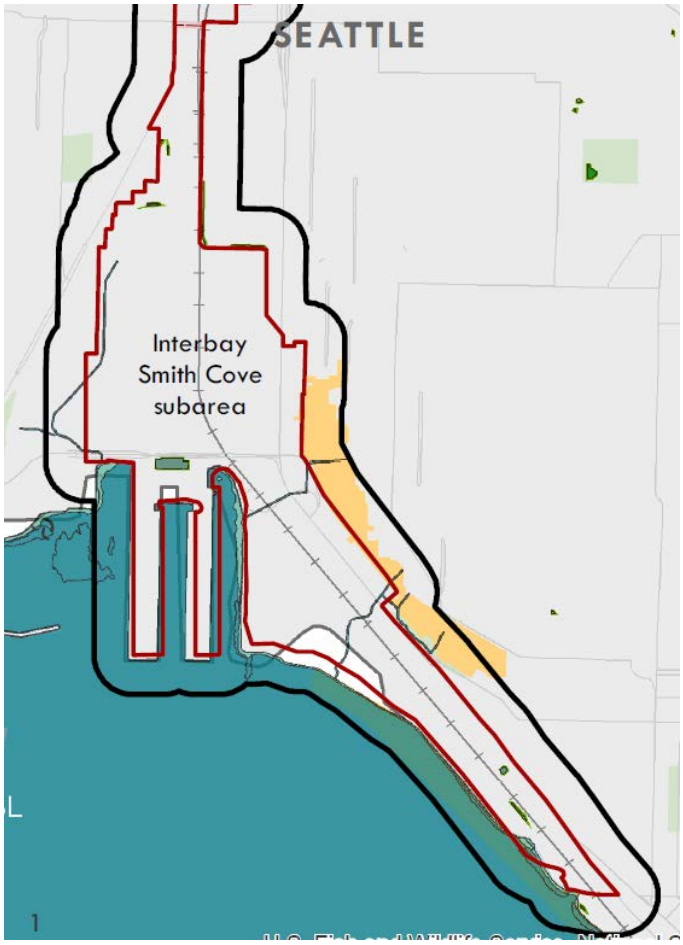
Lake

Source: Herrera, 2021.

Interbay Smith Cove

Critical areas identified within the Interbay Smith Cove Subarea are mapped in **Exhibit 3.4-9**. For further descriptions of plants in these areas please see the **Plants** section above. The presence of animals and animal habitats in this subarea is discussed in the **Animals** section above.

Exhibit 3.4-9 Critical Areas—Interbay Smith Cove Subarea, 2021



Highlights

Wildlife Corridors

Freshwater Wetlands

Estuarine Wetlands

Estuarine Deepwater

Primary study area - Duwamish MIC
Secondary study area
Subarea boundary
Riparian corridor (Seattle Critical Areas)
Wildlife corridor (Seattle Critical Areas)
Wetlands (Seattle Critical Areas)

Streams
City of Seattle
UGAs
Public Lands

NWI Wetlands

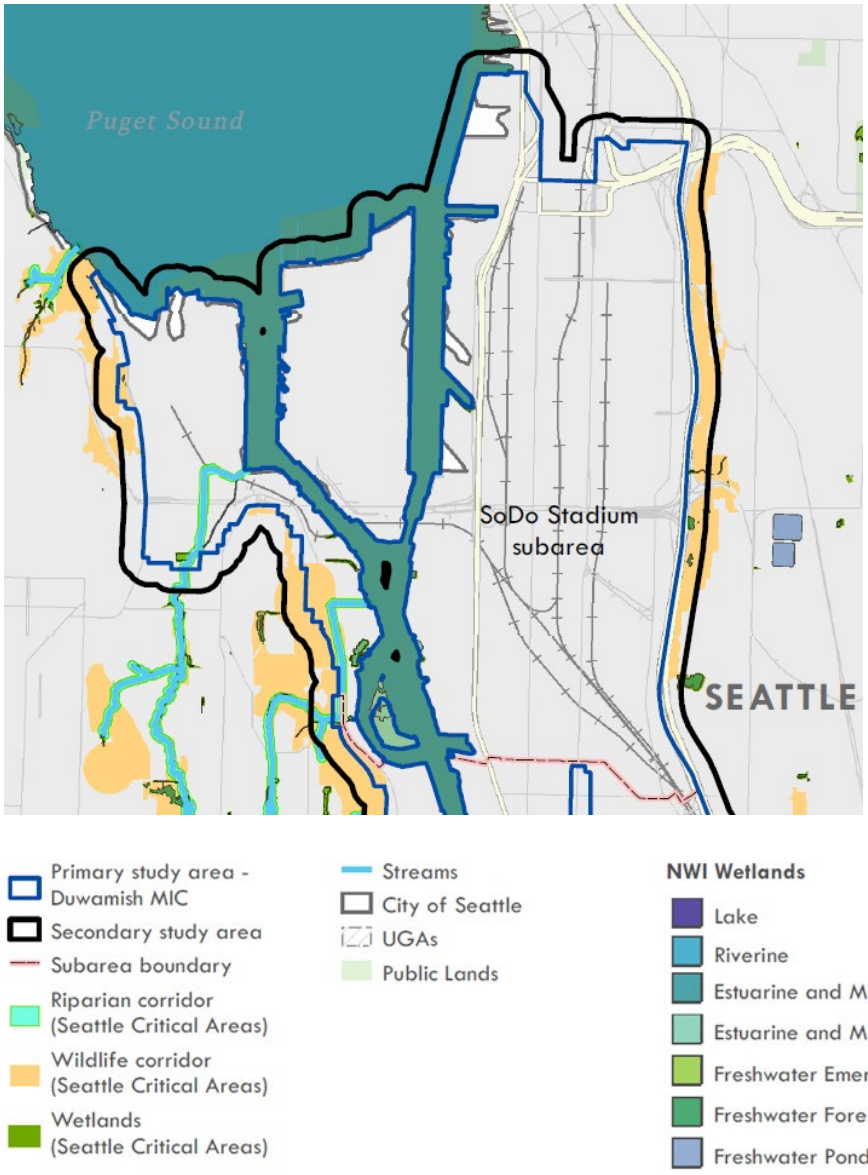
Lake
Riverine
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond

Source: Herrera, 2021.

SODO/Stadium

Critical areas identified within the SODO/Stadium Subarea are mapped in **Exhibit 3.4-10**. For further descriptions of plants in these areas please see the **Plants** section above. Areas that provide animal habitat are discussed in the **Animals** section above.

Exhibit 3.4-10 Critical Areas—SODO/Stadium Subarea, 2021



Highlights

Wildlife Corridors

Freshwater Wetlands

Estuarine Wetlands

Estuarine Deepwater

Riparian Corridors

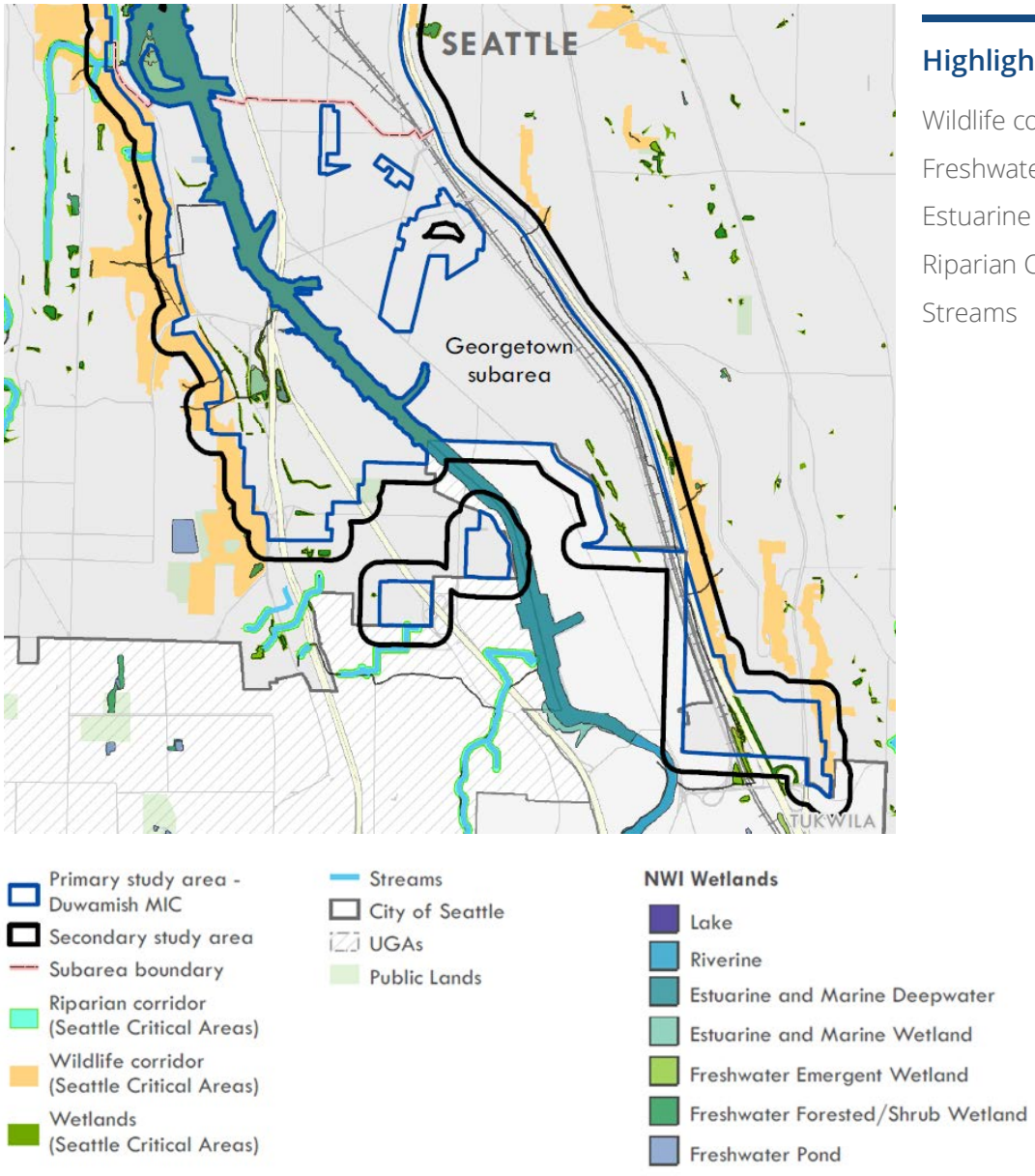
Streams

Source: Herrera, 2021.

Georgetown/South Park

Critical areas identified within the Georgetown/South Park Subarea are mapped in **Exhibit 3.4-11**. For further descriptions of plants in these areas please see the **Plants** section above. The presence of animals and animal habitats in this subarea are discussed in the **Animals** section above.

Exhibit 3.4-11 Critical Areas—Georgetown/South Park Subarea, 2021



Highlights

Wildlife corridors

Freshwater wetlands

Estuarine Deepwater

Riparian Corridors

Streams

Source: Herrera, 2021.

3.4.2 Impacts

Impacts Common to All Alternatives

Noise & Disturbance

All alternatives involve construction activities that would generate noise and disturbance that could temporarily displace bird species listed in **Section 3.4.1 Affected Environment** from preferred nesting, foraging, and/or migration sites.

The amount and intensity of construction is expected to be greater under the Action Alternatives, particularly alternatives 3 and 4, which allow for the greatest industry-associated caretakers' quarters and makers' space, as well as remove focused land in the Georgetown subarea that could be developed for housing. In particular there would be an increase housing in the UI zone in the Ballard and SODO/Stadium subareas. The Georgetown/ South Park subarea would be a focus for 20+ acre rezone to Seattle Mixed where alternatives 3 and 4 would allow for greater attached housing.

All studied alternatives add employment space over current conditions with Alternative 1 No Action the least and alternatives 3 and 4 the most. Given the high levels of existing human activity and noise levels in these industrial zones, construction activities would not be likely to increase noise and disturbance to an extent that would adversely affect birds in the study area. These species are already adapted to high levels of human activity and any disturbance would be minor. These species would likely return to normal activity levels shortly following construction.

None of the alternatives affect shoreline land use regulations or propose changes to regulations governing in-water work; accordingly, the studied alternatives would not result in direct noise or disturbance impacts to aquatic habitats or species.

Construction Stormwater Runoff

Stormwater runoff from active construction sites has the potential to adversely affect water quality in receiving water bodies, primarily by increasing sediment and turbidity. Best management practices (BMPs) implemented during construction per City of Seattle regulations would be protective of water quality. Refer to **Section 3.3 Water Resources**, for a more detailed discussion of temporary impacts related to construction.

Equity & Environmental Justice Considerations

The Action Alternatives would result in greater tree canopy cover in landscaped areas and green spaces that promote environmental health, provide safe, non-motorized transit options, encourage walkability and access to the outdoors, and improve comfort. This is through street frontage/street tree and green factor requirements in the II and UI zones. Alternatives 3 and 4

have the greatest share of land in II and UI zones (14% and 13%, respectively), where trees, landscaping, and green spaces would be concentrated. Under Alternative 2, about 10% of land within industrial areas would be zoned as II or UI. The No Action Alternative does not include II or UI zoning and does not have a plan for conversion of currently developed areas to landscaped areas or green spaces. The adaptation of impervious areas to increased tree canopy and green factor can increase shade and modestly improve habitat such as for birds and urban-adapted wildlife as well as for humans.

Focusing such street and landscaping improvements in SODO/Stadium and Georgetown/South Park areas would assist disadvantaged populations as identified in Seattle's Racial and Social Equity Index.

The Action Alternatives also have the potential to improve water quality in the study area. Older development that lacks modern stormwater infrastructure and treatment would be replaced with newer infrastructure that provides water quality treatment, thereby reducing pollutant loading to receiving water bodies. Similarly, flow control would be provided for discharges to flow-sensitive water bodies, reducing adverse effects of high flows. Improvements to water quality and flow control would benefit fish and aquatic invertebrate species, many of which are harvested for human consumption.

Impacts of Alternative 1 No Action

The No Action Alternative involves less redevelopment of previously developed parcels, and areas would not be rezoned for II and UI uses. Less redevelopment would result in fewer opportunities for implementing stormwater treatment and creating landscaped areas and green spaces that improve water quality. Existing pollutant loading to receiving water bodies would continue at current levels and continue to degrade aquatic habitat. Pollutants in stormwater runoff can cause avoidance of preferred habitat by aquatic species, reduced foraging efficiency of fish, and direct toxicity to fish species and their prey (NMFS 2020).

Except where protected by critical area and shoreline regulations, some minor amounts of habitat (such as landscaped or unpaved areas) may be converted to developed areas, which would decrease habitat available to species found in the study area. Because this alternative maintains existing zoning, there would be less development and therefore less habitat loss compared to other alternatives. Impacts to protected habitats, such as riparian corridors and wetlands, would be minimized to the extent possible per Seattle Municipal Code. Compensatory mitigation would be provided for permanent unavoidable impacts.

Impacts of Alternative 2

Alternative 2 would apply a mix of II and UI zone concepts in approximately 10% of current MIC areas. These concepts would increase the number of trees and landscaping, and green spaces, which would provide opportunities for stormwater treatment as well as terrestrial wildlife habitat. Stormwater treatment would reduce pollutant loading to receiving water bodies.

This alternative would result in a small increase of approximately 80 residential units, mostly in the SODO/Stadium and Georgetown/South Park subareas. Development on currently undeveloped parcels would increase impervious surfaces and resulting stormwater runoff, which could further degrade water quality. However, conversion of previously developed areas also provides opportunities for stormwater retrofits that would improve water quality.

Depending on where these units are located, and the degree of shoreline and critical area regulations protection, new construction has the potential to reduce wildlife habitat by converting minor amounts of landscaping or other unpaved areas to developed areas. Appropriate siting of new housing, as well as adherence to existing regulations regarding protected habitats, would minimize habitat impacts.

Impacts of Alternative 3

Alternative 3 would apply a mix of II and UI zone concepts in approximately 14% of current MIC areas, the most of any alternative. Residential dwelling would increase within the MIC and within focused areas removed from the MIC by approximately 1,688 net units, primarily within the Ballard, SODO/Stadium, and South Park/Georgetown subareas. As discussed under Alternative 2, II and UI zone concepts promote development of green spaces that provide opportunities for stormwater treatment and wildlife habitat.

Although residential development could degrade wildlife habitat by developing undeveloped properties, and creating new and additional sources of contamination (see **Section 3.3 Water Resources**), redevelopment of previously developed areas could provide opportunities for more advanced stormwater treatment, thereby improving water quality in the study area.

Impacts of Alternative 4

Alternative 4 would apply a mix of II and UI zone concepts in approximately 13% of current MIC areas, only slightly less than Alternative 3, and would result in the creation of green spaces and landscaped areas that provide similar opportunities for stormwater retrofits.

This alternative would increase residential units by approximately 3,273 net units, more than the other alternatives, primarily in the Ballard, SODO/Stadium, and Georgetown/South Park subareas. Although this increase has the potential to result in more pollutant sources and greater pollutant loading to receiving water bodies, redevelopment of a larger area also provides greater opportunities for stormwater retrofits that could improve water quality within the study area.

Increasing residential units could result in greater conversion of minor amounts of wildlife habitat provided by landscaped and unpaved areas to developed areas. However, existing habitat within the study area is limited, and habitat impacts would be minimal. Mitigation measures proscribed by existing regulations would avoid, minimize, and compensate for impacts to special status habitats (refer to Mitigation Measures below).

3.4.3 Mitigation Measures

Incorporated Plan Features

Development regulation proposals include some elements of streetscape and "green factor" in the II and UI zones for Action Alternatives.

Regulations & Commitments

The proposed alternatives would incorporate impact avoidance and minimization measures during construction and operation in accordance with the regulations described in this section. Construction impact avoidance and minimization measures would include the management of noise, dust, and runoff caused by construction activities. The proposed alternatives would include stormwater management measures during the operation of all constructed features to treat stormwater in compliance with all applicable regulations.

Existing environmental regulations including the City of Seattle Code, Washington State Law, and Federal Laws, aim to reduce the potential impacts of projects and would apply to all alternatives. These regulations ensure impacts to the environment are avoided, minimized, documented, and mitigated to the greatest extent possible. The procedures associated with these regulations create opportunities for public notice and comment on projects prior to implementation. Environmentally sensitive areas are designated as environmentally critical areas and are protected from avoidable development impacts. The principal existing regulations that protect ecosystem resources include the following:

- **Federal Clean Water Act.** Federal review by the United States Army Corps of Engineers (USACE) is required for to any project affecting waters of the United States (WOTUS). The USACE requires avoidance, minimization, and mitigation for impacts to WOTUS, endangered species, and cultural resources.
- **State of Washington Laws.** State review by the Washington Department of Ecology and/or the Washington Department of Fish and Wildlife is required for any project which affects waters of the state. The state requires projects demonstrate avoidance, minimization, and mitigation measures for any impacts to waters of the state and/or fish and wildlife.
- **City of Seattle Municipal Code (SMC) Chapter 25.09 Regulations for Environmentally Critical Areas.** Environmentally critical areas are protected by the SMC because they provide unique environmental functions that are difficult to replace. SMC 25.09 designates geologic hazard areas, steep slope erosion hazard areas, flood-prone areas, wetlands, fish and wildlife habitat conservation areas, and abandoned landfills as environmentally critical areas. Buffers and structure setbacks are also designated by SMC and are required to protect the functions of these environmentally critical areas.
- **Stormwater Regulations.** The City of Seattle ensures development complies with stormwater standards during the construction and operation phases of projects.

- **Environmental Health Regulations**. The Model Toxics Control Act of the State of Washington defines limits of contamination. Any project activities and related disturbances will need to address these limits based on the type of activity and proposed use of the parcel. The standards for voluntary cleanup for lower levels of contaminants are incorporated into new development or redevelopment parcels that have been noted to have contamination potential.

These environmental regulations condition development proposals to avoid, minimize, and/or mitigate potential impacts. Residual impacts are possible even with these environmental regulations and should be evaluated and avoided during project development.

Other Potential Mitigation Measures

- Mitigation measures would be developed on a case-by-case basis related to specific projects to comply with applicable federal, state, and City permitting requirements.
- Additional stormwater treatment would be integrated into new development or redevelopment as feasible including but not limited to green roofs, enhanced BMPs, and pervious pavement alternatives.
- New development or redevelopment could plant vegetation adjacent to streams and lakes to provide shade and organic inputs.

3.4.4 Significant Unavoidable Adverse Impacts

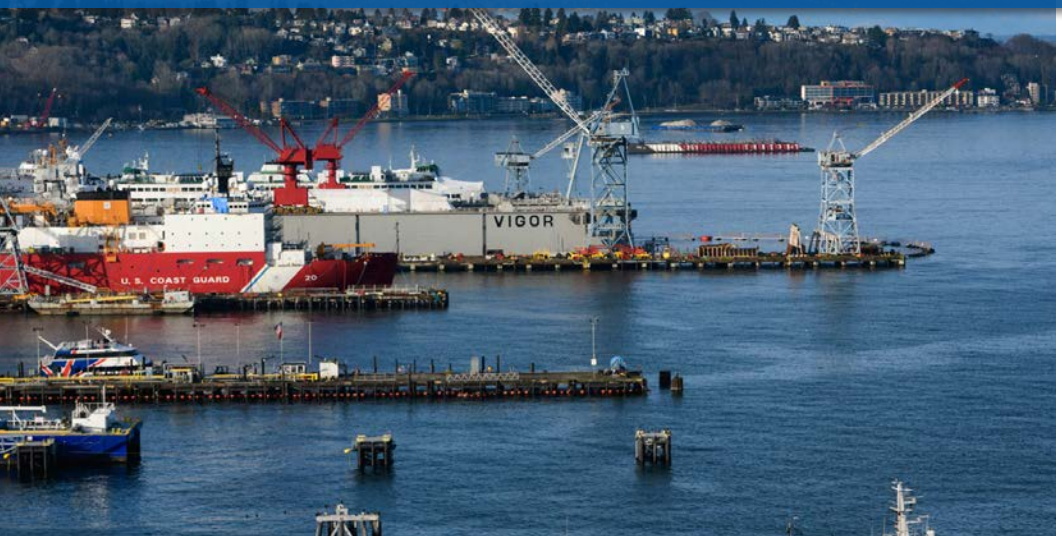
If all minimization and mitigation measures are implemented, no significant unavoidable adverse impacts are anticipated to plants and animals. The study area is already highly urbanized. Most plant species are nonnative introduced species common in urban environments. Development on industrial lands would not significantly reduce available habitat, particularly rare or unique habitat.

Terrestrial animal species are adapted to urban conditions and have a high tolerance for human disturbance. Additional noise and disturbance that would be generated under the different alternatives would not be likely to adversely affect species in the study area. The project does involve changes to shoreline or critical area policies or regulations regarding in-water work and is not anticipated to result in direct noise and disturbance to aquatic species.

Redevelopment of previously developed areas provides opportunities to reduce urban runoff and pollutant loading to aquatic habitat, potentially contributing to improved water quality in the study area. Improved water quality would benefit special status aquatic species and critical habitat, as well as other animals that prey on aquatic species.

Section 3.5

Contamination



This chapter describes the affected environment for contamination and presents the analysis completed to compare and contrast impacts from the alternatives. Mitigation measures for identified impacts and any significant unavoidable adverse impacts are also summarized.

Thresholds of significance utilized in this impact analysis include:

- Release or contamination of soils, groundwater, or surface water that requires removal and disposal.
- Hazardous chemicals or conditions that might result in health or safety impacts or impede future development.

Many different terms may be used to describe contamination at a site. The term hazardous material (or hazardous substance) is typically used to describe chemical contaminants in soils, groundwater, surface water, or other media at a site that have the potential to harm humans, animals, or the environment. Once the hazardous material is excavated or removed from the ground, it is considered a hazardous waste that must then be tested to determine how it would be properly disposed offsite at a licensed landfill or treatment facility. These terms are discussed further in **Section 3.5.3 Mitigation Measures**.

3.5.1 Affected Environment

Primary & Secondary Study Areas

The study area for Contamination is defined as areas within 0.25-mile of the boundaries of the BINMIC and Greater Duwamish MICs that could be directly or indirectly affected by the construction activities or land uses that result from implementation of the industrial and maritime strategy. The secondary study area extends 0.25 miles from the full study area. [9]

Data & Methods

The project team collected data from the following sources to support analysis to identify sites with confirmed or suspected contamination in soil, sediment, and groundwater, and sites where hazardous materials are used or stored; locate historical landfills; and evaluate potential effects of the project alternatives:

- Washington State Department of Ecology (Ecology) Facilities/Sites of Environmental Interest Geodatabase (Ecology 2021).
- Abandoned Landfill Study in the City of Seattle (Seattle-King County Department of Public Health 1984).

The initial list of confirmed or suspected contaminated sites, and sites that use or store hazardous materials within the full study area was developed from the Ecology geodatabase

[9] Maps show the 0.25-mile buffer, but tabular data and text refer to the hazardous sizes inside the primary study area.

that lists all known facilities and sites of environmental interest in Washington State. The geodatabase includes information on:

- State cleanup sites
- Federal Superfund cleanup sites
- Solid waste facilities
- Underground storage tanks and leaking underground storage tanks
- Dairies
- Enforcement actions
- Hazardous waste generators

To focus the analysis on contamination for the EIS, the geodatabase was pared down to include only those sites that fall within two program areas overseen by Ecology: 1) Toxics Cleanup, and 2) Hazardous Waste and Toxics Reduction. The Toxics Cleanup Program tracks sites with confirmed or suspected contamination of soil, sediment, groundwater, or other media, and the Hazardous Waste and Toxics Reduction Program tracks sites where hazardous chemicals are used or stored and where spills to the environment could potentially occur.

The geodatabase was downloaded and then sorted to include those sites located within 0.25-mile of the BINMIC and Greater Duwamish MIC (see **Exhibit 3.5-1** and **Exhibit 3.5-2**). The 0.25-mile distance was selected as the boundary of the secondary study area as an appropriate minimum search distance typically used for environmental site assessments to identify current or historical conditions that could cause soil, groundwater, or other contamination on or adjacent to a property per the American Society of Testing and Materials (ASTM) standard practice ASTM E 1527-13 (ASTM 2013). The 0.25-mile search radius also relates to the maximum distance that groundwater contamination is likely to travel for the majority of sites with groundwater contamination.

Available information regarding historical landfills located within the full study area was reviewed in the 1984 abandoned landfill study (Seattle-King County Department of Public Health 1984).

Current Policy & Regulatory Frameworks

Model Toxics Control Act

The Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340-710) is one of several environmental laws in Washington. Known as the state's cleanup law, MTCA authorizes the Washington State Department of Ecology (Ecology) to adopt cleanup standards for soil, groundwater, surface water, and air at sites where hazardous substances are present, and establishes processes for identifying, investigating, and cleaning up these sites. The term "site" in this context generally refers to the property where the hazardous substances are present but can extend onto adjacent properties.

MTCA's main purpose is to prevent the creation of future hazards due to improper disposal of toxic wastes into the state's lands and waters. MTCA Cleanup Regulations apply to all cleanups, whether they're upland cleanups on land or in groundwater, or sediment cleanups in freshwater or marine environments.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known also as Superfund, is a federal law (40 CFR Parts 300-311, 355, and 373) used to identify sites where hazardous materials threaten the environment and or public health because of leaks, spills, or general mismanagement, and identifies the responsible party. CERCLA authorizes Superfund cleanup responses in two ways: short-term removal and long-term environmental remediation. These actions are conducted only at sites listed on EPA's National Priorities List (NPL). CERCLA powers and responsibilities overlap with the Resource Conservation and Recovery Act (RCRA) (see below), the Clean Water Act, and the Safe Drinking Water Act. CERCLA and RCRA share jurisdiction with respect to hazardous materials, and underground storage tanks containing petroleum products. CERCLA was amended by the Superfund Amendments and Re-authorization Act (SARA) in 1986.

Resource Conservation & Recovery Act & Washington State Dangerous Waste Regulations

The Resource Conservation and Recovery Act (RCRA) is a federal law (40 CFR Parts 239 through 282) that creates the framework for proper management of non-hazardous and hazardous solid waste. Washington State's Dangerous Waste Regulations under WAC 173-303 are based on the federal RCRA law, but Washington's regulations are more protective and include more wastes. Per WAC 173-350-021, solid waste is defined as "all putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials."

During construction on a contaminated site, a cleanup contractor (also referred to as a remediation contractor) would typically screen and classify soils as they are excavated and select one of the following appropriate types of landfills for off-site disposal:

- Inert landfills accept clean soil with no detectable concentrations of contaminants, or clean waste with some organic debris/wood waste and trace amounts of detectable petroleum hydrocarbons, volatile organic compounds, metals, or other contaminants that are below MTCA cleanup levels.
- Subtitle D landfills accept solid waste, including contaminated soils with concentrations of contaminants detected above MTCA cleanup levels (includes hazardous waste but does not include contaminants at concentrations that trigger Washington's Dangerous Waste Regulations)

- Subtitle C landfills accept waste designated as dangerous waste and have special controls such as double liners, double leachate collection and removal systems, and leak detection systems to prevent release of contaminants to the environment.

Seattle Municipal Code 25.09.220 (Environmentally Critical Areas Code) indicates that development on historical landfills is subject to Public Health—Seattle & King County requirements. The code also specifies methane barriers or appropriate ventilation per Title 22, Subtitle I, Building Code, and Public Health—Seattle & King County regulations.

The Title 10 King County Board of Health Solid Waste Regulation governs construction standards and methane controls on historical landfills. Authority is established under RCW Chapter 70.05 and Washington State Administrative Code WAC 173-304, Minimal Functional Standards for Solid Waste Handling, and WAC 173-351, Criteria for Municipal Solid Waste Landfills.

General requirements for complying with federal, state, and local Applicable or Relevant and Appropriate Requirements (ARARs) for cleanup actions under MTCA are listed in WAC 173-340-710-745. A summary of potentially applicable federal, state, and local ARARs identified for cleanup actions and potential soil, groundwater, and surface water contamination at sites within the full study area is included in **Exhibit 3.5-1**.

Exhibit 3.5-1 Federal, State, and Local Arars Potentially Applicable for Cleanup Actions at Contaminated Sites Within the Full Study Area

Regulatory Program or Policies	Lead Agency	Description
The Federal Clean Water Act (33 USC Section 1251)	Ecology	The Federal Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
The Washington Water Pollution Control Act (Chapter 90.48 RCW; Chapter 173 201A WAC; Chapter 173-200 WAC)	Ecology	The Washington Water Pollution Control Act requires the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington.
Comprehensive Environmental Response, Compensation, and Liability Act and All Appropriate Inquiries (40 CFR Part 312)	Ecology	Commonly known as Superfund, this federal regulation governs cleaning up abandoned or uncontrolled hazardous waste sites.
Sediment Management Standards (Chapter 173-204 WAC)	Ecology	Standards developed for Washington state to reduce and ultimately eliminate adverse effects on biological resources and significant threats to human health from surface sediment contamination.
The Resource Conservation and Recovery Act (40 CFR Parts 239 through 282)	Ecology	RCRA is a federal law that creates the framework for the proper management of hazardous and non-hazardous solid waste.

Regulatory Program or Policies	Lead Agency	Description
Dangerous Waste Regulations (Chapter 173 303 WAC) and the Washington Hazardous Waste Management Act (Chapter 70.105 RCW)	Ecology	The Dangerous Waste Regulations implement the Washington Hazardous Waste Management Act and establish requirements for generators, transporters, and facilities that manage dangerous waste.
Federal and State Clean Air Acts (42 USC 7401 et seq.; 40 CFR 50; RCW 70.94; WAC 173-400, 403)	Puget Sound Clean Air Agency	These federal and state laws regulate air emissions from stationary and mobile sources, including construction sites.
The State Environmental Policy Act (RCW 43.21C; WAC 197-11	Ecology	SEPA ensures environmental values are considered during decision-making by state and local agencies when issuing permits for private projects; constructing public facilities; or adopting regulations, policies, or plans.
The Occupational Safety and Health Act (29 CFR 1910); Washington industrial Safety and Health Act (296-800 WAC)	Washington Department of Labor and Industries	These federal and state rules regulate the safety and health of workers in the workplace, including construction sites.
General Occupational Health Standards (Chapter 296-62 WAC)	Washington Department of Labor and Industries	These rules are designed to protect the health of employees and help to create a healthy workplace by establishing requirements to control health hazards.
Safety Standards for Construction Work (Chapter 296-155 WAC)	Washington Department of Labor and Industries	These safety and health standards help protect workers at construction sites.
Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC)	Ecology	These standards contain requirements for installation, maintenance, and decommissioning of groundwater monitoring wells.
Industrial Waste Discharge to Metropolitan King County Sewer System	King County Industrial Waste Program	This program regulates the discharge of industrial/commercial wastewater, including construction dewatering water, to the King County sanitary sewer system.

Source: Herrera, 2021.

Current Conditions

Full Study Area

A total of 710 Toxics Cleanup sites with confirmed and suspected contamination were identified within the full study area (Ecology 2021). Of these, 159 sites are located in the BINMIC and 551 are located in the Greater Duwamish MIC (see **Exhibit 3.5-2** and **Exhibit 3.5-4**, respectively). These sites have undergone various stages of investigation and cleanup. Some sites are still awaiting cleanup, others have been investigated to determine the nature and extent of contamination, and some sites have been satisfactorily cleaned up to the point where Ecology has issued a No Further Action letter.

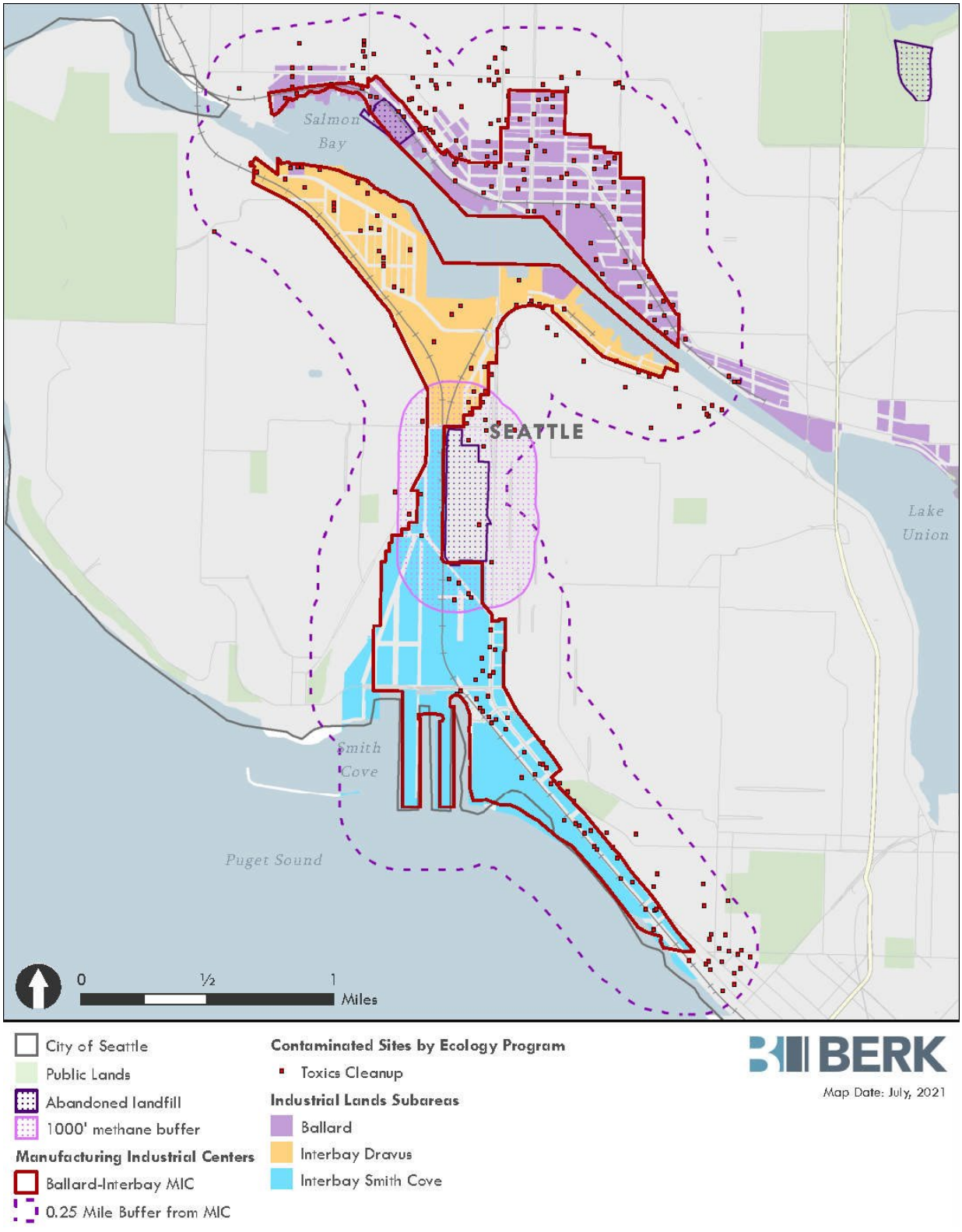
In addition, a total of 1,537 Hazardous Waste and Toxics Reduction sites were identified within the full study area (Ecology 2021). Of these, 276 sites are located in the BINMIC and 1,261 are located in the Greater Duwamish MIC (see **Exhibit 3.5-3** and **Exhibit 3.5-5**, respectively). These sites typically range from well-managed, well-kept facilities with few if any historic spills or enforcement actions by Ecology, to facilities where violations and/or spills to the environment have occurred. Spills, whether documented or not, can cause soil, groundwater, or surface water to become contaminated if not cleaned up properly and promptly.

A total of five historical landfills were identified within the study area. All the landfills have documented soil and/or groundwater contamination as well as potential constraints for construction on or adjacent to the sites due to the poor structural support provided or settlement, and risk of methane intrusion into structures that may require mitigation. Three landfills have prescribed 1,000-foot methane buffers.

Four federal Superfund sites were identified within the study area, all within the Greater Duwamish MIC. These sites have undergone various stages of investigation and cleanup. Three sites have had cleanup mostly completed or completed and are undergoing long-term monitoring to ensure the cleanup activities are protective to human health and the environment. One site has been investigated to determine the nature and extent of contamination and has had five Early Action Area (EAA) cleanups. The remaining areas are the subject of phased design and cleanup actions.

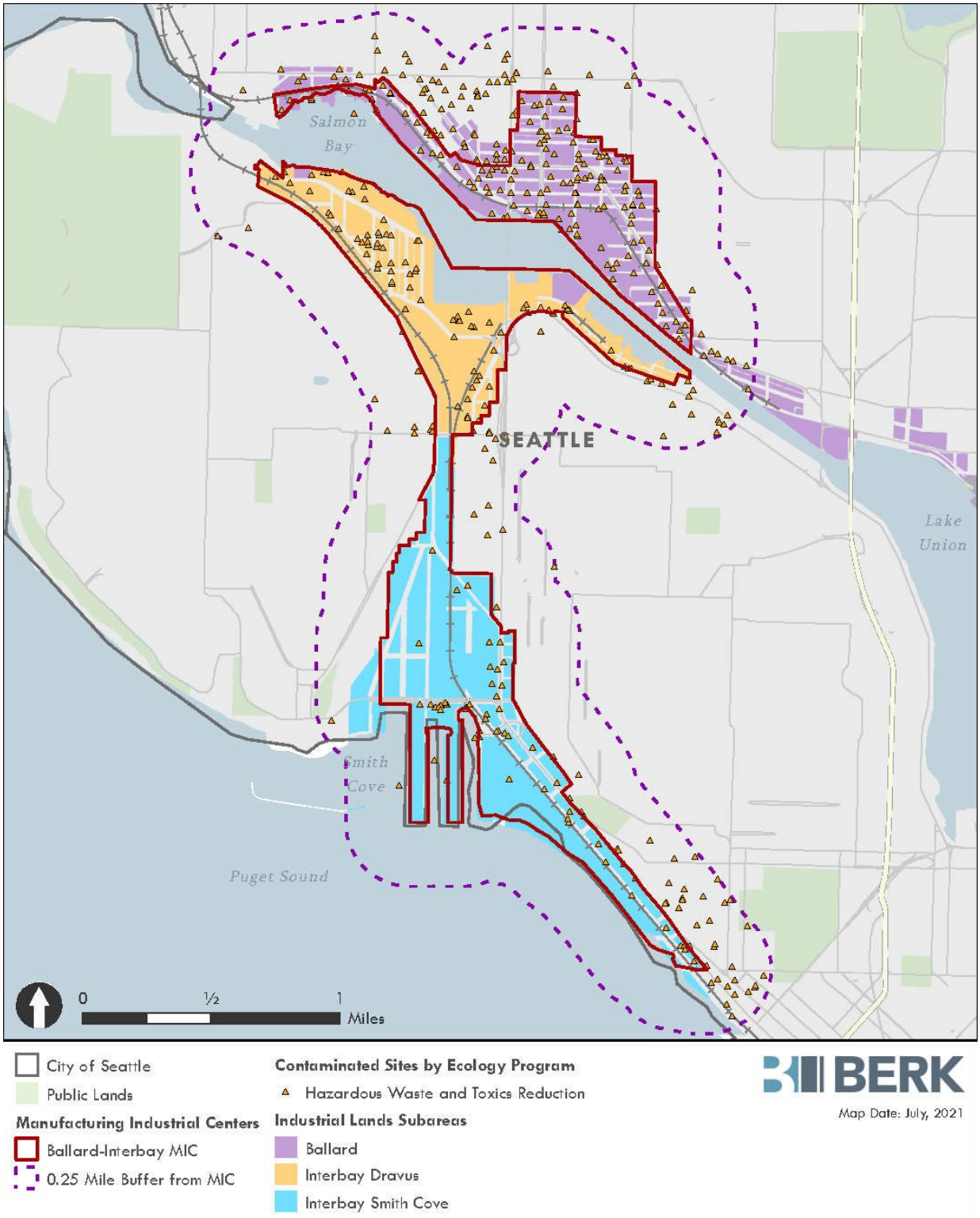
Exhibit 3.5-6 provides a summary of the total number of Toxics Cleanup Sites, and Hazardous Waste and Toxics Reduction Sites within the BINMIC and Greater Duwamish MIC and subareas. Note that because some sites are tracked by Ecology's Toxics Cleanup Program in multiple categories, the total number of Toxics Cleanup Program sites listed is not equal to the sum of all sites shown in each program subcategory in **Exhibit 3.5-6**.

Exhibit 3.5-2 Confirmed or Suspected Contaminated Sites Within 0.25-mile of the BINMIC



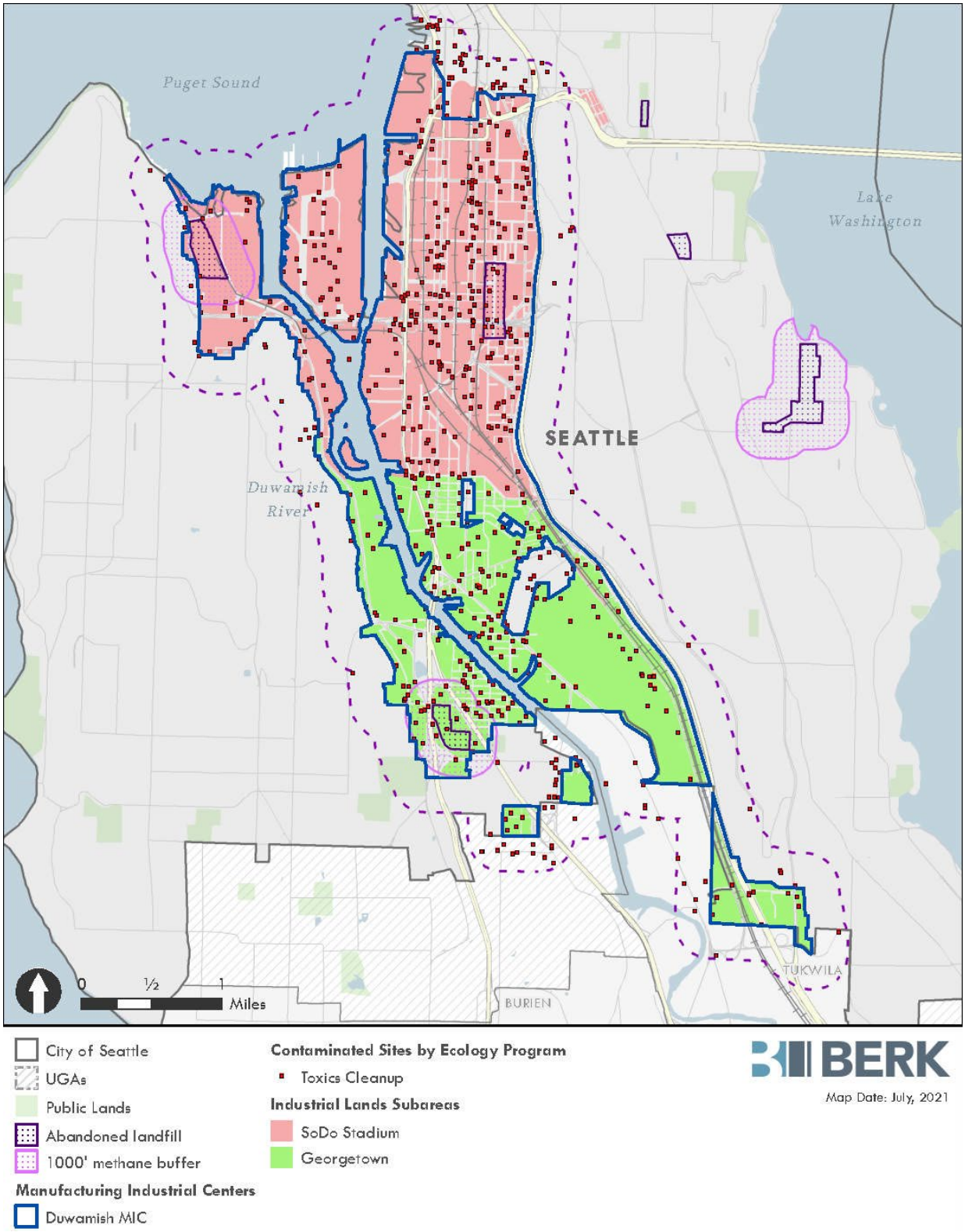
Source: Ecology, 2021.

Exhibit 3.5-3 Hazardous Waste and Toxics Reduction Sites Within 0.25-mile of the BINMIC



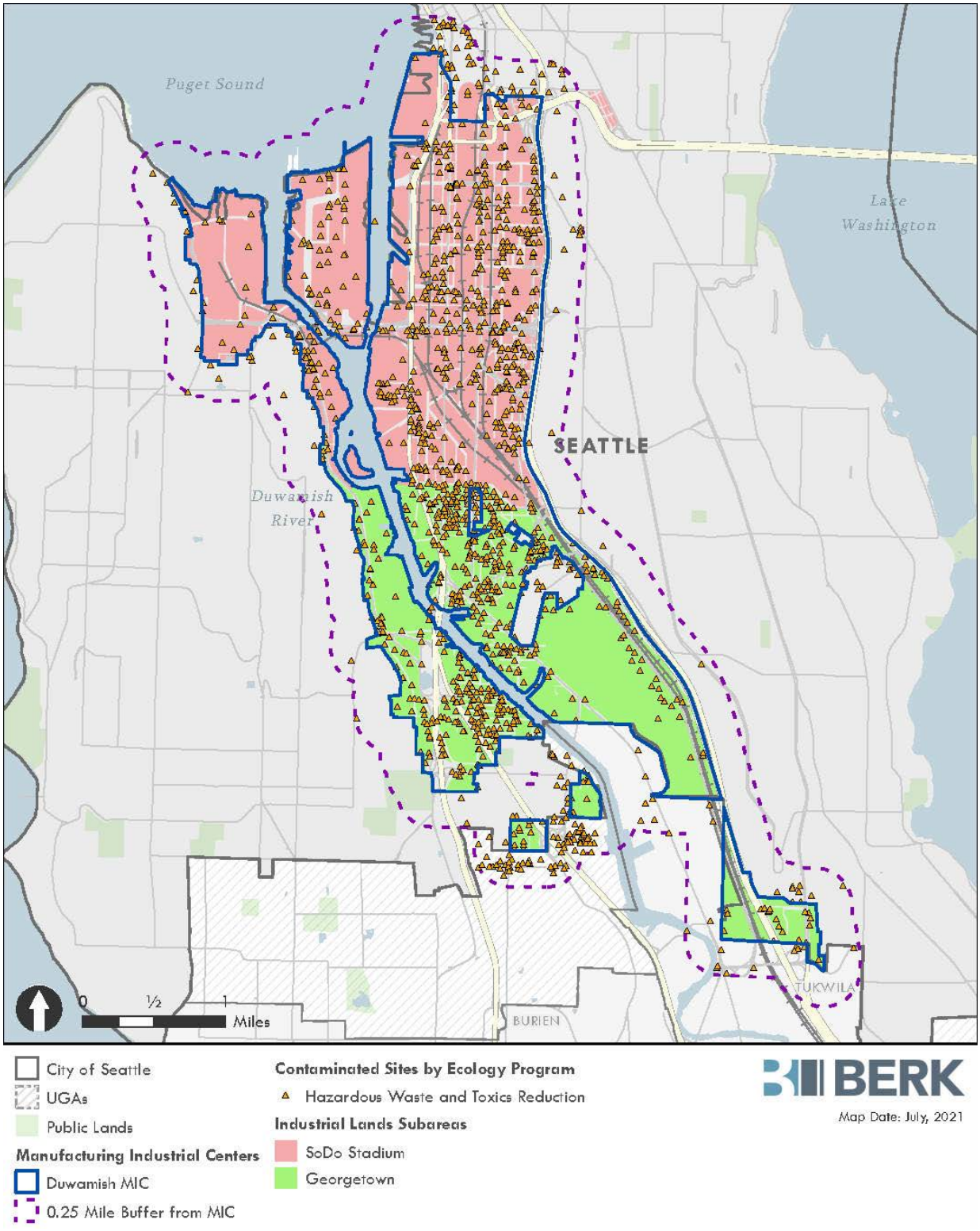
Source: Ecology, 2021.

Exhibit 3.5-4 Confirmed or Suspected Contaminated Sites Within 0.25-mile of the Greater Duwamish MIC



Source: Ecology, 2021.

Exhibit 3.5-5 Hazardous Waste and Toxics Reduction Sites Located Within 0.25-mile of the Greater Duwamish MIC



Source: Ecology, 2021.

Exhibit 3.5-6 Summary of Toxics Cleanup Sites and Hazardous Waste and Toxics Reduction Sites Within the BINMIC and Greater Duwamish MIC and Subareas

MIC	Subarea	Enforcement Action	Federal Superfund	Independent Cleanup / Remedial Action	LUST	UST	Sediments	State Cleanup	VCP	Total Number of Toxics Cleanup Program Sites[a]	Total Number of Hazardous Waste and Toxics Reduction Program Sites	
BINMIC	Ballard	3	0	9	19	44	2	22	29	73	143	276
	Interbay Dravus	1	0	5	11	21	1	16	13	38	79	
	Interbay Smith Cove	0	0	5	17	35	1	14	16	48	54	
Greater Duwamish MIC	SODO/Stadium	5	2	32	126	234	12	112	73	331	672	1,261
	Georgetown/South Park	20	0	26	76	141	4	81	51	220	589	
				Grand Totals Within the Full Study Area						**710**	**1,537**	

[a] Because some sites are tracked by Ecology's Toxics Cleanup Program in multiple categories, the total number of Toxics Cleanup Program sites listed is not equal to the sum of all sites shown in each program subcategory.
LUST: leaking underground storage tank
UST: underground storage tank
VCP: voluntary cleanup program
Source: Ecology, 2021.

Ballard

A total of 73 Toxics Cleanup sites and 143 Hazardous Waste and Toxics Reduction were identified in the Ballard Subarea (see **Exhibit 3.5-2** and **Exhibit 3.5-3**).

A historical landfill is located within the Ballard Subarea, adjacent to the south of Shilshole Avenue NW, along Salmon Bay (see **Exhibit 3.5-2**; City of Seattle 2021). Limited information regarding the landfill is available and it was not identified in the 1984 Abandoned Landfill Study (Seattle-King County Department of Public Health 1984). The landfill likely began operating in the early 1900s, covers approximately 10.5 acres, and is now developed with industrial and office buildings. Development within the former landfill area is subject to special engineering and construction management requirements to prevent damage from methane gas buildup, subsidence, and earthquake-induced ground shaking. Development in this area must comply with critical areas regulations.

Interbay Dravus

A total of 38 Toxics Cleanup sites and 79 Hazardous Waste and Toxics Reduction were identified within the Interbay Dravus Subarea (see **Exhibit 3.5-2** and **Exhibit 3.5-3**).

The Interbay Landfill is located adjacent to the west of the Interbay Dravus Subarea ((see **Exhibit 3.5-2**). The landfill is situated along 15th Avenue West, south of West Dravus Street and north of West Wheeler Street. A 1,000-foot methane buffer for the landfill overlaps with the southern portion of the Interbay Dravus secondary study area. The landfill consists of approximately 55 acres of land presently occupied by the Interbay Golf Center. The landfill, also known as the Interbay Dump or Sanitary Landfill No. 2, was established by the City in 1911 and continued to be used off and on until 1968 (Seattle-King County Department of Public Health 1984). Municipal solid waste from local homes and businesses was dumped at the south end, the north end was operated as a fire dump and received combustible wastes including wastes from local industries and the military. The landfill contains a wide range of putrescible and non-putrescible solid waste. The landfill is prone to settlement and is still producing methane gas. High groundwater and leachate formation are also concerns at this site.

Interbay Landfill and areas within a 1,000-foot radius are regulated as an Abandoned Landfill environmentally critical area (Landfill ECA). Specifically, Seattle Building Code (SBC) 1811—*Methane Mitigation Measures* requires that all construction within a Landfill ECA be protected from accumulation of methane within or under the enclosed portion of a building. Methane mitigation systems typically consist of passive or active venting systems installed in subslab /crawlspace areas coupled with monitoring systems in enclosed interior spaces.

Interbay Smith Cove

A total of 48 Toxics Cleanup sites and 54 Hazardous Waste and Toxics Reduction were identified within the Interbay-Smith Cove Subarea (see **Exhibit 3.5-2** and **Exhibit 3.5-3**).

The northern portion of the Interbay Smith Cove Subarea is also located within the 1,000-foot methane buffer for the Interbay Landfill (see **Exhibit 3.5-2**). As previously mentioned, areas within this buffer are subject to the methane mitigation measures outline under SBC 1811 to prevent accumulation of methane within or under the enclosed portion of a building.

SODO/Stadium

A total of 331 Toxics Cleanup sites and 672 Hazardous Waste and Toxics Reduction were identified within the SODO/Stadium Subarea (see **Exhibit 3.5-4** and **Exhibit 3.5-5**).

The West Seattle Landfill, previously known as the West Hanford Street Landfill, is located within the SODO-Stadium Subarea. The landfill is situated along Harbor Avenue SW, just south of SWA Florida Street (see **Exhibit 3.5-4;** City of Seattle 2021). The landfill is approximately 20 acres in size, built on former tidelands, and operated from 1939 until 1966. The landfill has a 1,000-foot methane buffer and areas within the buffer are subject to the methane mitigation measures outline under SBC 1811 (City of Seattle 2021).

The West Seattle Landfill accepted municipal solid waste as well as industrial wastes from local industries associated with lumber yards and mills, ship building, creosote pile treating, pesticide manufacturing, and a steel mill. The landfill historically had problems with fires and the Seattle Fire department also used a portion of the site for its oil fire control school (Seattle-King County Department of Public Health 1984).

A second landfill is located within the SODO/Stadium Subarea (see **Exhibit 3.5-4;** City of Seattle (2021). The landfill is approximately 51 acres in size, straddles 6th Avenue South, and extends from South Forest Street on the north end to South Charlestown Street on the south end. The landfill was not identified in the 1984 abandoned landfill study conducted by the Seattle-King County Department of Public Health. The former landfill area is densely developed with industrial/commercial buildings.

Three federal Superfund sites in the SODO-Stadium area have undergone cleanup. These include the Pacific Sound Resources and Lockheed West Seattle sites on what is now the Terminal 5 property on the west side of the west Duwamish waterway. The Harbor Island Superfund site is comprised of seven operable units—smaller areas to make cleanup easier and more manageable—with five having completed cleanup and two (the East Waterway and Todd Shipyards sediment areas awaiting cleanup estimated in 2023-2024).

Georgetown/South Park

A total of 220 Toxics Cleanup sites and 589 Hazardous Waste and Toxics Reduction were identified within the Georgetown/South Park Subarea (see **Exhibit 3.5-4** and **Exhibit 3.5-5**).

The South Park landfill located within the Georgetown/South Park Subarea covers approximately 96 acres and is bounded on the east by West Marginal Way and 5th Avenue South; on the north by Kenyon Street; on the west by 2nd Avenue South and Occidental Avenue; and on the south by Sullivan Street (see **Exhibit 3.5-4;** City of Seattle 2021). It began operating

after 1945 and closed in 1966 when the site was converted to a solid waste landfill (Seattle-King County Department of Public Health 1984). The landfill was used primarily for non-putrescible wastes and sawdust in the early years and operated as fire dump by the City where combustible refuse was burned until 1961. The landfill was also used to dispose putrescible waste as well as industrial wastes from nearby industries. An investigation in 1983 revealed fill soils with various debris, scattered organics, and an oily sheen and odors (Seattle-King County Department of Public Health 1984).

The Lower Duwamish Waterway (LDW) federal Superfund site extends 5 miles from the mouth of the Duwamish waterway in the SODO-Stadium area to the southern extent of the waterway where it becomes the Duwamish River in the Georgetown/South Park subarea. The LDW site encompasses upland sources of contamination as well as contamination within the waterway. The EPA is responsible for administering the cleanup of sediments in the Waterway, and Ecology is responsible for controlling sources of pollution to the Waterway. Most of the human health risk comes from polychlorinated biphenyls (PCBs), arsenic, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), as well as dioxins and furans. As a result, consumption of resident fish and shellfish, as well as contact with contaminated sediments, pose a risk to human health (EPA 2021).

3.5.2 Impacts

Impacts Common to All Alternatives

Development under any of the alternatives may encounter hazardous materials such as contaminated soil, groundwater, surface water, or sediments. The greatest potential for impacts associated with contamination would occur during construction when sites are disturbed. Construction activities could release hazardous materials due to ground disturbing, dewatering, and demolition activities. Development within the study area, especially where known hazardous material sites are located, would address the removal of hazardous materials, which could include contaminated soils, groundwater, surface water, and, in older structures, the potential for lead-based paints and asbestos-containing materials (ACMs).

A soil and groundwater management plan could be necessary for construction activities in areas with known or suspected contamination. Contaminated soils excavated during construction activities would require special handling, transport, storage, and off-site disposal. If soils are not contaminated, excavations at many sites would still require off-site hauling if the soils cannot be relocated and placed onsite. If there is concurrent construction requiring earth fill in close proximity, excavated materials could be transported to the nearby site as long as the excavated material is protected from precipitation and surface water runoff.

Depending on groundwater depth and the type of hazardous materials, it is possible that contaminants from historic spills or releases may have infiltrated and migrated, requiring

additional cleanup. Cleanup efforts implemented before or during construction would reduce potential short-term and long-term impacts.

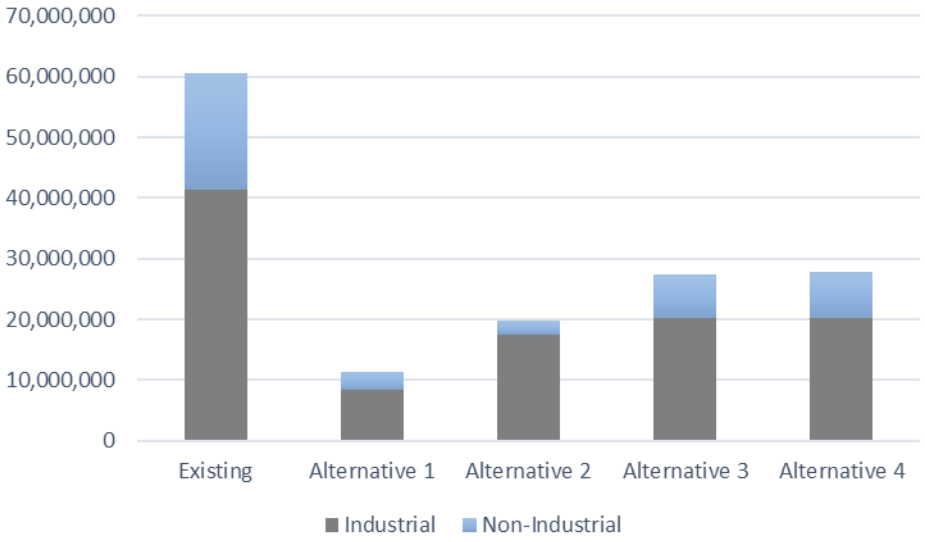
For contaminated soil, MTCA generally requires residential land uses to use the most protective cleanup levels established under MTCA Method A or B cleanup levels (WAC 173-340-740). These requirements apply to most land uses except those that meet the definition of "industrial property" as defined in WAC 173-340-200 and 173-340-745. For industrial properties, MTCA allows less restrictive soil cleanup levels established under MTCA Method A or C (WAC 173-340-745) based on adult worker exposure scenarios only and including the use of institutional controls.[10] Access to industrial properties by the public, especially children, or even proximity to residential areas may limit use of the less restrictive standard. All sites being redeveloped and needing cleanup under MTCA would be assessed for the nature of the contamination, the complexity and location of the site, and the current and potential land use to determine appropriate cleanup standards. Because documented contamination requiring cleanup would be removed or contained prior to new development, it is assumed there would be no significant health and safety impacts on those living, working, or visiting the area, or impacts on the intended uses of properties within the study area.

As growth occurs in the study area, there is potential for hazardous material spills associated with petroleum products to increase as traffic and the potential for accidents increases. With growth there is also the potential for increased risk of spills from industrial activities, industrial processes, or use of industrial chemicals. Any spills would be cleaned up consistent with applicable state and local requirements and no significant impacts are anticipated.

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most in each subarea and across the whole subarea. See **Exhibit 3.5-7** and **Exhibit 3.5-8**.

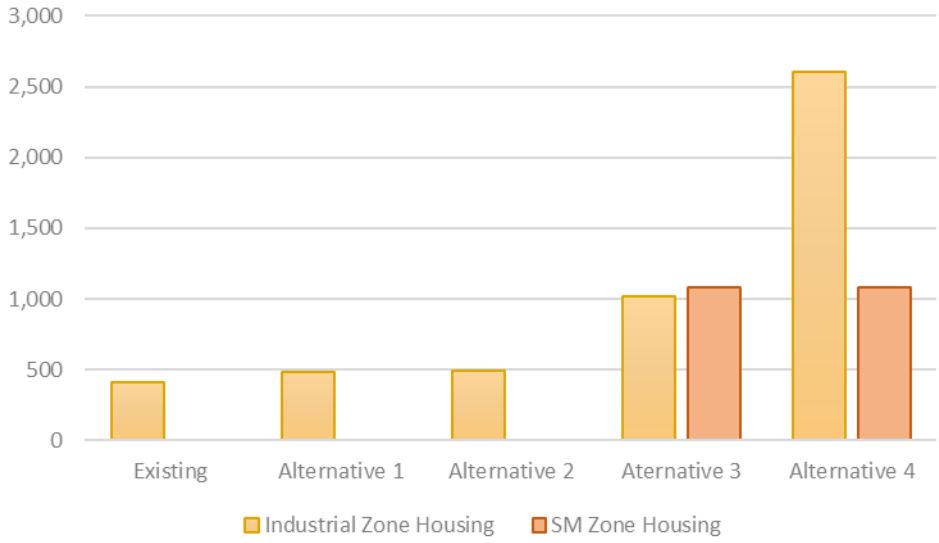
[10] Measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or cleanup action or that may result in exposure to hazardous substances at a site.

Exhibit 3.5-7 Existing and Net Building Space by Alternative



Source: City of Seattle, 2021; BERK, 2021.

Exhibit 3.5-8 Total Housing in Study Area by Alternative



Source: City of Seattle, 2021; BERK, 2021.

Ballard

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most. The Ballard Subarea would see the third highest growth in jobs and the second highest in housing under the alternatives of all the subareas. This subarea also has 73 Toxics Cleanup Program sites and 143 Hazardous Waste and Toxics Reduction Program sites. The risks of release of contaminants or of hazardous chemicals being used or causing conditions that result in health or safety impacts or impede future development are potentially higher than with the two

Interbay subareas, but less than the SODO/Stadium and Georgetown/South Park subareas. Although these risks are considered significant, they are avoidable with mitigation.

Interbay Dravus

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most. The Interbay Dravus Subarea would see modest growth in jobs and housing under the alternatives compared to the other subareas. This subarea has 38 Toxics Cleanup Program sites and 79 Hazardous Waste and Toxics Reduction Program sites. The risks of release of contaminants or of hazardous chemicals being used or causing conditions that result in health or safety impacts or impede future development are less than the Ballard, SODO/Stadium and Georgetown/South Park subareas. These risks are considered significant but avoidable with mitigation.

Interbay Smith Cove

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most. The Interbay Smith Cove Subarea would also see modest growth in jobs but minimal growth in housing under the alternatives compared to the other subareas. This subarea has 48 Toxics Cleanup Program sites and 54 Hazardous Waste and Toxics Reduction Program sites. The risks of release of contaminants or of hazardous chemicals being used or causing conditions that result in health or safety impacts or impede future development are also less than the Ballard, SODO/Stadium and Georgetown/South Park subareas. These risks are considered significant but avoidable with mitigation.

SODO/Stadium

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most. The SODO/Stadium Subarea would see the most growth in jobs and housing under the alternatives compared to the other subareas. This subarea also has 331 Toxics Cleanup Program sites and 672 Hazardous Waste and Toxics Reduction Program sites. The risks of release of contaminants or of hazardous chemicals being used or causing conditions that result in health or safety impacts or impede future development are greater than the other subareas. These risks are considered significant but avoidable with mitigation.

Georgetown/South Park

Alternative 1 would allow the least new jobs and housing and Alternative 4 the most. The Georgetown/South Park Subarea would see the second highest growth in jobs and third highest growth in housing compared to the other subareas. This subarea also has 220 Toxics Cleanup Program sites and 589 Hazardous Waste and Toxics Reduction Program sites. The risks of release of contaminants or of hazardous chemicals being used or causing conditions that result in health or safety impacts or impede future development are greater than other subareas

except the SODO/Stadium Subarea. These risks are considered significant but avoidable with mitigation.

Equity & Environmental Justice Considerations

Under any of the Action Alternatives, the primary equity and environmental justice concern for the proposal would be that cleanup of contaminated sites could cause temporary adverse effects from potential exposure of workers, nearby residents, and animals to contaminated soil, groundwater, surface water, fugitive dust, or spilled hazardous materials if mitigation measures are not fully implemented. This could lead to exposure of vulnerable communities, including lower-wage or under-represented workers, to inequitable exposure to contamination.

Under the Alternative 1 No Action, humans, plants, and animals could potentially be exposed to contaminants at existing contaminated sites in all subareas.

The greatest impacts would be associated with Alternative 4 because it would result in the most sites disturbed and cleaned up, housing units created, and workers living and working in the subareas. However, after completion of cleanup actions for projects under all the Action Alternatives, nearby residents would benefit from reduced risk of potential exposure to contaminants.

In order to mitigate potential exposure to contaminants, all workers would be issued personal protective equipment and protected by measures implemented under the contractor's site-specific health and safety plan.

Although all alternatives would likely result in short-term adverse effects on this determinant of equity and social justice, the Action Alternatives would generally have positive long-term benefits.

Impacts of Alternative 1 No Action

Under Alternative 1 No Action, contaminated sites and spills would still be investigated and cleaned up in accordance with MTCA and other applicable local, state, and federal laws. Industrial facilities and other sites would continue to manage hazardous and non-hazardous solid wastes as required under RCRA and Washington's Dangerous Waste Regulations to prevent human exposures and releases to the environment. A total of 8,330,000 square feet (SF) of industrial space and 2,900,000 SF of non-industrial space would be developed. This development would increase the short-term risk of exposure to contaminants as sites are cleaned up but result in a long-term benefit of lower concentrations of chemicals after sites are cleaned up. With the increases in industrial jobs (described below by subarea) and industrial space there would be an increased risk of chemical exposures and industrial spills related to industrial processes.

Impacts of Alternative 2

The impacts of Alternative 2 are similar to those described above under **Impacts Common to All Alternatives**, but the increased development under Alternative 2 increases the likelihood of encountering contaminated sites and for hazardous chemicals to cause impacts on health and safety or cause project delays. Under Alternative 2, the number of industrial jobs in the subareas would increase above Alternative 1 No Action by 2,000 in Ballard, 1,000 in Interbay Dravus, 1,100 in Interbay Smith Cove, 5,500 in SODO/Stadium, and 3,400 in Georgetown/South Park. In addition, the total square feet of industrial space developed within the subareas would more than double, from 8,330,000 SF under the No Action Alternative to 17,430,000 SF under Alternative 2.

With more industrial jobs and more than double the square footage of industrial space, there would be an increase in the number of Toxics Cleanup Program sites developed and cleaned up and an increase in the number of new Hazardous Waste and Toxics Reduction Program sites where chemicals are used. With the increase in industrial jobs and industrial space there would be an increased risk of chemical exposures and industrial spills related to industrial processes.

There would also be an increase in non-industrial jobs of 9,500 in new building space of 2,375,000 square feet, slightly lower than Alternative 1 No Action; the development of non-industrial space has the potential to increase the risk of potential chemical exposures.

The increase in total housing units from 488 under the No Action Alternative to 493 under Alternative 2 would also mean slightly more residents living in the subareas who could be exposed to contamination. The increased development would result in increases in traffic, which would increase the potential for hazardous material spills related to traffic accidents.

All these impacts together are considered significant but avoidable with mitigation.

Impacts of Alternative 3

The impacts of Alternative 3 are similar as those described above under Impacts Common to All Alternatives and under Impacts of Alternative 2. The zoning and development of residential properties and non-industrial mixed-use properties would require more restrictive cleanup levels under MTCA. This would have the positive benefit of removing more contamination to achieve lower cleanup levels and further reduce potential exposures.

Under Alternative 3, there would be slight increases in the number of industrial employees added in each of the subareas and Ballard and SODO/Stadium subareas would see the largest increases in number of housing units created.

The number of industrial jobs would increase above Alternative 1 No Action by 2,300 in Ballard, 600 in Interbay Dravus, 500 in Interbay Smith Cove, and 1,000 in SODO/Stadium, and would decrease by 300 in Georgetown.

Beyond Alternative 1 No Action, Alternative 3 would result in 2,870,000 SF of industrial space, 4,725,000 SF of non-industrial space. Additionally, 2,101 housing units would be developed above Alternative 1 within the subareas. As with Alternative 2, the increases industrial jobs added, and industrial and non-industrial space added under Alternative 3 would increase the risk of potential chemical exposures.

All these impacts together are considered significant but avoidable with mitigation.

Impacts of Alternative 4

The impacts of Alternative 4 are similar as those described above under Impacts Common to All Alternatives and under Impacts of Alternative 3. The zoning and development of residential properties and non-industrial mixed-use properties would require more restrictive cleanup levels under MTCA. As with Alternative 3 this would have the positive benefit of removing more contamination to achieve lower cleanup levels and further reduce potential exposures.

Under Alternative 4, the number of industrial jobs would increase by 100 above Alternative 1 No Action in the Ballard and Interbay Dravus subareas, remain the same in the Interbay Smith Cove Subarea, and decrease by 300 in the SODO/Stadium Subarea and 100 in the Georgetown/South Park Subarea. The total square footage of industrial space would decrease slightly, but an additional 500,000 SF of non-industrial space, and 3,686 housing units would be developed within the subareas. With the slight increases in the number of industrial employees working in the Ballard and Interbay Dravus subareas and increases in residents living in the developed housing units in the Ballard, Interbay Dravus, SODO/Stadium, and Georgetown/South Park subareas, potential exposures to contaminants or chemicals would increase due to the number of people working and living there.

All these impacts together are considered significant but avoidable with mitigation.

3.5.3 Mitigation Measures

Incorporated Plan Features

There are no incorporated plan features related to contamination.

Regulations & Commitments

All site development projects would be required to comply with applicable federal, state, and local regulations. The existing regulations described under *Current Policy and Regulatory Frameworks* in **Section 3.5.1 Affected Environment** establish standards for site characterization, cleanup of hazardous materials, and disposal of hazardous waste, as well as mitigation measures for development on or adjacent to historical landfills.

Development of known or suspected contaminated sites would require a Phase I Environmental Site Assessment per ASTM 1527 and potentially a Phase II Environmental Site Assessment (soil, sediment, and/or groundwater sampling) prior to construction-related activities, including demolition. Prior to renovation or demolition of structures, hazardous building material surveys (HBMS) would be conducted, and abatement of lead-based paints and asbestos, if present, would be required by the Puget Sound Clean Air Agency (PSCAA) and other agencies and laws. To the extent possible, the amount of contamination at a site with known contamination would be verified prior to construction, to minimize exposure to hazardous materials.

MTCA sets strict cleanup standards to ensure human health and the environment are not compromised. Washington's Dangerous Waste Regulations ensure that non-hazardous and hazardous solid wastes are properly managed from cradle to grave at industrial sites and other properties to prevent impacts to human health and the environment. Compliance with the regulations results in low levels of contamination after site cleanup and redevelopment.

The Seattle Department of Construction and Inspections and Seattle Fire Department regulate hazardous materials through the International Building Code and the International Fire Code. New development would need to meet the requirements prior to permits being issued for construction. Development and implementation of Construction Stormwater Pollution Prevention Plans would be required by the City to minimize the potential for release of hazardous materials to soil, groundwater, or surface water during construction.

Other Potential Mitigation Measures

During construction, the following measures would minimize potential impacts of accidental releases of hazardous material:

- Preparing a comprehensive contingency and hazardous substances management plan, a worker health and safety plan, a spill prevention control and countermeasures plan, and a Construction Stormwater Pollution Prevention Plan.
- Managing and disposing of hazardous or contaminated materials in accordance with applicable laws and regulations.

3.5.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts would occur with the implementation of mitigation measures. Hazardous materials sources would not impede redevelopment. Federal, state, and local regulations are in place to require cleanup of sites and to promote spill prevention.

Section 3.6

Noise

This chapter assesses the potential noise impacts associated with implementing the alternatives under consideration. The chapter includes a description of noise and noise levels in general, regulatory standards for noise, noise sources and potential sensitive noise receptors in the maritime and industrial areas of Seattle, the methods used to assess noise and impacts from noise, and an assessment of noise impacts associated with each alternative, as well as potentially feasible noise mitigation measures where appropriate. This analysis evaluates noise conditions and potential impacts for each MIC on an area-wide cumulative basis and, and in specific areas where the alternatives consider greater degrees of change.

Under the SEPA Rules (see WAC 197-11-330, WAC 197-11-440 and WAC 197-11-794), the evaluation of the significance of potential impacts considers whether there is a reasonable likelihood of more than a moderate adverse impact on environmental quality (WAC 197-11-794). In making this assessment, the following are considered:

- The context of the proposal, including the physical setting.
- The intensity of the impact, which depends on its magnitude and duration.
- The likelihood of the impact's occurrence.
- The duration of the impact.

In many cases, regulatory thresholds are used to judge significance. If actions would meet regulatory thresholds, then the determination is typically that the level of impact is unlikely to be significant. For the purposes of this programmatic impact analysis, noise is analyzed by examining whether:

- The alternative would cause future traffic noise levels of 10 dBA or more above existing noise levels.
- After application of mitigation, the alternative fails to comply with SMC Maximum Allowable Sound Level for receivers.

3.6.1 Affected Environment

Primary & Secondary Study Areas

The study area used in the noise assessment encompasses areas where construction noise or land uses that result from implementation of the industrial and maritime strategy would have the potential to affect nearby noise-sensitive land uses. The Primary Study Area includes the full study area and subareas referenced in **Chapter 2**, as well as a Secondary Study Area that includes areas extending 500 feet from the Primary Study Area boundary. Areas within the 500-foot radius include portions of the City of Seattle, City of Tukwila, and unincorporated King County.

Data & Methods

The project team used the following data sources for this construction noise assessment:

- Highway Construction Noise Handbook (FHWA 2006)
- City of Seattle Municipal Code (SMC Chapter 25)
- State of Washington Administrative Code (Chapter 173-60 WAC)

Background

Noise is defined as excessive or undesired sound. Human sensitivity to sound depends on its intensity, frequency composition and duration. Sound waves are received by the human ear as variations in pressure through a medium such as air over time. The loudest sounds typically encountered by humans are a million times greater in pressure than faint sounds at the threshold of hearing. Because of this large scale, noise intensity is measured on a scale whose units are termed decibels (dB) which use a logarithmic scale to compress the range of pressure fluctuations to a more usable noise metric. A logarithmic loudness scale with 0 dB corresponds roughly to the threshold of human hearing and 120 dB to 140 dB corresponds to the threshold of pain.

The greater sensitivity of the human ear to certain frequencies is approximated by skewing (or weighing) the decibel scale towards those frequencies. The weighted decibel scale which best approximates the response of the human ear is known as the A- weighted scale (dBA). The A-scale deemphasizes low frequency noise, slightly emphasizes mid-high frequency noise, and slightly de-emphasizes high frequency noise.

Community noise levels are typically measured over an extended period of time to characterize a community noise environment and evaluate cumulative sound impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. Commonly used technical noise terms used in this Chapter include:

Decibel (dB)—A logarithmic unit, which expresses the ratio of the measured sound pressure level to a standard reference level. Each increase in 10 dB equates to a tenfold increase in the magnitude of sound energy.

A-weighted Sound Level (dBA)—Sound level meters are usually equipped with weighting circuits, which filter out selected frequencies. The A-scale on a sound level meter best approximates the frequency response of the human ear.

Equivalent Noise Level (Leq)—The level of a constant sound having the same sound energy as the fluctuating levels measured over a period of time.

Ambient Noise Level—The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location (FWHA 2011).

Maximum Noise Level (Lmax)—The Lmax is the instantaneous maximum noise level measured during a measurement period of interest. This is the noise metric used when comparing a project's impacts to the City of Seattle Maximum Permissible Sound Levels.

Day-Night Average Sound Level (Ldn)—The day-night average sound level is the energy average of the A-weighted sound levels occurring during a 24-hour period, accounting for the greater sensitivity of most people to nighttime noise by weighting ("penalizing") nighttime noise levels by adding 10 dBA to noise between 10:00 p.m. and 7:00 a.m. (Seattle 2015).

Steady-state sound is typically described using the Leq descriptor. Impulse sound is sound generated over a relatively short duration period (e.g., a car horn or back-up alarm). Impulsive sound is typically characterized using the Lmax descriptor. Seattle's Noise code defines "Impulsive sound" where the peak of the sound level is less than one (1) second and short compared to the occurrence rate; the onset is abrupt; the decay rapid; and the peak value exceeds the ambient level by more than ten (10) dB(A) (Seattle 2015).

Effects of Noise on People

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise typically produces effects in the first two categories. Workers in industrial plants sometimes experience noise in the third category. There is no completely accurate way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. This lack of a standard is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is to compare it to the existing or "ambient" environment to which that person has adapted. In general, the more a new noise exceeds the previously ambient noise level, the less acceptable the new noise will be judged by listeners.

With regard to increases in A-weighted noise levels, the following relationships occur:

- People generally perceive a 10 dBA increase as a doubling of loudness and can cause an adverse response. For example, a 70 dBA sound will be perceived by an average person as twice as loud as a 60 dBA sound.
- People generally cannot detect differences of 1 dBA to 2 dBA between noise sources, but under typical listening conditions, differences of 3 dBA can be noticeable.
- A 5 dBA change would probably be perceived by most people under normal listening conditions.

Because of their logarithmic nature, decibels do not arithmetically add. For example, if two sound levels are added with one sound level being 10 dB louder than the other, the combined sound level is only 0.4 dB more than the louder sound level.

Exhibit 3.6-5 shows typical A-weighted noise levels and human response.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is a continuous line (for example, vehicle traffic on a highway), noise levels decrease by about 3 dBA for every doubling of distance away from the source. Noise levels at receptor locations can also be affected by factors other than the distance from the noise source. For example, topographic features and physical barriers can increase or decrease noise levels by absorbing, reflecting, or scattering sound waves. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can affect the degree to which sound is attenuated over distance. Temperature inversions and wind conditions can also diffract and focus a sound wave to a location at considerable distance from the noise source. The degree of impact also depends on the individual sensitivity of people listening and on ambient sound levels. For example, where background noise levels are high, introducing a new noise source tends to have less impact than in an environment where background noise levels are low.

Current Policy & Regulatory Frameworks

Federal Guidelines

The U.S. Department of Housing and Urban Development (HUD) promulgates noise standards (24 CFR Part 51, Subpart B) applicable to federally residential construction. These standards are widely used where federal involvement is not a factor to assess the significance of noise impacts in residential communities.

Under HUD standards, noise levels within residences should not exceed a day night average sound level (Ldn) of 45 dB (typically expressed as dBA). Because interior noise levels in typical residential construction are about 20 dBA below exterior levels, HUD standards classify sites where community exterior noise levels exceed 65 dB as noise-impacted areas and require additional sound attenuation to bring interior noise levels within the 45 dB standard.

A major source of noise in urban environments is from vehicles traveling on roads. Growth or changes in land use also can lead to additional traffic, and the potential for an increase in noise. Federal aid projects—transportation facilities receiving federal funding—are subject to federal noise guidelines. Washington State Department of Transportation (WSDOT) 2020 Traffic Noise Policy and Procedures (WSDOT 2020) are consistent with those of the Federal Highway Administration (FHWA) (23 Code of Federal Regulations 772) and have been approved by FHWA for use on federal-aid projects in Washington. FHWA guidelines state that noise abatement must be considered when a noise impact affects a particular land use or Activity Category. The FHWA Activity Categories B and C noise abatement criteria (NAC) of 67 dBA apply to residences

(single- and multi-family), places of worship, schools, recreation areas, and similar land use activities. **Exhibit 3.6-1** describes WSDOT's NAC by land use category. Other developed lands (e.g., hotels/motels, offices, restaurants/bars, or other developed lands) are included in Activity Category E, with a NAC of 72 dBA. FHWA determines a noise impact to occur when predicted future traffic noise levels "approach" or exceed the established FHWA NAC for a given Activity Category. WSDOT defines "approach" as within 1 dBA of the FHWA NAC (66 dBA for Activity Categories B and C or 71 dBA for Category E).

Exhibit 3.6-1 WSDOT Noise Abatement Criteria by Land Use Category

Activity Category	Leq(h)* (dBA) at Evaluation Location	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential (single and multi-family units)
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. Includes undeveloped land permitted for these activities.
F	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	—	Undeveloped lands that are not permitted

Source: WSDOT, 2020.

Washington State

The State of Washington authorized the establishment of rules to abate and control noise pollution (Revised Code of Washington 70.107). The regulations (Washington Administrative Code (WAC) 173-60-040) establish maximum permissible noise levels (termed "Environmental Designation for Noise Abatement" or EDNA), which vary depending upon the land uses of the noise source and the receiving property. The maximum permissible noise level is the decibel

level of noise generated by the project as measured at the property line of adjacent land uses; it is not the combined noise of a project and background. Maximum Permissible Environmental Noise Levels apply to a variety of activities and facilities including residences, hospitals, commercial services, storage, warehouse and distribution facilities, and industrial property, and exempts electrical substations, certain industrial installations, mobile noise sources and vehicles traveling in public right of way, as well as safety warning devices (i.e., bells). The state provisions have been adopted by most cities around the state, including the City of Seattle (SMC 25.08).

City of Seattle

Operational Noise Standards

Chapter 25.08 of the Seattle Municipal Code (SMC) establishes exterior sound level limits for specified land use zones or "districts," which vary depending on the district of sound source and the district of the receiving property (see **Exhibit 3.6-2**).

Exhibit 3.6-2 Maximum Permissible Noise Levels: Seattle Noise Control Ordinance

	EDNA Receiver of Noise (Maximum Allowable Sound Level in dBA Leq)		
EDNA Source of Noise	Residential	Commercial	Industrial
Class A Residential	55	57	60
Class B Commercial	57	60	65
Class C Industrial	60	65	70

Source: Seattle Municipal Code (SMC) 25.08.410.

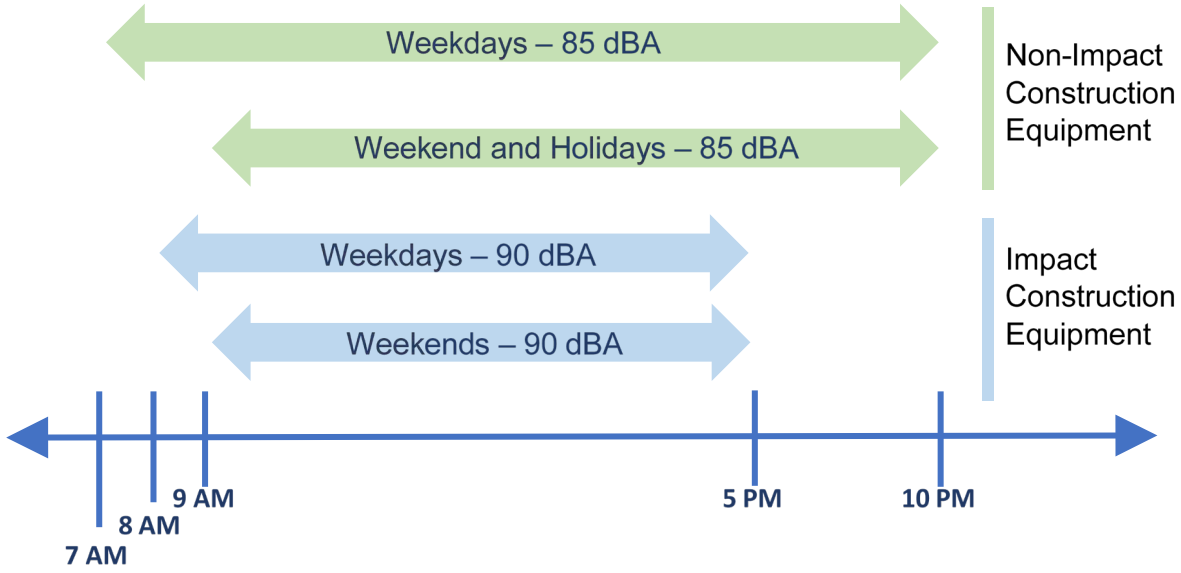
Between the hours of 10pm and 7am on weekdays and 10pm and 9am during weekends, the maximum limits for receivers within residential zones are to be reduced by 10 dBA. For noises of short duration these limits can be exceeded by a maximum of 5 dBA for 15 minutes/hour, 10 dBA for 5 minutes/hour or 15 dBA for 1.5 minutes/hour.

Construction Noise Standards

The City's Noise Control code allows the exterior sound level limits to be exceeded by certain types of construction equipment operating in many commercial districts between 7 a.m. and 10 p.m. on weekdays and between 9 a.m. and 10 p.m. on weekends and legal holidays (SMC 25.08.425; see **Exhibit 3.6-3**). The types of equipment that would usually exceed the exterior sound level limit of 60 dBA are tractors, loaders, excavators, and cranes. This equipment may exceed the applicable standard by up to 25 dBA (an 85 dBA standard) when measured at a reference distance of 50 feet. Use of impact equipment, such as a pile driver, is restricted to 8 a.m. to 5 p.m. on weekdays and 9 a.m. to 5 p.m. on weekends and holidays and limited to a

continuous noise level of 90 dBA and a maximum noise level of 99 dBA Lmax when measured at a reference distance of 50 feet.

Exhibit 3.6-3 Construction Noise Time Limits for Public Projects in Commercial Zones Under the City of Seattle Noise Ordinance



Source: City of Seattle, 2021.

Criteria for Increases in Noise Levels

As discussed in **Effects of Noise on People**, the following general relationships exist between noise levels and human perception:

- An increase in sound levels of 1- or 2-decibels is not perceptible to the average person.
- An increase in sounds levels of 3-decibels is just barely perceptible to the human ear.
- An increase in sounds levels of 5-decibels is readily perceptible to the human ear.
- An increase in sounds levels of 10-decibels is perceived as a doubling in loudness to the average person.

In addition, FHWA and WSDOT consider a traffic noise impact to occur if future predicted noise levels substantially exceed the existing noise levels. The WSDOT guidance indicates that a predicted future traffic noise level of 10 dBA or more above existing noise levels constitutes a substantial increase.

Current Conditions

Noise Sources in Seattle

For this analysis, the existing noise environments in the BINMIC and Greater Duwamish MIC are divided into several categories of noise sources: surface vehicle traffic; rail operations, including freight, light rail, and commuter trains; aircraft operations; commercial/industrial equipment; construction equipment and any other sources not associated with the transportation of people or goods.

Traffic Noise

Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours and the proximity of noise-sensitive receivers to the roadway. Existing traffic noise exposure adjacent to interstate highways is expected to be as high as 75 dB Ldn (FTA 2006). Bus transit can also make a meaningful contribution to roadway noise levels. Traffic noise assessment in this analysis is inclusive of bus transit, as buses are an assumed percentage of overall roadway volumes used in the calculation of roadside noise levels.

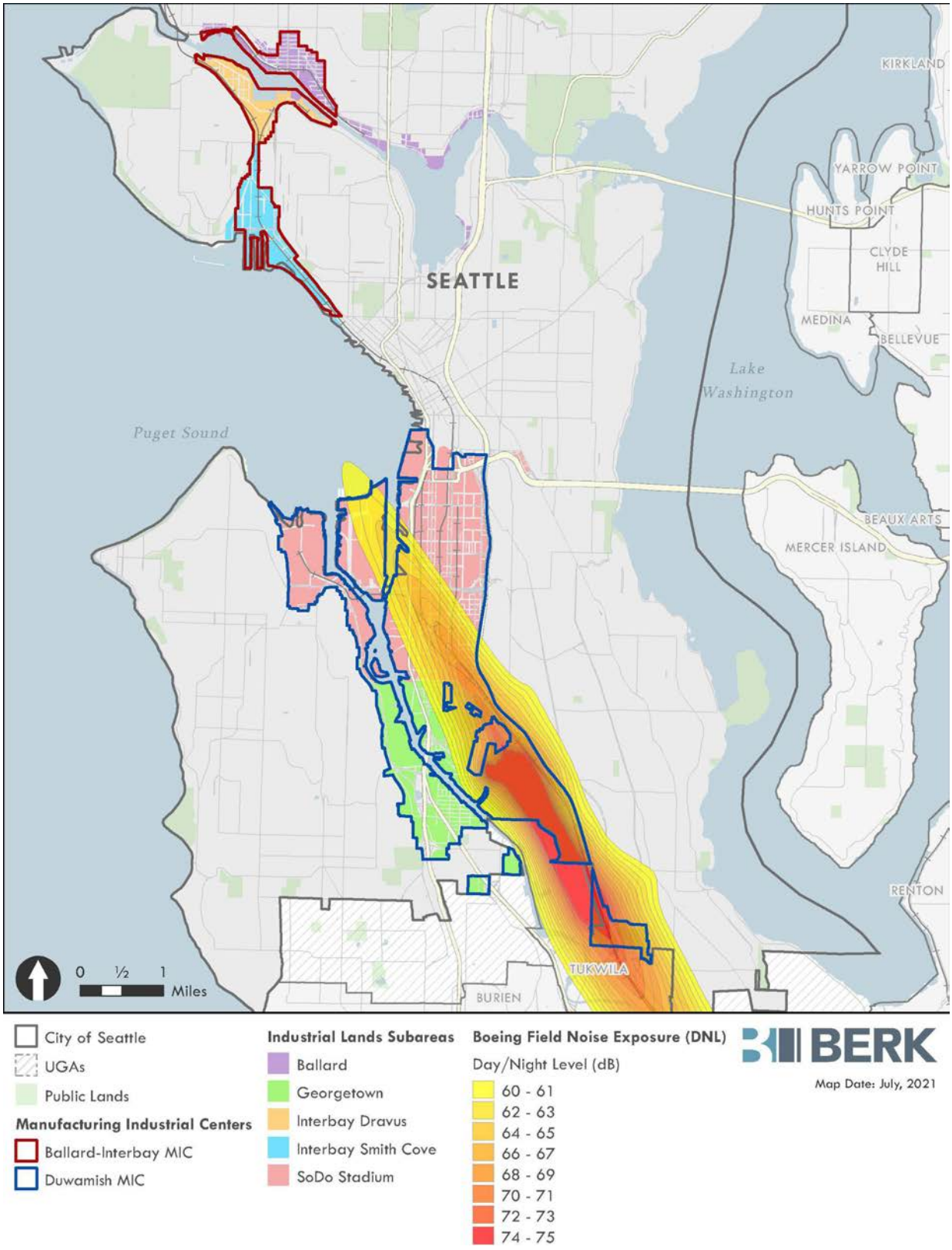
Rail Noise

MIC areas in Seattle are also affected by noise from freight and passenger rail operations. While these operations generate significant noise levels in the immediate vicinity of the railways, train operations are intermittent and area railways are widely dispersed. Commuter rail such as Sound Transit's light rail system operate with more frequency than standard gauge rail operations but electrification and lower speeds result in lower noise levels. The contribution of rail noise to the overall ambient noise environment in the Seattle MIC areas is relatively minor compared to other sources such as traffic. However, areas near train yards from assembling railcars into long trains and idling engines frequently experience high noise levels (FTA 2006).

Aircraft Noise

The King County International Airport, also known as Boeing Field, which generates approximately 500 aircraft operations a day. In addition to the numerous daily aircraft operations originating and terminating at Boeing Field, aircraft originating from other airports such as Seattle-Tacoma International Airport (Sea-Tac) frequently fly over Seattle. All of these operations contribute to the overall ambient noise environment. In general, like rail noise, the proximity of the receiver to the airport and aircraft flight path determines the noise exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft and atmospheric conditions. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft noise propagation. **Exhibit 3.6-4** presents the noise contours for Boeing Field as of the 2010 (King County 2010).

Exhibit 3.6-4 Boeing Field Noise Exposure



Source: Herrera, 2021.

Construction Noise

Construction activities for new development and transportation improvements can create high noise levels of relatively short duration. Noise production from construction equipment varies depending on factors such as operation being performed and equipment type, model, age, and condition. Noise from heavy equipment diesel engine operations often dominates the noise environment in the vicinity of construction sites. Stationary sources such as generators, pumps and compressors may also produce a significant contribution. However, if present, operations from impact equipment (e.g., pile driving, pavement breaking) will generally produce the highest noise levels and may also produce significant vibration in the vicinity. Maximum noise exposure from typical construction equipment operations is approximately 75–100 dB (Lmax at 50 feet) with noise from heavy demolition and pile driving operations having the highest noise production.

Industry and Other Non-Transportation Noise

A wide variety of industrial and other non-transportation noise sources are located in Seattle MICs. These include manufacturing plants, marine shipping facilities, and other heavy and general industrial facilities, and others. Noise generated by these sources varies widely, but in many cases may be a significant contributor to a local noise environment.

For comparative purposes, a list of common A-weighted noise levels is shown in **Exhibit 3.6-5**. Decibel levels and common subjective responses to that sound level are also presented in the table. The table also depicts how persons commonly describe sound level differences of 10 dB as being twice as loud or half as loud.

Exhibit 3.6-5 Typical Sound Levels

Example	dBA	Qualitative Evaluations	Times as Loud (re 70 dBA)
	140	Deafening	
Threshold of Pain	135		
Jet Engine 200 feet	125		
	120		32
Rock Band	115		
Accelerating Motorcycle a few ft. away	110		16
Noisy Urban Street/Heavy City Traffic	100	Very Loud	8
Jack Hammer at 50 feet	95		
	90		4
Heavy Truck at 50 feet	85		
	80	Moderately Loud	2
Vacuum Cleaner at 10 feet	75		

Example	dBA	Qualitative Evaluations	
Near freeway auto traffic	70		1
Business Office	60		½
	50	Quiet	¼
	45		
Quiet urban nighttime	40		⅛
Soft whisper at 5 ft.	30	Faint	
	25		
Motion picture studio	20		
Human breathing	10	Very Faint	
Threshold of human hearing	0		

Source: Herrera, 2021.

Existing Noise Levels in Seattle MIC Areas

This section presents current noise levels in the BINMIC and Greater Duwamish MIC study areas. Three methods are used to characterize existing noise levels in the Seattle MIC areas:

- A compilation of available noise data near the MICs was collected from publicly available documents to provide a sampling of noise environments near the areas of interest.
- Noise levels were measured at 8 locations in specific areas where the alternatives consider greater degrees of change and the potential for noise impacts is higher.
- A desktop survey using aerial photography, ArcGIS, and the City of Seattle Comprehensive Plan and zoning was used to determine locations of noise sensitive land uses in the MIC areas.

Existing noise levels are presented in **Exhibit 3.6-6** and **Exhibit 3.6-7** and the location of the measurements is presented in **Exhibit 3.6-8**. Measurements indicate that portions of the SODO/Stadium and Georgetown/South Park subareas exceed HUD's 65 dBA standard and would be classified as noise-impacted areas needing additional noise attenuation for residential structures.

These data show that ambient noise levels in maritime and industrial areas of the city (locations in **Exhibit 3.6-8**) are higher than other developed areas of the city. Larger traffic volumes on local roadways, rail and aircraft operations, and transit bus operations are largely responsible for this condition. Typical urban areas with low roadway volumes can regularly experience typical ambient noise levels below 50 dBA. Locations adjacent to freeways and highways can experience daytime ambient noise levels of 65–75 dBA, L50 (Caltrans 2009).

Exhibit 3.6-6 Ambient Noise Level Data at Ecology/PSCAA Seattle Monitoring Stations

	2018		2019		2020		2021	
Location	LEQ	LMax	LEQ	LMax	LEQ	LMax	LEQ	LMax
11-Beverly Park School	64.1	71.0	63.7	69.0	62.0	68.0	62.9	66.0
9-Beacon Hill	64.0	70.0	91.2	110.0	73.6	99.0	62.8	69.0
6-Hamilton Viewpoint Park	57.0	74.0	57.4	64.0	57.0	66.0	53.8	64.0
4b-Catherine Blaine School (Magnolia)	53.2	64.0	53.1	64.0	54.5	71.0	66.8	85.0

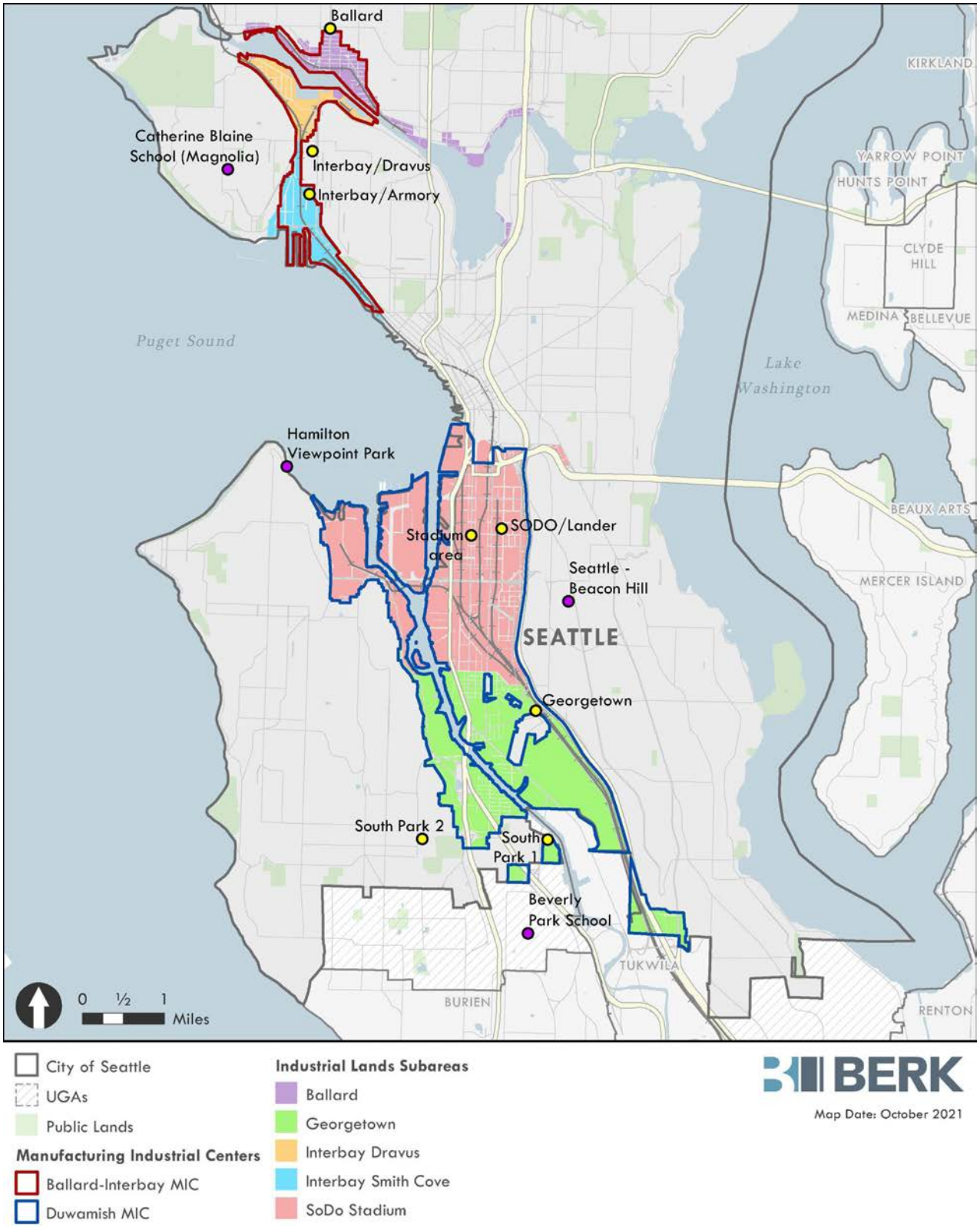
Sources: Port of Seattle, 2021 (https://www.portseattle.org/page/aircraft-noise-monitoring-system); Ramboll, 2021.

Exhibit 3.6-7 Sound Level Measurements (dBA) in the Seattle MIC Areas (2021)

	2021		
Location	24-Hour Day-Night Ldn	Hourly Leq Range—Daytime Hours	Hourly Leq Range—Nighttime Hours
Ballard	62.5	55.6–66.7	47.4–60.2
Interbay/Dravus	58.8	51.6–57.1	50.4–53.6
Interbay/Armory	58.5	52.1–56.7	50.6–52.3
Stadium	69.2	61.5–69.0	55.7–68.0
Georgetown	68.1	62.8–67.6	55.2–66.0
South Park 1	60.5	53.9–59.9	51.0–56.3
SODO/Lander	67.8 [a]	57.4–72.2 [a]	53.1–61.2
South Park 2	59.5	53.9–63.7	44.5–54.1

[a] At SODO/Lander location, sound levels during daytime hours between 7 a.m. and 2 p.m. were influenced by interference of a generator operating nearby. As estimate of the 24-hour Ldn sound level during this time period is approximately 65 dBA, approximately 3 dBA lower than presented in this table.
All measurements collected between August 23 and August 27, 2021.
Source: Ramboll, 2021.

Exhibit 3.6-8 Noise Monitoring Locations



Source: Herrera, 2021.

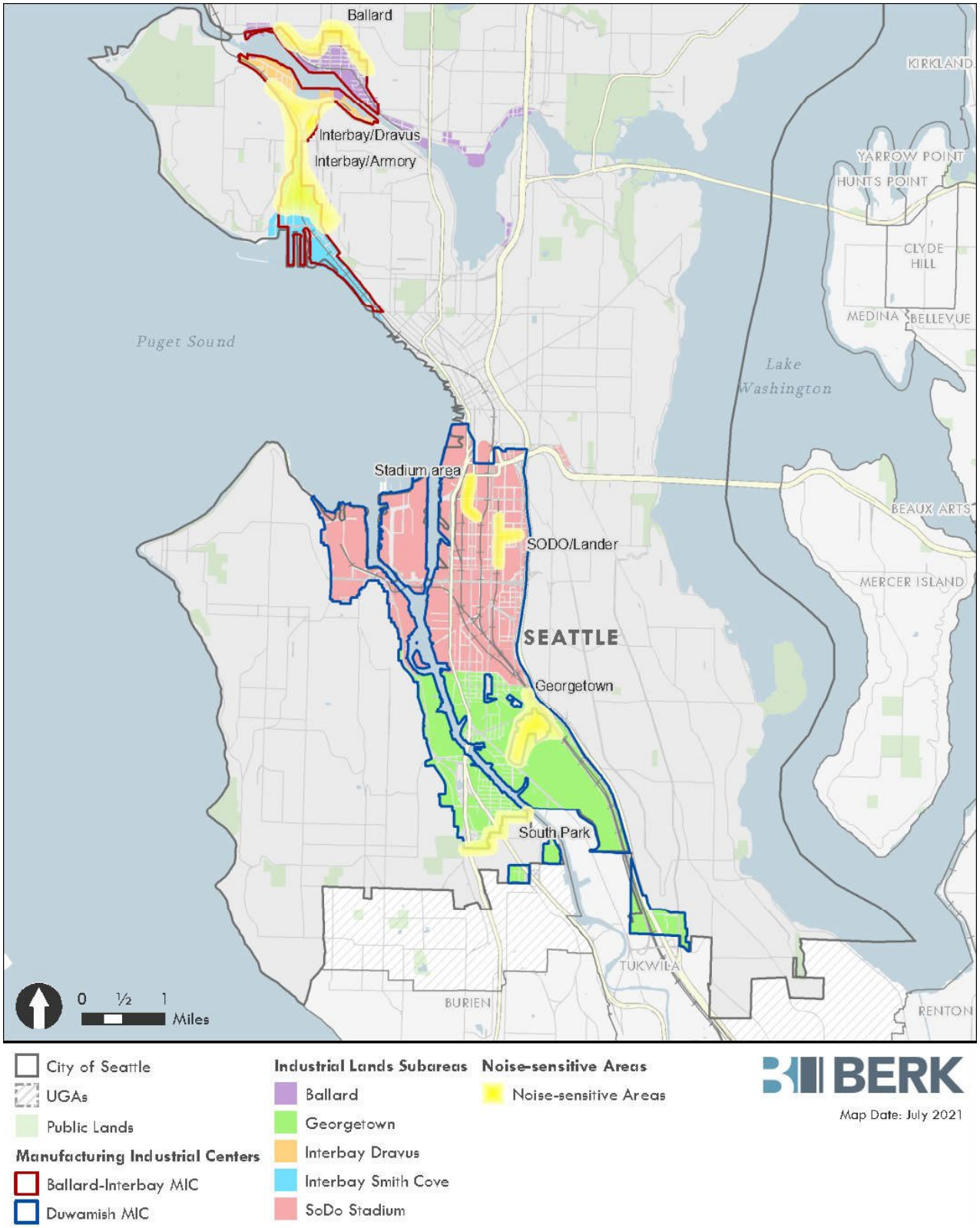
Noise-Sensitive Receptors

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, transient lodging, libraries, and certain types of recreational uses such as parks. Noise-sensitive residential receivers are found adjacent to many of the MIC areas. Residential areas of the Georgetown neighborhood occur within and surrounded by industrial land uses of the Greater Duwamish MIC.

Exhibit 3.6-9 shows the locations of the noise sensitive areas used in the analysis. The locations were selected because they are associated with areas of future land uses under one or more of the alternatives under consideration during Scoping, and would include a higher density of office workers, live/work uses, or in some cases, mixed-uses that may support residential and open space areas.

1. Ballard: 5007 14th Avenue Northwest. This site is also close to the future Sound Transit light rail station.
2. Interbay/Dravus: 3425 16th Avenue West. This is also close to a future Sound Transit light rail station, a BNSF rail yard, and facilities.
3. Interbay/Armory site: 1561 W Armory Way. This is a site that is close to the BNSF rail yard.
4. Stadium area: 1730 1st Avenue South
5. Georgetown: 5707 Airport Way South
6. South Park 1: 8620 16th Avenue South. An area close to the King County airport
7. SODO/Lander: 2437 6th Avenue South. An existing light rail station.
8. South Park 2: 8100 8th Avenue South. An area in proximity to SR 99 and SR 509.

Exhibit 3.6-9 Location of Potential Noise Sensitive Areas



Source: Herrera, 2021.

3.6.2 Impacts

Impacts Common to All Alternatives

Ballard

Noise Sensitive Receivers

In the Ballard Subarea portion of the BINMIC, existing sensitive receivers potentially impacted by noise include residences and schools primarily adjacent to the north and east sides of the Ballard Subarea but also at scattered locations within the subarea.

Recreation sites and facilities in and adjacent to this subarea include: a boat ramp, wading pool, outdoor sports courts, play areas, sports fields, the Burke-Gilman multi-use trail, and Fremont Canal Park. As urban recreation facilities they are only moderately noise sensitive, and the likeliest adverse impacts would result from noise from nearby construction activities.

Construction

Construction activities associated with development or redevelopment of industrial, commercial, and residential land uses would result in temporary, localized increases in noise that could affect nearby sensitive receivers.

Construction activities most likely to lead to increased noise involve excavation and related site preparation, and construction of foundation and building structure and exterior. These activities typically involve the use of heavy on-site equipment. Construction is also typically associated with a temporary increase in truck traffic as material is brought to and from the construction site. As indicated earlier in this section construction activities typically generate noise levels of 75–100 dB (Lmax at 50 feet) with noise from heavy demolition and pile driving operations typically having the highest noise production.

As described earlier in this section, the City's Noise Control regulations (SMC 25.08) would serve to limit noise impacts from construction by restricting the times when construction activity can exceed standard noise limitations.

Vibration is a distinct noise-related effect resulting from some construction activities, such as pile-driving, that can adversely affect the integrity of nearby structures and cause annoyance to nearby residents and other sensitive receptors. The City has not adopted quantitative standards limiting vibration. Potential vibration impacts, where anticipated, would be assessed in project-specific environmental review documents.

Noise from Stationary Operations

Industrial activities include manufacturing plants, marine shipping facilities, and other heavy and general industrial facilities and other stationary activities and land uses that generate noise. These facilities could use outdoor loading docks and outdoor material storage areas that, unless properly designed and controlled, could also generate of noise in the surrounding community. Noise generated by these sources varies widely and are often periodic but can exceed 80 dBA close to the source for some activities (**Exhibit 3.6-5**) and can be a substantial contributor to localized levels of noise. Depending on location, new residential uses within the Ballard Subarea could experience noise impacts from stationary industrial operations. Such uses would be subject to the noise limits of SMC Chapter 25.08.

Traffic Noise

Under all alternatives, traffic volumes on roads in and near the Ballard Subarea are expected to increase due to expected development and associated population increase in the overall Seattle area. Roadways in the study area are expected to experience a relatively high volume of light and heavy trucks. **Exhibit 3.6-10** shows PM peak hour volumes for all alternatives at roadways adjacent to monitoring locations.

Exhibit 3.6-10 PM Peak Hour Traffic Volumes for Existing Conditions and All Alternatives

Geographic Area	Adjacent Model Roadway	PM Peak Hour Volume									
		2019 Existing		2042 No Action		2044 Alt. 2		2044 Alt. 3		2044 Alt. 4	
		NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
Ballard	14th Ave NW	110	110	110	100	110	100	140	130	160	160
Interbay/Dravus	W Dravus St	1,180	1,220	1,150	1,210	1,240	1,230	1,390	1,260	1,410	1,260
Interbay/Armory	15th Ave NW	1,610	1,210	1,670	1,280	1,690	1,280	1,670	1,270	1,680	1,270
Stadium	1st Ave S	1,140	2,230	970	2,230	1,000	2,220	1,020	2,180	1,020	2,170
Georgetown	Airport Way S	510	1,580	760	1,590	780	1,600	820	1,620	830	1,650
South Park 1	14th Ave S	470	1,140	610	1,160	620	1,210	680	1,280	690	1,240
SODO/Lander	6th Ave S	250	320	230	720	230	720	230	700	250	720
South Park 2	8th Ave S	280	350	290	340	310	350	310	360	300	340

Source: Fehr and Peers, 2021.

These increased volumes would lead to very slight increases in roadway noise, if any. **Exhibit 3.6-11** shows estimated increases in modeled total noise exposure for all geographic areas for existing conditions, no action, and alternatives at the locations shown in **Exhibit 3.6-8**, above.

Exhibit 3.6-11 Increase in dBA Over Existing Conditions, All Alternatives

Geographic Area	Existing 24-Hour Day-Night Ldn	Increase in dBA— PM Peak Hour Volume									
		2019 Existing		2042 No Action		2044 Alt. 2		2044 Alt. 3		2044 Alt. 4	
		NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
Ballard	62.5			0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
Interbay/Dravus	59			0.0	0.0	1.0	0.0	2.0	0.0	2.0	0.0
Interbay/Armory	59			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stadium	69			-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Georgetown	68.1			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Park 1	60.5			1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
SODO/Lander	67.8			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Park 2	59.5			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Fehr and Peers, 2021; Herrera, 2021.

Anticipated increases in traffic within the Ballard Subarea would be insufficient (less than 3 dBA) to generate noticeable increases in roadway noise compared to the existing condition. In addition, over the next several decades technology of vehicles, both car and truck, is likely to reduce average vehicle noise. The result of expected limited increases coupled with likely technology changes would be that existing noise-sensitive land uses adjacent to the Ballard Subarea are unlikely to be adversely affected under any of the alternatives. Roadway noise could, however, adversely impact residents of new residential development anticipated within the subarea, especially under alternatives 3 and 4 if the new residential development occurs adjacent to major arterials.

Land Use Compatibility

Land use compatibility issues can arise when noise-sensitive uses, especially residences, are located near to industrial activities or heavily travelled roadways that generate high levels of noise. A common exterior noise standard for residences is 65 Ldn noise level, because exterior noise at that level can be reduced to an interior level of 45 dBA Ldn (the accepted maximum interior noise level for residential uses) using standard construction techniques. In the Ballard Subarea, land use compatibility impacts contributed to by subarea noise could occur in residential areas adjacent to the periphery of the subarea or in new residential and associated uses anticipated to be developed in the northern portion of the subarea (**Exhibit 3.6-9**).

Interbay Dravus

Noise Sensitive Receivers

In the vicinity of the Interbay Dravus Subarea, existing sensitive receivers potentially impacted by noise include residences and schools located primarily on the flanking hillsides to the east and west of the subarea, but also including multi-family residences and outdoor recreation facilities on the valley floor adjacent to the subarea boundary.

Recreation sites and facilities in and adjacent to this subarea include: Interbay Athletic Fields and Interbay Golf Course and the Ship Canal multi-use trail. As urban recreation facilities they are only moderately noise sensitive, and the likeliest adverse impacts would result from noise from nearby construction activities.

Construction

Construction noise impacts would be similar to those described for the Ballard Subarea. However, much of this subarea is underlain by fill, and special foundation construction (for example, over-excavation, pile-driving) may be necessary for some development leading to comparatively greater levels and/or durations of some construction noise.

Noise from Stationary Operations

Noise impacts from stationary sources would be similar to those described for the Ballard Subarea. However, historically, rail operations at the Balmer Yard (previously the Interbay Yard) have generated noticeable periodic noise. Depending on location, new residential uses within the Interbay Dravus Subarea could experience noise impacts from stationary industrial operations.

Traffic Noise

In the Interbay Dravus Subarea, impacts from traffic noise would be similar to those described for the Ballard Subarea.

Land Use Compatibility

Land use compatibility issues in the Interbay Dravus Subarea would be similar to those described for the Ballard Subarea. In the Interbay Dravus Subarea, land use compatibility impacts could occur in residential areas adjacent to the periphery of the subarea or in new residential and associated uses anticipated to be developed within the subarea (**Exhibit 3.6-9**).

Interbay Smith Cove

Noise Sensitive Receivers

In the vicinity of the Interbay Smith Cove Subarea, existing sensitive receivers potentially impacted by noise include residences and schools located primarily on the flanking hillsides to the east and west of the subarea, but also including multi-family residences and outdoor recreation facilities on the valley floor adjacent to the subarea boundary.

Recreation sites and facilities in and adjacent to this subarea include: sports fields, the Elliott Bay multi-use trail, and Smith Cove and Elliott Bay parks. As urban recreation facilities they are only moderately noise sensitive, and the likeliest adverse impacts would result from noise from nearby construction activities.

Construction

Construction noise impacts would be similar to those described for the Ballard Subarea. However, much of this subarea is underlain by fill, and special foundation construction (for example, over-excavation, pile-driving) may be necessary for some development leading to comparatively greater levels and/or durations of some construction noise.

Noise from Stationary Operations

Noise impacts from stationary sources would be similar to those described for the Ballard Subarea. However, historically, rail operations at the Balmer Yard (previously the Interbay Yard) have generated noticeable periodic noise. Depending on location, new residential uses within the Interbay Smith Cove Subarea could experience noise impacts from stationary industrial operations.

Traffic Noise

In the Interbay Smith Cove Subarea, impacts from traffic noise would be similar to those described for the Ballard Subarea.

Land Use Compatibility

Land use compatibility issues in the Interbay Smith Cove Subarea would be similar to those described for the Ballard Subarea. In the Interbay Smith Cove Subarea, land use compatibility impacts could occur in residential areas adjacent to the periphery of the subarea or in new residential and associated uses anticipated to be developed within the subarea (**Exhibit 3.6-9**)

SODO/Stadium

Noise Sensitive Receivers

In the SODO/Stadium Subarea portion of the Greater Duwamish MIC, existing sensitive receivers potentially impacted by noise include residences just west of the subarea in West Seattle and residences adjacent to the north periphery of the subarea. The noise environment of the primarily residential Beacon Hill area east of the subarea is dominated by noise from Interstate-5, and this area is unlikely to be affected substantially by noise from subarea development.

Recreation sites and facilities in and adjacent to this subarea include: a community center, the West Seattle Bridge and Duwamish River multi-use trails, and the West Duwamish Greenbelt and Puget Park adjacent to the west side of the subarea. As urban recreation facilities they are only moderately noise sensitive, and the likeliest adverse impacts would result from noise from nearby construction activities.

Construction

Construction noise impacts would be similar to those described for the Ballard Subarea. As in the Interbay subarea, much of the SODO/Stadium Subarea is underlain by fill, and special foundation construction (for example, over-excavation, pile-driving) may be necessary for some development resulting in comparatively greater levels and/or durations of some construction noise.

Noise from Stationary Operations

In the SODO/Stadium Subarea, noise impacts from stationary sources would be similar to those described for the Ballard Subarea. Rail operations at the Argo Yard in the southeast portion of the subarea periodically generate high frequency and impulsive noise. Depending on location, new residential uses within SODO/Stadium Subarea could experience noise impacts from stationary industrial operations.

Traffic Noise

In the SODO/Stadium Subarea, impacts from traffic noise would be similar to those described for the Ballard Subarea.

Land Use Compatibility

Land use compatibility issues in the SODO/Stadium Subarea would be similar to those described for the Ballard Subarea. In the SODO/Stadium Subarea, land use compatibility impacts could occur in residential areas adjacent to the periphery of the subarea or in new residential and associated uses anticipated to be developed primarily in the vicinities of the stadiums and the SODO light rail station (**Exhibit 3.6-9**). Noise monitoring at locations within

the subarea suggests that much of the subarea currently experiences noise levels above 65 dBA (Ldn) and new residential and associated noise sensitive development could be significantly adversely impacted by noise.

Georgetown/South Park

Noise Sensitive Receivers

In the Georgetown/South Park Subarea, existing sensitive receivers potentially impacted by noise include residences just west of the subarea in Delridge. The noise environment of the primarily residential Beacon Hill area east of the subarea is dominated by noise from Interstate-5 and Boeing Field (**Exhibit 3.6-4**), and this area is unlikely to be affected substantially by noise from subarea development.

Recreation sites and facilities in and adjacent to this subarea include: a hand launch site on the Duwamish River, a wading pool, a community center, outdoor sports courts, play areas, the Duwamish River and S Henderson Street multi-use trails, and the Duwamish Greenbelt and Puget Park adjacent to the west side of the subarea and Westcrest Park on the southeast. As urban recreation facilities they are only moderately noise sensitive, and the likeliest adverse impacts would result from noise from nearby construction activities.

Construction

Construction noise impacts would be similar to those described for the Ballard Subarea. Portions of the Georgetown/South Park Subarea are underlain by fill, and special foundation construction (for example, over-excavation, pile-driving) may be necessary for some development resulting in comparatively greater levels and/or durations of some construction noise.

Noise from Stationary Operations

In the Georgetown/South Park Subarea, noise impacts from stationary sources would be similar to those described for the Ballard Subarea. Depending on location, new residential uses within the Georgetown/South Park Subarea could experience noise impacts from stationary industrial operations.

Traffic and Aircraft Noise

In the Georgetown/South Park Subarea, impacts from traffic noise would be similar to those described for the Ballard Subarea. As shown in **Exhibit 3.6-4**, parts of the Georgetown portion of the subarea are within the Boeing Field Noise Exposure area. Areas of proposed Urban Industrial land within Georgetown lie within the exposure area, and new residential uses could experience relatively high levels of aircraft noise.

Land Use Compatibility

Land use compatibility issues in the Georgetown/South Park Subarea would be similar to those described for the Ballard Subarea. In the Georgetown/South Park Subarea, land use compatibility impacts could occur in residential areas adjacent to the periphery of the subarea or in new residential and associated uses anticipated to be developed primarily northwest of the north end of Boeing Field and in South Park (**Exhibit 3.6-9**). Noise monitoring at locations within the subarea suggests that the area northwest of Boeing Field may currently experience noise levels at or above 65 dBA (Ldn) and new residential and associated noise sensitive development in that area could be significantly adversely impacted by noise.

Other Industrial Zoned Lands

Other industrial lands include areas within the Ballard Subarea, but outside of the BINMIC, along the north side of the Ship Canal from the east end of the Ballard Subarea to about the Interstate-5 bridge and a confined area along the southeast shore of Lake Union. Also, other industrial lands include two small areas within the SODO/Stadium neighborhoods, but outside of the Greater Duwamish MIC, located north and east of the north end of SODO/Stadium Subarea. The other industrial lands in the Ballard Subarea are adjacent to residential areas to the north and east and noise impacts would be similar to those described for Ballard Subarea and unlikely to be significant. The other industrial lands within the SODO/Stadium Subarea are located adjacent to primarily commercial land uses which would not be noise sensitive and adverse noise impacts would be minimal.

Recreation sites and facilities in and adjacent to these other industrial lands include Gasworks Park at the north end of Lake Union. This is an urban recreation facility that is only moderately noise sensitive, and the likeliest adverse impact would result from noise from nearby construction activities.

Equity & Environmental Justice Considerations

Construction and increased activity under any of the alternatives has the potential to exacerbate residents' and workers' exposure to increased noise. Within the study area, the City has identified the SODO/Stadium and Georgetown/South Park subareas as having a Higher Disadvantage ranking in its Racial and Social Equity Index (City of Seattle 2017), and noise impacts to residents in those subareas may disproportionately affect low-income and minority communities.

Actual noise exposure is highly dependent on location, and in developing zoning boundaries to implement the selected industrial and maritime strategy, limiting proximity of new residential and associated development to high noise sources would limit exposure to excessive noise. In addition, noise reduction measures can be mandated for construction activities and adequate noise reduction measures also mandated for new residential construction, irrespective of

market value, in high noise environments within industrial areas. These measures are addressed below under **Section 3.6.3 Mitigation Measures**.

Impacts of Alternative 1 No Action

Based primarily on the expected increase in employment over the planning period, which is the lowest among the alternatives, the amount of construction and extent of new development would be less than other alternatives. Noise from stationary sources, which is typically dominated by heavy industrial exterior operations, would probably not increase substantially. As discussed above, expected traffic increases (see **Exhibit 3.6-10**) would be insufficient (less than 3dBA) to be noticeable (see **Exhibit 3.6-11**). Construction noise could adversely impact nearby locations, but impacts would be temporary and limited by the City's timing restrictions on construction activities. Overall, noise impacts should not be significant.

Impacts of Alternative 2

Based on the expected increase in employment and traffic over the planning period, noise increases would be similar to Alternative 1 in most locations, with minor increases in the Interbay Dravus Subarea; and similar to the other alternatives in most locations, but with less increase than Alternative 4 in the Interbay Dravus Subarea.

Impacts of Alternative 3

Based on the expected increase in employment and traffic over the planning period, noise increases would be similar to alternatives 1 and 2 in most locations, but slightly greater in the Interbay Dravus Subarea and portions of South Park; and similar to Alternative 4 but less than portions of South Park. Alternative 3 would include an expansion of housing allowances, which would expose new residents to potential noise impacts that could be significant without mitigation. Locations of new housing where residents would be particularly susceptible to adverse noise impacts include locations in proximity to one or more of the following: Interstate-5, active heavy or light rail lines, Boeing Field and its approach paths, and major activity centers. Locations having these characteristics occur in Interbay (heavy rail and future light rail); Stadium (Interstate-5, heavy and light rail, major activity center); SODO (Interstate-5, heavy and light rail); and Georgetown (Interstate-5, heavy rail, Boeing Field). Some of these locations experience high existing ambient noise levels (Leq) up to about 69 dBA (**Exhibit 3.6-7** Permissible EDNA levels are 60 dBA for residential receivers and up to 70 dBA for industrial receivers (SMC 25.08.410). However, some noise sources, for example rail and plane noise, are periodic and/or infrequent, and their contribution to hourly or daily noise metrics may not capture the extent to which their noise adversely affects noise-sensitive receptors.

Impacts of Alternative 4

Based on the expected increase in employment and traffic over the planning period, noise increases would be greater than alternatives 1 and 2 in the Ballard and Interbay Dravus subareas and less than some portions of South Park, but similar at all other locations. Alternative 4 would be similar to Alternative 3 in most locations, but greater in the Ballard Subarea and less in portions of South Park. Alternative 4 would include the largest expansion of housing allowances among the alternatives, which would expose the greatest number of new residents to potential noise impacts, the nature of which is discussed above under Alternative 3.

3.6.3 Mitigation Measures

Incorporated Plan Features

The recommendations of the Industrial and Maritime Strategy include the following features that relate to noise attenuation:

- Inclusion of circulation routes for non-motorized travel would reduce motorized traffic and associated noise.
- Incentivizing the use of transit and discouraging the use of single-occupancy vehicles would reduce overall traffic volumes and associated noise.
- Inclusion of green open spaces within Urban Industrial and Industry and Innovation districts would create greater separation between uses and decrease exterior noise levels.

Regulations & Commitments

City noise regulations establish exterior sound level limits for various land use zones with the limits varying depending on the source zone and the receiving zone (**Exhibit 3.6-2**). These limits are intended to result in acceptably low interior noise levels for residences and other sensitive noise receptors. City noise regulations also address construction noise, limiting the times during the day when construction noise, both impact and non-impact, can exceed exterior noise limits (**Exhibit 3.6-3**).

Other Potential Mitigation Measures

Zoning land use criteria or boundaries could be established, while meeting other planning goals, to limit the proximity of new residential development to known or anticipated sources of high noise levels.

To limit the impacts of temporary construction noise, in addition to restrictions on the hours of construction other mitigation that could be applied includes:

- installing barriers to shield noise sensitive receptors and enclosing stationary work

- selecting haul routes to avoid noise sensitive areas
- using alternative methods to pile-driving (e.g., hydraulic or vibration pile insertion or auguring/drilling holes for piles)
- using fully baffled compressors, or preferably electric compressors
- using fully mufflered construction equipment

Under alternatives 3 and 4, which would allow the development of new residential, the City could impose greater noise reduction standards in residential buildings where exterior noise levels greater than 65 dBA are likely to occur or where other uses occupying the same structure would likely contribute to excessive noise levels (above 45 dBA) within residences. These standards could include:

- installation of acoustically rated windows and doors that include high quality elastomeric caulking, multiple sashes, multiple panes, increased glass thickness, and increased airspace between glass panes
- installation of additional wall and attic/roof insulation
- installation of dampers and baffles on exterior vents, flues, and chimneys

Noise from tire-pavement interactions is the dominant contributor to roadway noise. A long-term mitigation program to reduce noise in noise-sensitive areas within the study area would be to install noise reducing pavement on major arterials and roadways that experience relatively high traffic volumes and speeds.

3.6.4 Significant Unavoidable Adverse Impacts

Under the studied alternatives, increased employment growth could result in increased traffic volumes, though the resulting noise increases are not anticipated to exceed 3dBA, the threshold of change that is perceptible. The location of noise sensitive receivers like residential uses near industrial or traffic noise sources could occur under all alternatives, particularly alternatives 3 and 4. Implementation of residential noise mitigation described in the preceding subsection should adequately reduce noise experienced by noise sensitive receivers. With the application of mitigation measures described above, no significant unavoidable adverse noise impacts would occur under any of the alternatives.

Section 3.7

Light & Glare

This section discusses light and glare conditions in the study area and considers the impact of development under each of the alternatives on future conditions. The existing conditions and impacts analysis primarily use spatial data published by the City of Seattle, supplemented with King County and Federal sources.

Impacts of the alternatives on light and glare are considered significant if:

- Light and glare from new development has the potential to affect substantial numbers of residents, shoreline views, or protected scenic views (e.g., scenic routes, designated parks).

3.7.1 Affected Environment

This section discusses existing lighting and glare conditions in the study area, including major sources of exterior illumination and nearby high-sensitivity locations, such as residential areas, public open spaces, and scenic views.

Data & Methods

This section primarily uses spatial data published by the City of Seattle, supplemented with King County and Federal sources. Data sources include:

- City of Seattle Geographic Information Systems
  - City of Seattle 10-foot topographic contours (2016)
  - City of Seattle Parks and Trails inventory (2020)
  - City of Seattle Zoning (2021)
- King County Assessor
  - Existing land use property classifications (2020)
- National Aeronautics and Space Administration (NASA)
  - International Space Station nighttime light emission imagery of Seattle metropolitan area (2015)

Viewshed Calculation

To determine potential visibility areas, City-published elevation contours were processed using GIS software to create a digital elevation raster model of the city. The study area was then subdivided using a grid of 100-foot by 100-foot cells. The centroids of these equal-area cells were designated as “observer” points in the viewshed calculation. This created approximately 4,900 observer locations, equally distributed throughout the study area. To account for the visibility of buildings above ground level, each observer point was assigned an above-ground height offset based on the maximum structure height allowed in the applicable zoning district.

Lines of sight were calculated for each observer point and combined to generate a consolidated viewshed image that indicates relative visibility. Areas of the map highlighted as having high

visibility are visible from a greater number of observer points; lower visibility areas are visible from fewer observer points.

Nighttime Light Emission Mapping

Maps of nighttime lighting conditions used NASA orbital imagery captured by the International Space Station in 2015, the most recent year for which a nighttime image of Seattle was available. The image was reoriented and cropped using photo editing software and then georeferenced using GIS software. Due to image resolution limitations, the resulting maps are likely to contain a minor amount of spatial positioning error and are intended to illustrate relative brightness of nighttime light emissions across the city.

Current Policy & Regulatory Frameworks

Comprehensive Plan Goals & Policies

Seattle 2035, Seattle's comprehensive plan, establishes goals and policies related to urban design and aesthetics, including light and glare.

- **Land Use Element Policy LU 5.14:** Establish controls on the placement, direction, and maximum height of lighting and on the glare from reflective materials used on the exterior of structures in order to limit impacts on surrounding uses, enhance the character of the city, and encourage energy conservation.
- **Eastlake Community Design Policy EL-P3:** Anticipate and minimize, through zoning regulations and/or design review guidelines, to be prepared for the Eastlake area, the potential for impacts on residential uses from the close proximity, orientation, or incongruent scale of commercial development, including the loss of privacy, sunlight, or air, or increased noise, artificial light, or glare.

Seattle Municipal Code

SEPA Policies

The City of Seattle Municipal Code Chapter 25.05 codifies environmental policies and procedures. Section 25.05.675.K contains provisions related to light and glare.

K. Light and glare

1. Policy background

a. Development projects sometimes include lighting and/or reflective surface materials which can adversely affect motorists, pedestrians, and the surrounding area. Such adverse impacts may be mitigated by alternative lighting techniques and surface materials.

b. The City's Land Use Code specifically addresses the issue of light and glare control associated with commercial and industrial projects.

2. Policies.

a. It is the City's policy to minimize or prevent hazards and other adverse impacts created by light and glare.

b. If a proposed project may create adverse impacts due to light and glare, the decisionmaker shall assess the impacts and the need for mitigation.

c. Subject to the overview policy set forth in Section 25.05.665, the decisionmaker may condition or deny a proposed project to mitigate its adverse impacts due to light and glare.

d. Mitigating measures may include, but are not limited to:

1) Limiting the reflective qualities of surface materials that can be used in the development;

2) Limiting the area and intensity of illumination;

3) Limiting the location or angle of illumination;

4) Limiting the hours of illumination; and

5) Providing landscaping.

Seattle Municipal Code Section 25.05.675.P contains provisions related to public view protection.

P. Public view protection

1. Policy background

a. Seattle has a magnificent natural setting of greenery, mountains, and water; visual amenities and opportunities are an integral part of the City's environmental quality.

b. The City has developed particular sites for the public's enjoyment of views of mountains, water, and skyline and has many scenic routes and other public places where such views enhance one's experience.

c. Obstruction of public views may occur when a proposed structure is located in close proximity to the street property line, when development occurs on lots situated at the foot of a street that terminates or changes direction because of a shift in the street grid pattern, or when development along a street creates a continuous wall separating the street from the view.

d. Authority provided through Chapter 25.12 is intended to preserve sites and structures which reflect significant elements of the City's historic heritage and to designate and regulate such sites and structures as historic landmarks.

e. The Land Use Code provides for the preservation of specified view corridors through setback requirements.

f. The Land Use Code attempts to protect private views through height and bulk controls and other zoning regulations but it is impractical to protect private views through project-specific review.

2. Policies

a. 1) It is the City's policy to protect public views of significant natural and human-made features: Mount Rainer, 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 the specified viewpoints, parks, scenic routes, and view corridors, identified in Attachment 1. (Attachment 1 is located at the end of this Section 25.05.675.) This subsection 25.05.675.P.2.a.i does not apply to the Space Needle, which is governed by subsection 25.05.675.P.2.c.

2) The decisionmaker may condition or deny a proposal to eliminate or reduce its adverse impacts on designated public views, whether or not the project meets the criteria of the overview policy set forth in Section 25.05.665; provided that downtown projects may be conditioned or denied only when public views from outside of downtown would be blocked as a result of a change in the street grid pattern.

b. 1) It is the City's policy to protect public views of historic landmarks designated by the Landmarks Preservation Board that, because of their prominence of location or contrasts of siting, age, or scale, are easily identifiable visual features of their neighborhood or the City and contribute to the distinctive quality or identity of their neighborhood or the City. This subsection does not apply to the Space Needle, which is governed by subsection 25.05.675.P.2.c.

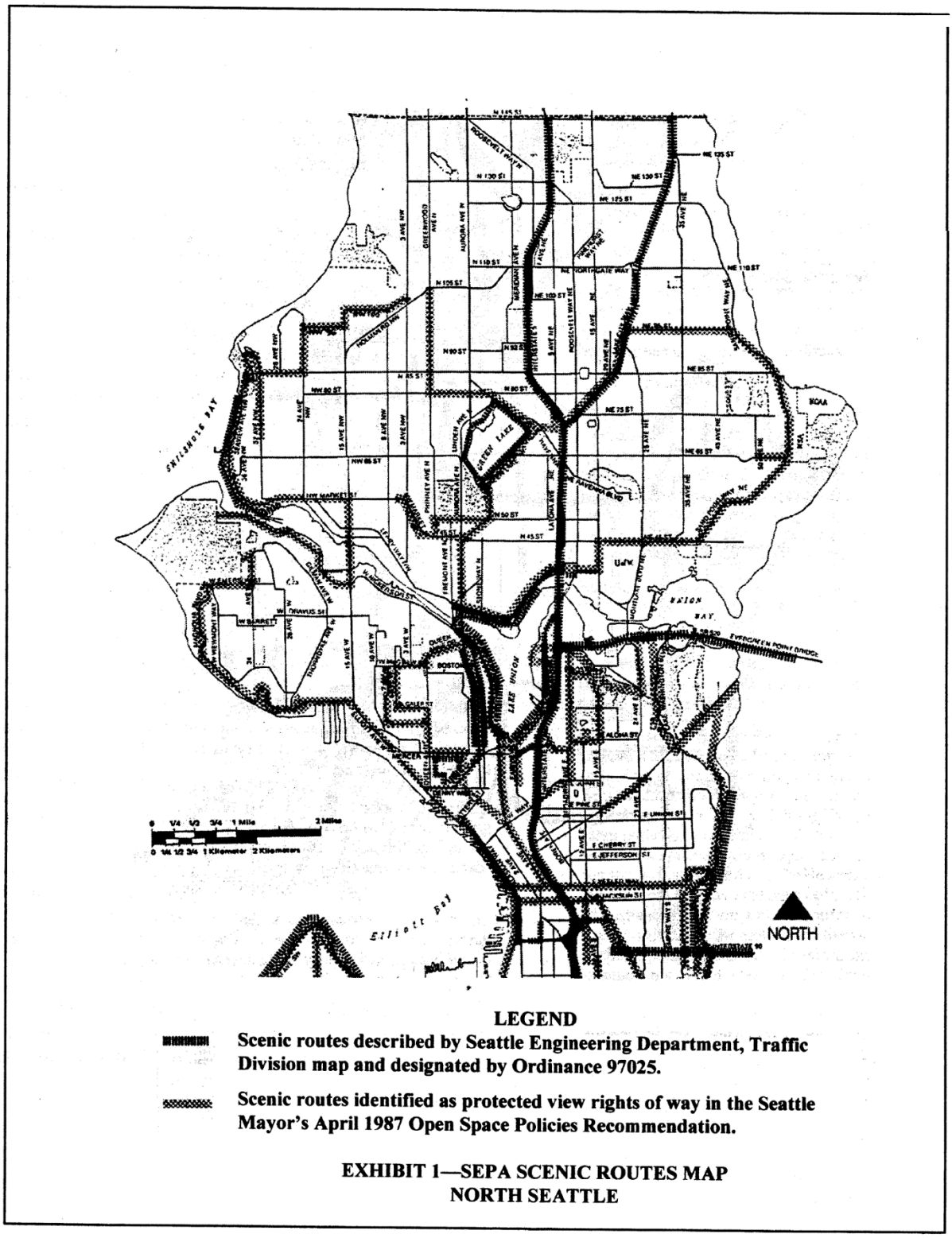
2) A proposed project may be conditioned or denied to mitigate view impacts on historic landmarks, whether or not the project meets the criteria of the overview policy set forth in Section 25.05.665.

c. It is the City's policy to protect public views of the Space Needle from the following public places. A proposed project may be conditioned or denied to protect such views, whether or not the project meets the criteria of the overview policy set forth in Section 25.05.665.

1) Alki Beach Park (Duwamish Head)
2) Bhy Kracke Park
3) Gasworks Park
4) Hamilton View Point
5) Kerry Park
6) Myrtle Edwards Park
7) Olympic Sculpture Park
8) Seacrest Park
9) Seattle Center
10) Volunteer Park

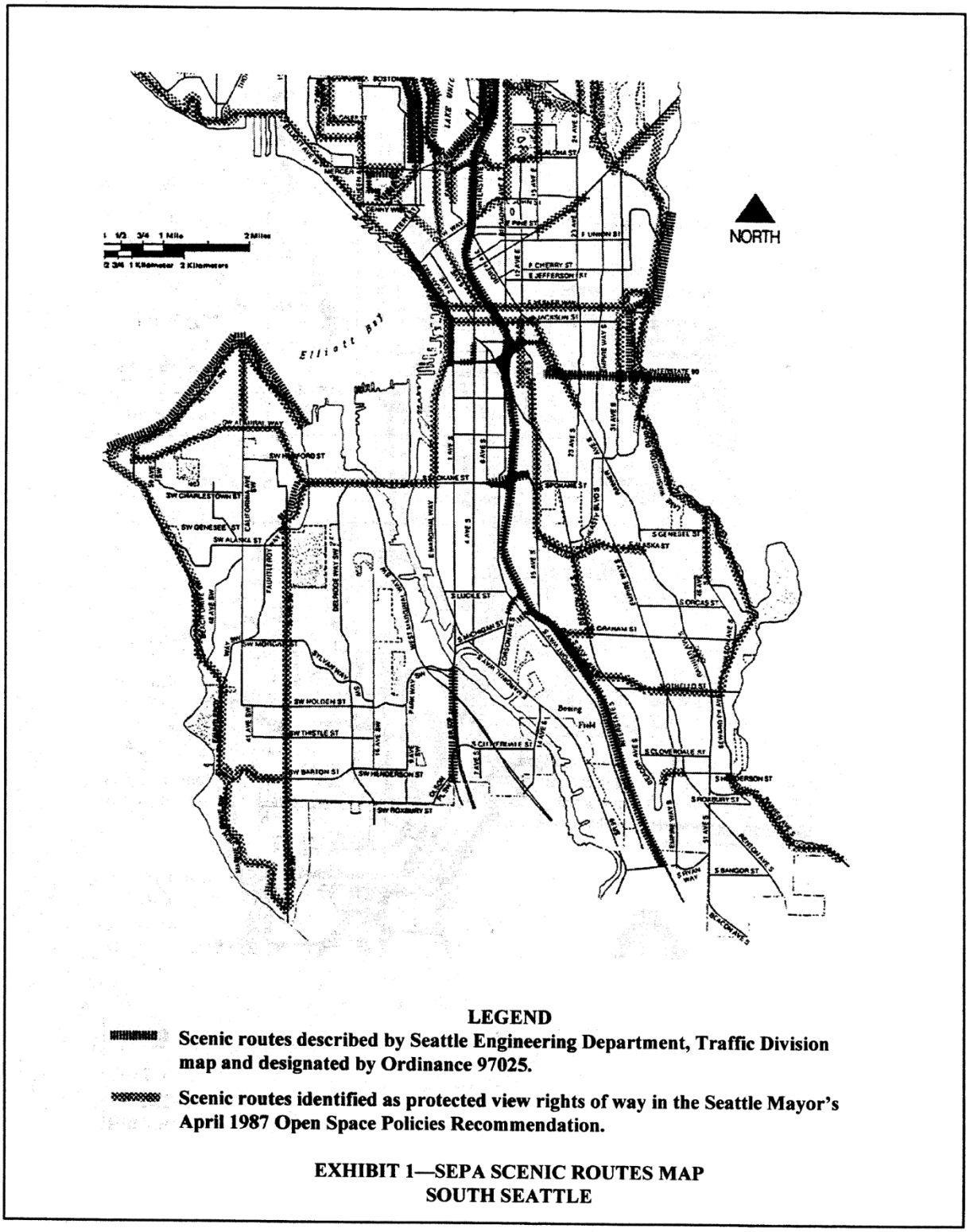
Designated scenic routes identified in SMC 25.05.675.P.2.a.1 are shown in **Exhibit 3.7-1** and **Exhibit 3.7-2**.

Exhibit 3.7-1 Seattle SEPA Scenic Routes Map—North



Source: Seattle Municipal Code Chapter 25.05 Subchapter VII—Attachment 1, 1987.

Exhibit 3.7-2 Seattle SEPA Scenic Routes Map—South



Source: Seattle Municipal Code Chapter 25.05 Subchapter VII—Attachment 1, 1987.

Development Standards

The Seattle Land Use Code (Seattle Municipal Code Title 23) contains development regulations for each of Seattle's zoning districts. These regulations establish light and glare standards for residential, commercial, and industrial zones that govern the design and placement of exterior site and building illumination, including effects on surrounding properties. As described in **Section 3.8 Land & Shoreline Use**, land in the study areas is primarily zoned Industrial; light and glare standards for Industrial Buffer (IB) or Industrial Commercial (IC) zones are established in SMC Chapter 23.50.046.

A. Exterior lighting shall be shielded and directed away from lots in adjacent residential zones.

B. Interior lighting in parking structures shall be shielded, to minimize nighttime glare affecting lots in adjacent residential zones.

C. When nonconforming exterior lighting in an Industrial Buffer (IB) or Industrial Commercial (IC) zone is replaced, new lighting shall conform to the requirements of this section.

D. Glare diagrams which clearly identify potential adverse glare impacts on residential zones and on arterials shall be required when:

1. Any structure is proposed to have facades of reflective coated glass or other highly reflective material, and/or a new structure or expansion of an existing structure greater than sixty-five (65) feet in height is proposed to have more than thirty (30) percent of the facades comprised of clear or tinted glass; and

2. The facade(s) surfaced or comprised of such materials either:

a. Are oriented towards and are less than two hundred (200) feet from any residential zone, and/or

b. Are oriented towards and are less than four hundred (400) feet from a major arterial with more than fifteen thousand (15,000) vehicle trips per day, according to Seattle Department of Transportation data.

E. When glare diagrams are required, the Director may require modification of the plans to mitigate adverse impacts, using methods including but not limited to the following:

1. Minimizing the percentage of exterior facade that is composed of glass;

2. Using exterior glass of low reflectance;

3. Tilting glass areas to prevent glare which could affect arterials, pedestrians or surrounding structures;

4. Alternating glass and nonglass materials on the exterior facade; and

5. Changing the orientation of the structure.

Current Conditions

Full Study Area

As described in **Section 3.8 Land & Shoreline Use**, the study area consists primarily of industrially-zoned properties occupied by a variety of commercial and industrial uses. This style of development is often characterized by larger lot sizes and buildings than lower-intensity commercial or residential properties and a higher level of exterior building and site illumination.

Exhibit 3.7-3 shows nighttime illumination levels across Seattle, including the study area and adjacent neighborhoods. These visible light sources are a combination of streetlights, vehicles, and on-site exterior lighting. As shown on the map, nighttime illumination is brightest along major transportation corridors and in areas characterized by high-density commercial or industrial development, including Downtown, Uptown, the University District, Ballard, and the Greater Duwamish MIC. Adjacent residential neighborhoods appear darker by comparison, partially due to the lower level of lighting present and partially due to greater tree canopy presence, which can shield and screen light sources.

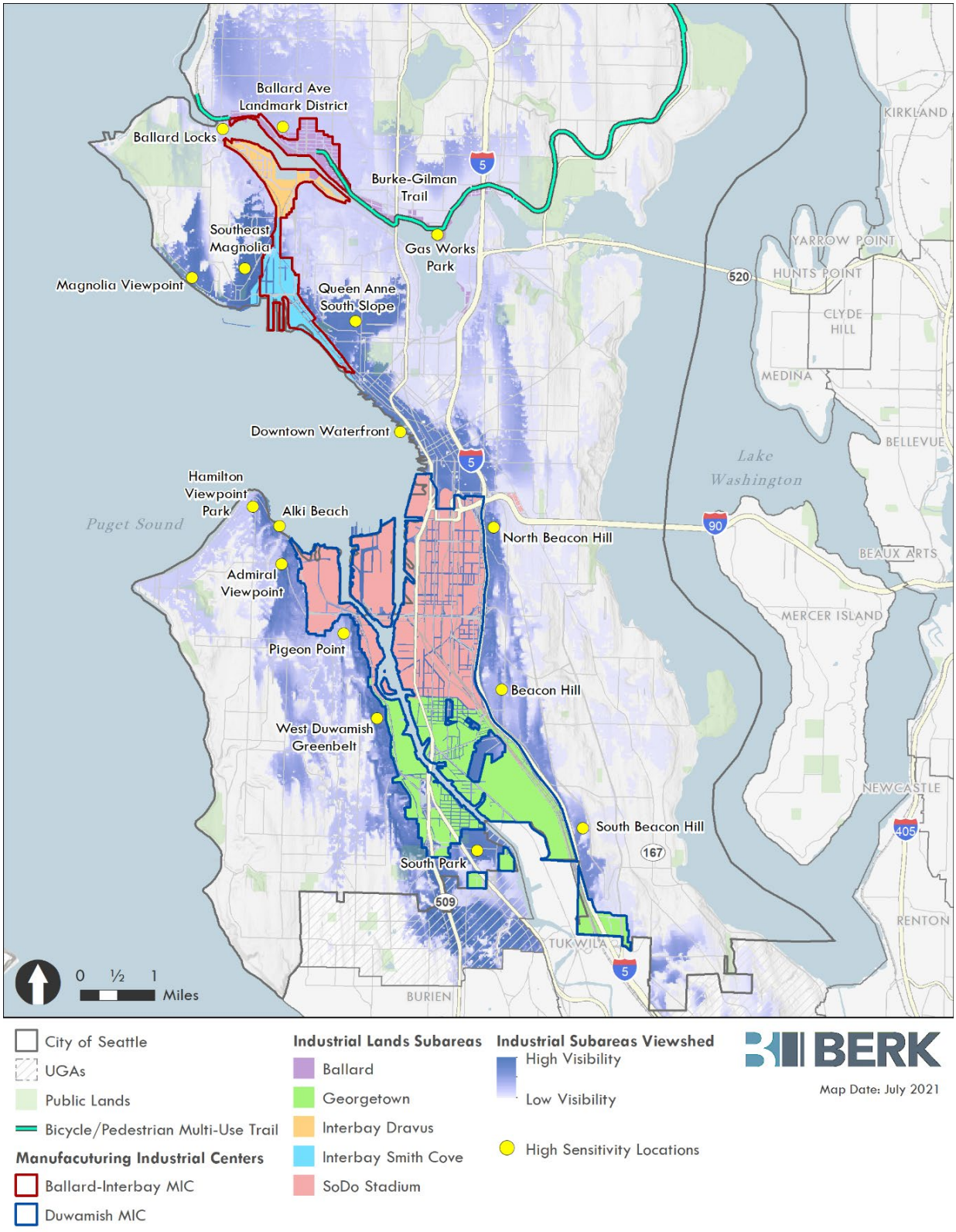
In general, the Greater Duwamish MIC (including the SODO/Stadium and Georgetown/South Park subareas) exhibits higher levels of light and glare than the Ballard and Interbay subareas. In particular, Harbor Island and the northwestern corner of the SODO/Stadium Subarea exhibit high levels of illumination comparable to the nearby Downtown core, with slightly lower levels of illumination present in the Georgetown/South Park Subarea to the south. The Ballard and Interbay subareas exhibit lower levels of light and glare, though still brighter than surrounding residential areas.

Exhibit 3.7-4 shows a topographic viewshed of the study area, based on City of Seattle 2016 elevation contours and maximum structure heights allowed by zoning. This viewshed provides an estimate of locations where portions of the study area are visible to observers and where light and glare generated by new and existing development could be perceived. The map also highlights locations that are likely to be highly sensitive to light and glare emissions; such locations include residential populations, scenic viewpoints, public parks and recreation areas, and open space and wildlife habitat areas. Major light sources and high-sensitivity locations in each subarea are described in more detail in the following sections.

Exhibit 3.7-3 Nighttime Illumination, 2015

Source: NASA, 2015; City of Seattle, 2021.

Exhibit 3.7-4 Industrial Subarea Viewshed, 2021



Source: City of Seattle, 2016. City of Seattle, 2021.

Ballard

Major Sources of Light & Glare

As shown in **Exhibit 3.7-5**, the Ballard Subarea occupies the northern shore of Salmon Bay and the Lake Washington Ship Canal. Much of the light and glare generated in the subarea comes from waterfront facilities, including docks and several small marinas, as well as the non-water oriented commercial/industrial area east of 15th Avenue NW. This area is characterized by small-scale commercial industrial properties, generally 1-2 stories in height. The area includes several breweries, multiple grocery stores and small-scale shopping centers, and limited large-format retail (Fred Meyer).

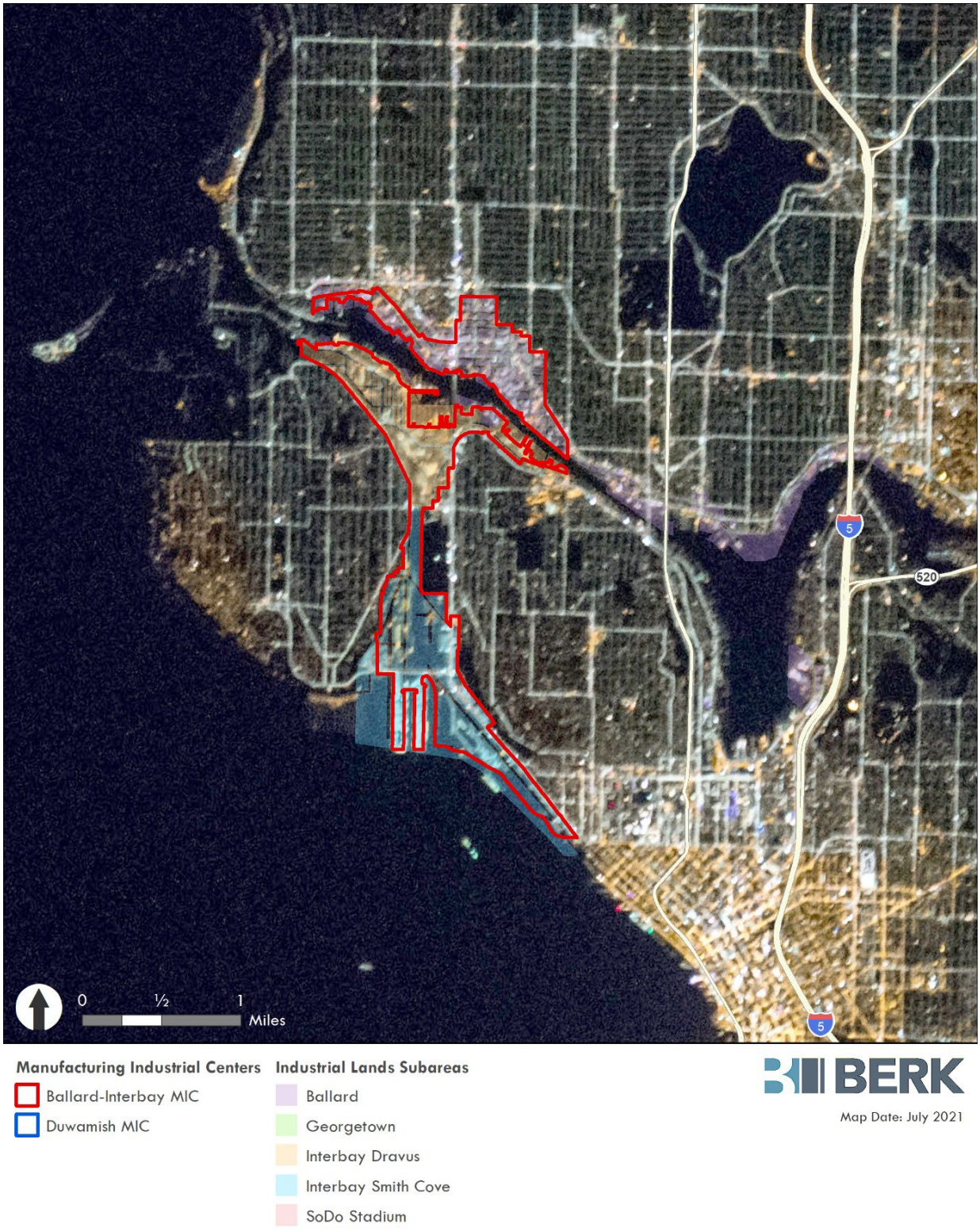
The Ballard Subarea also include several non-contiguous areas along the northern and eastern shores of Lake Union in Fremont and Eastlake, respectively. These areas consist primarily of docks and boat moorages; the Eastlake area includes a drydock, a seaplane dock, and several water-related industrial businesses.

High-Sensitivity Locations

Locations that are potentially sensitive to increases in light and glare associated with industrial development in the Ballard Subarea include the following:

- **Burke-Gilman Trail:** This major bicycle and pedestrian trail runs through the eastern portion of the main Ballard Subarea, as well as the non-contiguous portion of the subarea along the northern shore of Lake Union.
- **Gas Works Park:** One of Seattle's most popular parks, Gas Works Park provide approximately 19 acres of recreation opportunities and open space. The central hill offers views south to Downtown, as well as east and west along the ship canal.
- **Ballard Locks:** The Ballard Locks, one of Seattle's most popular tourist attractions, is located at the western end of the Ballard Subarea. The locks and their associated waterfront parks offer views eastward along the ship canal toward Lake Union, including the marine industry that lines the waterway.
- **Ballard Avenue Landmark District:** This historic district is home to a wide variety of hospitality, retail, office, and manufacturing uses and serves as an entertainment center for the Ballard neighborhood. The district is adjacent to the northern edge of the Ballard Subarea.

Exhibit 3.7-5 Nighttime Illumination—Ballard Interbay Northend MIC, 2015



Source: NASA, 2015; City of Seattle, 2021.

Interbay Dravus

Major Sources of Light & Glare

Industrial development in the Interbay Dravus Subarea consists of marine-related facilities along the south shore of Salmon Bay (Fisherman's Terminal and associated businesses) and railroad-related facilities generally located between W Emerson Place and W Dravus Street. The southern portion of the subarea, including the BNSF rail yard and the industrial development between the railroad and 15th Avenue W, is the primary source of light and glare; the area contains extensive on-site lighting and outdoor storage and parking areas, particularly along Thorndyke Avenue W. Several commercial businesses, including a grocery store and restaurant, as well as an apartment complex, also contribute to light generation in this portion of the subarea.

High-Sensitivity Locations

Locations that are potentially sensitive to increases in light and glare associated with industrial development in the Interbay Dravus Subarea include the following:

- **Ballard Locks:** The Ballard Locks, one of Seattle's most popular tourist attractions, is located at the western end of the Interbay Drave subarea. The locks and their associated waterfront parks offer views eastward along the ship canal toward Lake Union, including the marine industry that lines the waterway.

Interbay Smith Cove

Major Sources of Light & Glare

Primary light sources in the Interbay Smith Cove Subarea are concentrated in the western and southern portions of the study area. The Interbay rail yard forms the north-south spine of the subarea, with several large packing and shipping facilities located west of the rail yard. These facilities include large outdoor areas for loading, parking, and storage with extensive exterior lighting. The area east of the rail yard consists primarily of large-format commercial development, including a car wash, self-storage, a grocery store, a shopping center, and an Army National Guard facility with extensive outdoor storage. The Smith Cove Waterway, located south of the Magnolia Bridge, includes the Smith Cove Cruise Terminal (Pier 91) and several other port facilities. As shown in **Exhibit 3.7-5,** the cruise terminal and associated piers generate the highest levels of light and glare in the subarea.

High-Sensitivity Locations

Locations that are potentially sensitive to increases in light and glare associated with industrial development in the Interbay Smith Cove Subarea include the following:

- **Southeast Magnolia:** The southeast slope of Magnolia overlooks the Interbay rail yard and Smith Cove terminal. This area along Thorndyke Avenue W is characterized by a mix of

small-lot single family and moderate-density multifamily residential development, as well as the Magnolia Greenbelt, which occupies the steeply sloped hillside.

- **Queen Anne South Slope:** The south slope of Queen Anne Hill, above Uptown, is characterized by moderate to high-density urban housing and offers picturesque views of Downtown, Elliott Bay, Mount Rainier, and Harbor Island. In particular, two parks (Kinnear Park and Kerry Park) are popular with visitors and local photographers because of their exceptional views.
- **Downtown Waterfront:** Seattle's waterfront contains some of the city's most popular tourist attractions, such as the Seattle Aquarium, the Edgewater Hotel, Pier 66, and the Seattle Great Wheel, as well as lodging and restaurants. The waterfront provides visitors with panoramic views of southern Magnolia, Elliott Bay, Harbor Island, and West Seattle.

SODO/Stadium

Major Sources of Light & Glare

Due to the presence of extensive Port of Seattle facilities and associated private industrial development, the SODO/Stadium Subarea contains the most intense sources of light and glare in the study area, as shown in **Exhibit 3.7-6**. Harbor Island, located at the mouth of the Duwamish Waterway, and the surrounding facilities at Terminals 5, 25, 30, 37, 42, and 46, are characterized by large shipping facilities with extensive outdoor storage and staging areas. Compared with other portions of the study area, these locations include relatively few buildings; these facilities consist primarily of large open spaces where cargo can be staged and loaded, and the outdoor illumination necessary for operations generates large amounts of light and glare with few obstructions.

The portions of the SODO/Stadium Subarea east and south of the harbor also contribute to light and glare conditions, though to a lesser degree than the Harbor Island facilities. The industrial land use pattern in these areas consists of a mix of warehousing and manufacturing uses with large building footprints and limited outdoor storage or staging space.

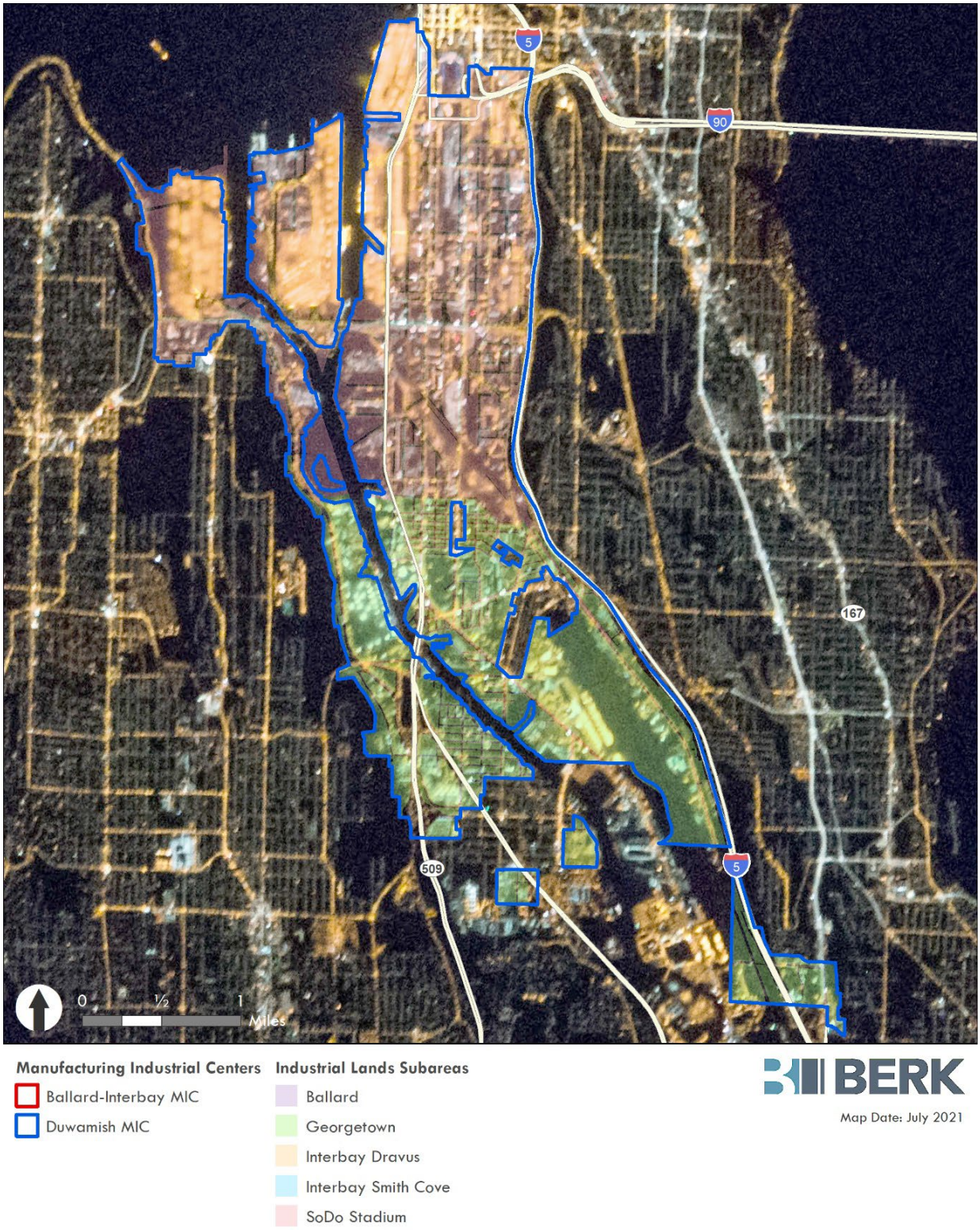
High-Sensitivity Locations

Locations that are potentially sensitive to increases in light and glare associated with industrial development in the SODO/Stadium Subarea include the following:

- **West Duwamish Greenbelt:** Seattle's largest contiguous forest, the West Duwamish Greenbelt provides over 550 acres of recreation opportunities, open space, and wildlife habitat and runs roughly north-south along the western edge of both the SODO/Stadium and Georgetown/South Park subareas. The greenbelt provides a buffer between industrial development in the Greater Duwamish MIC and the residential neighborhoods of High Point and Delridge to the west.

- **Magnolia Viewpoint:** The Magnolia Viewpoint is a small park on the southwest side of Magnolia, along Magnolia Boulevard. This viewpoint offers unobstructed views of Downtown, Harbor Island, and West Seattle.
- **Pigeon Point Neighborhood:** This West Seattle residential neighborhood is located south of the West Seattle Bridge and west of West Marginal Way. The neighborhood occupies a hill overlooking Harbor Island and much of the northern Greater Duwamish MIC.
- **West Seattle Viewpoints:** Several parks and viewpoints in West Seattle offer scenic views looking eastward to Downtown, including Harbor Island and the Port of Seattle. Specific locations include:
  - Hamilton Viewpoint Park
  - Admiral Viewpoint
  - Northeast Alki Beach
- **Beacon Hill:** This residential neighborhood occupies the eastern side of I-5 south of I-90. The north end of Beacon Hill overlooks both the Greater Duwamish MIC to the west and Downtown to the northwest. The neighborhood is separated from the Greater Duwamish MIC by the western slope of Beacon Hill and the I-5 corridor, but residences along the western edge of the hill have expansive views of the Duwamish Waterway, Elliott Bay, and West Seattle beyond. The central portion of Beacon Hill (south of Jefferson Park) has intermittent views of the Greater Duwamish MIC along the western edge of the neighborhood.
- **Downtown Waterfront:** Seattle's waterfront contains some of the city's most popular tourist attractions, such as the Seattle Aquarium, the Edgewater Hotel, Pier 66, and the Seattle Great Wheel, as well as lodging and restaurants. The waterfront provides visitors with panoramic views of southern Magnolia, Elliott Bay, Harbor Island, and West Seattle.

Exhibit 3.7-6 Nighttime Illumination—Greater Duwamish MIC, 2015



Source: NASA, 2015; City of Seattle, 2021.

Georgetown/South Park

Major Sources of Light & Glare

The Georgetown/South Park Subarea contains a mix of both large and small-scare industrial properties, as well as commercial and a small amount of residential development. The Duwamish Waterway divides the subarea, and the two sides differ in development pattern and intensity. The west side of the waterway features generally smaller lots with limited outdoor storage space or exterior illumination. The east side of the waterway features larger lots and buildings and more outdoor space for parking and storage. The eastern edge of the subarea is also the location of the King County International Airport (Boeing Field) and associated aviation-related industries. As shown on **Exhibit 3.7-6**, the airport runways themselves contribute very little illumination, but the adjacent terminals, hangars, and aircraft tie-down areas generate substantial light emissions.

High-Sensitivity Locations

Locations that are potentially sensitive to increases in light and glare associated with industrial development in the Georgetown/South Park Subarea include the following:

- **West Duwamish Greenbelt:** Seattle's largest contiguous forest, the West Duwamish Greenbelt provides over 550 acres of recreation opportunities, open space, and wildlife habitat and runs roughly north-south along the western edge of both the Georgetown/South Park and SODO/Stadium subareas. The greenbelt provides a buffer between industrial development in the Greater Duwamish MIC and the residential neighborhoods of High Point and Delridge to the west.
- **South Park Neighborhood:** The residential South Park neighborhood abuts the southern edge of the Georgetown/South Park Subarea on the west side of the Duwamish Waterway. The area features primarily moderate-density single-family and low-density attached housing, along with several parks and playgrounds, a school, and a branch of the Seattle Public Library. The neighborhood is bound on all sides by either a state highway, industrial development, or the Duwamish Waterway.
- **South Beacon Hill:** This residential neighborhood is located across I-5 from Boeing Field. The more southerly portions of the neighborhood are screened from views of the airport and MIC by vegetation, but the more northerly areas (north of S Kenyon Street) have little vegetation screening along the western periphery.

3.7.2 Impacts

The threshold of significance utilized in this impact analysis is as follows:

- Light and glare from new development that has the potential to affect substantial numbers of residents, shoreline views, or protected scenic views (e.g., scenic routes, designated parks).

Impacts Common to All Alternatives

Light and glare impacts associated with development depend on a variety of factors, including the type of development proposed, outdoor illumination needs of the specific uses proposed, elevation of the development site relative to surrounding areas, the density and size of on-site vegetation, and the architectural and site design characteristics of the structures and lighting elements specific to the development site. This combination of factors makes predicting potential impacts at an area-wide, programmatic scale challenging.

As described in **Chapter 2**, the proposed alternatives employ a combination of either existing land use designations (No Action Alternative) or new land use concepts (alternatives 2, 3, and 4). Though development on individual sites may vary, these land use concepts define a baseline development typology for industrial development in the areas where they are applied, including factors such as allowed building size and height, allowed land use mix, and architectural and landscaping design requirements. The following impact analysis evaluates the potential light and glare impacts associated with each of the proposed land use concepts at the programmatic level, followed by analysis of the individual subareas under each of the alternatives.

Light & Glare Effects of Proposed Land Use Concepts

Maritime, Manufacturing, & Logistics (MML)

Overall, light and glare conditions on sites designated Maritime, Manufacturing, and Logistics (MML) would be similar in nature to existing industrial areas, though the intensity of light emissions would depend on specific site characteristics. Similar to existing General Industrial zones, the MML land use concept is focused on traditional industrial and manufacturing uses, as well as shipping, logistics, and port facilities. As illustrated in **Exhibit 2.4-1** and **Exhibit 2.4-4**, development patterns will be similar to existing industrial areas, characterized by large parcels, substantial outdoor storage and staging areas, and relatively low building heights.

Light and glare impacts associated with this land use concept are likely to be similar to existing heavy manufacturing and port-related industrial development typologies, extensive examples of which can be seen in the Greater Duwamish MIC. Major sources of light and glare associated with this land use concept would include outdoor illumination at storage yards and cargo staging areas. Manufacturing facilities that use exterior lights for operations and safety during

nighttime hours would also be sources of light and glare. The MML land use concept would include zoning requirements for streetscape improvements, but on-site vegetation is anticipated to be sparse due to the intensive nature of development and the operational needs of shipping and logistics facilities, which are the primary anticipated uses. This lack of on-site vegetation would result in minimal screening of light sources. Similar to existing industrial development, the magnitude of light and glare impacts would depend on the specific design of on-site facilities and the proximity of high-sensitivity locations.

Industry & Innovation (II)

The Industry and Innovation (II) land use concept promotes higher-density industrial uses, including mixed-use development, as illustrated in **Exhibit 2.4-2** and **Exhibit 2.4-4**. Areas designated II are intended to be employment centers integrated with the high-capacity transit network. As such, the II land use concept is focused on a mix of uses that incorporates contemporary industrial methods and creates opportunities for combining light industrial and technology-oriented uses with associated office space. Compared to existing industrial areas, the II concept would exhibit taller building heights (up to 160 feet, including bonuses) and greater development density with fewer outdoor storage and/or staging areas. The integration of transit and bicycle/pedestrian connections would also result in fewer large parking areas.

Light and glare impacts associated with this land use concept are anticipated to be more similar to a commercial or mixed-use district than existing industrial areas. Without extensive outdoor areas requiring night-time lighting, exterior building illumination would be less intense, though taller allowable building heights could make buildings visible from farther away, depending on location and relative elevation.

Urban Industrial (UI)

The Urban Industrial (UI) land use concept focuses on a mix of smaller-scale industrial uses (such as fabrication shops, artist and maker spaces, and light industry) and limited non-industrial uses, such as retail, offices, or industry-supportive housing. These areas would also include bicycle and pedestrian transportation facilities, and landscaped open spaces to promote environmental health. UI areas would be designed to include flexibility of uses and development standards that promote compatibility with nearby residential uses. See **Exhibit 2.4-3** and **Exhibit 2.4-4**.

Development in UI areas is anticipated to generate relatively lower light emissions compared to existing industrial typologies and the proposed MML and II land use concepts, due to the smaller scale of development and a greater emphasis on vegetation and green space, which can screen exterior illumination from surrounding areas. The UI land use concept would allow building heights up to 75 feet, which would represent a height increase in some industrial areas. Though less pronounced than potential height increases under the II land use concept, taller building heights may result in development being visible from farther away than current conditions, depending on location and relative elevation.

Equity & Environmental Justice Considerations

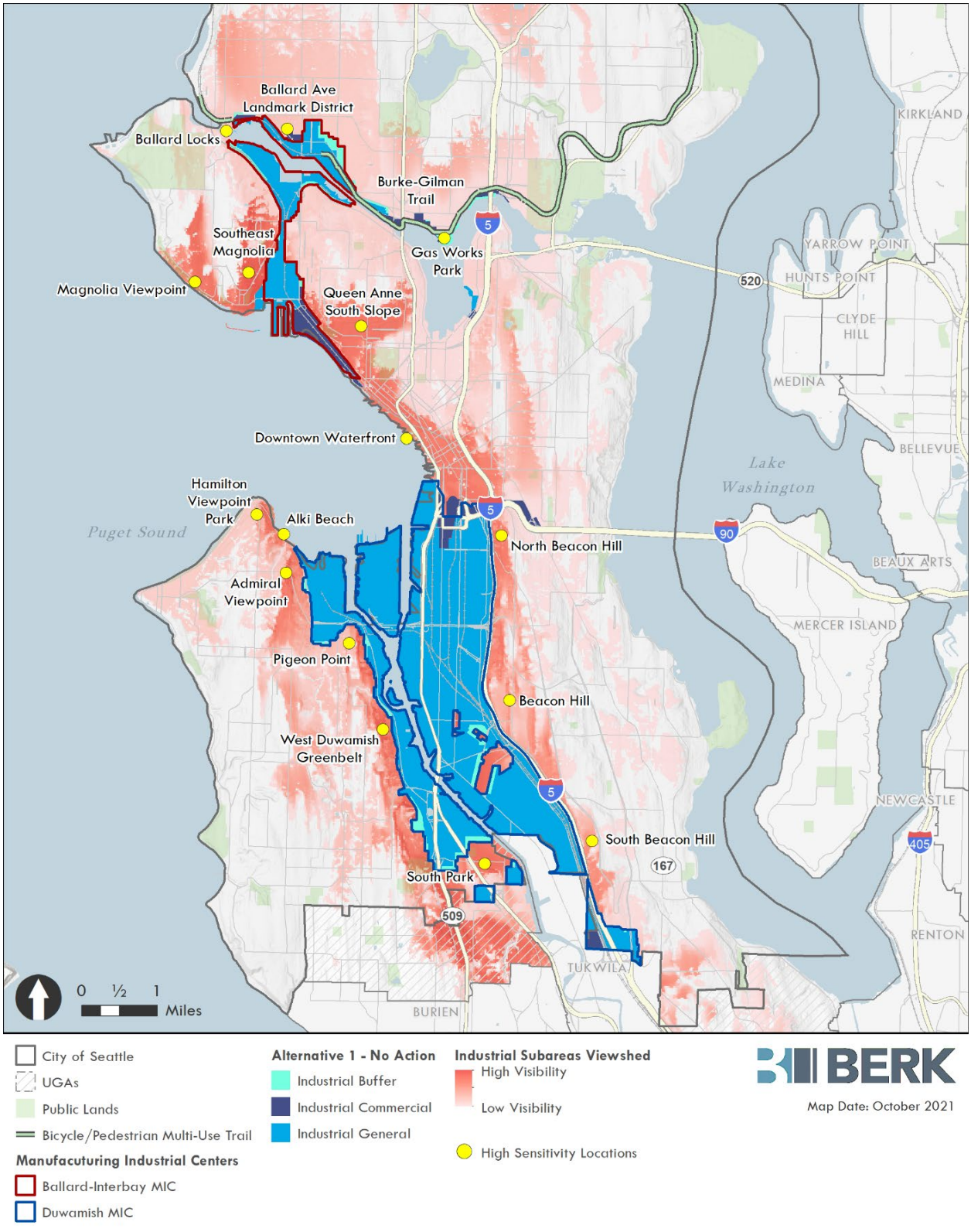
This EIS recognizes that impacts associated with industrial development, including exposure to light and glare emissions, are location-dependent and not equally distributed throughout the city. Due to market forces, historical practices regarding siting of industrial facilities, and historical restrictions on housing for people of color, residential areas near industrial centers are often home to communities of color and lower-income populations. The following impact analysis examines the potential for the alternatives to adversely affect residential populations, public spaces, and park and recreation facilities through exposure to increased light and glare emissions. The analysis also identifies instances where such impacts are likely to specifically affect vulnerable populations.

Impacts of Alternative 1 No Action

The No Action Alternative would preserve existing zoning and development regulations, resulting in future industrial development patterns similar to existing conditions. The No Action Alternative is anticipated to produce up to 11.23 million square feet of new employment-generating building space. Light and glare impacts associated with such development would be similar in nature to existing conditions, though the additional anticipated growth would increase overall light emissions as development occurs. **Exhibit 3.7-7** shows the viewshed and industrial zoning in the study area under the No Action Alternative.

Under the No Action Alternative, future industrial growth would generate additional light and glare emissions that could be perceived by non-industrial areas surrounding the study area, including high-sensitivity locations described in **Section 3.7.1 Affected Environment**. The following sections describe potential location-specific impacts.

Exhibit 3.7-7 Land Use Concepts Viewshed—Alternative 1



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

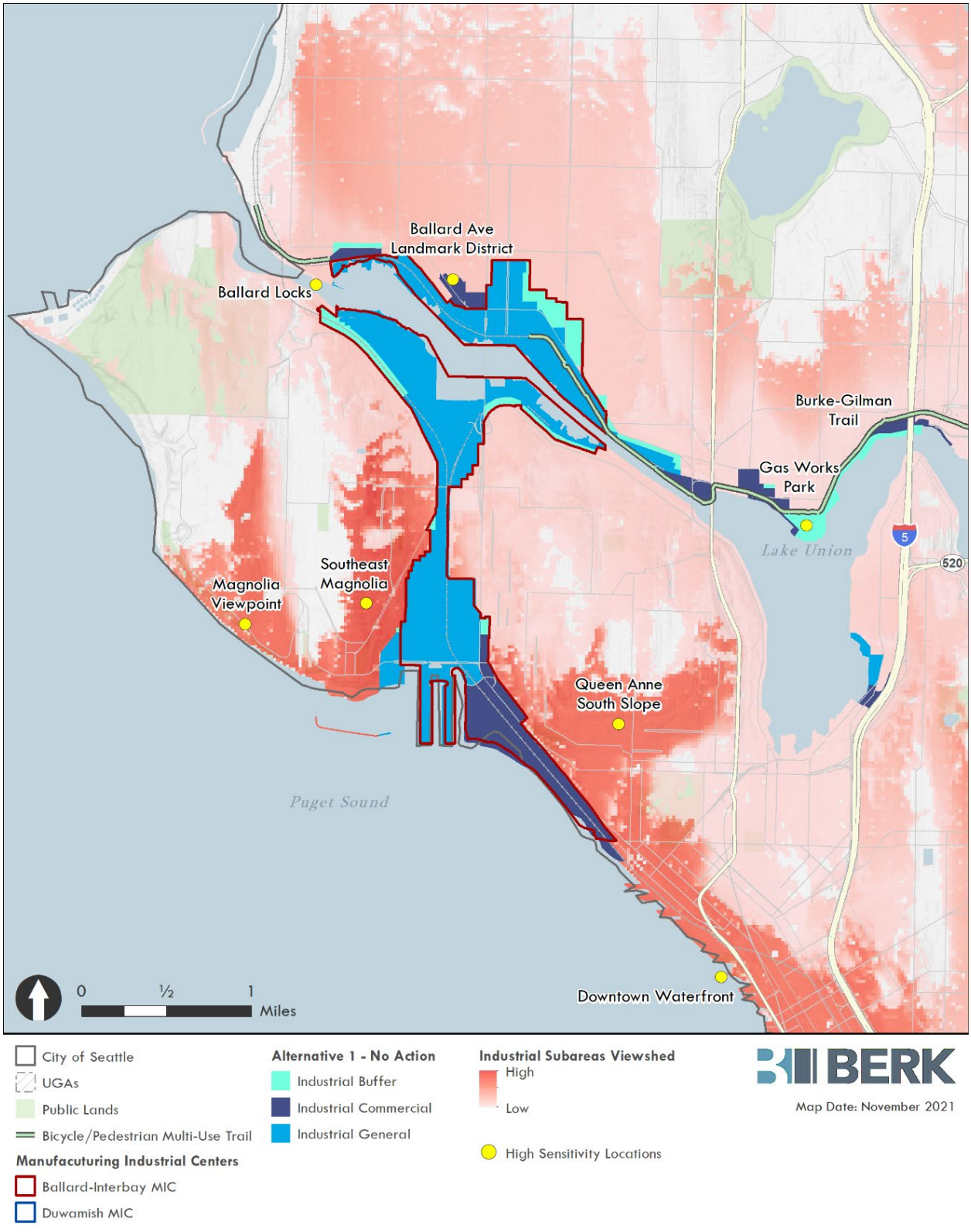
Ballard

Anticipated industrial development in the BINMIC would generate additional light and glare emissions that could be perceived by surrounding non-industrial areas (see **Exhibit 3.7-7** and **Exhibit 3.7-8**). The high-sensitivity areas primarily affected in the Ballard Subarea would include the western portions of the Burke-Gilman Trail and the Ballard Locks due to their close proximity to industrial development; the Ballard Locks would potentially be impacted by light and glare emissions from both the Ballard and Magnolia sides of the ship canal. However, use of these park and trail facilities is relatively low during nighttime hours, when light and glare emissions would be most evident.

Increased light and glare emissions from the BINMIC would potentially be visible to non-industrial areas north of the Ballard Subarea, including the Ballard Avenue Landmark District. The landmark district itself is unlikely to experience significant impacts due to its location in the commercial center of Ballard, where nighttime illumination is already extensively used, though the portion of the district closest to industrial uses along Shilshole Avenue could experience impacts from the more intense lighting on industrial properties. Residential neighborhoods to the north at higher elevations could potentially observe the increased light and glare, though the effect would be attenuated with distance.

Industrial development at the eastern end of the Ballard Subarea could also potentially increase light and glare emissions observed at Gas Works Park, though potential increases in exposure at this location are likely to be reduced relative to other portions of the Ballard Subarea due to the smaller amount of adjacent industrial land. Likewise, the Eastlake portion of the Ballard Subarea is likely to experience minimal impacts; visibility of other industrial lands is relatively low, and the major concentrations of new industrial development in the BINMIC and Greater Duwamish MIC are screened by topography.

Exhibit 3.7-8 Ballard, Interbay Dravus, and Interbay Smith Cove Viewshed—Alternative 1



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Interbay Dravus

Additional light and glare associated with new development in the Interbay Dravus Subarea would primarily be visible on immediately adjacent properties and along the Ballard waterfront, due to topography screening by nearby Magnolia and Queen Anne hillsides (see **Exhibit 3.7-7** and **Exhibit 3.7-8**). As described above, development in Interbay Dravus would contribute to light emissions observed at the Ballard Locks, which could potentially be impacted by light and glare emissions from both the Ballard and Magnolia sides of the ship canal. As described in **Chapter 2**, Interbay Dravus is anticipated to receive the smallest share of future employment growth under the No Action Alternative, so the increase in light and glare emissions is likely represent only an incremental increase compared to existing conditions.

Interbay Smith Cove

As shown in **Exhibit 3.7-7** and **Exhibit 3.7-8**, additional light and glare emissions in Interbay Smith Cove would primarily affect Southeast Magnolia and the South Slope of Queen Anne. As described in **Section 3.7.1 Affected Environment**, these areas contain a mix of single- and multi-family housing, exposing local residential populations to increased light and glare during nighttime hours. As described in **Chapter 2**, Interbay Smith Cove is anticipated to receive the second smallest share of future employment growth under the No Action Alternative (slightly more than Interbay Dravus), so the increase in light and glare emissions is likely represent a minor increase compared to existing conditions. Though minor, these increased light and glare emissions would be visible to a larger population than the northern portion of the Interbay corridor.

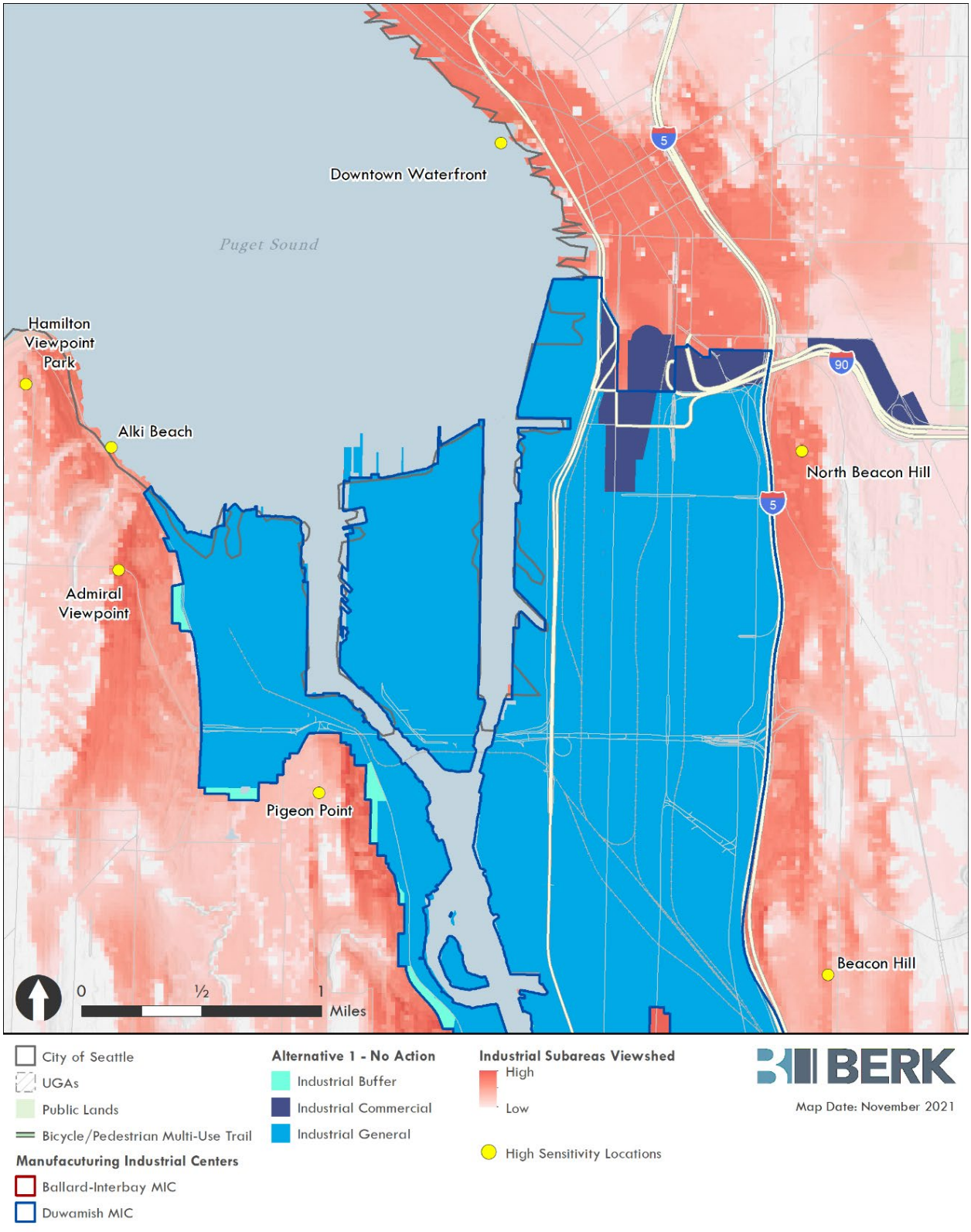
SODO/Stadium

As described in **Section 3.7.1 Affected Environment**, the SODO/Stadium Subarea is the largest and most intensely developed industrial area, and it produces the highest levels of light and glare emissions, due to the presence of the Port of Seattle and associated private industrial facilities. As shown in **Exhibit 3.7-7** and **Exhibit 3.7-9**, light and glare emissions from this study area have wide visibility, including residential areas in Beacon Hill and West Seattle (Pigeon Point, Alki) and public spaces in West Seattle (West Duwamish Greenbelt, Hamilton Viewpoint Park), Downtown, and Magnolia. Under the No Action Alternative, the SODO/Stadium Subarea would absorb the greatest share of future employment growth, generating additional light and glare emissions as development occurs.

Increased light and glare under the No Action Alternative would be most perceptible to nearby residential areas in Pigeon Point and Beacon Hill due to their close proximity and higher elevation relative to the study area. Because future development would include a similar mix of industrial uses and facility types as existing conditions, the increase in light and glare emissions may not be perceptible at greater distances, such as Downtown or south Magnolia.

Light and glare emissions would also be visible from the West Duwamish Greenbelt, which runs along the western edge of the Greater Duwamish MIC. Those recreational use of the greenbelt occurs primarily during daylight hours when light and glare emissions are least perceptible, the greenbelt also include wildlife habitat areas that could be affected by nighttime light and glare. An analysis of potential impacts of the proposal on wildlife is contained in **Section 3.4 Plants & Animals**.

Exhibit 3.7-9 SODO/Stadium Viewshed—Alternative 1

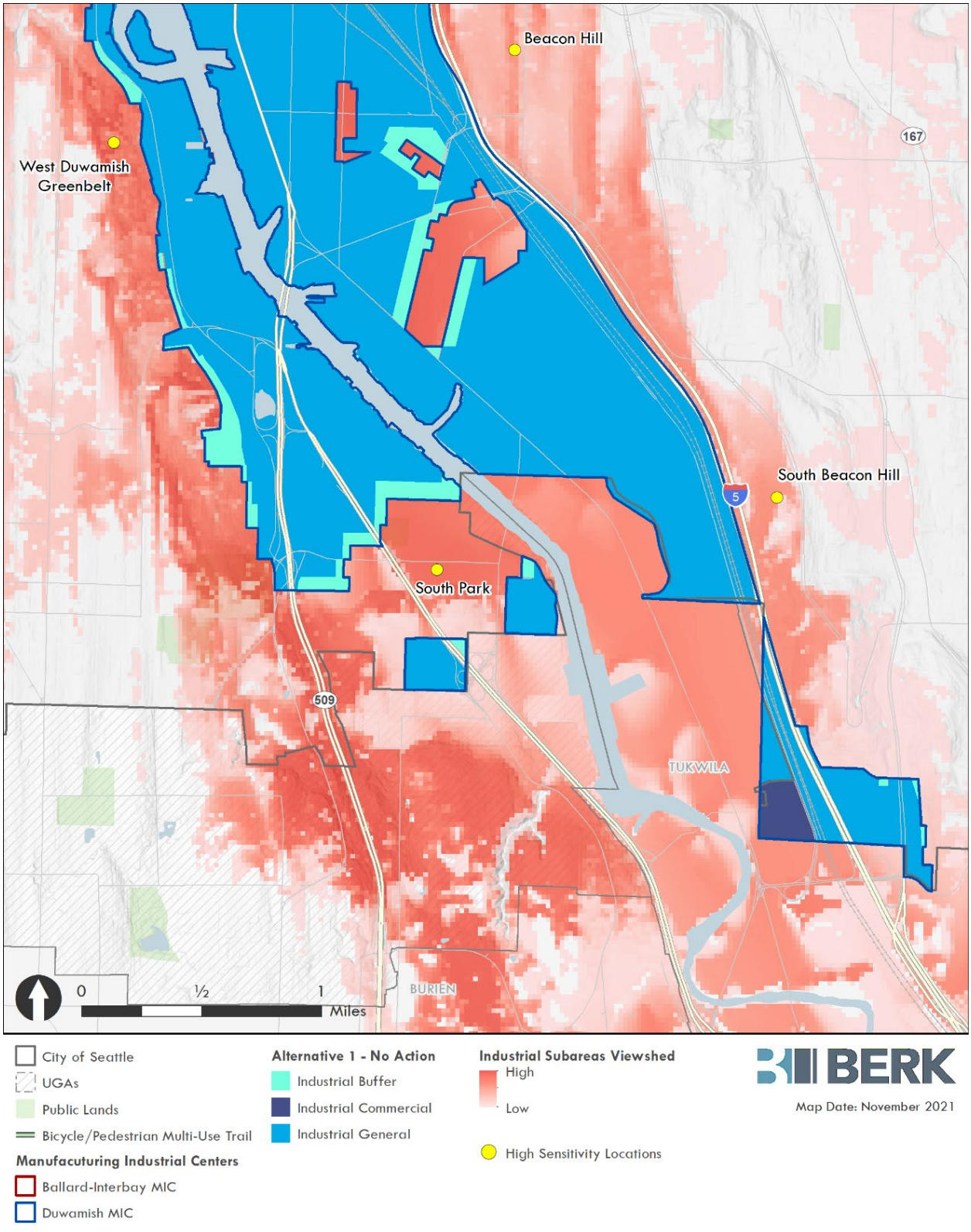


Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Georgetown/South Park

As shown in **Exhibit 3.7-7** and **Exhibit 3.7-10**, light and glare emissions from the Georgetown/South Park Subarea would primarily affect South Beacon Hill, the South Park neighborhood, and the West Duwamish Greenbelt. South Park and South Beacon Hill are primarily residential areas and generally exhibit lower household incomes and higher populations of persons of color than other areas of Seattle. Increased light and glare emissions would be particularly visible in South Park, which is surrounded on three sides by portions of the Georgetown/South Park Subarea.

Exhibit 3.7-10 Georgetown/South Park Viewshed—Alternative 1



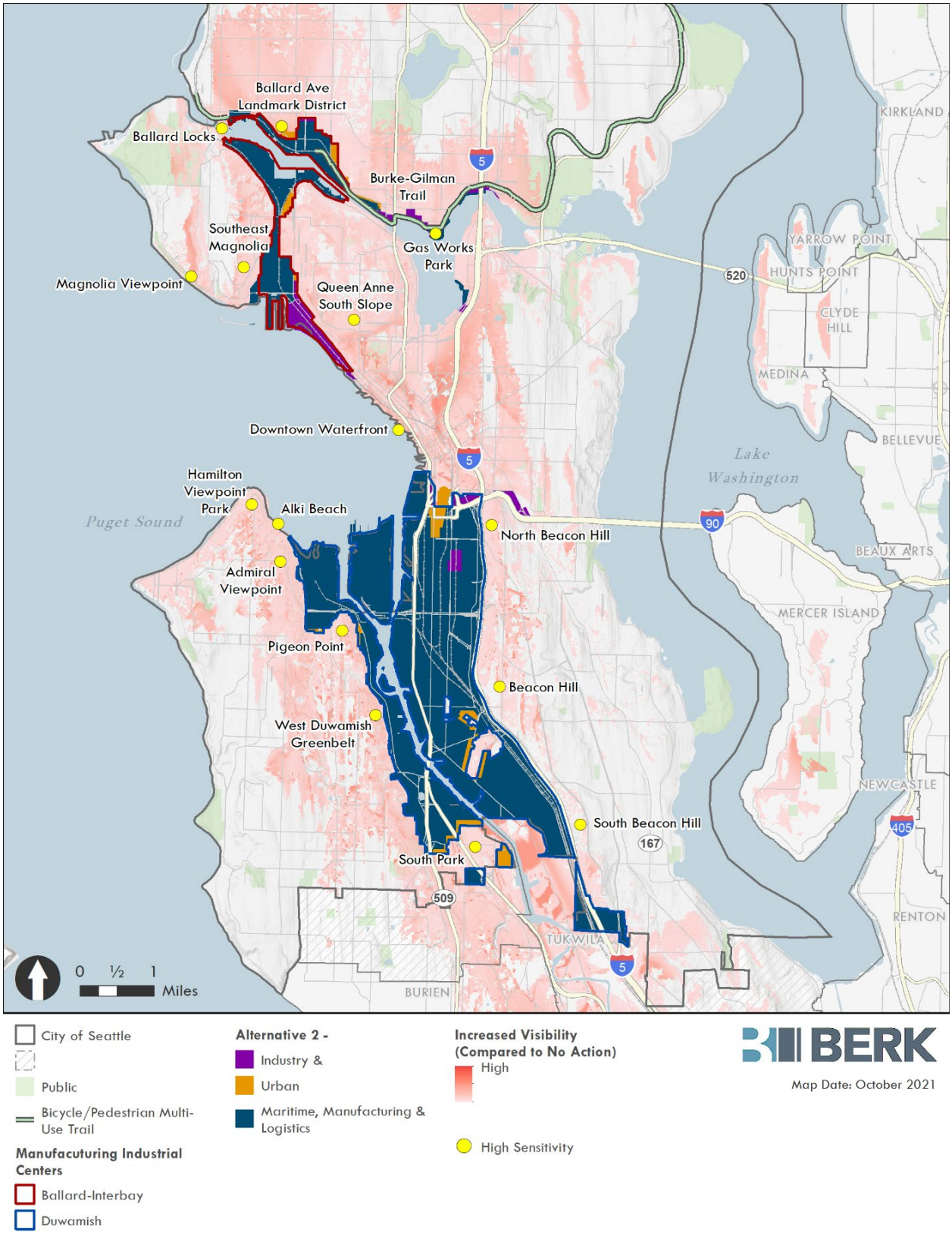
Source: City of Seattle, 2016. City of Seattle, 2021. BERK, 2021.

Impacts of Alternative 2

Alternative 2 applies the proposed land use concepts with relatively less Industry and Innovation and Urban Industrial land use than the other two Action Alternatives; the bulk of industrial land would be classified as MML, which would allow a mix of industrial uses and building typologies similar to the existing Industrial General zone. Sources of light and glare emissions would consist primarily of outdoor illumination for streets, storage and staging areas, as well as exterior operations and safety lighting for shipping and manufacturing facilities. Of the three Action Alternatives, Alternative 2 is the most similar to the No Action Alternative in terms of development type and distribution of light and glare sources and effects. **Exhibit 3.7-11** shows the land use concepts and potential viewshed for Alternative 2.

As described in **Chapter 2**, Alternative 2 is anticipated to produce up to 19.8 million square feet of new employment-generating building space. Overall light and glare emissions, though similar in nature and distribution to the No Action Alternative, are anticipated to be greater in intensity due to more extensive development of the study area. The following sections describe potential location-specific impacts and how the alternative differs from the No Action Alternative.

Exhibit 3.7-11 Increase in Viewshed—Alternative 2



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

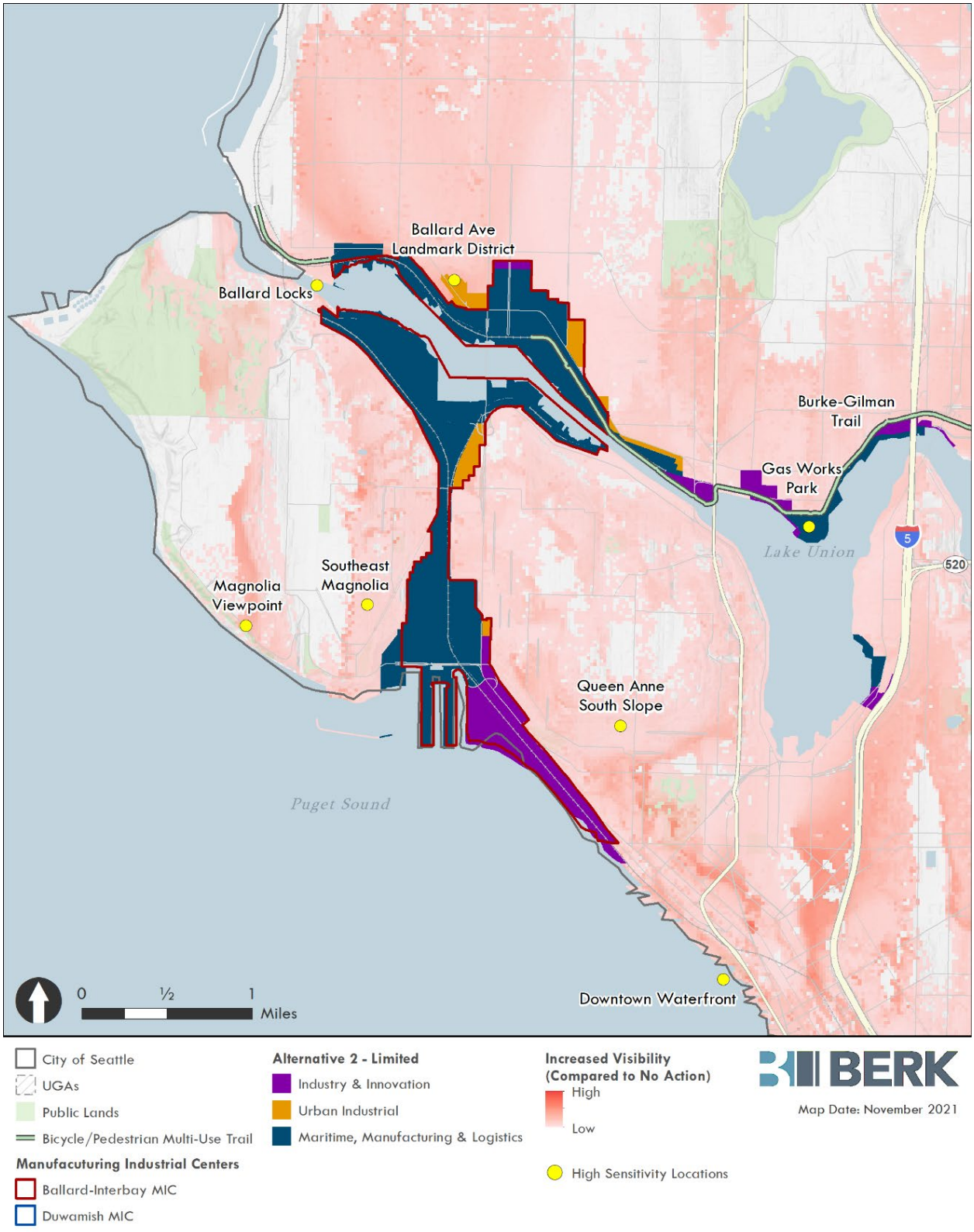
Ballard

Light and glare emissions under Alternative 2 would be similar to the No Action Alternative; the majority of the study area would be classified MML, which would produce development types and lighting conditions similar to existing Industrial General zoning. Alternative 2 would incorporate the Urban Industrial and Industry & Innovation land use concept on the edges of the Ballard Subarea to serve as transition zones between MML areas and surrounding non-industrial development, as shown in **Exhibit 3.7-11** and **Exhibit 3.7-12**. These areas would generally allow greater building heights than current zoning, particularly in the II area on the northern edge of the subarea, where building heights could reach up to 160 feet. As described for the No Action Alternative, these increased heights would increase visibility of new buildings for residential areas to the north.

Though the II and UI areas would increase visibility of new buildings, development typologies in these areas would include fewer outdoor storage and staging areas, resulting in less use of intense exterior nighttime lighting, which would reduce light and glare emissions compared to the No Action Alternative. In particular, application of the UI land use concept to the area around the Ballard Avenue Landmark District would provide a buffer from more intense lighting conditions along the waterfront to the south.

Alternative 2 would implement the Industry & Innovation land use concept in the eastern portion of the Ballard Subarea, near Gas Works Park. Greater building heights would make this development more visible to the residential neighborhoods to the north, as well as from Lake Union itself. However, as described above, this land use concept places less emphasis on outdoor operations, reducing site lighting needs and resulting in reduced light and glare emissions compared to the No Action Alternative.

Exhibit 3.7-12 Increase in Viewshed (Ballard, Interbay Dravus, and Interbay Smith Cove)—Alternative 2



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Interbay Dravus

Under Alternative 2, the Interbay Dravus Subarea would consist primarily of the MML land use concept, which would allow similar development types and intensities as the No Action Alternative, resulting in similar light and glare emissions and effects on high-sensitivity locations, such as the Ballard Locks. See **Exhibit 3.7-11** and **Exhibit 3.7-12**.

Interbay Smith Cove

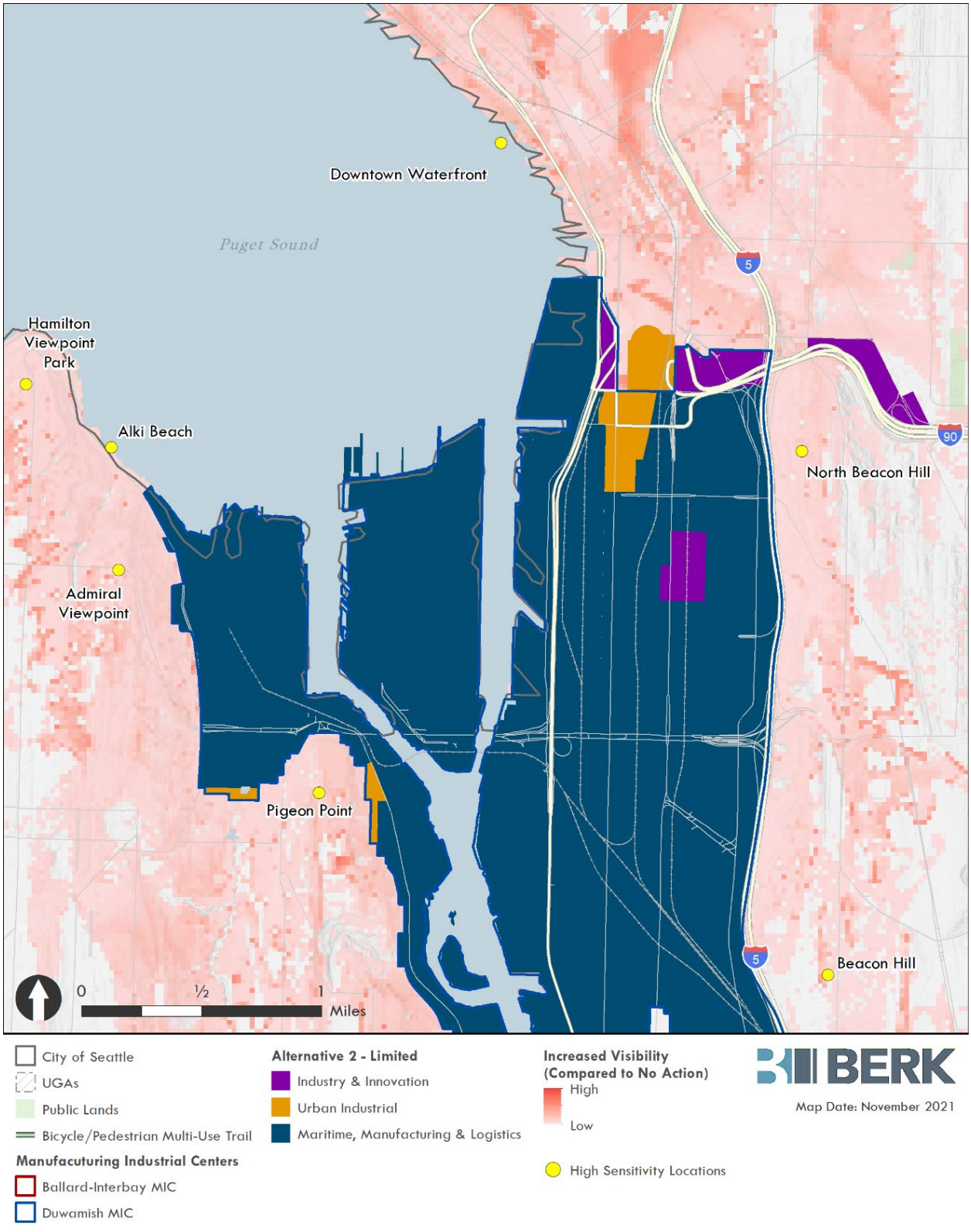
Under Alternative 2, the southeastern portion of the Interbay Smith Cove Subarea, currently zoned Industrial Commercial, would be converted to Industry & Innovation (see **Exhibit 3.7-11** and **Exhibit 3.7-12**). The Industry & Innovation land use concept would promote greater development density and a wider mix of office and commercial uses than the current Industrial Commercial zone. With fewer outdoor storage and operations areas, light emissions would generally be reduced in this area compared to the No Action Alternative. However, the II land use concept would allow a substantial increase in building heights, resulting in greater visibility to surrounding areas, particularly Southeast Magnolia and the South Slope of Queen Anne.

SODO/Stadium

Similar to the No Action Alternative, the SODO/Stadium Subarea would absorb the greatest share of future employment growth under Alternative 2, generating additional light and glare emissions as development occurs. Most of the study area would be designated MML, resulting in similar building types and lighting features as under the No Action alternative. As shown in **Exhibit 3.7-11** and **Exhibit 3.7-13**, Alternative 2 would introduce the Urban Industrial land use concept in targeted locations on the edge of the Greater Duwamish MIC to create transition areas to surrounding neighborhoods (i.e., Pigeon Point and the Stadium District). In the area surrounding the stadiums, this would result in a slight increase in maximum building heights, increasing the visibility of development, but light emissions from the UI land use concepts are anticipated to be lower than MML or existing industrial zones. In the areas adjacent to Pigeon Point, application of the UI land use concept would implement lower building heights and reduce light and glare emissions on surrounding residential areas.

Alternative 2 would also implement the Industry & Innovation land use concept in the northern portion of subarea, near the stadiums and the I-5/I-90 interchange. As previously described, increased building heights would make development in these areas more visible, but light emissions are anticipated to be lower compared to the No Action Alternative.

Exhibit 3.7-13 Increase in Viewshed (SODO/Stadium)—Alternative 2

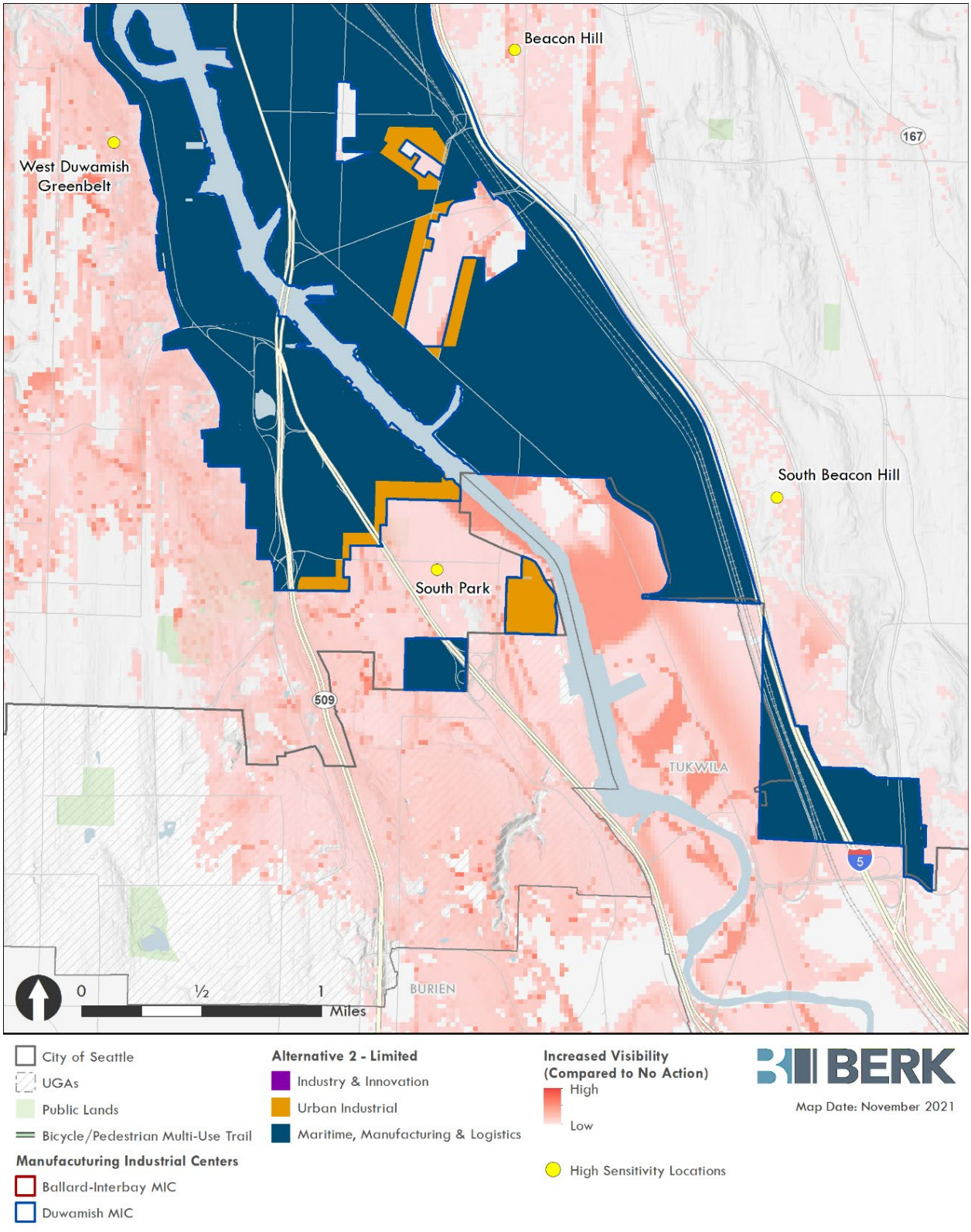


Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Georgetown/South Park

Alternative 2 would apply the Urban Industrial land use concept in most portions of the Georgetown/South Park Subarea currently zoned Industrial Buffer, providing a transition space to areas not within the Greater Duwamish MIC boundary. As described previously, this would slightly increase building heights and visibility of development in these locations, though the proposed land use mix of the UI designation would generate less intense light and glare emissions than the No Action Alternative. In particular, the South Park neighborhood is likely to experience reduced light and glare exposure compared to the No Action Alternative. See **Exhibit 3.7-11** and **Exhibit 3.7-14**.

Exhibit 3.7-14 Increase in Viewshed (Georgetown/South Park)—Alternative 2



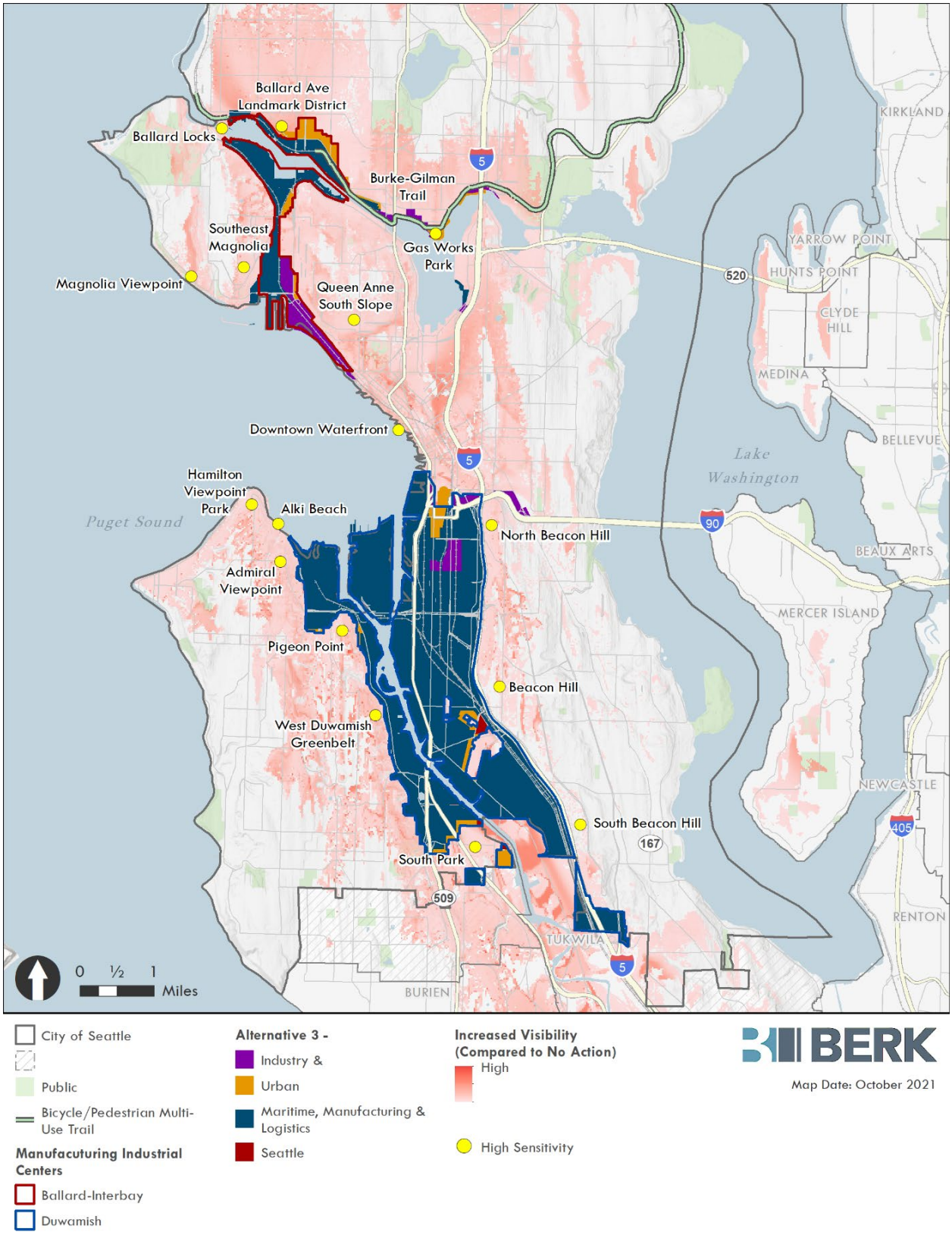
Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Impacts of Alternative 3

As described in **Chapter 2**, Alternative 3 would apply the proposed land use concepts with a greater share of Industry & Innovation and Urban Industrial than Alternative 2. **Exhibit 3.7-15** shows the land use concepts and potential viewshed for Alternative 3.

As discussed previously, the building typologies and land use mix allowed under these land use concepts would generally reduce light and glare emissions from those areas due to a reduced focus on large-scale outdoor operations that require extensive lighting. However, Alternative 3 is anticipated to produce up to 27.4 million square feet of new employment-generating building space, and overall light and glare emissions from future development is likely to be greater than both the No Action Alternative and Alternative 2. Potential location-specific impacts are described in the following sections.

Exhibit 3.7-15 Increase in Viewshed—Alternative 3



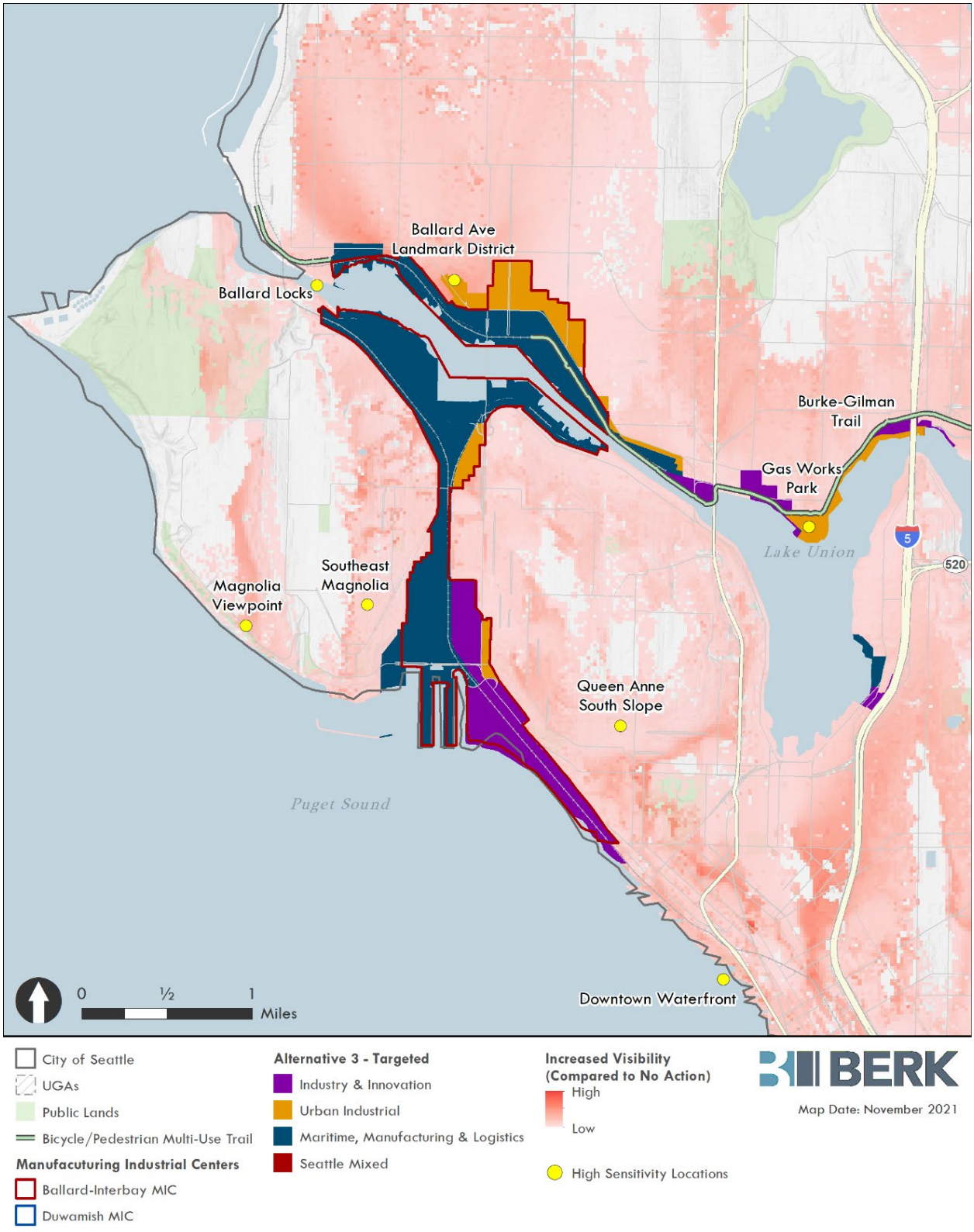
Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Ballard

As shown in **Exhibit 3.7-15** and **Exhibit 3.7-16**, Alternative 3 would implement the Urban Industrial land use concept more widely in the Ballard Subarea, specifically in the areas north of NW Leary Way and NW Market Street. Compared to Alternative 2, this change would increase building heights in this area (except for the small area designated Industry & Innovation under Alternative 2), though it would reduce light and glare emissions. This would create a transition zone between the MML area along the waterfront and reduce impacts on residential areas north of the subarea.

In the eastern portion of the subarea near Gas Works Park, the areas designated MML under Alternative 2 would be designated UI under Alternative 3. As described above, this would increase building heights and visibility of development, but it would result in lower light and glare emissions, reducing impacts on residential areas to the north, as well as the Burke-Gilman Trail, which travels through the area.

Exhibit 3.7-16 Increase in Viewshed (Ballard, Interbay Dravus, and Interbay Smith Cove)—Alternative 3



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Interbay Dravus

As shown in **Exhibit 3.7-15** and **Exhibit 3.7-16**, Alternative 3 would implement the same land use concept pattern in the Interbay Dravus Subarea as Alternative 2, resulting in similar light and glare impacts.

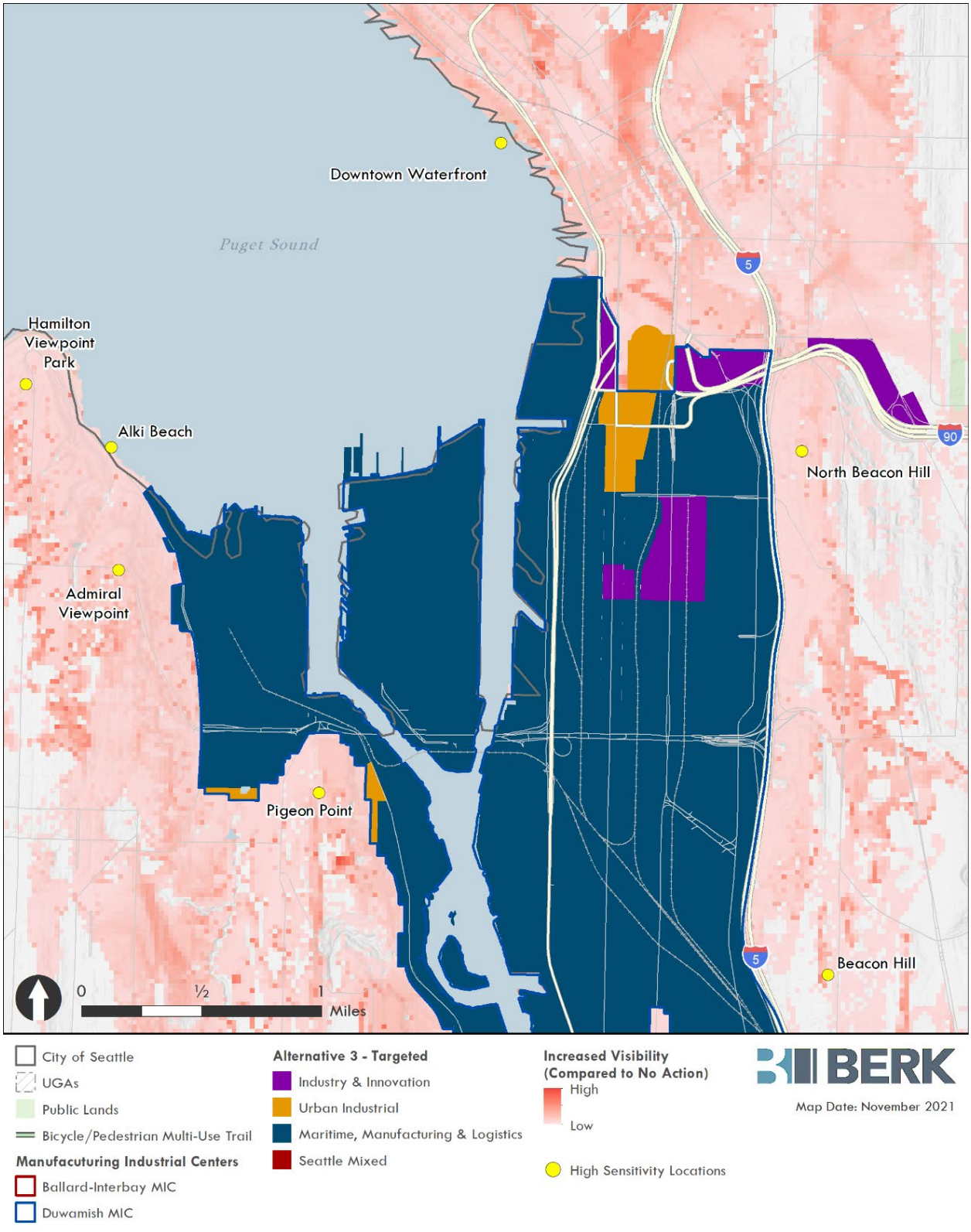
Interbay Smith Cove

Alternative 3 would implement the same land use concept pattern in Interbay Smith Cove as Alternative 2, with the exception of the southwest slope of Queen Anne, where Alternative 3 would implement a greater amount of Urban Industrial instead of Industry & Innovation. Light and glare impacts in Interbay Smith Cover under Alternative 3 are therefore anticipated to be similar to, or less than, Alternative 2. See **Exhibit 3.7-15** and **Exhibit 3.7-16**.

SODO/Stadium

As shown in **Exhibit 3.7-15** and **Exhibit 3.7-17**, Alternative 3 would implement the same land use concept pattern in the SODO/Stadium Subarea as Alternative 2, with the exception of a larger node of Industry & Innovation south of S Holgate Street. Compared to Alternative 2, this change would result in a slight increase in visibility due to taller building heights in this location, though light and glare emissions would be less than the surrounding MML land use. As such, light and glare impacts in the SODO/Stadium Subarea under Alternative 3 are anticipated to be similar to, or less than, Alternative 2.

Exhibit 3.7-17 Increase in Viewshed (SODO/Stadium)—Alternative 3



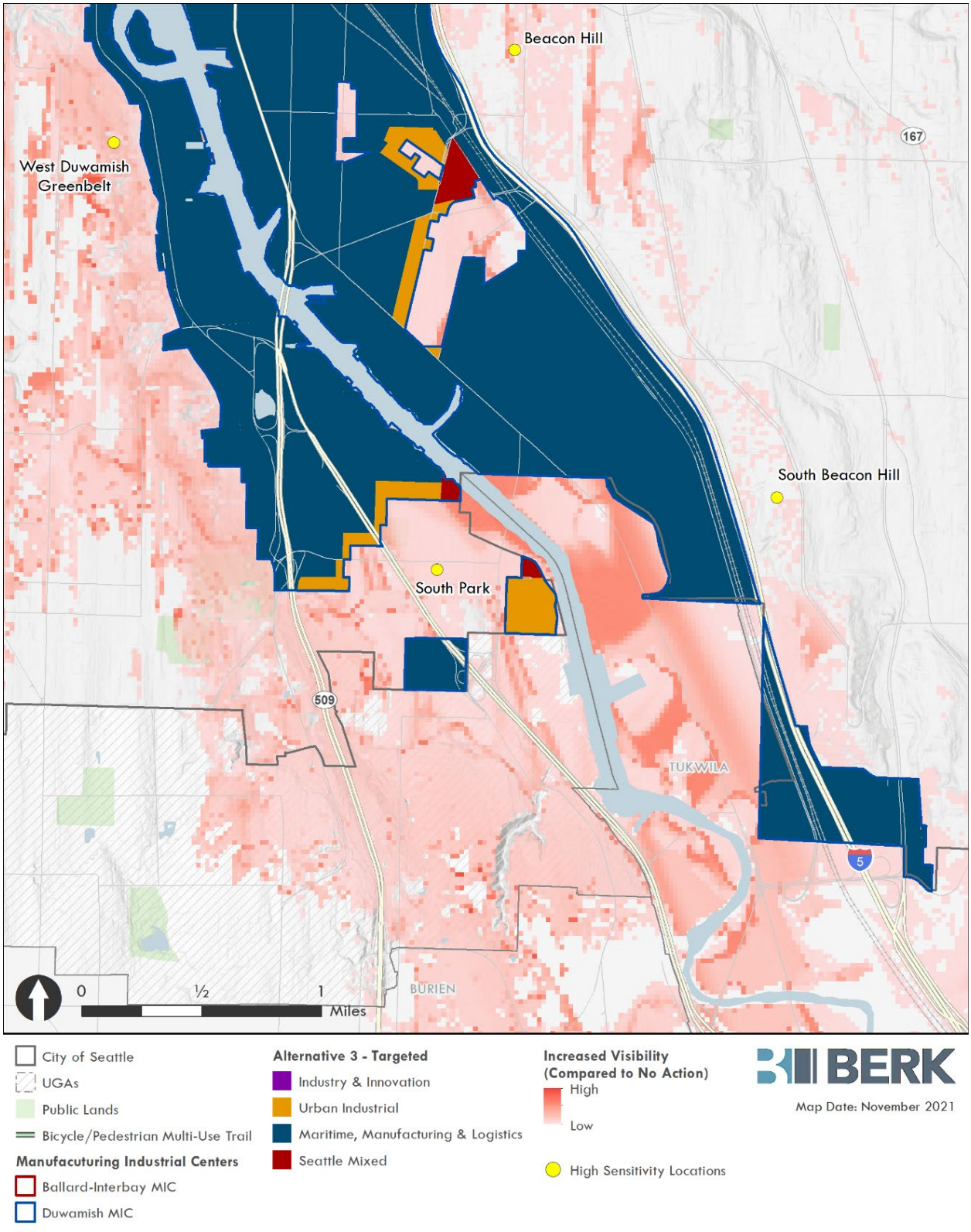
Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Georgetown/South Park

Alternative 3 would apply a similar land use concept pattern in the Georgetown/South Park Subarea as Alternative 2 with the following changes:

- Removal of three targeted areas from the Greater Duwamish MIC, shown on **Exhibit 3.7-15** and **Exhibit 3.7-18** as Seattle Mixed:
  - One area approximately bounded by Corson Avenue S, S Michigan Street, and Airport Way S Removal of this area from the MIC would result in future development of this location for commercial and multifamily residential uses instead of industrial facilities. Light and glare emissions would be reduced compared to the MML land use proposed under Alternative 2, which would reduce potential impacts on the nearby Georgetown Playfield and Spraypark, located across Corson Avenue from the removal area.
  - Two areas adjacent to the South Park Neighborhood along the Duwamish Waterway. Removal of these areas and rezoning to Seattle Mixed would affect the uses allowed, but the building typologies and scale of development would be similar to the Urban Industrial land use concept proposed under Alternative 2, resulting in similar light and glare emissions.
- Designation of the eastern side of Ellis Avenue S north of S Myrtle Street as MML instead of UI. The use mix and building typologies allowed by the MML land use concept would potentially generate greater light and glare emissions than the UI land use concept proposed under Alternative 2. These impacts would primarily affect existing residential uses west of Ellis Avenue S, which are not included in the MIC.

Exhibit 3.7-18 Increase in Viewshed (Georgetown/South Park)—Alternative 3



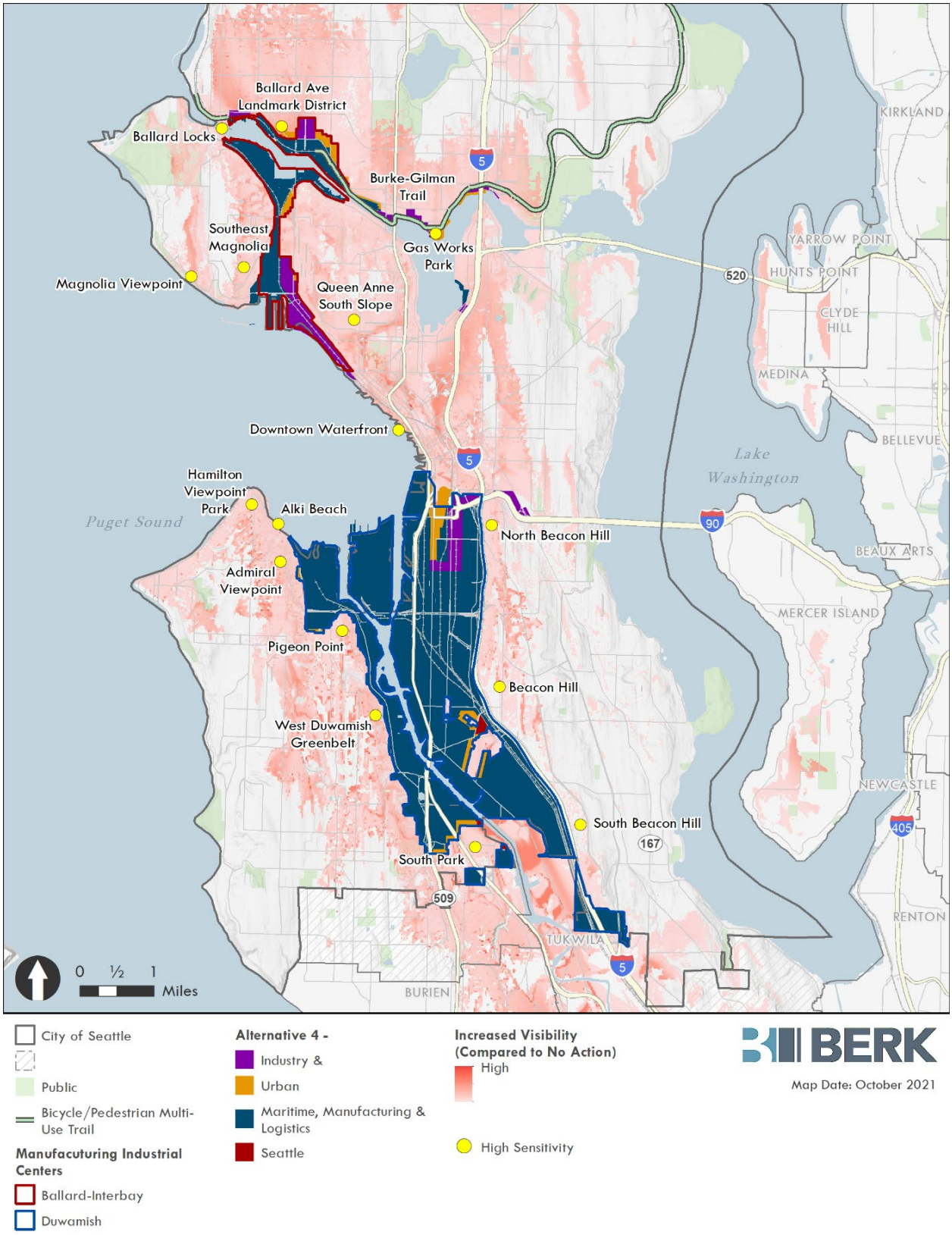
Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Impacts of Alternative 4

As described in **Chapter 2**, Alternative 4 would implement a land use pattern similar to alternatives 2 and 3, but with a greater share of Industry & Innovation and Urban Industrial than Alternative 2. Compared to Alternative 3, Alternative 4 would have slightly higher shares of Maritime, Manufacturing, & Logistics and Industry & Innovation, and a lower share of Urban Industrial. **Exhibit 3.7-19** shows the land use concepts and potential viewshed for Alternative 4.

As described in **Chapter 2**, Alternative 4 would produce up to 27.8 million square feet of employment-generating building space, the highest of the four alternatives. Of the four alternatives, Alternative 4 also proposed the most extensive use of the Industry & Innovation land use concept, which would allow building heights up to 160 feet. As described in the introduction to this chapter, these increased heights would increase the visibility of industrial development to surrounding areas, though the building typologies allowed would likely generate less light and glare emissions due to less focus on outdoor operation and storage areas that require extensive outdoor lighting. Overall light and glare emissions are anticipated to be similar to or slightly higher than Alternative 3 due to the higher overall developed square footage and slightly greater share of land designated MML. Potential location-specific impacts are described in the following sections.

Exhibit 3.7-19 Increase in Viewshed—Alternative 4



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Ballard

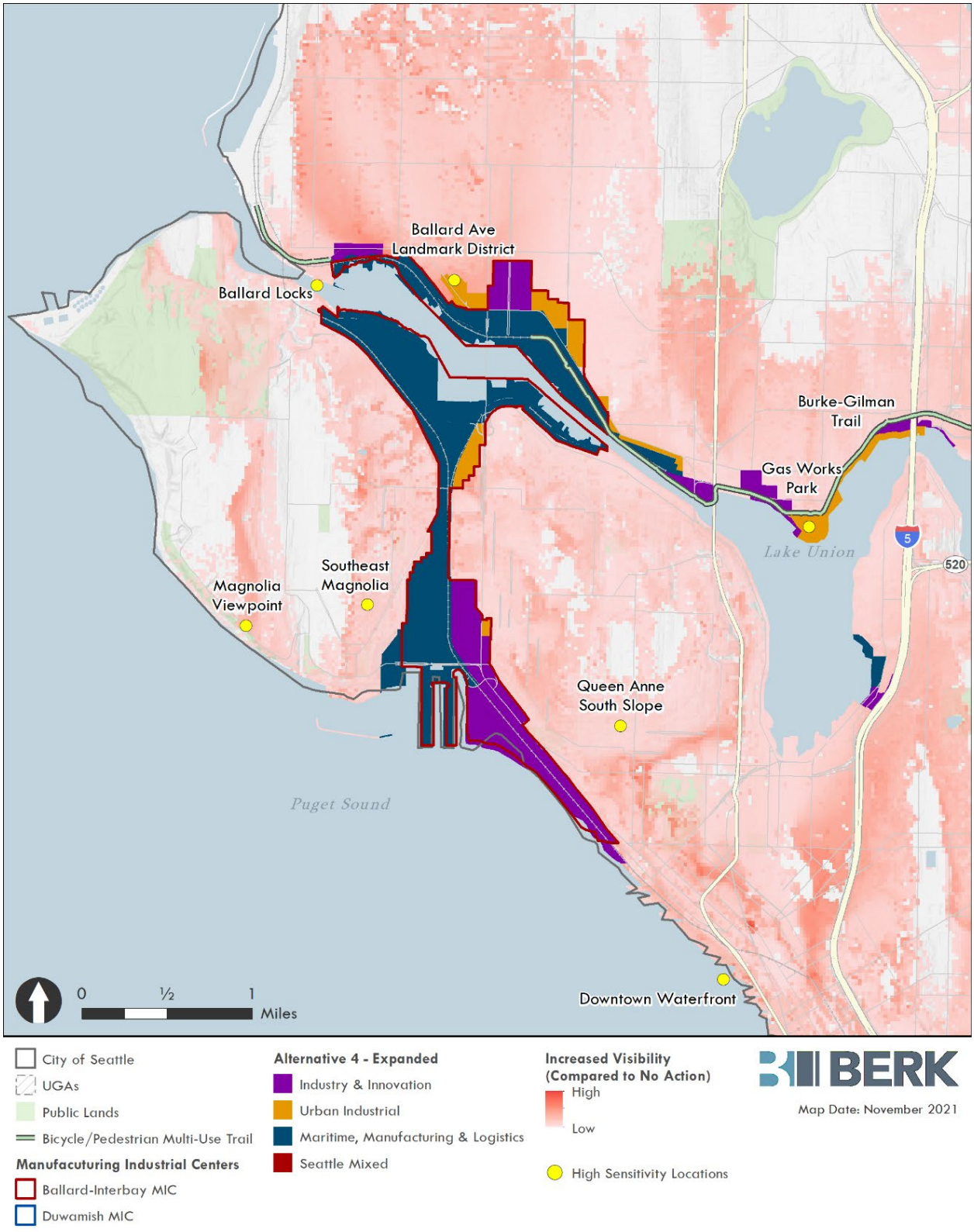
In the Ballard Subarea, Alternative 4 would implement two areas of Industry & Innovation on the north side of the subarea, as shown in **Exhibit 3.7-19** and **Exhibit 3.7-20**:

- At the northwest corner of the subarea, along NW Market Street; and
- North of NW Market Street on either side of 14th Avenue NW.

Implementation of the Industry & Innovation land use concept would allow increased building heights up to 160 feet, increasing the visibility of development to surrounding residential areas, particularly neighborhoods north of the subarea, which are located at higher elevations. While development under the II land use concept would generate lower light and glare emissions compared to the MML development proposed for these locations under Alternative 2, the increased height would expose a greater number of residents to light and glare effects than under alternatives 2 and 3.

Other portions of the subarea would implement the same land use concept pattern as Alternative 3 and would generate the same potential impacts.

Exhibit 3.7-20 Increase in Viewshed (Ballard, Interbay Dravus, and Interbay Smith Cove)—Alternative 4



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Interbay Dravus

Alternative 4 would implement the same land use concept pattern in the Interbay Dravus Subarea as alternatives 2 and 3, resulting in similar light and glare impacts. See **Exhibit 3.7-19** and **Exhibit 3.7-20**.

Interbay Smith Cove

Alternative 4 would implement the same land use concept pattern in the Interbay Smith Cove Subarea as Alternative 2, resulting in similar light and glare impacts. Compared to Alternative 3, Alternative 4 would implement more Industry & Innovation on the southwest slope of Queen Anne, resulting in taller building heights and increased visibility of development in western Queen Anne and Southeast Magnolia. See **Exhibit 3.7-19** and **Exhibit 3.7-20**.

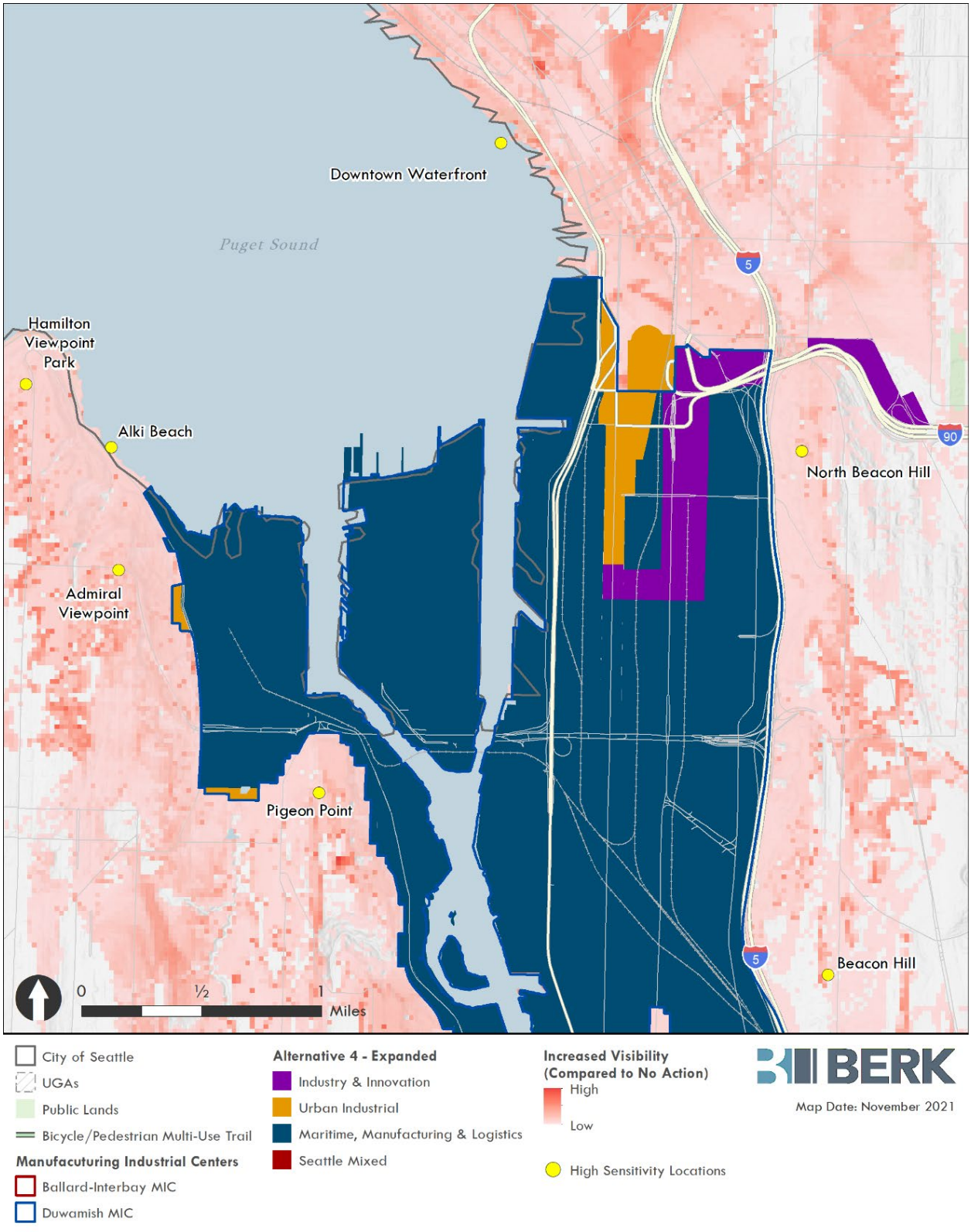
SODO/Stadium

In the SODO/Stadium Subarea, Alternative 4 would apply a similar land use concept pattern as Alternative 3 with the following changes:

- Expand the Industry & Innovation node east of the stadiums northward to the I-5/I-90 interchange. This would increase building heights and visibility to residential populations in North Beacon Hill but reduce light and glare emissions compared to the MML land use concept.
- Expand the Urban Industrial node that encompasses the stadiums southward along 1st Avenue S Similar to above, this would increase allowed building heights but potentially reduce light and glare emissions.
- Convert the area west of Lumen Field bounded by Alaskan Way S, S Royal Brougham Way, and 1st Avenue S from Industry & Innovation to Urban Industrial. This would reduce building heights and visibility to the adjacent portions of Downtown.
- Incorporate additional Urban Industrial along Harbor Avenue SW in West Seattle and W Marginal Way in Pigeon Point. This change could increase building heights in this location, but effects on visibility to populations to the west in West Seattle and Pigeon point would be minimal due to steep terrain. Light and glare emissions would likely be reduced compared to the MML land use concept proposed under alternatives 2 and 3 in this area.

Overall, these changes would result in greater visibility of development to surrounding areas, particularly Downtown and North Beacon Hill, but reduced light and glare emissions, relative to alternatives 2 and 3. See **Exhibit 3.7-19** and **Exhibit 3.7-21**.

Exhibit 3.7-21 Increase in Viewshed (SODO/Stadium)—Alternative 4



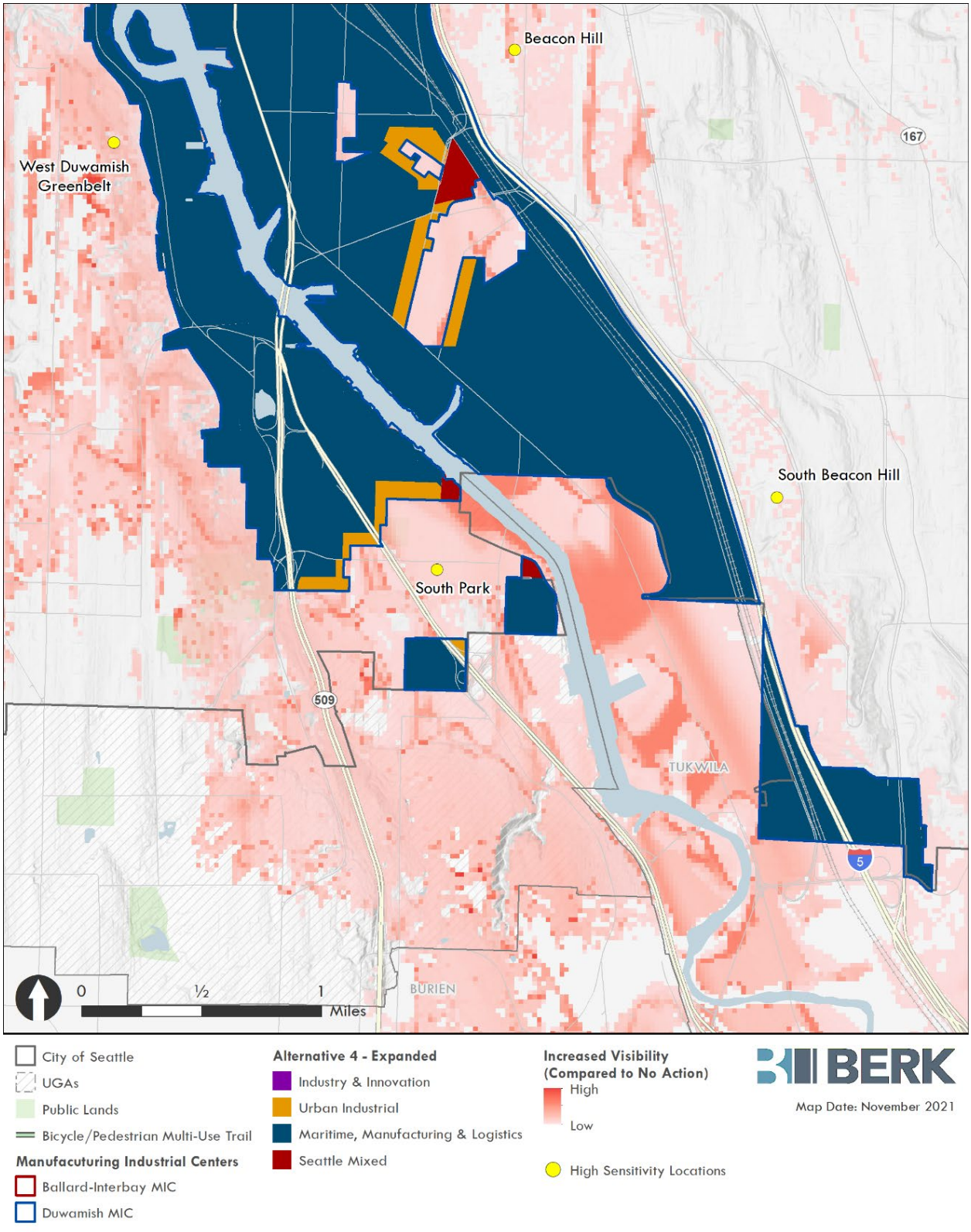
Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Georgetown/South Park

In the Georgetown/South Park Subarea, Alternative 4 would apply a similar land use concept pattern as Alternative 3 with the following changes (see **Exhibit 3.7-19** and **Exhibit 3.7-22**):

- Designation of a small area near the intersection of Padilla Place S and S Orcas Street as MML instead of UI. This change could increase light and glare emissions and associated impacts on nearby residential properties not included in the MIC, as well as the nearby Georgetown Playfield and Spraypark to the northeast (which is within the MIC).
- Designation of the eastern side of Ellis Avenue S north of S Myrtle Street as UI instead of MML (similar to Alternative 2). Compared to Alternative 3, this would reduce light and glare emissions and effects on residential properties outside the MIC, west of Ellis Avenue S.
- Designation of the MIC area east of 14th Avenue S as MML instead of UI (as proposed for alternatives 2 and 3). This location is currently occupied by a Boeing facility and other manufacturing and warehouse uses consistent with the MML land use concept, so future light and glare emissions in this area would be similar to the No Action Alternative and greater than alternatives 2 and 3. Residential and commercial areas on the west side of 14th Avenue S in the South Park neighborhood would be most affected.
- Designation of a small area bounded by W Marginal Way, S Director Street, and 12th Avenue S as UI instead of MML. Due to the small size of this area, effects on overall light and glare emissions would be small, but it would create a transition area and reduce localized impacts on non-MIC residential properties in South Park north of S Director Street.

Exhibit 3.7-22 Increase in Viewshed (Georgetown/South Park)—Alternative 4



Source: City of Seattle, 2016; City of Seattle, 2021; BERK, 2021.

Summary of Impacts

Exhibit 3.7-23 provides a summary of impacts and comparison of the alternatives.

Exhibit 3.7-23 Summary of Light and Glare Impacts— Action Alternatives

Subarea	Land Use Concept	Alternative 2	Alternative 3	Alternative 4
Ballard	Maritime, Manufacturing, & Logistics	▪ Development style and light emissions similar in nature and location to existing Industrial General zones. ▪ Higher level of development would increase overall light emissions, especially along waterfront and near Ballard Avenue Landmark District.	▪ Smaller MML footprint (compared to Alternative 2), resulting in reduced light emission exposure, particularly in areas northeast of the subarea.	▪ Further reduced MML footprint, resulting in reduced light & glare emissions away from the waterfront.
	Industry & Innovation	▪ Taller buildings would increase visibility in residential neighborhoods to the north. ▪ More office/commercial building typologies would reduce exterior light emissions.	▪ See Alternative 2	▪ Larger II footprint would increase visibility of buildings from surrounding neighborhoods. Largest potential viewshed of the alternatives.
	Urban Industrial	▪ Small increases in building heights would increase visibility in limited areas. ▪ Reduced light emissions and greater screening through landscaping and design concepts.	▪ Increased UI footprint (compared to Alternative 2), providing more transitions to residential neighborhoods to the northeast and near Gas Works Park. ▪ Limited increases in height and visibility.	▪ Smaller UI footprint than Alternative 3, but otherwise similar to Alternative 3.
Interbay Dravus	Maritime, Manufacturing, & Logistics	▪ Development style and light emissions similar in nature and location to existing Industrial General zones. ▪ Light & glare emissions along the waterfront (including Ballard Locks) similar to No Action.	▪ See Alternative 2	▪ See alternatives 2 & 3

Subarea	Land Use Concept	Alternative 2	Alternative 3	Alternative 4
	Industry & Innovation	▪ N/A	▪ N/A	▪ N/A
	Urban Industrial	▪ Small UI area would provide reduced emissions and transition to residential areas on northwest Queen Anne.	▪ See Alternative 2	▪ See alternatives 2 & 3
Interbay Smith Cove	Maritime, Manufacturing, & Logistics	▪ Development style and light emissions similar in nature and location to existing Industrial General zones.	▪ See Alternative 2	▪ See Alternative 2
	Industry & Innovation	▪ Would replace existing Industrial Commercial zoning in southeastern subarea. ▪ Reduced light emissions compared to No Action, but taller building heights would increase visibility in Southeast Magnolia and South Queen Anne.	▪ Reduced II footprint compared to Alternative 2. ▪ Light emissions similar to Alternative 2, but smaller viewshed.	▪ See Alternative 2
	Urban Industrial	▪ N/A	▪ Would create transition areas on southwest slope of Queen Anne. Light emissions would be similar to Alternative 2, but viewshed would be reduced.	▪ N/A
SODO/ Stadium	Maritime, Manufacturing, & Logistics	▪ Development style and light emissions similar in nature and location to existing Industrial General zones. ▪ Higher level of development would increase overall light emissions.	▪ See Alternative 2. MML footprint reduced relative to Alternative 2 in area south of stadiums.	▪ See Alternative 2. MML footprint further reduced relative to alternatives 2 and 3.

Subarea	Land Use Concept	Alternative 2	Alternative 3	Alternative 4
	Industry & Innovation	▪ Taller building heights in small area south of stadium district would increase visibility from surrounding areas, including Beacon Hill. ▪ Reduced light emissions in this location due to less intense exterior lighting.	▪ See Alternative 2. Increased footprint compared to Alternative 2, further increasing visibility in surrounding areas.	▪ II node east of stadiums expanded relative to alternatives 2 and 3, further increasing visibility in surrounding areas. ▪ II reduced west of the stadiums, reducing building heights and visibility relative to alternatives 2 and 3.
	Urban Industrial	▪ Would reduce light emissions and create transition areas in targeted locations near the stadium district/downtown.	▪ See Alternative 2.	▪ Increased UI footprint south and west of stadiums compared to alternatives 2 and 3. ▪ Conversion of MML to UI south of stadiums would slightly increase heights and visibility but would reduce light emissions.
Georgetown/ South Park	Maritime, Manufacturing, & Logistics	▪ Development style and light emissions similar in nature and location to existing Industrial General zones.	▪ Increased light emissions in the area between Corson Ave and Ellis Ave due to conversion of current Industrial Buffer zoning to MML. ▪ Compared to Alternative 2 and No Action, increased visibility of MML areas removed from MIC due to taller building heights under SM zoning.	▪ Light emissions in the area between Corson Ave and Ellis Ave similar to Alternative 2 and No Action. ▪ Compared to Alternative 2 and No Action, increased visibility of MML areas removed from MIC due to taller building heights under SM zoning.
	Industry & Innovation	▪ N/A	▪ N/A	▪ N/A
	Urban Industrial	▪ Implementation of UI along edges of the MIC would reduce light emission exposure	▪ Compared to Alternative 2, increased visibility of UI areas removed from MIC due to taller building heights under SM zoning.	▪ See Alternative 2.

Source: City of Seattle, 2016. City of Seattle, 2021. BERK, 2021.

3.7.3 Mitigation Measures

Incorporated Plan Features

As described in **Chapter 2**, the Industry & Innovation and Urban Industrial land use concepts include several design principals that would limit light and glare impacts:

- The Industry & Innovation land use concept would include standards for frontage improvements, trees and landscaping, and maximum limits on vehicle parking areas.
- The Urban Industrial land use concept would incorporate open space and landscaping, which can reduce or screen light and glare emissions from surrounding areas.
- All proposed land use concepts would prohibit principal use parking areas, which often require extensive outdoor illumination. The Urban Industrial land use concept would also prohibit heavy manufacturing uses, which likewise may generate substantial light emissions due to operational and safety needs.
- The Urban Industrial land use concept includes standards for ground-level and upper-story setbacks from adjacent residential zones to create transition areas and reduce impacts.

Regulations & Commitments

- As described in **Section 3.7.1 Affected Environment**, Seattle Municipal Code Chapter 25.05.675 codifies environmental policies related to light and glare and public view protection. Future site-specific development projects requiring SEPA review will be evaluated for consistency with these policies.
- The Seattle Land Use Code (Seattle Municipal Code Title 23) contains development regulations, including standards governing the design and placement of exterior site and building illumination. Future development in the study area will be required to comply with the standards established for industrial zones in SMC Chapter 23.50, or their successor zones.

Other Potential Mitigation Measures

- Consider implementation of additional development standards to address maximum height of exterior illumination. The Industry & Innovation land use concept would allow buildings up to 160 feet in height, and the MML land use concept does not impose a maximum height, only a maximum Floor Area Ratio (FAR). These standards should address placement, light output, direction, and shielding of any exterior illumination above a given height to reduce light and glare emissions to adjacent non-industrial areas.

3.7.4 Significant Unavoidable Adverse Impacts

Urban development, including development of a non-industrial nature, generates light and glare emissions associated with occupation and operation. The precise nature of these emissions and impacts vary based on building design, location, and shielding/screening measures employed, but any future growth in the study area, regardless of the specific uses or building design, will generate at least some increase in light and glare. Though unavoidable, these effects can be minimized and reduced to less than significant levels through application of design standards and the mitigation measures described in this analysis.

Section 3.8

Land & Shoreline Use

This section summarizes the affected environment—including the historical context of planning and land use decisions, current land use plan and policy framework, and current land and shoreline uses in the study area—and compares impacts of the alternatives on land and shoreline use in the study area.

Four impact categories were used to identify potential adverse land use impacts in the study area and at a subarea level (where applicable): consistency with plans and policies, land use compatibility, employment mix, and land use transitions. The alternatives are expected to result in a land use impact if:

- **Consistency with plans and policies.** The action would result in an inconsistency between the predominant land use pattern and the stated land use goals and policies in the Comprehensive Plan and/or the VISION 2050 regional growth plan, Countywide Planning Policies, or Shoreline Master Program. The action would introduce a land use pattern that would foreclose future opportunities to reach goals and polices.
- **Land use compatibility.** The action would cause an increase in the prevalence of disparate activity levels and use patterns that would result in incompatibilities within industrial zones. Incompatibilities could undermine industrial and maritime operations, or the comfort and safety of employees or residents. Incompatibilities could be related to time of day/night activity, noise levels, odors, and conflicting movements by vehicles and other modes.
- **Employment mix.** The action would lead to changes to employment mix that would decrease the percentage and total quantity of jobs related to or supportive of industrial and maritime sectors, in Manufacturing Industrial Centers (MICs). The action would cause a high likelihood of voluntary or involuntary economic displacements of businesses in industrial maritime sectors widely throughout a subarea. It would preclude new opportunity for expansion of industrial and maritime employment through business formation and retention.
- **Land use transitions.** The action would create a land use pattern where high intensity / high impact uses would be likely to abut or encroach on adjacent non-industrial uses and concentrations of residential populations. These impacts can result from noise, light and glare, odor, or height, bulk, and scale of taller buildings adjacent to nonindustrial areas.

Land use impacts of the alternatives are considered significant if:

- There is an acute/severe adverse impact within one of the impact categories defined above.
- There are cumulative land use impacts in multiple categories within one of the defined subareas.

Within industrial areas that have limited residential populations and a utilitarian industrial context, impacts related to height, bulk, and scale, and aesthetics are not considered adverse impacts. Other areas of the city, outside of MICs or industrial zones are more sensitive to aesthetic and height/bulk/scale impacts. Therefore, within this EIS adverse impacts related to aesthetics and height/bulk/scale are focused on the transition areas and addressed as part of the land use transitions impacts analysis.

Mitigation measures and a summary of any significant unavoidable adverse impacts are included following the impacts analysis.

3.8.1 Affected Environment

Overview of Historical Planning & Land Use Decisions

Prior to the presence of White settlers in the region the study area was inhabited extensively by Coast Salish peoples for thousands of years. Before European contact, the region was one of the most populated centers in North America. The Indians of the Eastern Puget Sound lived in relatively small, autonomous villages and spoke variations of the Lushootseed (*txʷəlšucid*, *dxʷləšúcid*), one of the Coast Salish languages. Many tribes were affiliated through intermarriage, political agreement, trade, and material culture. Indigenous people lived in permanent villages of longhouses or winter houses, and traditionally left their winter residences in the spring, summer, and early fall in family canoes to travel to temporary camps at fishing, hunting, and gathering grounds. At the time of the first White settlements around 1850, natives were living in more than 90 longhouses, in at least 17 villages, in modern-day Seattle and environs including in the study area. See also **Section 3.11 Historic, Archaeological, & Cultural Resources**.

Waterways were central to the cultures and livelihoods of native people. Duwamish "Duwamish" is the Anglo-Europeanized word which meant "people of the inside", *dxʷdəwʔabš*, referencing the interior waters of the Duwamish, Black and Cedar rivers. The Suquamish take their name from the Lushootseed phrase for “people of the clear salt water”, and the people living around Lake Washington were collectively known as *hah-choo-AHBSH* or *hah-chu-AHBSH* or *Xacuabš*, People of *HAH-choo* or *Xachu*, "People of a Large Lake" or "Lake People".

Physical alteration of the land and waterways by white settlers is important context for a discussion of land use today. Most present-day manufacturing and industrial centers are along the Duwamish River’s historic meandering flood plain, Elliott Bay, Lake Union, and Salmon Bay. Prior to the Lake Washington ship canal and other alterations, the land and waterways looked much different. In the location of present-day Lake Union there were a series of separate lakes that natives transited with over-land portages. The Lushootseed name for present day Lake Union was *tenas Chuck* or *XáXu7cHoo* ("small great-amount-of-water"), present day Lake Washington was called *hyas Chuck* or *Xacuabš* ("great-amount-of-water"), and the present-day area of the Montlake Cut was called "Carry a Canoe".

Construction of a system of locks and cut waterways connecting east to west began in 1911 and culminated in 1916 (see **Exhibit 3.8-1**). Waters were connected from Lake Washington’s Union Bay to Lake Union, to Salmon Bay though a series of locks to Shilshole Bay. As a result, the waters of Lake Washington were partially drained, lowering the level of that lake by 8.8 ft and drying up more than 1,000 acres of wetlands.

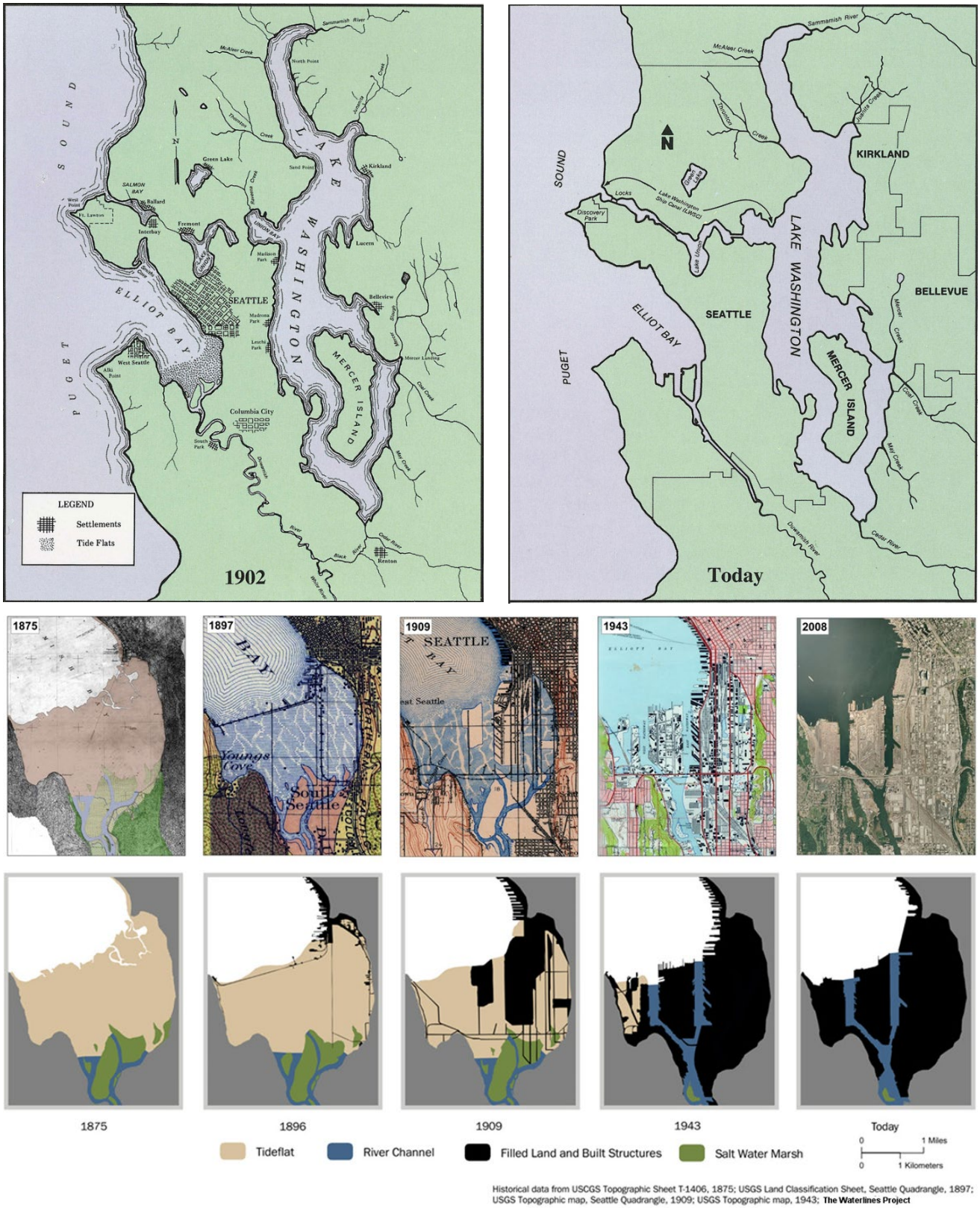
Changes to river flows at the south end of Lake Washington resulted from construction of the ship canal and locks. Prior to the alterations, Lake Washington emptied from its south end into the Black River (which no longer exists). The Black River connected to the Duwamish River, which outlets as it does today to Elliott Bay. The Cedar River, which had previously flowed into

the Black River in Renton, was diverted in 1912 directly into the south end of Lake Washington to reduce flooding in Renton. In 1916, when Lake Washington's level dropped, the remaining portion of the Black River dried up. Several indigenous villages were located near the confluence of the Black and Duwamish rivers and the area was long used as a place of refuge. When the Black River vanished, natives were displaced from the area.

During the first decades of the 20th century hundreds of acres of tide flats were also filled in to create dry land as depicted below in **Exhibit 3.8-1**. After the completion of the man-made Harbor Island in 1909, the mouth of the Duwamish River was divided into two channels. A series of major public works projects were undertaken to straighten and dredge the Duwamish riverbed, both to open the area to commercial use and to alleviate flooding. The City of Seattle formed the Duwamish Waterway Commission in order to oversee the re-channeling of the river and beginning in 1913 the river was altered to remove oxbows and meanders to maintain high water flows and turning ships. By 1920, 4½ miles of the Duwamish Waterway had been dredged to a depth of 50 feet, with 20 million cubic feet of mud and sand going into the expansion of Harbor Island. The shallow, meandering, nine-mile-long river became a five-mile engineered waterway capable of handling ocean-going vessels. The Duwamish basin became Seattle's industrial and commercial core area. Activities included cargo handling and storage, marine construction, ship and boat manufacturing, concrete manufacturing, paper and metals fabrication, food processing, and many other industrial operations. Boeing Plant 1 was established on the Lower Duwamish in 1916, and Boeing Plant 2 further upriver in 1936. Through the 1930's and 1940's Boeing's operations and footprint expanded greatly to support United States war efforts.

Native villages on the Duwamish were completely supplanted by white settlement and commercial use through the massive alterations of the land and waterways, the destruction of wildlife and fish habitats it caused, by the occupation of land. There was also deliberate removal of native settlements evidenced by burning of Indian longhouses in 1893. Duwamish people continued to work and fish in the area, using man-made "Ballast Island" on the Seattle waterfront as a canoe haul-out and informal market, but by the mid-1920's, most remnants of traditional life along the river had disappeared.

Exhibit 3.8-1 Seattle's Shoreline Over Time



Source: Burke Museum, The Waterlines Project.

With the spread of ecological concerns in the 1970s, various environmental, tribal, and community organizations became interested in the severely polluted Duwamish. Kellogg Island, the last remnant of the original river, was declared a wildlife preserve, and nearby terminal T-107 was converted into a park, creating a substantial natural area near the mouth of the river. T-107 is the site of the Duwamish village of x̌aʔəpus. Intervention by Native people was instrumental in the reclamation of T-107 and Kellogg Island as natural areas that remain hotspots of biodiversity instead of additional industrial uses along the river.

In 2009, the Duwamish Longhouse and Cultural Center was opened on the west bank of the river. The Duwamish Longhouse, Herring's House Park, Kellogg Island have an important presence in the study area today as vestige of connection to the natural state of the river and of ownership and residence by the native Duwamish people.

Due to 20th century industrial contamination, the lower 5 miles of the Duwamish was declared a superfund site by the United State Environmental Protection Agency. Cleanup and restoration efforts are ongoing. The Duwamish River Community Coalition (DRCC) was established in 2001 to help monitor cleanup of the river. DRCC promotes place-keeping and prioritizes community capacity and resilience and is actively promoting improvements and investments in the greater Duwamish Valley that will benefit communities there.

The steady expansion of industrial and commercial enterprises on land in the study area led to some displacement of some non-native settlements. This history is evident in areas including Georgetown, South Park, and portions of northeast Ballard.

Due to dredging and rerouting of the Duwamish River, parts of the Georgetown and South Park neighborhoods once on riverbanks found themselves inland. Georgetown had early rail connections at the location of the present-day Union Pacific Argo Yard and operated as its own small city from 1904 to 1910 before being annexed by Seattle. Industrial and commercial activity expanded in the first decades of the 20th century with establishment of the public airport south of Georgetown (present day King County Airport), expansion of Boeing's aircraft assembly plants in the 1930's and 1940's and varied industrial and warehouse businesses on filled tidelands accessed by rail spurs. Residential elements declined in Georgetown by the 1950's and civic features such as a public library branch and movie theatre were shuttered. Evidence of isolation of former residential uses can be seen in the vicinity today where residential structures over 75 years old remain within a broader industrial context.

South Park, on the west bank of the Duwamish was similarly affected by the historical expansion of industry. In the late 1800s and early 1900s, South Park was largely a farming community. Italian and Japanese families farmed the alluvial plain of the Duwamish and brought goods for sale in Seattle at Pike Place Market. During the War era, South Park's residential population increased as a place for workers. However, in the late 1950s and 1960s Seattle sought to expand industrial zoning throughout South Park. Protests by residents resulted in most of present-day South Park retaining residential zoning and a residential presence.

Historical land use decisions also led to the location of multi-family housing in areas bordering industrial lands that caused environmental justice harms. Seattle's first zoning ordinance in 1923 and its major update in 1956 located multi-family residential districts at the edges of rail lines, industrial districts, and manufacturing districts. Relatively less affluent renters were exposed to noise and air quality and other impacts, while single family districts removed from the edges of industrial areas were not. The continued pattern of multi-family housing and zoning districts bordering MICs continues to be evident today in areas including Interbay and the northeast edge of Ballard.

Data and Methods

The Land Use Section uses an inventory of existing land uses based on parcel level GIS data that was updated with manual scans by City staff and consultants and input from stakeholders. Existing and projected employment information relies on a 2021 CAI Inc. study. In addition to data, state, regional and local land use policies were reviewed and evaluated.

Current Policy & Regulatory Framework

Identification of land use impacts requires consideration of the policy framework regulating land use in Seattle's industrial areas. The policy framework flows from the State of Washington Growth Management Act, the Puget Sound Regional Council's (PSRC's) Multi-County Planning Policies (MPPs), King County's County-Wide Panning Policies (CPPs) the City Comprehensive Plan (Seattle 2035), and implementation actions including development standards in the Seattle Municipal Code (SMC) and the City's Shoreline Master Program. Several other regulatory measures affect industrial land use including localized overlay districts and community agreements.

State & Regional Policy Framework

Growth Management Act

The Washington State Growth Management Act (GMA), adopted in 1990, is a body of planning regulations that establishes requirements for Counties and localities to plan for future growth.

- GMA requires local governments to manage growth by (among other things) preparing comprehensive plans and implementing them through capital investments and development regulations (zoning).
- The Washington State Department of Commerce, the Puget Sound Regional Council, and a Governor-appointed Hearings Board oversees whether local governments are in compliance.
- Local comprehensive plans must provide land use capacity to accommodate growth that is projected for 20 years.

- Cities in King County must demonstrate sufficient zoned capacity for housing and employment growth.

Consistent with the GMA, the City of Seattle prepares updates to its Comprehensive Plan to accommodate new 20-year growth projections every eight years and has an annual process to amend the plan between major updates. Seattle most recently completed a major update, Seattle 2035, in 2015 and is preparing for a major update in 2024 that will extend the planning horizon to the year 2044.

The GMA establishes planning requirements and procedures including mandating elements of the Comprehensive Plan that the City must address (discussed below)

Puget Sound Regional Council VISION 2050

The Puget Sound Regional Council (PSRC) is composed of nearly 100 members, including the four counties, cities and towns, ports, state and local transportation agencies, and Tribal governments within the region. PSRC develops policies and coordinates decisions about regional growth, transportation and economic development planning within King, Pierce, Snohomish, and Kitsap counties.

The GMA requires multi-county planning policies (MPPs) and cities and counties planning under GMA must develop Comprehensive Plan policies consistent with the MPPs. MPPs for King, Pierce, Snohomish, and Kitsap are adopted by PSRC in a long-range plan called VISION 2050, the region's plan for growth. By 2050, the region's population is expected to reach 5.8 million people.

PSRC designates MICs for the Puget Sound Region. VISION 2050 establishes criteria for designation of MICs. MICs are primarily locations of more intense industrial uses and employment and are not appropriate for housing. VISION 2050 calls for the recognition and preservation of existing centers of intensive manufacturing and industrial activity and the provision of infrastructure and services necessary to support these areas. VISION 2050 discourages non-supportive land uses in MICs, such as large retail stores or non-related offices.

The Regional Centers Framework adopted by PSRC in 2018 lays out criteria for designation of MICs that address size, current and future employment, and mix of uses, the majority of which are expected to represent core industrial activities. Cities are expected to plan for each MIC through a subarea planning process or the equivalent. There are 10 total designated MICs in the four-county region, two of which are in Seattle: the Greater Duwamish MIC and the Ballard Interbay Northend MIC (BINMIC).

The criteria established by PSRC for designation or redesignation as a MIC are the following:

- Planned jobs: 20,000 minimum.
- Minimum 50% industrial employment.
- If MIC is within a transit service district, availability of existing or planned frequent, local, express, or flexible transit service. If MIC is outside a transit service district, documented

strategies to reduce commute impacts through transportation demand management strategies consistent with the Regional Transportation Plan Appendix F (Regional TDM Action Plan).

- Presence of irreplaceable industrial infrastructure.
- At least 75% of land area zoned for core industrial uses.
- Industrial retention strategies in place.
- Regional role.

MIC designation is important not only for the regional recognition of the value of the City's industrial areas to the State, but it also makes these areas eligible for federal transportation funding.

Local Policy Framework

King County

Within the GMA framework, each county collaborates with its cities to adopt Countywide Planning Policies (CPPs) and develop local growth targets that set expectations for local comprehensive plans. The MICs are also designated at this countywide level. In July of 2021 the GMPC approved new CPPs, and they are now being considered by the King County Council. The updated policies are consistent with PSRC's newly adopted VISION 2050. It is anticipated that these policies will be adopted prior to issuance of a Final Industrial and Maritime Strategy EIS. The CPPs include two policies for MICs. These policies are as follows:

> ***DP-38*** *Designate and accommodate industrial employment growth in a network of regional and countywide industrial centers to support economic development and middle-wage jobs in King County. The Generalized Land Use Categories Map in Appendix 1 shows the locations of the designated Manufacturing/Industrial Centers. Designate these centers based on nominations from cities and after determining that:*
>
> *a) the nominated locations meet the criteria set forth in the King County Centers Designation Framework and the criteria established by the Puget Sound Regional Council for regional manufacturing/ Industrial Centers;*
>
> *b) the proposed center's location will promote a countywide system of manufacturing/industrial centers with the total number of centers representing a realistic growth strategy for the county; and*
>
> *c) the city's commitments will help ensure the success of the center.*
>
> ***DP-38*** *Minimize or mitigate potential health impacts of the activities in manufacturing/industrial centers on residential communities, schools, open space, and other public facilities.*

City of Seattle 2035 Comprehensive Plan

Seattle's Comprehensive Plan establishes land use policies for industrial areas in Seattle. The Plan, subject to approval by PSRC for consistency with VISION 2050 and the CPP's, above, sets out Seattle's growth management strategy. Seattle 2035 includes a land use element, container port element, and shoreline areas element that each establish land use goals and policies for Seattle's industrial areas. Other elements that guide the City's investments and activities in industrial lands include the transportation, economic development, and environment elements.

This proposal includes amendments to the existing goals and policies in the land use element that will include a framework for the new proposed industrial zones that are analyzed in the three Action Alternatives, an amendment to strengthen existing protections for industrial land by limiting changes to MIC boundaries to major updates of the Comprehensive Plan, and an amendment that states the intent of the City to work with the owners of the Oregon Washington Shippers Cooperative Association (WOSCA) site and the Interbay Armory site on future master planning for future industrial redevelopment of those sites.

The land use policies, below, include both the existing policy framework and the proposed amendments to the Comprehensive Plan that are a part of this proposal. The proposed amendments are indicated with underlined, and deletions are in ~~strikethrough~~.

Land Use Element

Goals

> ***LU G10*** *Provide sufficient land with the necessary characteristics to allow industrial activity to thrive in Seattle and protect the preferred industrial function of these areas from activities that could disrupt or displace them.*
>
> ***LU G11*** *Support employment-dense emerging industries that require greater flexibility in the range of on-site uses and activities.*
>
> ***LU G12*** *Develop transitions between industrial areas and adjacent neighborhoods that support healthy communities, reduce adverse environmental impacts, and minimize land use conflicts.*

Policies

> ***LU 10.1*** *Designate industrial zones generally where*
>
> *1. the primary functions are industrial activity and industrial-related commercial functions,*
>
> *2. the basic infrastructure needed to support industrial uses already exists, areas are large enough to allow a full range of industrial activities to function successfully, and*
>
> *3. sufficient separation or special conditions exist to reduce the possibility of conflicts with development in adjacent less intensive areas.*

LU 10.2 *Preserve industrial land for industrial uses, especially where industrial land is near rail- or water-transportation facilities, in order to allow marine- and rail-related industries that rely on that transportation infrastructure to continue to function in the city.*

LU 10.3 *Ensure predictability and permanence for industrial activities in industrial areas by limiting changes in industrial land use designation. There should be no reclassification of industrial land to a non-industrial land use category except as part of a City-initiated comprehensive study and review of industrial land use policies or as part of a major update to the Comprehensive Plan.*

LU 10.~~3~~4 *Accommodate the expansion of current industrial businesses and promote opportunities for new industrial businesses and emerging industries within Seattle to strengthen the city's ~~existing~~ industrial economy.*

LU 10.4~~5~~ *Restrict to appropriate locations within industrial areas those activities that—by the nature of materials involved or processes employed—are potentially dangerous or very noxious.*

LU 10.5~~6~~ *Provide a range of industrial zones that address varying conditions and priorities in different industrial areas. Those priorities include maintaining industrial areas that have critical supporting infrastructure, leveraging investments in high-capacity transit service, providing transitions between industrial areas and less intensive areas, and promoting high-quality environments attractive to business expansion or to new industrial activities.*

LU 10.7 *Use the following zones for industrial lands in Seattle:*

- *Maritime, Manufacturing and Logistics: This designation would be intended to support the city's maritime, manufacturing, logistics and other industrial clusters. Areas that have significant industrial activity, accessibility to major industrial infrastructure investments, or locational needs (Port facilities, shipyards, freight rail, and shoreline access) may be considered for the maritime, manufacturing, and logistics designation.*
- *Industry and Innovation: This designation would be intended to promote emerging industries and leverage investments in high-capacity transit. These industrial transit-oriented districts may be characterized by emerging industries and high-density industrial employment that combine a greater mix of production, research and design, and offices uses found in multi-story buildings. Areas in MICs and are generally within one quarter and one-half mile of high-capacity transit stations may be considered for the industry and innovation designation.*
- *Urban Industrial: This designation would be intended to encourage a vibrant mix of uses and relatively affordable, small-scale industrial, makers and arts spaces. Areas located at transitions from industrial to commercial and residential areas traditionally zoned for buffer purposes may be considered for the Urban industrial designation.*

LU 10.~~6~~8 *Prohibit new residential development in industrial zones, except for certain types of dwellings, such as caretaker units or, potentially in urban industrial zones, dwellings for workers that are related to the industrial area and that would not restrict or disrupt industrial activity.*

LU 10.~~7~~9 *Use the general industrial or maritime, manufacturing, and logistics zones to promote a full range of industrial activities and related support uses.*

LU 10.~~8~~10 *Apply the general industrial zones mostly within the designated manufacturing/industrial centers, where impacts from industrial activity are less likely to affect residential or commercial uses. Outside of manufacturing/industrial centers, general industrial or the maritime, manufacturing, and logistics zones may be appropriate along waterways used for maritime uses. Consider applying the maritime, manufacturing, and logistics designation mostly within the designated manufacturing/industrial centers and it may also be appropriate outside of manufacturing/industrial centers along waterways used for maritime uses.*

LU 10.~~9~~11 *Avoid placing industrial zones within urban centers or urban villages. However, in locations where a center or village borders a manufacturing/industrial center, use of the industrial commercial-within the center or village where it abuts the manufacturing/industrial center may provide an appropriate transition to help separate residential uses from heavier industrial activities. Consider using the urban industrial zone in locations where a center or village borders a manufacturing/industrial center, where it abuts the manufacturing/industrial center may provide an appropriate transition to help separate residential uses from heavier industrial activities.*

LU 10.~~10~~12 *Limit the density of development for nonindustrial uses in the manufacturing/industrial centers to reduce competition from nonindustrial activities that are better suited to other locations in the city, particularly urban centers and urban villages, where this Plan encourages most new residential and commercial development. Permit a limited amount of stand-alone commercial uses in industrial areas as workforce amenities. ~~or only if they reinforce the industrial character, and~~ strictly limit the size of office and retail uses not associated with industrial uses~~,~~ in order to preserve these areas for industrial development.*

LU 10.~~11~~13 *Recognize the unique working character of industrial areas by keeping landscaping and street standards to a minimum to allow flexibility for industrial activities, except along selected arterials where installing street trees and providing screening and landscaping can offset impacts of new industrial development in highly visible locations.*

LU 10.~~12~~14 *Set parking and loading requirements in industrial zones to provide adequate parking and loading facilities to support business activity, promote air quality, encourage efficient use of the land in industrial areas, discourage underused parking facilities, and maintain adequate traffic safety and circulation. Allow some on-street*

loading and occasional spillover parking. Consider limiting parking in the industry and innovation zone located in the vicinity of high-capacity transit stations.

LU 10.~~13~~15 *Maintain standards for the size and location of vehicle curb cuts and driveways in industrial zones in order to balance the need to provide adequate maneuvering and loading areas with availability of on-street parking and safe pedestrian, bike, and transit access.*

LU 10.~~14~~16 *Permit noise levels in industrial areas, except buffer areas, that would not be allowed in other parts of the city, in recognition of the importance and special nature of industrial activities.*

LU 10.~~15~~17 *Classify certain industrial activities as conditional uses in industrial zones in order to accommodate these uses while making sure they are compatible with the zone's primary industrial function and to protect public safety and welfare on nearby sites. Require mitigation of impacts on industrial activity and on the immediate surroundings, especially nearby less intensive zones.*

LU 10.~~16~~18 *Prohibit uses that attract large numbers of people to the industrial area for nonindustrial purposes, in order to keep the focus on industrial activity and to minimize potential conflicts from the noise, nighttime activity, and truck movement that accompanies industrial activity. Consider allowing such uses in the urban industrial zone only.*

LU 10.19 *In the industry and innovation zone, consider development regulations that are compatible with employment-dense transit-oriented development. Seek to establish minimum density standards to ensure employment density at a level necessary to leverage transit investments. Consider upper level density limits to discourage higher value ancillary uses that are more appropriate in non-industrial areas.*

LU 10.20 *In the Industry and Innovation zone, consider development standards that promotes development that meets the needs of industrial businesses including load-bearing floors, freight elevators, and adequate freight facilities.*

LU 10.21 *In the industry and innovation zone, consider an incentive system whereby non-industrial floor area may be included in a development as a bonus if new bona-fide industrial space is included.*

LU 10.~~17~~22 *~~Establish the industrial buffer~~ Consider using the urban industrial or industrial buffer zones to provide an appropriate transition between industrial areas and adjacent residential or pedestrian-oriented commercial zones.*

LU 10.23 *In the urban industrial zone, consider allowing a range of ancillary non-industrial uses. Recognize that industrial businesses in this zone have a greater need for a limited amount of space for such uses as tasting rooms and retail facilities that directly support the industrial activity of the business.*

LU 10.24 *In the urban industrial zone, consider establishing buffer standards to ease the transition from industrial areas to urban villages and other non-industrial parts of Seattle.*

LU 10.25 *Recognize the unique development opportunity that the Washington National Guard Armory in the BINMIC represents. Work with the State of Washington or other future owners of this site to develop a comprehensive industrial development plan. This plan should include green infrastructure, consolidated waste management programs, and workforce equity commitments.*

LU 10.~~18~~26 *Allow the widest possible range of manufacturing uses and related industrial and commercial activities within the industrial buffer zone, while ensuring compatibility the activity and physical character of neighboring less intensive zones.*

LU 10.~~19~~27 *Include development standards or performance standards for the industrial buffer zone that protect the livability of neighboring areas, promote visual quality, and maintain a compatible scale of development along zone edges. Apply these standards only in places where existing conditions do not adequately separate industrial activity from less intensive zones.*

LU 10.~~20~~28 *Limit the height of structures on the borders of industrial buffer zones where streets along the zone edge do not provide sufficient separation for a reasonable transition in scale between industrial areas and less intensive neighboring zones, taking into consideration the permitted height in the abutting less intensive zone.*

LU 10.~~21~~29 *Allow a wide mix of employment activities in the industrial commercial zones, such as light manufacturing and research and development.*

LU 10.~~22~~30 *Limit development density in industrial commercial and maritime, manufacturing, and logistics zones in order to reflect transportation and other infrastructure constraints, while taking into account other features of an area.*

LU 10.~~23~~31 *Include development standards in the industrial commercial zone designed to create environments that are attractive to new technology businesses and that support a pedestrian-oriented environment, while controlling structure height and scale to limit impacts on nearby neighborhoods.*

LU 10.~~24~~32 *Provide a range of maximum building height limits in the industrial commercial zones in order to protect the distinctive features that attract new technology businesses to the area—such as views of water, shoreline access, and the neighborhood scale and character—to make sure that these features will continue to be enjoyed, both within the zone and from the surrounding area.*

LU 10.~~26~~33 *Assign height limits independently of the industrial zoning designation to provide flexibility in zoning-specific areas and to allow different areas within a zone to be assigned different height limits according to the rezone criteria.*

LU 10.~~26~~34 *Restrict or prohibit uses that may negatively affect the availability of land for industrial activity, or that conflict with the character and function of industrial areas.*

LU 10.~~27~~35 *Consider high value-added, living wage industrial activities to be a high priority.*

LU 10.~~28~~36 *Permit commercial uses in industrial areas to the extent that they reinforce the industrial character, and limit specified non-industrial uses, including office and retail development, in order to preserve these areas for industrial development.*

Container Port Element Land Use Policies (from Seattle 2035)

The container port element contains land use, transportation, economic development, and environmental policies to guide and support container port activities in Seattle. The land use policies emphasize ensuring adequate land area needs for port expansion, avoiding land use conflicts. These policies focus more specifically on the maritime industry than the land use policies, above. Container Port Element land use policies are below:

CP 1.1 *Help preserve cargo container activities by retaining industrial designations on land that supports marine and rail- related industries including industrial land adjacent to rail or water-dependent transportation facilities.*

CP 1.2 *Continue to monitor the land area needs, including for expansion, of cargo container related activities and take action to prevent the loss of needed land that can serve these activities.*

CP 1.3 *Discourage non-industrial land uses, such as stand-alone retail and residential, in industrially zoned areas to minimize conflicts between uses and to prevent conversion of industrial land in the vicinity of cargo container terminals or their support facilities.*

CP 1.4 *Consider how zoning designations may affect the definition of highest and best use, with the goal of maintaining the jobs and revenue that cargo container activities generate and to protect scarce industrial land supply for cargo container industries, such as marine and rail-related industries.*

CP 1.5 *Consider the value of transition areas at the edges of general industrial and maritime manufacturing and logistics zones which allow a wider range of uses while not creating conflicts with preferred cargo container activities and uses. In this context, zoning provisions such as locational criteria and development standards are among the tools for defining such edge areas.*

Shoreline Areas Element (from Seattle 2035)

As part of the Shoreline Master Program (discussed below), the shoreline areas element contains land use policies for industrial land adjacent to Seattle's shorelines. These policies are implemented through the Shoreline Master Program which designates which shorelines are industrial in use and establishes development regulations for those uses within 200-feet of the shoreline.

SA P37 *Support the retention and expansion of existing conforming water-dependent and water-related businesses and anticipate the creation of new water-dependent and water-related development in areas now dedicated to such use.*

SA P38 *Identify and designate appropriate land adjacent to deep water for industrial and commercial uses that require such condition.*

SA P39 *Provide regulatory and nonregulatory incentives for property owners to include public amenities and ecological enhancements on private property.*

SA P40 *Identify and designate appropriate land for water-dependent business and industrial uses as follows:*

1. *Cargo-handling facilities*
2. *Tug and barge facilities*
3. *Shipbuilding, boatbuilding, and repairs*
4. *Moorage*
5. *Recreational boating*
6. *Passenger terminals*
7. *Fishing industry*

(See Seattle 2035 for Detailed policy guidance provided for each)

SA P41 *Allow multiuse developments including uses that are not water dependent or water related where the demand for water-dependent and water-related uses is less than the land available or if the use that is not water dependent is limited in size, provides a benefit to existing water-dependent and water-related uses in the area, or is necessary for the viability of the water-dependent uses. Such multiuse development shall provide shoreline ecological restoration, which is preferred, and/or additional public access to the shoreline to achieve other Shoreline Master Program goals.*

Comprehensive Plan Growth Strategy

The Comprehensive Plan includes the city's overall plan for accommodating housing and job growth over a 20-year planning horizon. Under GMA the plan must demonstrate the City's ability to accommodate expected additional jobs and housing. The plan includes estimations for where jobs and housing will be located in the city and seeks to steer the allocation of new jobs and housing to those areas with land use regulations. During the previous 20-year planning horizon of the Seattle 2035 Comprehensive Plan, MICs were planned to accommodate 9,000 of the city's estimated total job growth of 115,000, or about 8%. The City is currently embarking on a major update to the Comprehensive Plan to the year 2044, and the total citywide estimation of job growth for the new 20-year planning horizon is 169,500 additional jobs. Growth studied in this EIS is expected to be integrated into the 2044 Comprehensive Plan major update.

MIC Subarea Plans

PSRC MIC designation also requires Centers Plans (this is a requirement for other designated Urban Centers as well). Both the Greater Duwamish MIC and the BINMIC have subarea plans that were adopted in 2000 and 1998, respectively. As part of VISION 2050, PSRC is requiring the City to prepare updated subarea plans for the two MICs. These updates will update goals and policies consistent with this proposal and address VISION 2050 goals for Centers Plans.

Ballard Interbay Northend Neighborhood Plan

Applicable goals and policies include:

> ***BI-P2*** *Preserve land in the BINMIC for industrial activities such as manufacturing, warehousing, marine uses, transportation, utilities, construction, and services to businesses.*
>
> ***BI-P8*** *Maintain the BINMIC as an industrial area and work for ways that subareas within the BINMIC can be better utilized for marine/fishing, high tech, or small manufacturing industrial activities.*
>
> ***BI-P9*** *Support efforts to locate and attract appropriately skilled workers, particularly from adjacent neighborhoods, to fill family-wage jobs in the BINMIC.*
>
> ***BI-P10*** *Support efforts to provide an educated and skilled labor workforce for BINMIC businesses.*
>
> ***BI-P11*** *Within the BINMIC, water-dependent and industrial uses shall be the highest priority use.*

Greater Duwamish MIC Neighborhood Plan

Applicable goals and policies include:

> ***GD-G3*** *Land in the Duwamish Manufacturing/ Industrial Center is maintained for industrial uses including the manufacture, assembly, storage, repair, distribution, research about or development of tangible materials and advanced technologies; as well as transportation, utilities, and commercial fishing activities.*
>
> ***GD-P5*** *Limit the location or expansion of nonindustrial uses, including publicly sponsored nonindustrial uses, in the Duwamish Manufacturing/Industrial Center.*
>
> ***GD-G8*** *The Duwamish Manufacturing/Industrial Center remains a manufacturing/industrial center promoting the growth of industrial jobs and businesses and strictly limiting incompatible commercial and residential activities.*

Seattle Municipal Code Industrial Zones (SMC 23.50)

Seattle's industrial zones were last updated in 1987 when the current Industrial 1 (IG1), Industrial General 2 (IG2), Industrial Commercial (IC) and Industrial Buffer (IB) zones were established and have only been altered slightly since then. The functional intent of the zones is as follows:

- **IG1:** An area that provides opportunities for manufacturing and industrial uses and related activity, where these activities are already established and viable, and their accessibility by rail and/or waterway make them a specialized and limited land resource.
- **IG2:** An area with existing industrial uses, that provides space for new industrial development and accommodates a broad mix of activity, including additional commercial development, when such activity improves employment opportunities and the physical conditions of the area without conflicting with industrial activity.
- **IC:** The Industrial Commercial zone is intended to promote development of businesses which incorporate a mix of industrial and commercial activities, including light manufacturing and research and development, while accommodating a wide range of other employment activities.
- **IB:** An area that provides an appropriate transition between industrial areas and adjacent residential zones, or commercial zones having a residential orientation and/or pedestrian character.

For a summary of the locational criteria and development regulations in the IG1, IG2, IC, and IB zones see **Appendix E**. Development standards include allowable uses, height limits, floor area ratio limits, and maximum size of use limits.

In 2007, the City passed Ordinance 122601 that took steps to reduce maximum size of use limits for non-industrial uses in industrial zones. It was preceded by studies that found industrial occupancy rates of industrial land to be very high and that non-industrial uses, such as offices and retail stores, were displacing industrial uses.

For an overview of proposed development regulations in a new set of industrial zones that would update and replace the existing zones see the description of alternatives in **Chapter 2**.

Stadium Transition Area Overlay District (STAOD) (SMC 23.74)

In addition to zoning regulations in the Seattle Municipal Code for industrial zones, the areas around professional sports stadiums are subject to the Stadium Transition Area Overlay District. In 2000, the City established the STAOD, which is a 93-acre area comprised of Lumen Field, T-Mobile Field and surrounding areas to the east, west and south of those stadiums. The overlay district applied additional zoning standards beyond the base zoning to achieve certain goals for the district, including improving the pedestrian environment and connections to Downtown, discouraging encroachment into industrial areas, and permitting a mix of uses to support the pedestrian-oriented character of the area. For a summary of development regulations in the STAOD see **Appendix E**.

Shoreline Management Act & Shoreline Master Program

The State of Washington requires Cities and Counties to plan for how shorelines in their jurisdiction will develop through a Shoreline Master Program (SMP). The SMP must address a wide range of physical conditions and development settings along areas of the shoreline. The SMP prescribes different environmental protection measures, allowable use provisions and development standards for each of these areas of the shoreline. The method to account for different shoreline conditions is to assign an environment designation to each distinct shoreline section. The environment designation assignments provide the framework for implementing shoreline policies and regulatory measures specific to the environment designations. The shoreline environments within Seattle's Shoreline District are divided into two broad categories; Conservancy and Urban and then subdivided further within these two categories. Within the Urban category are the Urban Industrial (UI) and Urban Maritime (UM) designations. These shoreline designations are found on sections of Lake Union, Salmon Bay, Elliott Bay (Terminal 92) and the Duwamish where adjacent land is zone for industrial use. In cases where the development regulations in the SMP are more restrictive than the zoning regulations, the SMP supersedes. Shoreline Master program regulations provide additional controls and supports for the intended character and uses of unique shoreline lands. No amendments to the SMP are a part of the proposal studied in this EIS. See **Appendix F**.

Community Agreements

In addition to the above policy framework, some parts of Seattle's industrial lands are subject to community agreements. The Port of Seattle and the Magnolia Community Club and the Queen Anne Community Council have entered into a Short-Fill Redevelopment Agreement that establishes a neighborhood advisory committee to work with the port on disputes occurring during redevelopment activities and operations of Terminal 91 regarding light and traffic (**Appendix E**). This agreement does not regulate land use but is more of a mitigation vehicle for impacts resulting from T91 activities.

Planned Future Land Use

Exhibit 3.8-2 shows planned future land use for the study area. The Future Land Use Map (FLUM) is a required feature of the Comprehensive Plan under GMA. It indicates the city's policies and intent for guiding use of land in geographic areas over time. Seattle's industrial land (the study area) comprises approximately 12% of land citywide.

Manufacturing Industrial Centers (MICs). Most industrial land is within the two regionally designated MICs mapped with the MIC designation on the FLUM. The Greater Duwamish MIC is approximately 5,330 acres and stretches from the south end of downtown Seattle to the city's southern city limit. It includes land along the Duwamish River. The Ballard Interbay Northend MIC (BINMIC) is approximately 1,458 acres. It includes the lowlands along 15th Avenue and the rail tracks area stretching from north side of Elliott Bay to Salmon Bay. The BINMIC also include

shoreline lands along Lake Union and the ship canal, as well as uplands adjacent to the Ballard urban village.

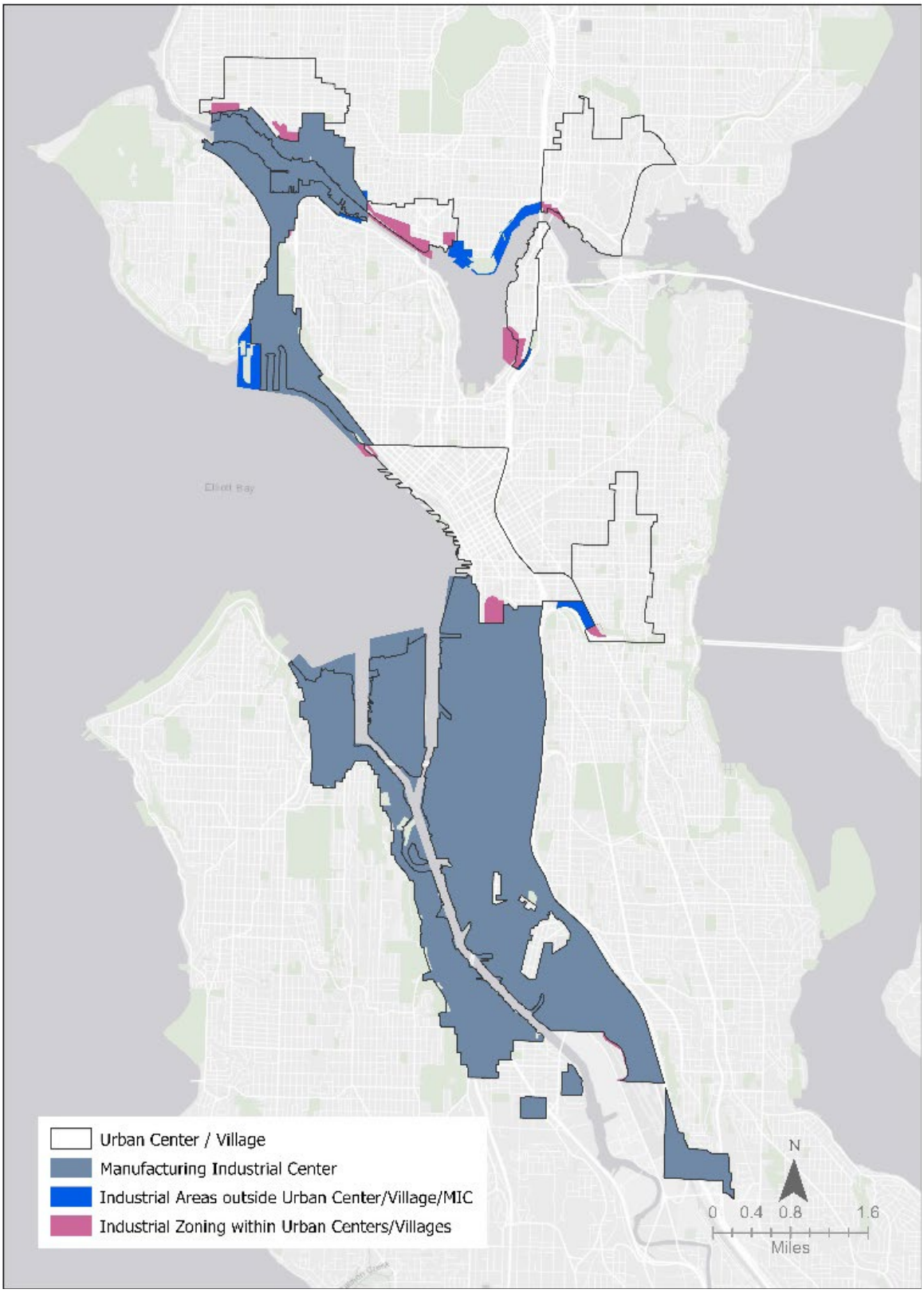
Land with a MIC FLUM designation is the subject of extensive policy guidance in the City's Comprehensive Plan and via regional VISION 2050 policy and designation criteria, and county-wide planning policies. The policy documents give these areas the highest priority for continued and ongoing future use primarily with industrial and maritime land uses. The policies prioritize industrial and maritime uses over stand-alone commercial and retail uses, and generally do not support residential uses. The City's practice has been to apply only industrial zone classifications within the MICs.[11]

Industrially Areas Designated Outside MICs. Not all the city's industrial land (study area) is within MICs. There are limited lands with a FLUM designation of "Industrial Areas" outside of the MICs. Pockets of designated Industrial Area are found on the north shore of Lake Union between the Fremont Urban Village and the University District Urban Center, between the I-90 ramps and Dearborn Street, and small collections of parcels north of NW Leary Way, by Nickerson Street, and north of Smith Cove Park near the Magnolia Greenbelt. Land in these areas is subject to the City's comprehensive plan policy guidance for "industrial areas" (policies LU10.1–10.31), but not the regional or county-wide policy framework for MICs. Similar to MICs, the City's practice has been to apply only industrial zone classifications to these areas.

Other Industrial Zoned Land. There are several areas of industrial zoned land in the study area in other FLUM classifications. These are areas with a history of industrial use adjacent to MICs or by shorelines that are now included in urban village growth areas. They include land in the west portion of the Ballard Hub Urban Village along NW Market Street, and a pocket of land south of the Swedish Medical Center. In the Fremont Hub Urban Village, a swath of industrially zoned land extends from NW 36th Street to the ship canal and near the base of Stone Way Avenue N. A small collection of parcels at the northwest corner of the University District Urban Center is zoned industrial. A pocket of industrial shoreline land on the east shore of Lake Union is in the Eastlake Residential Urban Village. The policy framework for industrially zoned land inside of urban villages is complex because industrial areas policies apply, but so do policies for urban villages. Urban village growth strategy policies are found in the Growth Strategy element and call for a mix of commercial and residential areas that can accommodate growth and are connected by transit. A wide range of commercial and mixed-use zones may be applied in areas designated as urban villages on the FLUM.

[11] The only exception is one parcel of land zoned Commercial in the BINMIC in Interbay on the site of the GM Nameplate facility that was the result of an industrial use expanding over time onto a commercially zoned parcel.

Exhibit 3.8-2 Future Land Use Map for Industrial Areas Within and Outside MICs



Source: City of Seattle, 2021.

Existing Zoning

Exhibit 3.8-3 displays the amount of existing zoning in the study area by zone classification. These figures also represent zoning under Alternative 1 No Action. The intent and features of the existing zone classifications are summarized above and in **Appendix E**.

Most of the study area is zoned either IG1 (52%) or IG2 (38%) reflecting how the IG zones are the foundation of the land use regulatory framework for the city's industrial areas. Only 10% of study area lands are in the IB and IC zoning classifications combined. A large majority of industrially zoned areas that are outside of designated MICs are zoned IC (86%). The IB zones only cover 5% of the study area in total and are found inside of the designated MICs.

The BINMIC has a greater share of land area in IC and IB zones (10% and 9% of the BINMIC respectively) compared to the Greater Duwamish MIC which is almost entirely zoned IG (95% of the Greater Duwamish MIC). This difference between the two MICs reflects the fact that the Duwamish has a greater degree of separation and physical boundaries at the MIC edges, while the BINMIC has a somewhat greater degree of physical integration with surrounding neighborhoods—befitting placement of the IB and IC zones.

Exhibit 3.8-3 Existing Zoning by MIC, Outside MICs, and Citywide

	BINMIC		Duwamish MIC		Outside MICs		Citywide Total	
Zone	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Industrial General 1	56.52%	824	52.31%	2,787	5.41%	8	52 %	3,612
Industrial General 2	24.69%	360	43.80%	2,282	8.11%	12	38 %	2,661
Industrial Commercial	9.67%	141	1.46%	78	86.49%	129	5%	347
Industrial Buffer	9.12%	133	3.43%	183	0%	0	5%	316
Total	100%	1,458	100%	5,330	100%	148	100%	6,936

Source: City of Seattle, 2021.

Existing Land Use

This section characterizes existing land use conditions in the study area and breaks out land use features for the Greater Duwamish MIC and the BINMIC individually, and for the five EIS subareas where information is available and useful.

Exhibit 3.8-4 and **Exhibit 3.8-5** summarize the amount of existing industrial and non-industrial land uses in the study area for the BINMIC and north industrial areas and the Greater Duwamish MIC and south industrial areas. Existing land uses are the observed current activities on non-right of way land parcels. The assessment methodology for existing land use started with data provided by the King County assessor's office at the parcel level. However, sometimes assessor data is out of date or does not accurately reflect all the uses present. To address these

issues, input from stakeholders and manual scans by City staff and consultants were used to update the inventory. Data relied on are from the 2017 CAI Study that was updated and modified in 2020.[12]

Not all land designated for planning purposes as industrial, or that is zoned industrial has industrial land uses. The analysis shows on an area basis, how much of the study area is currently in use for industrial (**Exhibit 3.8-4**) and non-industrial (**Exhibit 3.8-5**) activity. The data also displays the size of lands devoted to specific land use categories.

In the BINMIC and north industrial areas 628 acres or 59.4% of land by area is in an industrial category. The largest industrial uses by area include marine terminals and industrial heavy marine, reflecting the large presence of Port of Seattle Terminal 91 and Fisherman's terminal, and the BNSF railyard. See also **Exhibit 3.8-6**.

In the Greater Duwamish and south industrial areas 3,249 acres or 80.4% of land by area is in an industrial use category. The largest industrial uses by area include transportation terminals, marine terminals, and warehouses reflecting the large presence of Port Terminals the SIG and Argo Rail Yards, and the network of other warehouse uses. See also **Exhibit 3.8-7**.

Office is the largest non-industrial land use in the BINMIC occupying over 9% of the land area. In the Greater Duwamish MIC, office is also the largest non-industrial use, but it occupies only about 3% of the land there. See **Exhibit 3.8-5**.

Exhibit 3.8-4 Industrial Land Uses by Area

	BINMIC and North Industrial Areas		Greater Duwamish MIC and South Industrial Areas	
Detailed Land Use	Net Acres	Percent	Net Acres	Percent
Industrial Gen. Purpose	48	4.5	295	7
Industrial Flex	0	0	2	0.5
Industrial Heavy	4	0.4	334	7.9
Industrial Light	32	3	122	2.9
Industrial Park	0	0	54	1.3
Industrial Staging	7	0.7	52	1.2
Distribution	2	0.2	27	0.6
Warehouse	61	5.8	577	13.6
Marine Terminal	157	14.8	665	15.7
Shipyard	32	3	20	0.4

[12] The methodology is documented on page 7 of the November 2017 CAI report, Industrial Lands Land Use and Employment Study: https://www.seattle.gov/Documents/Departments/OPCD/OngoingInitiatives/DuwamishIndustrialLandsStudy/OPCDIndustrialLandUseEmploymentStudy1.pdf.

	BINMIC and North Industrial Areas		Greater Duwamish MIC and South Industrial Areas	
Detailed Land Use	Net Acres	Percent	Net Acres	Percent
Industrial Heavy Marine	112	10.6	97	2.3
Transpo Terminal	39	3.7	881	20.8
Railroad	30	2.8	145	3.4
Fleet Support Services	40	3.8	57	1.3
Utilities	62	5.9	50	1.2
Vocational Training	2	.2	13	0.3
Subtotal	628	59.4%	3,249	80.4

Source: City of Seattle, 2021.

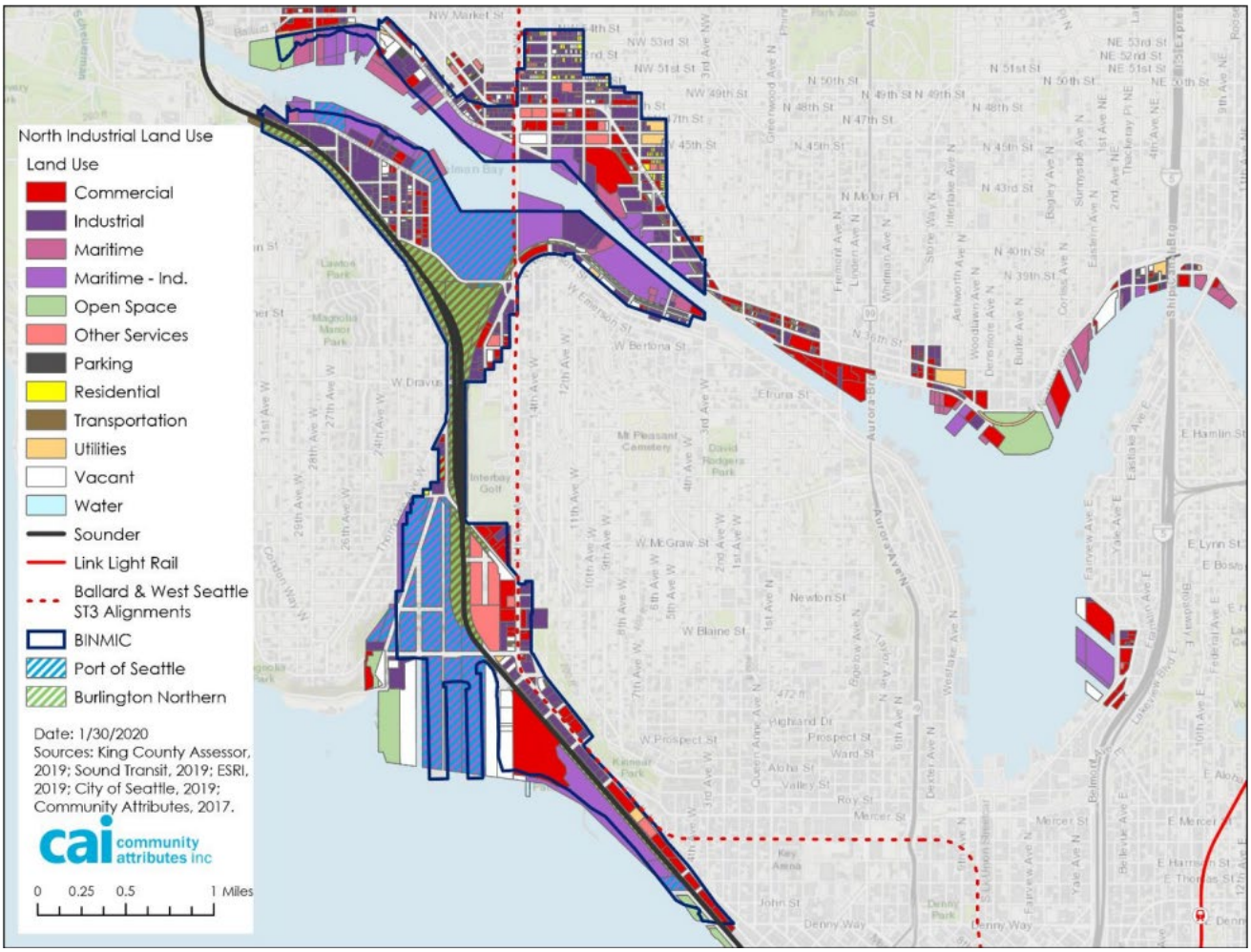
Exhibit 3.8-5 Non-industrial Uses by Area

	BINMIC and North Industrial Areas		Greater Duwamish MIC and South Industrial Areas	
Detailed Land Use	Net Acres	Percent	Net Acres	Percent
Accommodation	0	0	2	0.4
Artists' Lofts	0	0	1	.03
Marina	59	5.5	3	0.1
Office	101	9.4	139	3.3
Retail Trade	47	4.4	95	2.3
Auto Repair / Trade	2	0.2	9	0.2
Auto Dealerships	1	0,1	10	0.2
Warehouse (Comm)	8	0.7	19	0.5
Healthcare / Social Services	10	1	2	0.05
Animal Services	1	0.1	0.4	0.01
Public Service Facilities	23	2.1	3	0.1
Education	1	.1	0	0
Mail Processing	2	.2	5	0.11
Entertainment and Arts	2	0.2	49	1.1
Outdoor Vehicle Storage	1	.1	11	0.3
Religious Inst.	1	0.1	1	0.02
Single Family	4	0.4	11	0.3
Multi-Family	3	0.3	4	0.1

	BINMIC and North Industrial Areas		Greater Duwamish MIC and South Industrial Areas	
Detailed Land Use	**Net Acres**	**Percent**	**Net Acres**	**Percent**
Parking	12	1.1	107	2.5
Open Space	41	3.9	113	2.7
Miscellaneous (water, vacant land, unknown)	112	10.5	204	4.8
Subtotal	431	40.1	776.4	18.75

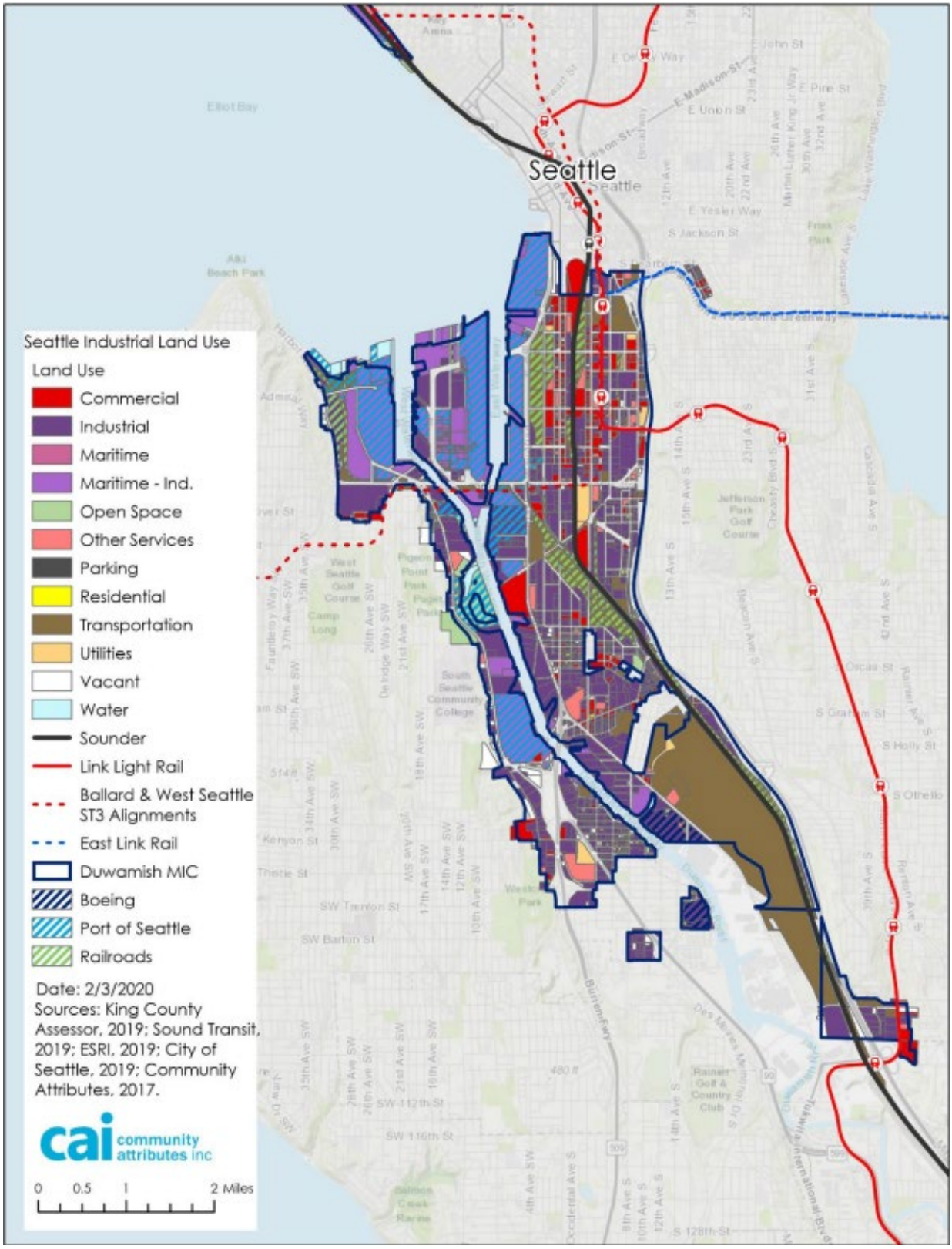
Source: City of Seattle, 2021.

Exhibit 3.8-6 North Industrial Land Use



Source: CAI, 2017, updated 2020.

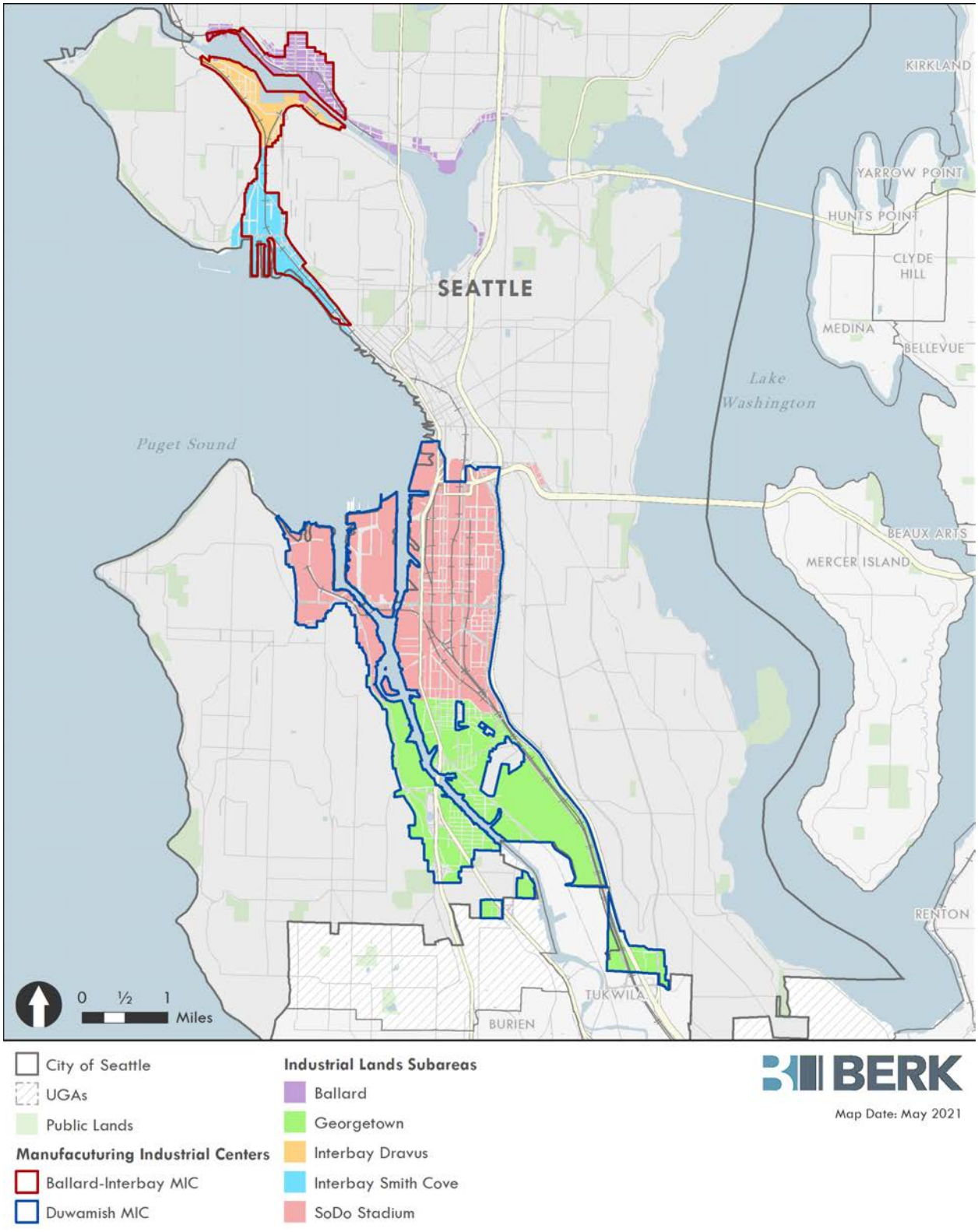
Exhibit 3.8-7 South Industrial Land Use



Source: CAI, 2017, updated 2020.

In addition to aggregate quantification of land uses, the qualitative analysis below highlights major features, important sites and uses, concentrations of activity, and notable adjacencies in the five EIS subareas (**Exhibit 3.8-8**). Characterizations inform a basis for identification of impacts in the EIS impact categories.

Exhibit 3.8-8 Industrial Subareas



Source: City of Seattle, 2021.

Ballard

The Ballard Subarea consists of the land between the Salmon Bay shoreline and the Ballard Urban Village. For the purposes of this analysis the subarea also includes portions of the study area in the Fremont Urban Village and along the north and east shores of Lake Union.

The study area includes an extensive stretch of shoreline along the north shore of Salmon Bay. Shoreline lands are in the designated MIC from the Hiram Chittenden locks at the west to 3rd Avenue NW at the east. This portion of the shoreline contains a variety of maritime uses and marine services on a series of docks and piers that extend into Salmon Bay. There are industrial marine services and businesses primarily in the west portion including Trident Seafoods, Stabbert Marine Industrial shipyard, Waypoint Marine, and others. Closer to the Ballard bridge is a higher concentration of recreational marina services, and Seattle Maritime Academy.

The Ballard uplands south of Leary Way include a series of large parcels or whole blocks that developed with large footprint non-industrial uses. Seven non-industrial use developments are located in close proximity to one another: Ballard Blocks 1, Ballard Blocks 2, former New Seasons, UW Medical, Big 5 Sports, Office Depot, Fred Meyer. Together these non-industrial uses occupy about 22 acres of land. They contain retail and office activities unrelated to industrial and maritime sectors and draw volumes of users into the area. A wide variety of industrial uses are co-mingled and adjacent to or across the street. The variety of industrial activities includes car repair services, building/trades supply, and other light manufacturing. Other large-footprint uses of note in this area include the Quest church at Leary/14th Avenue NW, and the whole-block USPS mail distribution facility at 11th Avenue NW/ NW 46th Street.

The Ballard uplands north of Leary Way include a diverse array of industrial, commercial/retail, office storage and even some residential uses. There is a high concentration of breweries and tap rooms. Reuben's Brews, Urban Family Brewing, the Fremont Brewing production facility, Stoup Brewing, Fair Aisle Brewing, Bale Breaker and Yonder Cider Tap Room, Peddler Brewing Company and others are located here. Several large-scale industrial operations that occupy whole blocks are present including Rudd Company paint manufacturer and Bardahl Manufacturing, a maker of petroleum oil additives, lubricants and gasoline additives that are sold worldwide, and has operated in Ballard since 1939. There is an eclectic mix of retailers, many related to hardware and automotive. The large, new West Woodland building is a multi-story light industrial structure. A few scattered non-conforming residential single family and multi-family homes are found in blocks flanking 14th Avenue NW towards the north end of the subarea.

A portion of the subarea is in the Fremont Urban Village. Parcels fronting N 36th Street are small and only about 115 feet deep. The parcels have a high concentration of non-industrial uses especially bars and restaurants, which are generally accessed by patrons on foot from the N 36th Street frontage. A topography drop is present at the alley to the rear of those parcels, and from this alley south to the ship canal parcels sizes are generally larger. Land uses in the area include several large-scale office, software and technology uses including the Google and Adobe campuses, some of the Tableau offices, a biotechnical laboratory company, and the

Burke Building offices. This cluster of uses is sometimes referred to as the Silicon Canal. There are no marine uses fronting this section of the ship canal, and the water's edge is primarily a recreational and open space feature experienced by users from the Burke Gilman trail, which runs along it. Industrial uses are mixed in this geographic area including a large footprint film/sound studio company, a distillery, craft manufacturers, and the Theo Chocolate company which includes production, and retail activities.

The study area includes waterfront land and adjacent uplands from the east edge of the Fremont Urban village to the southwest corner of the University District Urban Center. The shoreline has a consistent string of marine uses on a series of docks and piers extending into Lake Union. Recreational marine activities are present including three marinas, as well as industrial maritime activity such as the North Lake shipyard, a divers training school, and the police department harbor patrol site. Recreational and open space uses are integrated into the area with the presence of the 20-acre Gas Works parks and the Burke Gilman Trail. About four blocks of upland are included in the study area near the corner of the Stone Way N / N 35th Street Intersection. The only significant industrial activity in this pocket is the Seattle Public Utilities transfer station. Non-industrial uses include recently constructed offices of Brooks headquarters, and Tableau software's new structure between Woodlawn Avenue N and Densmore Avenue N. Other uses include restaurants, bars breweries and retail uses.

The study area includes one shoreline area on the east bank of Lake Union between E Newton Street and E Nelson Place. Waterfront uses are all marine uses with substantial dock infrastructure, including US Seafoods, and the Lake Union Dry Dock, and Seattle Seaplanes. The limited upland uses in this area are dominated by biotechnical / laboratory uses.

Interbay Dravus and Interbay Smith Cove

The Interbay Dravus and Interbay Smith Cove subareas consists of three distinct nodes—Fisherman's Terminal and vicinity, Dravus, and Smith Cove. This subarea stretches from the southern shoreline of Salmon Bay between the locks and ship canal on the north and Elliott Bay to the South. It is bound by the Queen Anne and Uptown neighborhoods to the east and Magnolia to the west. This Subarea contains a significant number of Port of Seattle facilities (Terminal 91, the Terminal 91 Uplands, and Seattle Fisherman's Terminal), the Washington State National Guard Armory, the BNSF switching yard and maintenance facility, and a mix of industrial, retail, and office uses.

The southern shoreline of Salmon Bay between the Hiram Chittenden Locks and 3rd Avenue NW is developed with significant maritime industries, general industrial uses, and the Port of Seattle's Fisherman's Terminal. These maritime uses include shipyards, marine terminals, fishing, and warehousing. Immediately adjacent to the shoreline uses is the BNSF switching yard creating a southern edge to this subarea. This land is zoned IG1 and is within the BINMIC. The Port of Seattle has recently completed work on the Maritime Innovation Center to incubate the next generation of maritime companies and has future plans for additional development of facilities to support the maritime industry.

South of the Fisherman's Terminal area and separated by BNSF tracks is the Dravus area. This area is 21 acres in size and includes 7 acres of mixed-use zoning and 14 acres of land zoned IG1 located within the BINMIC. This area is bound by the BNSF rail corridor to the west and north, 15th Avenue W to the East and the Interbay Golf Center to the south. The industrially zoned property is developed with a mix of manufacturing, warehousing, and office uses. In the future this area may be the location of a Sound Transit light rail station and a Seattle Storm practice facility. The future light rail station has the potential to substantially reduce the industrial capacity of this area depending on future decisions regarding station location and whether the crossing at salmon bay will be above ground or by way of a tunnel. In 2006, the seven acres south of the IG1 zoned area was rezoned from Commercial 2 (C2) to Seattle Mixed Dravus (SM-D). The C2 zone designation prohibited residential development unless approved by a conditional use permit. One condition was that the area is not proximate to an industrially zoned area. The rezone from C2 to SM-D allowed recent mixed-use residential development in this area.

Smith Cove is the southern boundary of the BINMIC. This area includes major port facilities (Terminal 91 and the Terminal 91 Uplands), the Washington National Guard Armory, the corporate headquarters for Expedia, and a diverse mix of maritime, industrial, commercial, and retail uses. Zoning in this area is IG 1, Industrial Buffer (IB), Industrial Commercial (IC). Smith Cove is also the site of a proposed Sound Transit light rail station and line. Major property owners in this area include the Port of Seattle, the State of Washington, and development companies that own office and retail projects in this area.

Port facilities in the Smith Cove area play an important and expanding role in Seattle's maritime sector. Terminal 91 provides short-term and long-term moorage for fishing and commercial vessels, including factory trawlers, long liners, tugs, barges, ferries, research vessels, and ships of state, military, and commercial vessels for lay-up or idle. Terminal 91 includes fish processing and cold storage facilities, access to vessel repair and services, fueling by barge, and on-terminal rail access. Upland from Terminal 91 is the Port of Seattle's Terminal 91 Uplands development project. Over the next 10-15 years, this two-phase project will construct flexible, light industrial building space to support maritime manufacturers and fishing industry suppliers in the BINMIC. Phase I will develop 100,000 square feet of light industrial space with minimal site infrastructure improvements. Phase 2 will involve construction of approximately 300,000 square feet of additional industrial space along with extensive utility improvements.

To the east of Terminal 91 is the Expedia Corporate Campus. This project is part of Seattle's technology sector and consists of several large office buildings and a significant parking garage. This land is zoned IC. Seattle adopted the IC zone in 1988 with the intention that it allow for industrial uses and importantly research and development offices. This zone in other areas of Seattle is home to technology companies including Google and Adobe in Fremont. Stretching south from Expedia along Elliott Avenue W, land is zoned primarily IC and is developed with multiple office buildings, warehouses, retail, and limited industrial uses.

Directly east of the Port of Seattle's Terminal Uplands project, separated by the BNSF rail corridor, is the Washington State Armory. This site is approximately 26 acres in size and is the staging facility for the National Guard emergency response and other activities. This site is zoned IG2 and is located within the BINMIC. Currently, the State of Washington is exploring options to relocate this facility and redevelop this site. Adjacent to this site to the north and east is significant retail development. These retail developments are allowed by existing zoning but not the intended use for the IG2 zone.

SODO/Stadium

The SODO/Stadium Subarea includes the mouth of the Duwamish River where it outlets to Elliott Bay. There are a concentration of maritime installations and terminals at and around the Duwamish River shoreline and Elliott Bay. This includes Harbor Island, with major shipyard terminals of Vigor Shipyards and Crowley Marine as well as Port of Seattle Terminals 5 and 18 that handle container cargo, and pier 30. Terminal 5 is completing major investment and upgrade. These locations feature on-terminal rail. Other marine activity includes the Coast Guard base, which is a homeport of arctic icebreakers. Port of Seattle's Terminal 46 at the north end of the subarea is currently vacant. Potential plans for conversion to a cruise ship terminal are on hold.

SODO contains the BNSF Stacy railyard. The Stacy Yard hosts transloading—a practice whereby containers are transferred from ships via short-haul trucking and loaded onto trains. SODO also is home to the Union Pacific Argo Yard, south of Spokane Street near Georgetown. The heavy rail line bisects SODO with tracks that carry train traffic to destinations north and south. Other rail-related facilities include the Amtrack maintenance facility, and some direct rail connectivity to logistics businesses.

The presence of rail and marine infrastructure supports a cluster of logistics focused businesses in SODO and other businesses dealing in heavy materials that are dependent on rail and/or marine infrastructure. Examples are numerous and include Ash Grove Cement, Alaskan Copper, and Nucor Steel, Alaska Marine Lines, MacMillan Piper, and Republic Services (a refuse transfer station and recycling facility). Rail and marine terminals have been a fixture in the area for at least 100 years.

The Stadium area is home to Seattle's professional football/soccer and baseball stadiums as well as other event venues, the WAMU theater, Showbox SODO. These facilities draw large volumes of visitors to a range of events. The stadiums are integrated functionally with Pioneer Square, Downtown and C/ID to the north. In the stadium area there is a more consistent presence of open spaces, sidewalks than in other parts of the subarea.

The WOSCA site is a notable vacant piece of land. It is approximately 6 acres located between the stadiums and SR 99 infrastructure and Terminal 46. The site was used as construction staging by WSDOT and is potentially eligible for future reuse.

Major non-industrial employers are in the SODO/Stadium Subarea. Starbucks corporate headquarters and the Seattle School District's John Stanford Center are two large offices located in the Lander Street corridor, and the Army Corps of Engineers has offices near Diagonal Avenue S. Significant non-industrial retail is located throughout SODO including the Home Depot, and Costco Wholesale at 4th Avenue S, south of Spokane Street.

The district hosts large public utility operations that occupy expansive swaths of land. The King County Metro Central Base is west of the stadiums, the Sound Transit Operations and Maintenance Facility is south of S Forest Street, and the Seattle City Light South Service Center is to the south of Spokane Street.

Throughout the SODO/Stadium Subarea there are numerous craft business and activities. A concentration is evident along the 1st Avenue S corridor to the south of the stadiums. The stretch includes maker businesses that attract visitors and have a sense of design orientation to customers. Examples include Macrina Bakery, Westland Distillery, Filson, and others.

There is a significant cluster of auto-oriented sales and service business in the Airport Way corridor. In blocks to the south of S Holgate Street large-sized auto dealerships for Honda, Toyota, and Mercedes Benz area present. The general vicinity also includes multiple auto maintenance and repair shops.

Important adjacencies include interfaces with Pioneer Square and Chinatown / ID at the north end, as well as the edges of the West Seattle and Delridge residential neighborhoods. However, most other edges of SODO have strong physical buffers to non-industrial areas. This include I-5 at the east and the steeply sloped and heavily wooded greenbelt to the west, and waters of Elliott Bay to the north.

The Duwamish Longhouse is located on west bank of Duwamish River south of Harbor Island, overlooking the Duwamish River Valley, near the village called hah-AH-poos, a major archeological site known as Duwamish Site No. 1. The Longhouse is among a cluster of open spaces that are some of the only remaining vestiges of natural shoreline conditions along the lower Duwamish River. Kellogg Island and Terminal 107 Park is an approximately 60-acre natural area owned by the Port of Seattle. Adjacent to the north of this green space is Herring's House Park, a 6.5-acre open space owned by the City of Seattle Department of Parks and Recreation. The Duwamish Longhouse is directly across W Marginal Way from these open space resources. More greenbelt land owned by Seattle Parks is behind the longhouse in the wooded and sloping areas of Pigeon Point Park, the West Duwamish Greenbelt and Puget Park. Duwamish Tribal Services hosts community gatherings, meetings at the longhouse and is seeking to expand the facility to support the social, cultural, and economic survival of the Duwamish Tribe. The organization intends to display artifacts and to create interpretive exhibits and tours to maximize its cultural and recreational public use. See **Exhibit 3.8-9**.

Exhibit 3.8-9 The Duwamish Longhouse

The Duwamish Longhouse

The Duwamish Longhouse is located on the west bank of Duwamish River south of Harbor Island, overlooking the Duwamish River Valley, near the village called hah-AH-poos, a major archeological site known as Duwamish Site No. 1. Duwamish Tribal Services hosts community gatherings and meetings at the longhouse, and is seeking to expand the facility to support the social, cultural, and economic survival of the Duwamish Tribe. The organization intends to display artifacts and to create interpretive exhibits and tours to maximize its cultural and recreational public use.

Source: BERK, 2021.

Georgetown/South Park

Georgetown is situated on the east bank of the Duwamish River. The riverfront contains numerous heavy industrial operations including cement, materials, recycling/refuse handling and logistics companies that rely on barging and water access, and the Ardagh glass manufacturing facility. Other notable shoreline uses include the Army Corps of Engineers offices at Diagonal Avenue S.

Georgetown's industrial uplands between the Union Pacific Argo Rail Yard and E Marginal Way S contain a high concentration of logistics and warehousing activities. Many of these buildings are characterized by warehouse structures with loading docks and bays and large access areas for truck turning. The Prologis Georgetown Crossing facility is a notably new warehouse and distribution center constructed in 2017, because it includes multiple levels of stacked

warehouse space. Interspersed among logistics operations there is a wide variety of small and medium sized industrial supply businesses, small offices, manufacturers and makers including the Equinox Studios campus, and South Seattle College. The area also contains multiple breweries and distilleries including Georgetown Brewing at the east end of Lucille Street.

Boeing's campus and the King County International Airport / Boeing Field are located at the south edge of industrial Georgetown and extend south outside of Seattle's city limit on both sides of E Marginal Way. The airport averages 180,000 takeoffs and landings each year. The airport serves small commercial passenger airlines, cargo carriers, private aircraft owners, helicopters, corporate jets, and military and other aircraft. It's also home to various Boeing Company operations.

The study area surrounds two residential neighborhoods areas in Georgetown—the Van Asselt district between Ellis Avenue S and Corson Avenue S and a roughly four-block residential district between S Homer Street and S Fidalgo Street Both include townhomes, single family and multifamily housing including some new construction. Residents of these areas are closely adjacent to the surrounding industrial activities. The study area also surrounds blocks of commercially zoned land along 4th Avenue S and Lucille Street, and the S Albro Place corridor that contain a variety of retail and service uses. At the time of this writing a mixed residential development was proposed for the commercial areas on 4th Avenue S.

The triangular area bounded by Corson Avenue S, Carleton Avenue S and I-5 contains a high concentration of retail and restaurant businesses fronting onto Airport Way S. This stretch contains a string of notable brick historic structures including the historic Georgetown Brewery complex that backs up to the rail line on the east side of Airport Way. These structures are now occupied by a variety of small business. Several historic storefronts on the west side of Airport Way contain restaurants and coffee shops and the Georgetown Ballroom. The area attracts visitors and events unrelated to industrial activities. The west portion of the blocks in this triangle (off of the Airport Way) include construction and building supply firms, warehouse structures, and other light industrial uses. A little-used Union Pacific Rail spur bisects the triangular area.

South Park is situated on the west bank of the Duwamish River. The study area contains the industrial lands that surround the South Park neighborhood, which is a mixed-use neighborhood that is designated residential urban village in Seattle's Comprehensive Plan.

Like Georgetown's riverfront, the South Park riverfront in the study area contains numerous heavy industrial operations that rely on marine transport including the Duwamish Shipyard, materials handling and logistics companies, and marine services. Riverfront operations south of State Route 509 are on smaller shoreland parcels, while operations north of SR 509 are large on shoreland parcels 20 acres or larger.

Upland uses in the study area that are north of the South Park urban village include a variety of distribution and logistics activities, small manufacturing, construction related businesses, small offices, and marine and industrial supply companies. This mix of light and heavy industrial uses

closely borders the north edge of the South Park urban village. Duwamish Waterway Park is a 1.26-acre open space bordering the river at the northwest corner of the South Park Urban Village affording some river access. Lands near the SR 509 ramps at S Cloverdale Street, and S Holden Street contain large footprint uses of the South Transfer Station and the First Student bus parking yard, and Waste Management services.

Portions of the study area to the south of the South Park Urban Village flank the offramps of SR99 at 14th Avenue S. A high concentration of land uses here appear to be transportation oriented including distribution and warehousing, materials supply, and building materials. Many structures have loading docks and truck access and circulation. Other land uses include union hall offices and the currently vacant Boeing Radiation Effects Lab and Boeing South Park facilities, which closely border the edge of the urban village. In addition to industrial marine activities on the riverfront, the Duwamish Yacht Club is located on the riverfront here.

Land at the base of the South Park bridge, bordering the river and the urban village is outside of Seattle city limits and outside the study area. For reference, that land contains a mix of neighborhood-residential uses, the South Park Marina, and Port of Seattle's Terminal 117, which is being converted into a 2+ acre river front park.

Adjacent to the study area, residential uses inside the urban village are primarily single-family homes, with some multifamily housing near arterial roadways. In several locations such as the vicinity of S Southern Street, 8th Avenue S, 5th Avenue S and others, residential uses are closely adjacent to industrial activities such as a transit van company, a portable toilet company, and an equipment supply company as examples.

Existing Employment Mix

Employment mix is addressed in the land use section because City and regional land use policies encourage employment in industrial and maritime sectors. A chief intention of industrial lands policies is to foster living wage employment opportunities and economic development associated with industrial and maritime sectors, and for diversification of the economy. (See plans and policies description above.) Existing employment on study area land in thirteen industry sectors is characterized in **Exhibit 3.8-10** and **Exhibit 3.8-11**. There is a total of 98,500 jobs. The analysis characterizes employment in industry sectors of interest, where there are agglomerations of related supporting economic activity. Methodology is from the 2019 CAI study.[13]

[13] The methodology is documented on page 7 of the November 2017 CAI report, Industrial Lands Land Use and Employment Study: https://www.seattle.gov/Documents/Departments/OPCD/OngoingInitiatives/DuwamishIndustrialLandsStudy/OPCDIndustrialLandUseEmploymentStudy1.pdf.

Exhibit 3.8-10 Industrial Areas Employment by Economic Sector

Industry	2018 Industrial Areas Employment
Hospitality & Tourism	6,700
Construction & Utilities	13,700
ICT	8,200
Distribution & E-commerce	8,500
Food & Beverage Production	3,800
Aerospace	6,300
Transportation & Logistics	5,500
Maritime	8,600
Other Manufacturing	5,900
All Other Retail	3,400
All Other Services	21,400
Government	5,300
Education	1,200
Total	98,400

Source: CAI, 2020.

Employment in the study area and subareas can also be analyzed according to the quantity of jobs in industrial vs. non-industrial classifications. It is not straightforward to classify jobs as industrial or non-industrial. Methods in this analysis are from the 2019 CAI study. As seen in **Exhibit 3.8-11**, 55.3% of all employment in the study area is industrial and the percentage of industrial employment in all subareas is above 50%.

Exhibit 3.8-11 Industrial and Non-Industrial Employment by Sub-Area, Current Conditions (2018)

Subarea	2018 Industrial Emp.	2018 Total Emp.	% Industrial
Ballard	9,400	17,100	55.0%
Interbay Dravus	3,400	5,600	60/7%
Interbay Smith Cove	3,900	6,000	65.0%
SODO/Stadium	23,000	43,900	52.4%
Georgetown/South Park	14,900	25,900	57.5%
Total	54,500	98,500	55.3%

Note: Methodology is documented on page 7 of the November 2017 CAI report, Industrial Lands Land Use and Employment Study: https://www.seattle.gov/Documents/Departments/OPCD/OngoingInitiatives/DuwamishIndustrialLandsStudy/OPCDIndustrialLandUseEmploymentStudy1.pdf.
Source: CAI, 2020.

3.8.2 Impacts

As described in the introduction to this section, four impact categories were used to identify potential adverse land use impacts for the study area broadly and on a subarea level (where applicable): consistency with plans or policies, land use compatibility, employment mix, and land use transitions. The alternatives are expected to result in a land use impact if:

- **Consistency with plans and policies.** The action would result in an inconsistency between the predominant land use pattern and the stated land use goals and policies in the Comprehensive Plan and/or the VISION 2050 regional growth plan, Countywide Planning Policies, or Shoreline Master Program. The action would introduce a land use pattern that would foreclose future opportunities to reach goals and polices.[14]
- **Land use compatibility.** The action would cause an increase in the prevalence of disparate activity levels and use patterns that would result in incompatibilities within industrial zones. Incompatibilities could undermine industrial and maritime operations, or the comfort and safety of employees or residents. Incompatibilities could be related to time of day/night activity, noise levels, odors, and conflicting movements by vehicles and other modes.
- **Employment mix.** The action would lead to changes to employment mix that would decrease the percentage and total quantity of jobs related to or supportive of industrial and maritime sectors, in MICs. The action would cause a high likelihood of voluntary or involuntary economic displacements of businesses in industrial maritime sectors widely throughout a subarea. It would preclude new opportunity for expansion of industrial and maritime employment through business formation and retention.
- **Land use transitions.** The action would create a land use pattern where high intensity / high impact uses would be likely to abut or encroach or impacts related to height, bulk, scale and aesthetics on adjacent non-industrial uses and concentrations of residential populations.

Not every adverse land use impact identified within the impact categories would result in a significant adverse impact as some impacts are an expected part of a changing urban environment. Land use impacts of the alternatives are considered significant if they would result in more than a moderate adverse impact regarding:

- An acute/severe adverse impact within one of the impact categories defined above.
- Cumulative land use impacts in multiple categories within one of the defined subareas.

The terms "**minor**" and "**moderate**" are also used in the assessment to describe relative levels of impact below the threshold of significance. Minor is used to describe a level of impact that is barely perceptible, de minimis or questionable as to whether it would materialize at all.

[14] It is not practical to summarize consistency with every policy or goal. Select policies or goals with notable factors towards consistency or inconsistency are described, and a general summary of the level of consistency with the full range of policies is provided under each alternative.

Moderate is used to describe a level of impact that would clearly be perceptible, have a tangible influence, yet not exceed the threshold for significance.

Optional economic analysis. The City is not required to address purely economic impacts on individual businesses in environmental analysis (SMC 25.05.440 F.3). In scoping, some commented that if certain land uses are not permitted under an alternative (i.e., unlimited housing) landowners would be less likely to invest in improvements and development, which would lead to economic blight. Comments are addressed in the scoping report (**Appendix A**). A wide variety of land uses would be allowed in the study area under all alternatives sufficient for robust economic use of property. However, purely economic factors for individual businesses are not an element of the environment to be analyzed and therefore are not considered a factor in determining significant impacts. The City includes at its option some non-environmental economic analysis of development feasibility.

Organization of the impacts analysis. The first portion of the impact analysis under each alternative describes the likely changes over the 20-year planning horizon under the alternative in the topics areas of land use planning and policy context, future land use, zoning, land use, and employment mix. The changes are also described in the description of alternatives in **Chapter 2**, which should be read in conjunction with this Land Use Chapter. The assessment of impacts follow the descriptions.

Equity & Environmental Justice Considerations

While shoreline and land use impacts are expected to be less than significant under all alternatives, some of the identified impacts could have equity and environmental justice considerations.

Land use transition impacts would raise environmental justice concerns where residents of nonindustrial areas in or adjacent to the study area could be adversely affected by inadequate transitions at the edges of industrial areas. In areas of inadequate transitions, impacts from noise, odors, and truck access and circulation associated with industrial land uses could affect communities of color and economically disadvantaged people. Impacts of increased building height, bulk and scale at transitions could also affect vulnerable populations. The neighborhoods of Georgetown, SODO, and South Park are vulnerable because there are land use transition impacts and they have populations with higher levels of disadvantage as seen in **Exhibit 1.7-7**. However, the proposal includes features with potential to improve transitions as well, especially the expected development in the Urban Industrial zone.

Land use compatibility impacts could have equity and environmental justice considerations. Introduction of new buildings with dense employment in the II zone and industry-supportive housing in the UI zone could create incompatibilities between new activity patterns and adjacent areas of continued industrial uses. There is potential for new employees or residents in the rezoned areas to be vulnerable populations at a relatively higher rate. Adverse localized

impacts on these community members could result from increased exposure to freight traffic and other challenges of working or living in the area.

In general, it is expected that the proposal will have positive equity affects related to the employment mix. Under all alternatives, employment in the study area would increase including industrial employment. A high proportion of jobs in industrial and maritime sectors are accessible without a traditional four-year degree and many remain unionized with high quality benefits. With increased employment training opportunities focused on equitable access, vulnerable populations could benefit from increased employment in industrial and nonindustrial sectors.

While impacts on vulnerable communities are identified, a range of existing regulations and commitments and potential mitigation strategies will reduce the harmful impacts of the proposal related to land and shoreline use.

Impacts of Alternative 1 No Action

Likely Changes Over the 20-year Planning Horizon

Land Use Planning & Policy Context. Under Alternative 1 the planning and policy context would be unchanged from existing conditions. No changes to the Comprehensive Plan or policy framework would be enacted. Existing Comprehensive Plan land use policies (without amendment) summarized above in **Local Policy Framework** would continue. There would be no updates to the currently adopted Sub Area Plans for the Greater Duwamish MIC and BINMIC.

Future Land Use. Under Alternative 1 the future Land Use Map for the study areas would be unchanged. Future land use categories would be the same as shown in the existing conditions section in **Exhibit 3.8-2** above. No specific lands would be added to or removed from the MICs under Alternative 1. However, because regulations allow for annual amendment proposals to the Comprehensive Plan, some land could be removed from MICs over the 20-year planning horizon as a result of individually proposed annual amendments.

Zoning. Under Alternative 1 zoning would be unchanged. Development standards for the city's four existing industrial zones (IG1, IG2, IB, IC) would be unchanged from those summarized above in **Local Policy Framework**. No changes to the zoning maps would be proposed. However, because regulations allow for annual amendment proposals to the Comprehensive Plan and contract rezones, some land could be removed from MICs over the 20-year planning horizon as a result of individually proposed zoning changes.

Land Use. Under Alternative 1 land use would continue to evolve over the planning period according to current trends and the parameters of existing zoning. Some notable expected changes could include.

- **Continued conversion to office and retail uses in IG zoned areas.** Consistent with recent trends, more stand-alone retail and office structures similar to the Armory Way shopping center or Ballard Blocks would be anticipated. Developments would maximize current IG zone maximum size of use limits for offices and retail. Areas that could see increased concentrations of such development would be in Fremont, Ballard, Interbay Smith Cove, and Georgetown/South Park.
- **Continued development of large offices in IC zoned areas.** Consistent with recent trends, more large office development would occur in IC zoned areas with no inclusion of industrial uses. This would be expected in the stadium area and the Elliott Avenue corridor and areas of Ballard.
- **Interim timeframe, some lack of investment.** In the first half of the planning horizon some disinvestment could be expected for land parcels close to future ST station areas at SODO/Lander, W Dravus Street, and Ballard as landholders would not be likely to invest in new development in areas of aging infrastructure on large parcels near stations, in anticipation of future rail.
- **Continued addition of distribution and warehouse facilities.** Continued addition of some new distribution and warehouse facilities would be expected in the study area.
- **Little or no new housing.** Only about 75 new homes would be added in caretakers' quarters and artist/studios.
- **Maintenance of maritime and industrial base.** Most long standing maritime and logistics uses would continue on waterfront lands and industrial lands near infrastructure, especially in the Duwamish.
- **Armory Site Redevelopment.** Under Alternative 1 the Armory site would be developed with light industrial and flex space of a relatively low-density nature after relocation of the Army National Guard to North Bend, WA.
- **Piecemeal conversions of parcels from industrial to non-industrial.** Annual comprehensive plan applications for amendment would allow for piecemeal removal of parcels of land from the MIC and conversions to non-industrial zoning. The location and amount are not known.

Employment Mix. Under Alternative 1 employment is projected to grow incrementally in proportions similar to trends from the last 10-20 years. A total of 23,500 additional jobs are projected for the study area, an increase of 24%. Job growth in the study area would be estimated to be about 14% of expected citywide job growth over the 20-year planning horizon. The percentage of industrial employment would decrease slightly by 0.9% points. Both MICs would continue to contain many more than the minimum number of industrial jobs required to meet PSRC's regional criteria for MIC designation (20,000). See **Exhibit 3.8-12**.

Exhibit 3.8-12 Employment by Subarea, Current Conditions and Alternative 1

	Current Conditions (2018)			Alternative 1 No Action (2044)		
Subarea	Ind. Emp.	Total Emp.	% Ind.	Ind. Emp.	Total Emp.	% Ind.
Ballard	9,400	17,100	55.0%	11,600	22,300	52.0%
Interbay Dravus	3,400	5,600	60.7%	3,900	6,800	57.4%
Interbay Smith Cove	3,900	6,000	65.0%	4,700	7,400	63.5%
SODO/Stadium	23,000	43,900	52.4%	28,200	53,500	52.7%
Georgetown/South Park	14,900	25,900	57.5%	18,000	32,000	56.3%
Total	54,500	98,500	55.3%	66,400	122,000	54.4%

Source: City of Seattle, 2021.

Consistency with Plans & Policies

Although there would be no changes to plans and policies under Alternative 1, some inconsistencies with plans and policies are expected to increase due to the evolution of land use during the study time horizon under Alternative 1.

Conditions in both the Greater Duwamish MIC and BINMIC would still meet PSRC's regional criteria for designation as an Employment Center MIC.

- 75% land zoned for core industrial uses. Under Alternative 1 the IC zone would not be considered a core industrial zone satisfying the PSRC criteria because zone development under existing standards would increasingly be dominated by office-only uses. Nonetheless, 90% of land in the BINMIC would be in core industrial zones, and 97% of land in the Greater Duwamish MIC would be in core industrial zones.
- Employment would remain over 50% industrial.
- Employment would remain far above 20,000 jobs.

Land use changes under Alternative 1 would continue to be consistent with most of the planning goals and policies of the City's Comprehensive Plan, SMP and regional plans. However, an incremental degree of inconsistency would arise with respect to select policies, because of development trends towards continued conversion to office and retail uses in IG zoned areas, and continued development of large offices in IC zoned areas. The resulting land use trend would be somewhat inconsistent with policy 10.2 (preserve land for industrial uses), and 10.17 (avoid attracting large numbers of visitors), and Container Port Element policy CP3 (discouraging retail and residential uses).

Localized areas where the inconsistency would increase would be upland areas in the Ballard, Interbay Dravus, Interbay Smith Cove, and SODO/Stadium subareas. In general inconsistency with policies would be largest in areas in proximity to the future light rail station and in proximity to areas that have strong demand for residential development. This would result in a **moderate** impact in this category due to inconsistency with plans for portions of the study area.

Land Use Compatibility

Under Alternative 1 No Action, land use incompatibilities would be similar to those observed today but would become more severe over time with continuing trends. Expected incompatibilities in localized areas are summarized below:

Ballard

Conflicts in the Ballard uplands in the 14th Avenue corridor north of NW Leary would increase and would manifest as increased difficulty for larger and long-standing industrial operations due to access and congestion constraints as a result of increasing non-industrial office and retail uses. Similar pressure would be exerted on remaining shoreline industrial/marine activities, as visitors of non-industrial activities congest roadways and access points to shoreline operations. Noises, visual impacts, and odors received by an increased number of non-industrial visitors to the area would also result. However, with limited opportunities for housing and the sporadic nature of nonindustrial visits the impact would be **moderate.**

Interbay Dravus

Incompatible use conflicts would be about the same as today in this area. Maritime and shoreline areas such as Fisherman's Terminal and areas along W Commodore Way would continue to be well-buffered from encroaching uses, and rail yards and facilities would not change substantially. The biggest land use changes would occur in areas near the future rail station between BNSF rail tracks and 15th Avenue W north of W Dravus Street where construction of light rail infrastructure and infill development under IG zoning would be expected. But this triangular area already contains few extensive heavy industrial uses, and few new conflicts exceeding today's level are expected. If parcels adjacent to BNSF tracks develop with non-industrial uses some minor impact due to noise and vibration as experience by future tenants could result but because prohibitions on new residential development would limit nonindustrial activity to commercial uses which are less sensitive to noise and vibration than residential uses, the impact would not be more than **minor**.

Interbay Smith Cove

Incompatible use conflicts would be about the same as today in this area. Maritime and shoreline areas such as Terminal 91 and its upland would continue to be well-buffered from encroaching uses, and rail yards and facilities would not change substantially. Terminal 91 uplands and the Armory site would develop in part or in whole with industrial uses such as distribution space flex, or light industrial space. The effects of such development would not increase incompatibility with adjacent retail and office uses over existing conditions. The biggest land use changes would occur in areas near the future rail station in the Elliott Avenue corridor where construction of light rail infrastructure and infill development under IC and IG zoning would be expected and could include substantial offices. This area already contains few extensive heavy industrial uses, and few new conflicts exceeding today's level are expected. If parcels adjacent to BNSF tracks develop

with non-industrial uses some minor impact due to noise and vibration as experienced by future tenants could result but because prohibitions on new residential development would limit nonindustrial activity to commercial uses which are less sensitive to noise and vibration than residential uses, the impact would not be more than **minor**.

SODO/Stadium

Incompatible use conflicts would increase incrementally throughout greater SODO as current trends towards non-industrial retail and office under existing IG zone regulations result in infill on more sites scattered across the area. Existing heavy industrial land uses described above that are sources of noise, odors and glare would be expected to continue in SODO. (i.e., Republic Services, Port Terminals, SIG, and Argo Rail yards etc.). Proximity of these sources to new non-industrial users would create incrementally greater incompatibility. Large industrial users upland at the center of SODO would have increased difficulty continuing operation due to access constraints as a result of increasing non-industrial office and retail uses.

Maritime and waterfront areas would continue to be well-buffered from encroaching uses in SODO, including Harbor Island, Lower Duwamish Waterway installations and Terminal 5.

Incompatibilities in the stadium area would increase only slightly as more office development in the existing IC zones flanking 1st Avenue materializes. The main source of incompatibility would be exposure of new users/tenants/visitors to heavily trafficked roadways (i.e., SR99) and loud truck traffic that would continue to transit the area. The area contains few extensive heavy industrial uses, and few new conflicts exceeding today's level are expected. If parcels adjacent to the SIG railyard develop with non-industrial uses some minor impact due to noise and vibration as experience by future tenants could result but would not be more than minor.

Overall, in this subarea incompatible use impacts would increase over time but because prohibitions on new residential development would limit non-industrial activity to commercial uses which are less sensitive to noise and vibration than residential uses, the impact and would be **minor**.

Georgetown/South Park

Incompatible use conflicts would increase incrementally in portions of the Georgetown/South Park Subarea. This would be due to current trends towards non-industrial retail and office development under existing IG zone regulations that would result in infill on more sites scattered across the area. Existing heavy industrial land uses described above in existing conditions that are sources of noise, odors and glare would be expected to continue in SODO. (i.e., Argo Rail yards, manufacturers etc.). Proximity of these sources to new non-industrial users would create incrementally greater incompatibility. Large industrial users would have increased difficulty continuing operation due to access constraints as a result of increasing non-industrial office and retail uses.

Maritime and waterfront areas would continue to be well-buffered from encroaching uses in Lower Duwamish Waterway Georgetown.

Incompatible use impacts would increase incrementally over time, particularly in areas proximate to residential uses, but due to the limited amount of housing the impacts and would be **minor**.

Employment Mix

As seen above in **Exhibit 3.8-12**, the overall employment mix would change only slightly. The employment mix would remain over 50% industrial in both MICs and the study area. Employment projections estimate an addition of 23,500 total jobs, of which about 11,900 would be industrial and 11,600 would be non-industrial. Alternative 1 would result in no more than a **minor** impact to employment mix.

Land Use Transitions

Under Alternative 1 land use transitions are expected to be similar to how they are today. Transition areas are industrial areas with uses that are less intense than core/heavy industrial areas and adjoin areas that are planned for non-industrial areas such as residential neighborhoods or mixed-use commercial areas. Abrupt transitions occur when non-industrial adjacencies are impacted by neighboring high intensity/high impact industrial activities that result in excessive noise, air pollution, noxious odor, or impacts resulting from height bulk and scale of taller buildings in the IC zone where it abuts nonindustrial areas.

Much of Seattle's industrial land has well defined edges (I-5, rail corridors, green belts, waterways) separating industrial areas from non-industrial uses eliminating the potential for encroachment of high intensity/high-impact uses adjacent on residential areas. However, some industrial areas directly abut residential and mixed-use commercial areas. In many cases, these areas are zoned IB which is intended to create a transition from industrial areas through a more limited set of permitted industrial uses and development standards such as setbacks, additional height limits, and landscaping requirements. In some places, the IB zone is applied with a shallow depth, limiting its effectiveness as a transition, and limiting development potential. Similarly, development in IC zones in some areas provides effective transitions because they are frequently developed with office buildings that can provide a transition from core industrial areas to nonresidential areas. In some places where the IC zone abuts nonindustrial areas potential impacts related to height, bulk, scale, and aesthetics exist however, development standards intended to reduce these impacts on adjacent residential zones reduce these potential impacts to a level of insignificance.

Ballard

Industrial zones in the Ballard Subarea directly abut residential zones and mixed-use commercial areas resulting in long-term unavoidable impacts. North of Leary Way, the eastern edge of Ballard land zoned IB provides a transition from core industrial areas, developed with a

mix of legally non-conforming residential, warehouse, industrial, storage, and retail uses. On the northern edge of the central portion of the BINMIC, east and west of 14th Avenue W, the transition is abrupt with significant industrial activity adjacent to mixed-use and residential commercial areas. This development is a mix of light industrial, warehouse, parking, and non-conforming residential uses. This land is currently zoned IG2 and while there are currently no high intensity/high impact uses, current zoning would allow such uses over the next 20 years. In northwest Ballard, an abrupt transition exists at the northwest corner of 24th Avenue NW and NW Market Street where maritime activity directly abuts mixed-use zoning as part of the Ballard Hub Urban Village. This area is an important location for maritime industries, including ship servicing, seafood processing, and other activity dependent on the critical maritime infrastructure that is Salmon Bay. An adequate transition exists existing moving west from the mixed-use zoning. The Nordic Museum and other property in the IC zoning on the south side of Market Street and IB zoning on the north side of Market Street provide a strong transition from the core industrial area. Continued development in industrial areas is expected to be consistent with the existing development pattern and not result in height, bulk, scale, or aesthetic impacts.

The adjacency of IG zoned land and the range of existing and permitted uses in the Ballard Subarea results in a **moderate** impact.

Interbay Dravus and Interbay Smith Cove

The majority of Interbay is defined by hard edges, but long-term unavoidable impacts occur in the area west of the BNSF rail corridor (which in some places directly abuts residential areas) and in the Interbay Dravus Subarea (where industrial uses directly abut multifamily residential development). Operations of the BNSF rail corridor and switching yard results in noise and exhaust from train assembly, and idling locomotives are a high intensity/high impact use. The Interbay Dravus Subarea is a compact node and although the lack of transition will continue in the No Action Alternative, it is confined to a small area and somewhat mitigated by the presence of commercial uses fronting on both sides of Dravus Street. This subarea includes conditions where IG1 zoning directly abuts a mixed-use commercial area substantially developed with housing. The industrial part of this subarea is developed primarily with 1 and 2 story buildings with outdoor storage or parking which is typical of this zone classification. This is different than the type of development expected in IC zoning with 3-4 story, bulkier office buildings that can result in height, bulk, scale, and aesthetic impacts to adjacent nonindustrial areas. Continued development in these industrial areas is expected to be consistent with the existing development pattern and not result in height, bulk, scale, or aesthetic impacts.

The adjacency of the BNSF rail corridor to residential areas is a **moderate** impact. The lack of transition in the Interbay Dravus Subarea results in a **minor** impact.

SODO/Stadium

The majority of the SODO portion of the Subarea is defined by hard edges including I-5 and the parallel green belt to the east and steep topography and a green belt adjacent to W Marginal

Way. However, potential impacts could occur over 20 years on land in Delridge adjacent to the Nucor Steel and on currently vacant land adjacent to Harbor Blvd SW. The Nucor Steel mill is a heavy manufacturing facility adjacent to residential development but transitions in the form of Longfellow Creek Green Space and IB zoning developed with a mix of office and mini storage that reduces the scale of this ongoing moderate impact. North of Delridge, Harbor Avenue SW separates the SODO portion of the MIC from mixed residential and commercial development to the west. Most of the industrial land adjacent to Harbor Avenue SW is vacant, used as outdoor storage, or developed as park land and currently provides a transition from adjacent industrial areas including Terminal 5. It is possible over the next 20 years that industrial development could occur on vacant land in the IG2 zone that would introduce high impact/high intensity uses thereby eroding the existing transition conditions and resulting in a **moderate** impact.

To the north, the Stadium district and its focus on spectator sports facilities provides a transition to the Pioneer Square Neighborhood. While the IC zoning to the northeast end of the Greater Duwamish MIC adjacent to the CID is currently developed with a mix of office, transportation, and industrial uses, it is likely in the next 20 years there will be continued office development in the IC zoned parcels in this area creating a stronger transition from core industrial areas to the CID. The IC zoned parcels in this area allow for substantially larger buildings than are found in existing industrial development (up to 175 feet), however, development standards for these IC zones intended to regulate bulk, scale, and aesthetic impacts mean future development on these sites will reduce impacts to insignificant levels.

Adjacent to Nucor Steel and Harbor Blvd the transition impact is **moderate**. Adjacent to Pioneer Square and CID the impact is **minor**.

Georgetown/South Park

Both the Georgetown and South Park neighborhoods abut industrial areas. A transitional strip of IB zoning separates the residential areas from core industrial areas resulting in a **moderate** land use impact. Land uses in the transition area include vehicle storage (WSDOT), a community college just east of Georgetown, and a mix of industrial uses north of South Park. The IB areas represent a shallow transition from core industrial areas and this pattern is expected to continue under the No Action Alternative. Continued development in industrial areas is expected to be consistent with the existing development pattern and not result in height, bulk, scale, or aesthetic impacts.

Impacts from a lack of transition in both areas are **minor**.

Other Industrial Zoned Lands

Industrial land outside the MICs include land in Fremont, the north shore of Lake union, the Southeast shore of Lake Union and the area bound by I-90, Rannier Avenue S, and S Dearborn.

- Industrial land in Fremont is zoned with a mix of IB, IC, and IG2 zoning. On the south side of N 36th Street, land is zoned IB and is developed with a mix of commercial uses. An area south of the strip of IB zoned land and fronting N 36th Street is zoned IG2, with land further

south adjacent to the ship canal zoned IC. The area currently zoned IG2 is developed with a mix of industrial, commercial, warehouse, and legally nonconforming residential uses. The relative size of the IG2 land compared to core industrial areas and the surrounding zones means it is unlikely to result in development of high impact/high intensity uses that will encroach on or abut non-industrial areas. Continued development in industrial areas is expected to be consistent with the existing development pattern and not result in height, bulk, scale, or aesthetic impacts. The impact due to lack of transition in this area is low.

- Industrial land on the shoreline south of N Northlake Way is zoned IB. This land falls substantially within the shoreline area and is subject to provisions of the Shoreline Master Program. This area is developed with a mix of office, marina, marine terminal, warehouse, public safety, and park uses. There is little to no potential for high intensity/high impact uses to encroach on nonresidential areas. Development regulations including height limits, FAR limits, and view corridor requirements of the Shoreline Master Program means impacts resulting from height, bulk, scale, and aesthetics are not anticipated. North of N Northlake Way, land contiguous to the IB zoned land to the south at Stone Way N is zoned IC and is developed with a range of office and retail uses. The industrial area defined by N Northlake Way, I-90, and N Pacific Street is zoned IC. This area is currently developed with a mix of warehouse, office, light industrial, and parking uses. There is limited potential for high intensity/high impact uses to encroach on nonindustrial areas in all of these areas. Although IC zoning allows for development 3 to 4 story office buildings with greater bulk and scale than is typical of other industrial zones, development regulations for development projects in the IC zone that abut residential areas mean impacts related to height, bulk, scale, and aesthetics are not anticipated.
- The industrial area near I-90 is currently zoned IC and is developed with a mix of recreational, office, and warehouse uses. Because of the compact nature of this area, the hard edge of I-90 to the west and south, and significant arterials to the east and north that separate this area from nonindustrial areas and the IC zoning of this land, there is no potential for high intensity/high impact uses to encroach on nonresidential areas or for impacts resulting from incompatible height, bulk, scale, or aesthetics.
- The industrial area on the shoreline of southeast Lake Union is zoned with a mix of IG1 and IC. The IG1 portion of this area is currently developed with a seafood processing company and a drydock facility and falls substantially within the shoreline zone. Development regulations including height limits, FAR limits, and view corridor requirements of the Shoreline Master Program means impacts resulting from height, bulk, scale, and aesthetics are not anticipated. IC land up shore from the IG1 land is developed with R&D facilities. There is no potential for impacts resulting from encroachment of high intensity/high impact uses at this location because the IG1 land is shoreline and water and is subject to the provisions of the SMP which would preclude such impactful uses. The IC area is developed with R&D and office uses which do not encroach on non-industrial areas.

Impacts resulting from inadequate transition for industrial to nonindustrial areas outside of the MICs is **minor**.

Impacts of Alternative 2

Likely Changes Over the 20-year Planning Horizon

Land Use Planning & Policy. Under Alternative 2—Future of Industry Limited, the planning and policy context would be changed to enact the Comprehensive Plan policy amendments described above in **Local Policy Framework**. The City would also adopt updates to the currently adopted Sub Area Plans for the Greater Duwamish MIC and BINMIC which include the land use concepts identified in this proposal.

Future Land Use. Under Alternative 2 the future Land Use Map would not change. Boundaries of the BINMIC and Greater Duwamish MIC would not be altered, as no land is removed from MICs under Alternative 2. "Industrial Areas" designation on the FLUM outside of MICs would not be changed. Industrial zoned land within the FLUM designated urban villages would remain in that designation.

Zoning. Under Alternative 2 zoning would be changed to apply the proposed new Maritime, Manufacturing and Logistics (MML), Industry and Innovation (II), and Urban Industrial (UI) zones, instead of the existing zones. The Seattle Municipal Code would be amended to add the development standards in the MML, II and UI zones as described in **Chapter 2**, including retention of a Stadium Area Overlay District. The location of the zones in Alternative 2 is mapped as shown in **Chapter 2** and **Appendix C**.

Alternative 2 applies the proposed new industrial zones with relatively less Industry and Innovation and Urban Industrial than the other two Action Alternatives. Under Alternative 2:

- The maritime, manufacturing and logistics zones would cover 89% of industrial lands.
- A mix of Industry and Innovation and Urban Industrial Zones would cover 11% of the study area including an estimated ¼ mile from light rail stations.
- There would be no expansion of housing allowances in the UI zone

Land Use. Under Alternative 2, land use would change over the planning period according to current trends and as a result of the proposed zoning changes. Some notable expected changes include.

- **Decreased rate of conversion to stand-alone office and retail uses in MML zoned areas.** The new MML zone would have stricter size of use and FAR limits for stand-alone office and retail uses. As a result, there would be fewer conversions to stand-alone office and retail than past trends and under Alternative 1.
- **Continued distribution and warehouse facilities.** Strong demand for new warehouse and distribution space is expected to continue, resulting in the addition of new distribution and warehouse facilities in MML zoned areas.
- **Maintenance of maritime and industrial base.** Most long term maritime and logistics uses would continue on waterfront and industrial lands near infrastructure, especially in the Greater Duwamish MIC. New Comprehensive Plan policies limiting the removal of land from

MICs will provide existing industrial land uses with the kind of long-term predictability that will increase onsite reinvestment for continued industrial use could be expected at a greater rate than under Alternative 1.

- **Denser employment including new industrial space near future light rail station in the limited II zoned areas.** The proposed II zone regulations combined with expected strong market interest due to increased access provided by light rail stations is likely to result in development with a high density of employment in ICT and Office development sectors in these areas. However, the mapped locations of the II zone are limited in the alternative. New development in the II zoned areas would include new light industrial space at ground level. Much higher levels of employment, and general activity by employees and visitors is expected. Associated frontage improvements and infrastructure upgrades would also be expected with the changed character and activity pattern in these nodes.
- **Increased development of mixed-use, flex, and light industrial uses in UI zoned areas.** The proposed UI zone regulations combined with expected strong market interest due to proximity to population centers will lead to incremental addition of new buildings with light industry, office, and flex space in areas at the edges of MICs near urban villages. Increased ancillary uses for breweries, retail showrooms and similar will incrementally increase use of the area by non-industrial populations. Frontage improvements, infrastructure upgrades, and increased landscape would be expected. The physical character in these edge areas would become more urban in nature with more buildings built to lot lines.
- **Armory Site Redevelopment.** Under Alternative 2 the Armory site would be developed with light industrial and flex space of a relatively low-density nature or remain vacant after relocation of the Army National Guard to North Bend, WA.
- **Little or no new housing.** Only an estimated 80 new homes would be added in caretakers' quarters and artist/studios.

Employment Mix. Under Alternative 2, employment is projected to grow substantially more than under Alternative 1 No Action. A total of 34,400 additional jobs are projected for the study area, an increase of 35%. This would represent about 20% of the projected citywide employment growth over the 20-year planning horizon. The mix of industrial employment would increase by 4.4% points compared to the No Action Alternative, up to 59.7%. Both MICs would continue to contain much more than the minimum number of industrial jobs required to meet PSRC's regional criteria for MIC designation (20,000). The percentage of industrial employment would remain at roughly 58% or greater in every subarea under the alternative. See **Exhibit 3.8-13**.

Exhibit 3.8-13 Employment by Subarea, Current Conditions and Alternative 2

	Current Conditions (2018)			Alternative 2—Future of Industry Limited (2044)		
Subarea	Ind. Emp.	Total Emp.	% Ind.	Ind. Emp.	Total Emp.	% Ind.
Ballard	9,400	17,100	55.0%	13,600	23,600	57.6%
Interbay Dravus	3,400	5,600	60.7%	4,900	7,700	63.6%
Interbay Smith Cove	3,900	6,000	65.0%	5,800	8,600	67.4%
SODO/Stadium	23,000	43,900	52.4%	33,700	57,700	58.4%
Georgetown/South Park	14,900	25,900	57.5%	21,400	35,300	60.6%
Total	54,500	98,500	55.3%	79,400	132,900	59.7%

Source: City of Seattle, 2021.

Consistency with Plans & Policies

Under Alternative 2, conditions in both the Greater Duwamish MIC and the BINMIC would still meet PSRC's regional criteria for designation as an Employment Center MIC.

- 75% land zoned for core industrial uses: Under Alternative 2, the new zones (MML, II, and UI) would be considered core industrial zones satisfying the PSRC criteria, because development under the standards in all three zones would include industrial development. Therefore, 100% of the land in the BINMIC and Greater Duwamish MIC would be zoned for core industrial purposes.
- Employment would remain over 50% industrial for the MICs as a whole and for all subareas.
- Employment would remain far above 20,000 jobs.

Land use changes over the time horizon would be consistent with Comprehensive Plan goals and policies. Updates to goals and policies are an integrated part of Alternative 2 and the new zones and development that would occur in them would be crafted to advance those policies.

Land use patterns would be consistent with the plan's goals and policies concerning protections for industrial and maritime uses in core areas, such as land use goal 10, and policies 10.2, 10.3 and 10.4. Future development in the MML zone would afford stronger protections (compared to existing IG zones) for industrial uses such as lower maximum size of use limits and FAR limits for non-industrial uses and prohibition of mini storage uses. Limiting removal of land from MICs to major plan updates would also provide stronger protection in accord with these policies.

Land use changes expected over time under the new II and UI zones would be consistent with the plan's amended goals and policies including LUG11and LUG12. New or amended policies including 10.6 address integration of land use with high-capacity transit. Development in the II zone would be consistent with new policies supporting dense employment and emerging industries near transit, including policies 10.7 and 10.19. New or amended plan policies would promote transitions at edges of MICs that integrate with nearby urban villages including 10.7,

and 10.22-24. Development in the II zone would be built with reduced setback requirements, large ancillary size of use limits, and urban landscaping standards that would cause new buildings to augment transitions in line with the policy intent.

However, an incremental degree of inconsistency could arise with respect to select policies under Alternative 2, because there is some increased potential for denser development in the II and UI zones to adversely affect traditional heavy industrial uses. If robust development under the new II and UI zones occurs, there could be some incremental inconsistency with policies 10.12 (concerning limiting density in MICs), policy 10.13 (concerning limiting landscaping requirements in industrial areas), and 10.18 (concerning avoiding attracting large numbers of visitors), and Container Port Element CP3 (concerning discouraging retail and residential uses).

Alternative 2 would increase the share of projected employment growth in industrial areas to about 20% of total citywide job growth that the city would be planning for during the 20-year planning horizon. This would represent a shift of a moderately greater share of the city's expected employment growth into industrial areas compared to past trends and the previous 20-year Comprehensive Plan planning horizon.

Overall consistency with regional plans would be maintained, and consistency with the City's Comprehensive Plan goals and policies would increase compared to Alternative 1. Although there is potential for slight inconsistency with a few policies, land uses under Alternative 2 would be strongly consistent with most policies and impacts related to consistency are **minor**.

Land Use Compatibility

Ballard

Most land in the Ballard uplands in the 14th Avenue corridor north of NW Leary would be placed in the MML zone. Over time some use conflicts would likely be reduced here because stricter maximum size of use limits for non-industrial would reduce pressure to convert land to stand-alone retail and offices, compared to Alterative 1. A stronger and more consistent industrial use pattern would evolve over time, and longstanding industrial operations would be afforded relative ease of operation concerning truck movements, and insulation from complaints about noises and odors. There is some potential for use conflict between an increasingly consistent industrial use pattern south of NW 53rd Street and increased volumes of passersby through the area to a transit station. See also **Section 3.10 Transportation**.

Dense employment in multi-story buildings would likely be added in the two blocks of the II zone between NW 53rd and NW 54th Street near a potential future light rail station, and II zoned areas in Fremont that already contain a high concentration of dense employment. No major use conflict would be expected in these locations.

Due to conversion to the MML zone for lands abutting the shoreline, incompatible use pressures in areas of Ballard south of Leary Way would be lessened over time, compared to Alternative 1. Existing use incompatibilities in the BINMIC due to proximities between retail and

office land uses and industrial and maritime activity related to noise, congestion etc., would continue near existing levels, but are not expected to increase markedly.

Increased infill development with light industrial uses and brewers/makers with large ancillary spaces is expected in areas at the edges of Ballard, and along NW 36th Street in Fremont. New zone standards would allow smaller parcels to accommodate new structures. Uses that appeal to visitors from nearby urban villages such as showrooms and tasting rooms are expected to occupy new structures. Resulting land use patterns and expected times of day for activity would be consistent with the adjacent areas outside of the study area. There is some potential for increased volumes of visitors to create minor use conflicts with remaining heavy industrial uses in MML zones at the interior.

Overall impacts resulting from land use conflicts in Ballard would be **minor** under Alternative 2**.**

Interbay Dravus

Under Alternative 2, all the shoreline and adjacent lands including Fisherman's Terminal, W Commodore Way lands, and the BNSF railyard would be placed in the MML zone. Stricter maximum size of use limits would reduce pressures for conversion to non-industrial uses in these areas, and over time a stronger and more consistent industrial use pattern would emerge compared to Alternative 1. Use conflicts between operation of maritime and heavy industry related to noise, local truck access and similar would be reduced compared to Alternative 1.

Land north of Dravus Street along Thorndyke Avenue W that would be in the UI zone would likely receive incremental infill development with light industrial uses, brewers/makers with large ancillary spaces, including on some smaller parcels. The uses would appeal to visitors from nearby residential areas and by those using light rail transit. Some land would likely be used for light rail construction and operation. These changes would cause an overall transition of the 14-acre area to an urban mixed-use pattern (albeit without housing). Impact of this transition would be minor, since no very heavy or largescale industrial uses are located in the small area, and the area is contained by defined edges of the rail track.

Overall use impacts resulting compatible land uses in the Interbay Dravus Subarea would be **minor** under Alternative 2**.**

Interbay Smith Cove

Under Alternative 2, land use patterns in the Interbay Smith Cove Subarea would not change markedly from current conditions, and use incompatibilities are not expected to increase in severity compared to Alternative 1. The W Armory Way corridor has been developed with a mix of retail ministorage uses that are expected to remain in place, and since few adjacent heavy industrial activities remain, there is not a high degree of use conflict at present.

The Armory site would be in the MML zone and would likely be developed with light industrial and flex space of a relatively low-density nature including activities such as distribution and warehousing. Such uses are not expected to conflict with the surrounding context due in part

to the large site that can contain activities and provide buffering at edges. Some minor use incompatibilities could arise due to increased volumes of truck entering and exiting the large site via routes including W Armory Way which also provides access to the non-industrial retail uses.

Marine Terminals and T91 uplands would be placed in the MML zone. Marine activities, and industrial use similar to existing conditions will continue on those lands and would not create additional land use conflicts.

Areas zoned Industry and Innovation not already developed with offices in the Elliott / 15th Avenue W corridor would be likely to receive some additional dense employment development in multi-story buildings. The use pattern by daytime employees would be similar to adjacent uses such as the Expedia campus.

Overall use compatible impacts in the Interbay Dravus Subarea would be **minor** under Alternative 2**.**

SODO/Stadium

Under Alternative 2, all the shoreline and adjacent lands including Port Terminals, and expansive stretches of land currently zoned IG would be placed in the MML zone. Stricter maximum size of use limits would reduce pressures for conversion to non-industrial uses in these areas, and over time a stronger and more consistent industrial use pattern would emerge compared to Alternative 1. In MML zoned areas land use conflicts between operation of maritime and heavy industry related to noise, local truck access and similar would be reduced compared to Alternative 1.

Under Alternative 2 limited areas of the Industry and Innovation zone are added in a close ¼ walking areas to the SODO/Lander Street station, on the WOSCA site and on land north of I-90, all of which would be likely to receive some additional dense employment development in multi-story buildings, with light industrial uses integrated at ground level.

Minor new use conflicts would be likely in the area around the SODO/Lander Street light rail station, as a significantly higher volume of daytime workers, unrelated to industrial operations would be present. Minor conflicts could include new exposures of pedestrians and workers using outside spaces to loud truck traffic and industrial equipment and to odors from industrial operation such as the Republic Transfer station. Presence of workers could increase difficulty of fluid freight movement including difficulty with operation of loading docks and site access. However, since the geographic area zoned II is tightly limited to the area around the station, impacts would be minor.

The II zoned area between 4th Avenue S and I-90, the Rainier Avenue S corridor, and the WOSCA site would be likely to receive additional dense employment development in multi-story buildings and an increased volume of daytime workers. However, the use pattern by daytime employees would be like the adjacent existing uses such as Union Station, Home Plate Center, and other development in the permitting process. New development and uses are expected to

be compatible with adjacent Chinatown/ID and Little Saigon neighborhoods. Ground floors in II developments would include new light industrial space, and there is a demand for such space in Chinatown/ID and Little Saigon by distributors of goods including produce and restaurant supply. Employees of office, R&D, and ICT uses would likely provide increased customer base for restaurant and service uses in Chinatown/ID.

Land in the stadium area in the UI zone would likely receive incremental infill development with light industrial uses, brewers/makers with large ancillary spaces, including on some smaller parcels. Some additional lodging uses would be expected due to the change to permit lodging in the Stadium Area Overlay District (STAOD). Continued addition of large-sized office and retail uses are expected in the STAOD. The uses would appeal to visitors from nearby residential areas and patrons of stadium events. These changes would cause an overall transition of the area fronting 1st Avenue to an urban mixed-use pattern (albeit without housing). Some minor impacts could result due to an incremental increase in exposure of pedestrian activity near trucks transiting on 1st Avenue and accessing I-90 and SR99 freeways.

Overall use compatibility impacts in the SODO/Stadium Subarea would be **minor** under Alternative 2**.**

Georgetown/South Park

Under Alternative 2, all riverfront lands including Port Terminals, marine operations, and expansive stretches of land currently zoned IG would be placed in the MML zone. Stricter maximum size of use limits would reduce pressures for conversion to non-industrial uses in these areas, and over time a stronger and more consistent industrial use pattern would emerge compared to Alternative 1. In MML zoned areas use conflicts within the MIC between operation of maritime and heavy industry related to noise, local truck access and similar would be reduced compared to Alternative 1.

Increased infill development with light industrial uses, brewers/makers, and small manufacturers with large ancillary spaces is expected in areas at the edges of South Park Urban Village and the Georgetown residential areas. New zone standards would allow smaller parcels to accommodate new structures. Uses that appeal to visitors from nearby urban villages such as showrooms, tasting rooms and similar are expected to occupy new structures. Resulting use patterns, and times of day for activity, would become more consistent with the adjacent areas outside of the study area in South Park. There is some potential for increased volumes of visitors to create minor use conflicts with heavy industrial uses in MML zones at the interior.

Existing use conflicts would persist in the triangular area of Georgetown bounded by Corson Avenue S, Carleton Avenue S, and I-5 where there are a high concentration of retail uses on Airport Way S. A primarily industrial character would remain and increase in the areas in the western portion of the triangle due to stricter limits on non-industrial uses in the MML zone. This would solidify a break in the continuity between the two residential portions of Georgetown neighborhood that exists today, which is a **minor** adverse land use impact.

Employment Mix

As seen above in **Exhibit 3.8-13** the overall employment mix would change incrementally. The mix of industrial employment would increase by 4.4% points compared to No Action, up to 59.7%. The percentage of industrial employment would remain at roughly 58% or greater in every subarea under the alternative. Although there would be an increase in non-industrial employment in office and ICT sectors, the increase in industrial employment due to stronger protections in the MML zones, inclusion of new light industrial space in II zone development, and industrial redevelopment of the Armory site would result in bigger increases in industrial employment than Alternative 1. No adverse impact is expected.

Land Use Transitions

Land use transitions under Alternative 2 remain much as they are under Alternative 1—No Action alternative. Most IB zoning is replaced with the new UI zone to create a scale of development and uses compatible with nearby non-residential areas and provide a transition from high intensity/high impact industrial uses in core industrial areas. Development in this zone would be higher density than the IB zone with a finer grained development pattern consisting of makers spaces, light industrial uses. In addition to less intense industrial activity, these areas will generate pedestrian activity by including opportunities for more ancillary retail and showroom space. Because Alternative 2 applies the UI zone in the same pattern as the IB zone in the No Action Alternative, the narrow application of this zone in some areas limits the degree to which these areas developed as intended. However, it is expected that the UI zone will allow for an increased amount of infill development on small sites due to decreased setbacks compared to the IB zone.

Alternative 2 also replaces limited portions of land in the current IC zone classification with the core industrial zone, the MML zone, in locations that abut nonindustrial areas. This change could result in high impact/high intensity uses adjacent to nonindustrial areas resulting in an incremental impact due to lack of transition.

Ballard

In northeast Ballard the existing IB zoning is replaced with UI zoning and provides a narrow transition between the core industrial area to the west and non-industrial areas to the east and north. In the Central part of Ballard introduction of the II zone in the area of 14th Avenue NW and NW 54th Street could develop with a mix of industrial and commercial uses providing a narrow transition from the core industrial area. Because the UI zone will larger buildings than is typical of industrial areas, there is potential for impacts related to height, bulk, scale, and aesthetics where it abuts residential areas in northeast Ballard. In the western portion of the Ballard Subarea, expansion of the core industrial zone into areas currently zoned IC could result in introduction of high intensity/high impact uses adjacent to non-residential uses in the Ballard Hub Urban Village. Due to the limited size of this condition, this is a moderate impact.

Interbay

Like Alternative 1—No Action, most of this subarea is defined by hard edges except for the node anchored by W Dravus Street and the area adjacent to the BNSF rail corridor. A stronger transition occurs in the Dravus area by applying the UI zone where land is currently in a core industrial zone. This will result in finer grained development of light industrial and makers spaces and anticipation of increased pedestrian activity that provides better compatibility with the adjacent residential development. The nature of the UI zone of encouraging pedestrian activity, and structures of a similar bulk and scale as the adjacent mixed-use zoning means there will be minimal impacts related to height bulk and scale. The presence of residential uses adjacent to the BNSF rail corridor will continue to result in long-term unavoidable impacts. Adjacent to the BNSF rail corridor the impact is moderate. In Dravus the impact is low.

SODO/Stadium

The impacts due to a lack of transition from core industrial areas to nonindustrial areas for Alternative 2 are similar to Alternative 1—No Action. The IB zone in Alternative 1—No Action adjacent to the Nucor Steel plant will be rezoned to UI and the area along Harbor Boulevard would change from existing IG2 and limited IB zoning to the MML zone with a similar range of permitted uses and scale of development as existing zoning. Likewise, to the north the areas adjacent to Pioneer Square and the CID would see zoning changes from IC zoning to a mix of UI and II zoning with a similar reduction of impacts overtime as redevelopment occurs. The potential impact from encroaching or abutting high intensity/high impact uses or from impacts related to heigh, bulk, scale, and aesthetics inn nonresidential areas is low.

Georgetown/South Park

The impacts in the subarea are expected to be similar to Alternative 1—No Action. Alternative 2 mirrors the existing zoning pattern by changing areas adjacent to Georgetown and South Park from IB to UI. Because the UI zone will allow for taller structures with ancillary housing than is allowed in the current IB zone there is potential for impacts related to height, bulk, scale, and aesthetics. However, due to the shallow depth of this zoning in areas where it abuts nonresidential areas the potential impact from encroaching or abutting high intensity/high impact uses on nonresidential areas or the potential for impacts associated with height, bulk, scale, and aesthetics is low.

Other Industrial Zoned Lands

In Fremont the impacts from lack of transition are the same as Alternative 1—No Action. Alternative 2 proposes to leave the land use pattern unchanged with UI replacing the IB zone, MML replacing the IG2 zone, and II replacing the IC zone. On the north shore of lake union, Alternative 2 proposes changing the IB zone to the more intensive MML zone but the narrowness of the strip and development regulations of the SMP preclude the potential for development of high intensity/high impact uses in this area. IC zoning is proposed to be changed to II and will

result in the same level of impact as Alternative 1—No Action. The southeast Lake Union industrial area will continue to not have impacts resulting from inadequate transition from core uses. Alternative 2 proposes changing the IG1 zoning to MML and the IC zoning to II. The potential impact from encroaching or abutting high intensity/high impact uses or impacts related to height, bulk, scale, and aesthetics on nonresidential areas is low.

Impacts of Alternative 3

Likely Changes Over the 20-year Planning Horizon

Land Use Planning & Policy. Under Alternative 3—Future of Industry Targeted, the planning and policy context would be changed to enact the Comprehensive Plan policy amendments described above in **Local Policy Framework**. The City would also adopt updates to the currently adopted Sub Area Plans for the Greater Duwamish MIC and BINMIC which include the land use concepts identified in this proposal.

Future Land Use. Under Alternative 3 the Future Land Use Map would be amended slightly. Boundaries of the Greater Duwamish MIC would be altered to remove focused land near Georgetown and South Park from the MIC designation, as indicated on the map in **Chapter 2** and **Appendix C**. In Georgetown, the triangular area bounded by Corson Avenue S, Carleton Avenue S, and I-5 would be placed into the Commercial/Mixed-Use Areas designation. In South Park select parcels at the northeast and southeast corners of the urban village adjacent to the Duwamish River would be removed from the MIC and placed in the South Park Urban Village. The total area of lands removed from the MIC would be 26 acres. No land would be removed from the BINMIC, and no other Comprehensive Plan FLUM designations would change.

Zoning. Under Alternative 3, zoning would be changed to apply the proposed new MML, II, and UI zones, instead of the existing zones. The Seattle Municipal Code would be amended to add the development standards in the MML, II and UI zones as described in **Chapter 2**, including the retention of a Stadium Transition Area Overlay District The location of the zones in Alternative 3 is mapped as shown in **Chapter 2** and **Appendix C**.

Alternative 3 applies the proposed new industrial zones with a greater share of II and UI zones than Alternative 2. Alternative 3:

- Applies the MML zones covering 86% of industrial lands.
- Applies a mix of II and UI zones in 14% of the study area including an estimated 1/2 mile from light rail stations.
- Expands allowances for limited industry-supportive housing in UI Zone concept with a maximum density of 25/dwelling units per acre.
- Applies mixed-use zoning to the areas of Georgetown and South Park that are removed from the MIC. Neighborhood Commercial with a 75’ height limit or a 55’ height limit could be applied. The higher scale 75’ zone is analyzed for impact analysis purposes. An MHA (M1) suffix are assumed for analysis.

Land Use. Under Alternative 3, land use would change over the planning period according to current trends and as a result of the zoning changes of the alternative. Some notable expected changes include.

- **Decreased rate of conversion to stand-alone office and retail uses in MML zoned areas.** The new MML zone would have stricter size of use and FAR limits for stand-alone office and retail uses and a prohibition on mini storage. As a result, there would be fewer conversions to stand-alone office, retail, and mini storage than past trends and under Alternative 1.
- **Continued additions of distribution and warehouse facilities.** Strong demand for new warehouse and distribution space is expected to continue, resulting in the addition of new distribution and warehouse facilities in MML zoned areas.
- **Maintenance of maritime and industrial base.** Most long standing maritime and logistics uses would continue on waterfront lands and industrial lands near key industrial infrastructure, especially in the Greater Duwamish MIC. Incremental renewal of facilities and buildings for industrial use could be expected at a greater rate than under Alternative 1.
- **Denser employment including new industrial space, near future light rail station in II zoned areas.** The proposed II zone standards combined with expected strong market interest due to increased access provided by light rail stations is likely to result in development with a high density of employment in new buildings for Information Computer Technology and offices in these areas. The development would also include new light industrial space at ground level. Much higher levels of employment, and activity pattern of employees and visitors than Alternative 1—No Action is expected. Associated frontage improvements and infrastructure upgrades would be expected.
- **Increased development of mixed-use, flex, and light industrial uses in UI zoned areas.** The proposed UI zone regulations combined with expected strong market interest due to proximity to population centers will lead to incremental addition of new buildings with light industry, office, and flex space in areas at the edges of MICs near urban villages. Incremental infill development will add density of activity and employment, serving non-industrial populations. Frontage improvements and infrastructure upgrades and increased landscaped areas would be expected. The physical character in these edge areas would become more urban in nature with more buildings built to lot lines.
- **Introduction of some new industry-supportive housing.** Under Alternative 3 about 610 new homes would be added in UI zoned portions of industrial areas due to increased flexibility for caretakers' quarters and artist/studios. With Introduction of more housing changes use in activity patterns are expected, as more 24-hour presence of residents living in areas at the edges of MICs.
- **Additional new housing in areas removed from the Greater Duwamish MIC.** More housing would be added in mixed-use buildings in areas removed from MICs in Georgetown and South Park. This housing would contribute to the expansion of a mixed-use, urban neighborhood character in both locations. The added housing capacity is anticipated at 1,078 units.

- **Armory Site Redevelopment.** Under Alternative 3 the Armory site would be redeveloped with a mix of ICT/office and include new light industrial space at ground level after relocation of the Army National Guard to North Bend, WA. The site would contain a substantial amount of employment density in a new campus-like setting with integrated open space features and new roadway, utilities, and infrastructure, including integration of green infrastructure.

Employment Mix. Under Alternative 3, employment is projected to grow substantially more than under Alternative 1 No Action and more than Alternative 2. A total of 57,400 additional jobs are projected for the study area, an increase of 58%. This would represent 34% of the city's total expected job growth over the 20-year planning horizon. The mix of industrial employment would decrease by 1.7%% points compared to Alternative 1—No Action, down to 53.6%. Both MICs would continue to contain much more than the minimum number of industrial jobs required to meet PSRC's regional criteria for MIC designation (20,000). The percentage of industrial employment would decrease close to the 50% threshold in the Ballard (51.1%) and SODO/Stadium (52.6%) subareas. See **Exhibit 3.8-14**.

Exhibit 3.8-14 Employment by Subarea, Current Conditions and Alternative 3

	Current Conditions (2018)			Alternative 3 Future of Industry Limited (2044)		
Subarea	Ind. Emp.	Total Emp.	% Ind.	Ind. Emp.	Total Emp.	% Ind.
Ballard	9,400	17,100	55.0%	15,900	31,100	51.1%
Interbay Dravus	3,400	5,600	60.7%	5,500	9,900	55.6%
Interbay Smith Cove	3,900	6,000	65.0%	6,300	10,500	60.0%
SODO/Stadium	23,000	43,900	52.4%	34,700	66,000	52.6%
Georgetown/South Park	14,900	25,900	57.5%	21,100	38,400	54.9%
Total	54,500	98,500	55.3%	83,500	155,900	53.6%

Source: City of Seattle, 2021.

Consistency With Plans & Policies

Impacts regarding consistency with plans and policies under Alternative 3 are the same as described for Alternative 2 with additional impacts related to housing. Alternative 3 includes an estimated additional 610 limited industry supportive housing units in industrial zones. The housing would be available to business owners or employees of an on-site business that is an industrial use, or available to artists/makers with a business license in live-work spaces. Live/workspaces contain area for production/art/making activities that are physically connected to residential space. Limitations on who may occupy the housing is expected to mitigate the impact of the introduction of residential use (see discussion in **Mitigation Measures**). the homes are considered residential uses for the purposes of environmental analysis in this section.

Alternative 3 would increase the share of projected employment growth in industrial areas to about 34% of total citywide job growth that the city is planning for during the 20-year planning horizon. This would represent a substantial shift of the city's expected employment growth into industrial areas compared to past trends and the previous 20-year Comprehensive Plan planning horizon. This could have the effect of curtailing recently high rates of job growth in other areas of the City such as Downtown and South Lake Union compared to past comprehensive planning period. Or, if the city receives greater job growth than the 20-year citywide estimate, robust employment growth in the study area would provide the benefit of absorbing some of the city's stronger than expected growth. Since the Comprehensive Plan major update is expected to integrate and plan for the changes contemplated in this EIS the share of employment growth in the study area is not considered an adverse impact.

An incremental increase in conflicts would arise with regional multi-county and PSRC policies that discourage location of new housing in MICs, including (e.g., MPP-Ec-22 and MPP-DP-). Similarly, a degree of inconsistency would arise with the City's Comprehensive Plan policies including LU Policy 10.12 (competition for industrial land by non-industrial uses) and Container Port CP.3 (discouraging retail and residential uses). Overall impacts to consistency with plans and policies due to introduction of housing would result in **moderate** impacts.

Land Use Compatibility

Ballard

Under Alternative 3 land in the Ballard uplands in the 14th Avenue NW corridor north of NW Leary would be placed in the UI zone, and the zone would allow industry supportive housing at a maximum density of 25 dwelling units / acre. A substantial amount of increased infill development with light industrial uses, brewers/makers with large ancillary spaces is expected throughout this area and along NW 36th Street in Fremont. Proximity to light rail would fuel demand. New zone standards would allow small parcels to accommodate new structures. An additional 260 housing units are estimated, and they would typically be located on an upper floor of a 3-4 story mixed-use development. Ground floor uses would appeal to visitors from nearby urban villages such as showrooms, tasting rooms and similar.

These changes would cause an overall and thorough transition of the area to an urban mixed-use pattern with some 24-hour residences interspersed sporadically throughout. Compatibility impacts would increase between remaining longstanding industrial operations and the evolving context due to factors such as impediments to local truck access, and increased exposure of new residents and patrons/visitors to industrial noises and other effects. These compatibility impacts would likely increase pressure on intensive or heavy industrial activities to relocate form the area over time and would rise to the level of moderate. However, use compatibility could also improve to some degree as new investment brings associated streetscape improvements and landscaping that would reduce conflicts between pedestrians and freight movement by increasing amenity features and vegetation that would buffer non-industrial visitors or residents from effects of heavier industrial uses. The resulting use patterns, and

times of day for activity, would become more consistent with the adjacent areas outside of the study area.

Due to conversion to the MML zone for lands abutting the shoreline, incompatible use pressures in areas of Ballard south of Leary Way would be lessened over time, compared to Alternative 1. Existing land use incompatibilities here would continue near existing levels and would be the same as described above for Alternative 2.

Dense employment in multi-story buildings would likely be added in the two blocks of the II in Fremont that already contain a high concentration of dense employment. Similar to Alternative 2, No major land use conflict would be expected in these locations.

Overall use compatibility impacts in Ballard would be **moderate** under Alternative 3**.**

Interbay Dravus

Under Alternative 3, all of the shoreline and adjacent lands including Fisherman's Terminal, W Commodore Way lands, and the BNSF railyard would be placed in the MML zone. Use land use conflicts in industrial areas would be the same as described above under Alternative 2 and reduced compared to Alternative 1—No Action.

Land north of Dravus Street along Thorndyke Avenue W that would be in the UI zone as in Alternative 2, however in Alternative 3 the zone would allow for supportive housing at a maximum density of 25 dwelling units / acre. An additional 75 housing units are estimated, and they would typically be located on an upper floor of a 3-4 story mixed-use development. Similar to Alternative 2, the areas would likely receive incremental infill development with light industrial uses, brewers/makers with large ancillary spaces, including on some smaller parcels. Some land would likely be used for light rail construction. These changes would cause an overall transition of the area to an urban mixed-use pattern with housing units sporadically introduced throughout. However, no very heavy or largescale industrial uses are in the small area, and the area is contained by defined edges of the rail track and 15th Avenue W.

The limited size of land in this node and the relatively small number of projected homes are factors that keep overall use compatible impacts in the Interbay Dravus Subarea to a degree of **minor** under Alternative 3**.**

Interbay Smith Cove

Under Alternative 3 the Armory site would be in the II zone and would likely be developed with a significant amount of dense employment in multistory structures, including some towers, with dedicated space for ground floor light industry. Development would be coordinated through master planning to create a campus like setting with interconnected circulation, open spaces, and infrastructure. Since development would be coordinated, light industry would be integrated such that potential use conflict are minimized with respect to factors such as noise, access, glare, and odors. Such redevelopment would contribute to a strong agglomeration of daytime employment uses in conjunction with the existing Expedia campus and offices in the

Elliott Way corridor. The resulting use pattern would be largely compatible with surrounding context towards the Queen Anne, Uptown urban villages, and the W Armory Way corridor that has already been converted to include a prevalence of retail uses. There is some potential for land use incompatibility at the west edge of the Armory site abutting BNSF rail tracks where vibrations, noise from trains could impact new office uses. Due to integrated design of the Armory site, and findings in other sections of this EIS, such impacts would not be more than minor.

As with Alternative 2, the T91 Marine Terminals and T91 uplands would be placed in the MML zone. Marine activities, and industrial uses similar to existing today would continue on these lands and would not create additional land use conflict.

For other parts of Interbay /Smith Cove, use compatibility aspects of Alternative 3 would be similar to Alternative 2. However, there is increased potential for incompatibility in UI zoned areas in the four blocks along 15th Avenue NW where an estimated 15 housing units would be located. Some land use conflicts resulting from a high volume of truck traffic and presence of 24-hour residences could occur, but the small overall quantity of residences would keep impact to a minor level.

Overall use compatible impacts in the Interbay Smith Cove Subarea would be **minor** under Alternative 3**.**

SODO/Stadium

Under Alternative 3, of the shoreline areas and adjacent lands including Port Terminals, and land currently zoned IG would be placed in the MML zone. Compatibility impacts there would be similar to Alternative 2 and reduced compared to Alternative 1—No Action.

Under Alternative 3 a larger area of the II zone is added in areas approximately ½ mile walking distance to the SODO/Lander station. A higher amount of new land use conflicts would be likely in the area around the SODO/Lander Street light rail station compared to Alternative 2 as more land would potentially generate higher volumes of daytime workers unrelated to industrial operations. Conflicts could include new exposures of pedestrians and workers using outside spaces to loud truck traffic and industrial equipment and to odors from industrial operation such as the Republic Transfer station. Presence of workers could increase difficulty of fluid movement of freight and other industrial vehicles, including difficulty operating loading docks and site access. Under Alternative 3 new dense employment would abut heavy rail tracks on the east and west and would be closer to rail yards. There is a higher potential for new employees or tenants in the area to levy complaints against longstanding heavy industrial activities in the vicinity. Impacts rise to the level of moderate.

Use compatibility impacts for The II zoned area between 4th Avenue S and I-90, and in the Rainier Avenue S corridor, and the WOSCA site would be the same as under Alternative 2, including the described relationships to adjacent Chinatown/ID and Little Saigon neighborhoods.

Under Alternative 3 land in the stadium area in the UI zone could receive an estimated 200 industry-supportive housing units. The area would also receive incremental infill development with light industrial uses, brewers/makers with large ancillary spaces, including on some smaller parcels—similar to Alternative 2. Some additional lodging uses would be expected due to the change to permit lodging in the Stadium Area Overlay District (STAOD). Continued addition of large-sized office and retail uses are expected in the STAOD. The uses would appeal to visitors from nearby residential areas and patrons of stadium events. These changes would cause an overall transition of the area fronting 1st Avenue to an urban mixed-use land use pattern, with some homes interspersed on upper stories of new buildings. The duration of hours and times when visitors unrelated to industry are present would increase in the stadium area outside of event times. This could result in use compatibility impacts due to an incremental increase in exposure of pedestrian activity near trucks transiting 1st Avenue increasing the potential for complaints levied against long standing industrial users. Such impacts would rise to the level of moderate. However, there is also potential for decreases in use conflict as the stadium area transitions to an internally cohesive mixed-use environment with more regular patterns of patronage outside of event times.

Overall use compatibility impacts in the Stadium area would be **moderate** under Alternative 3**.**

Georgetown/South Park

Under Alternative 3, all of the riverfront lands including Port Terminals and marine operations, and expansive stretches of land currently zoned IG would be placed in the MML zone. Use compatibility impacts there would be similar to Alternative 2 and reduced compared to Alternative 1.

Under Alternative 3 (as in Alternative 2) edges of South Park and Georgetown residential areas would be zone UI, and increased infill development with light industrial uses, brewers/makers, and small manufacturers with large ancillary spaces is expected. However, the zone would enable an estimated 60 industry supportive residential units interspersed in these areas. Resulting use patterns, and times of day for activity that would become more consistent with the adjacent areas outside of the study area in South Park. There is some potential for increased volumes of visitors to create minor use conflicts with heavy industrial uses in MML zones, including the potential for increased complaints levied against industrial users. In some locations, residences could directly view industrial layout spaces and storage yards, truck loading docks, and other industrial development.

Under Alternative 3, the triangular area of Georgetown bounded by Corson Avenue S, Carleton Avenue S and I-5 would be removed from the MIC and placed into a mixed-use zone. The area would likely develop with a high concentration of urban mixed-use structures with ground level retail and residential above. An estimated 1,078 housing units could be added. Land use incompatibility would contribute to pressure for existing industrial businesses to relocate, and by the end of the study time horizon the area would likely transition to mixed-use area similar to an urban village. The new activity pattern would complement the existing use pattern of

restaurants, bars, and retail that fronts Airport Way S and could create a cohesive district. The break in the continuity between the two residential portions of the Georgetown neighborhood that exists today would be removed, which could increase land use compatibility.

Land removed from the MIC at the edges of South Park would be placed in a mixed-use zone. Some of it would likely redevelop with mixed-use structures including housing on upper floors. The new activity patterns could complement existing use pattern of community uses, local businesses and housing that is inside the South Park urban village. Land added to the South Park urban village adjacent to Duwamish Waterway Park would support community goals to add community uses and residents near open space, provide better physical connection of community members to the Duwamish River. Similarly, conversion to mixed residential and commercial use in the area adjacent to Terminal 117 could alleviate the perception of disconnectedness of South Park community to the Duwamish River. Addition of residences and mixed-use structures would, however, create a period of moderate land use conflict between operation of light industrial businesses and new users.

Overall, while there is potential to reduce land use conflicts by creation of more cohesive mixed-use districts in Georgetown and South Park, the process would result in interim increases in **moderate** land use incompatibilities.

Employment Mix

As seen above in **Exhibit 3.8-14**the overall employment under Alternative 3 would increase by 57,000 jobs. The mix of industrial employment would decrease by 1.7% points compared to 53.6% in the No Action Alternative, but total industrial employment would increase by 29,000 jobs. The percentage of industrial employment would remain at roughly 51% or greater in every subarea under the alternative. Although there would be an increase in non-industrial employment in office and ICT sectors, the increase in industrial employment due to stronger protections in the MML zones, inclusion of new light industrial space in II zone development, and industrial redevelopment of the Armory site would result in bigger increases in industrial employment. No adverse impact is expected.

Land Use Transitions

Alternative 3 results in impacts due to a lack of transition similar to Alternative 2 except for Ballard and Georgetown where changes to land currently in the IG1 zone are rezoned as UI or in the case of Georgetown and South Park where small areas are removed from the MIC and placed in a mixed-use commercial zone.

Ballard

The area north of Leary Way and east of 15th Avenue W are removed from a core industrial zone and rezoned UI. This change further reduces the potential for high intensity/high impact uses occurring in proximity to nonindustrial areas. The IC zoned area in northwest Ballard is removed from the IC zone and the core industrial zone is extended to the north Side of Market

Street. Potential impacts related to height, bulk, and scale in Alternative 3 are similar to those in Alternative 2. The IC zoned area in northwest Ballard is removed from the IC zone and the core industrial zone is extended to the north Side of Market Street. This has the potential to introduce high intensity/high impact uses. The relative size of this change means that the impact due to a lack of transition is moderate.

Interbay Dravus and Interbay Smith Cove

Alternative 3 proposes the same land use pattern as Alternative 2. Existing unavoidable impacts occur parallel to the BNSF rail corridor and reduced potential impacts occur in the Dravus area. Impacts adjacent to the BNSF rail corridor are moderate and in Dravus are low.

SODO/Stadium

The land use pattern in SODO/Stadium is the same as Alternative 2 and will result in the same impacts as Alternative 2.

Georgetown/South Park

Alternative 3 proposes the removal of some land from both the Georgetown and South Park neighborhoods from the MIC and rezoned with a mixed-use commercial zone. In Georgetown land zoned IG2 bound by Corson Avenue S to the north, Airport Way S to the east and the commercial and mixed-use commercial zoning to the south is removed from the MIC. This change will not erode the existing transition from the core industrial areas and removes the potential for high impact/high intensity to encroach or abut nonindustrial areas. Potential impact from this proposal is low.

Other Industrial Zoned Lands

The only difference between the proposed changes for land outside the MICs between Alternative 2 and 3 occurs on the northern shoreline of Lake Union. Alternative 3 proposes changing the IB zoning in this area to UI with no potential for high intensity/high impact uses. The potential for impacts with this proposal is low.

Impacts of Alternative 4

Likely Changes Over the 20-year Planning Horizon

Land Use Planning & Policy. Under Alternative 4—Future of Industry Expanded, the planning and policy context would be changed to enact the Comprehensive Plan policy amendments described above in **Local Policy Framework**. The City would also adopt updates to the currently adopted Sub Area Plans for the Greater Duwamish MIC and BINMIC which include the land use concepts identified in this proposal.

Future Land Use. Under Alternative 4, the Future Land Use Map would be amended slightly. Boundaries of the Greater Duwamish MIC would be altered to remove 19 acres near Georgetown and 7 acres adjacent to South Park from the MIC designation, as indicated on the map in **Chapter 2** and **Appendix C**. In Georgetown, the triangular area bounded by Corson Avenue S, Carleton Avenue S, and I-5 would be placed into the Commercial/Mixed-Use Areas designation. In South Park select parcels at the northeast and southeast corners of the urban village adjacent to the Duwamish River would be removed from the MIC and placed in the South Park Urban Village. The total area of lands removed from the MIC would be 26 acres. No land would be removed from the BINMIC, and no other Comprehensive Plan FLUM designations would change.

Zoning. Under Alternative 4, zoning would be changed to apply the proposed new MML, II, and UI zones, instead of the existing zones. The Seattle Municipal Code would be amended to add the development standards in the MML, II and UI zones as described in **Chapter 2**, including retention of a Stadium Transition Area Overlay District. The location of the zones in Alternative 4 is mapped as shown in **Chapter 2**, and **Appendix C**.

Alternative 4 applies the proposed land use concepts with a greater share of Industry and Innovation and Urban Industrial than Alternative 2. This alternative expands limited housing allowances to the greatest degree of any of the alternatives. Alternative 4:

- Applies the MML zone covering 87% of industrial lands.
- Applies a mix of the II and UI zones to 13% of the study area includes an estimated 1/2 mile from light rail stations.
- Expands limited industry-supportive housing in UI zone with a maximum density of 50 Dwelling Units / Acre
- Applies mixed-use zoning to the areas of Georgetown and South Park that are removed from the MIC. Neighborhood Commercial with a 75’ height limit or a 55’ height limit could be applied. The higher scale 75’ zone is analyzed for impact analysis purposes. An MHA (M1) suffix are assumed for analysis.

Alternative 4 includes a maximum size of use limit for indoor sports and recreation uses up to 50,000 sq. ft. in all proposed industrial zones. This would be an increase over the 10,000 sq. ft. size limit of the existing IG zones, but a decrease from the existing limit of 75,000 in IB and IC zones. The SMC also already includes a special allowance for indoor sports and recreation facilities up to 50,000 sq. ft. in the BINMIC subject to limiting locational criteria of SMC 23.50.027.H.

Land Use. Under Alternative 4, land use would change over the planning period according to current trends and as a result of the zoning changes of the alternative. Some notable expected changes include.

- **Decreased rate of conversion to stand-alone office and retail uses in MML zoned areas.** The new MML zone would have stricter size of use and FAR limits for stand-alone office and retail uses and a prohibition on new mini-storage facilities. As a result, there

would be fewer conversions to stand-alone office and retail than past trends and under Alternative 1.

- **Continued additions of distribution and warehouse facilities.** Strong demand for new warehouse and distribution space is expected to continue, resulting in the addition of new distribution and warehouse facilities in MML zoned areas.
- **Maintenance of the maritime and industrial base.** Most long standing maritime and logistics uses would continue on shorelines and industrial lands near industrial infrastructure, especially in the Greater Duwamish MIC. Incremental renewal of facilities and buildings for industrial use could be expected at a greater rate than under Alternative 1.
- **Denser employment including new industrial space, near future light rail station in II zoned areas.** The proposed II zone standards combined with expected strong market interest due to increased access provided by light rail stations is likely to result in development with a high density of employment in new buildings for Information Computer Technology and offices in these areas. The development would also include new light industrial space at ground level. Much higher levels of employment, and activity pattern of by employees and visitors. Associated frontage improvements and infrastructure upgrades would be expected.
- **Increased development of mixed-use, flex and light industrial uses in UI zoned areas.** The proposed UI zone regulations combined with expected strong market interest due to proximity to population centers will lead to the incremental addition of new buildings with light industry, office, and flex space in areas at the edges of MICs near urban villages. Incremental infill development will add density of activity, employment, serving non-industrial populations. Frontage improvements and infrastructure upgrades and increased landscaped areas would be expected. The physical character in these edge areas would become more urban in nature with more buildings built to lot lines.
- **Introduction of some new industry-supportive housing.** Under Alternative 4 about 2,195 new homes would be added in UI zoned portions of industrial areas due to increased flexibility for caretakers' quarters and artist/studios. Introduction of housing changes use patterns, as more 24-hour presence of residents living in areas at the edges of MICs.
- **Additional new housing in areas removed from the Greater Duwamish MIC.** More housing would be added in mixed-use buildings in areas removed from MICs in Georgetown and South Park. This housing would contribute to the expansion of a mixed-use, urban neighborhood character in both locations. The number of new units in the mixed-use areas removed from the MIC equal about 1,078.
- **Armory Site Redevelopment.** Under Alternative 3 the Armory site would be redeveloped with a mix of ICT/office and include new light industrial space at ground level after relocation of the Army National Guard to North Bend, Washington. The site would contain a substantial amount of employment density in a new campus-like setting with integrated open space features and new roadway and utilities infrastructure, including integration of green infrastructure.

Employment Mix. Under Alternative 4, employment is projected to grow substantially more than under Alternative 1 No Action and Alternative 2, and by a similar amount to Alternative 3. A total of 59,200 additional jobs are projected for the study area, an increase of 59%. This would represent 35% of the total projected citywide employment growth over the 20-year planning horizon. The mix of industrial employment would decrease by 2.5% points compared to No Action, down to 52.8%. Both MICs would continue to contain much more than the minimum number of industrial jobs required to meet PSRC's regional criteria for MIC designation (20,000). The percentage of industrial employment would decrease close to the 50% threshold in the Ballard (50.0%) and SODO/Stadium (51.9%) subareas. See **Exhibit 3.8-15**.

Exhibit 3.8-15 Employment by Subarea Current Conditions and Alternative 4

	Current Conditions (2018)			Alternative 4 Future of Industry Limited (2044)		
Subarea	Ind. Emp.	Total Emp.	% Ind.	Ind. Emp.	Total Emp.	% Ind.
Ballard	9,400	17,100	55.0%	16,000	32,000	50.0%
Interbay Dravus	3,400	5,600	60.7%	5,600	10,200	54.9%
Interbay Smith Cove	3,900	6,000	65.0%	6,300	10,700	58.9%
SODO/Stadium	23,000	43,900	52.4%	34,400	66,300	51.9%
South Park/Georgetown	14,900	25,900	57.5%	21,000	38,500	54.5%
Total	54,500	98,500	55.3%	83,300	157,700	52.8%

Source: City of Seattle, 2021.

Consistency With Plans & Policies

Impacts regarding consistency with plans and policies under Alternative 4 are similar in nature to those described under Alternative 3 above. However, the anticipated impact is greater under Alternative 4 because Alternative 4 introduces a greater quantity of industry-supportive housing (an estimated 2,195 limited industry supportive housing units in industrial zones). The housing would be available in caretakers' quarters or artist/maker live/workspaces as described for Alternative 3.

Similar to Alternative 3, Alternative 4 would represent a substantial shift of the city's expected employment growth into industrial areas compared to past trends and the previous 20-year Comprehensive Plan planning horizon, with 35% of expected job growth in the study area. For reasons described above for Alternative 3 however, this would not result in an adverse impact.

An incremental increase in conflicts would arise with regional multi-county and PSRC policies that discourage location of new housing in MICs. Similarly, a degree of inconsistency would arise with the City's Comprehensive Plan policies including LU Policy 10.12 (competition for industrial land by non-industrial uses) and Container Port CP.3 (discouraging retail and

residential uses). Overall impacts to consistency with plans and policies due to introduction of housing would be greater than under Alternative 3 but would result in **moderate** impacts.

Land Use Compatibility

Ballard

Under Alternative 4 land in the Ballard uplands in the 14th Avenue corridor north of NW Leary would be placed in a combination of the II zone and the UI zone. The UI zone would allow a greater density of industry supportive housing at a maximum density of 50 dwelling units / acre.

The blocks zoned II would likely be developed with a significant amount of dense employment in multistory structures, including some towers, with dedicated space for ground floor light industry. Development pressure would be fueled by proximity to light rail. The redevelopment would contribute to an agglomeration of daytime employment uses in conjunction with nearby activity in the Ballard Urban Village. New uses would generate higher volumes of daytime workers unrelated to industrial operations. Conflicts could include new exposures of pedestrians and workers using outdoor spaces to loud truck traffic and industrial equipment and to odors from long-standing industrial operations in the area. Presence of workers could increase difficulty of fluid movement of freight and other industrial vehicles, including difficulty with loading and site access.

Other areas that are north of NW Leary Way NW and in Fremont north of 36th Street would be placed in the UI zone and would likely receive a substantial amount of increased infill development with light industrial uses, brewers/makers with large ancillary spaces. New zone standards would allow small parcels to accommodate new structures. An additional 790 housing units are estimated and would typically be located on several upper floors of a 4-6 story mixed-use development. Ground floor uses would appeal to visitors from nearby urban villages such as showrooms, tasting rooms and similar uses. Residents would be in view of storge and loading areas of industrial business. The likelihood of complaints levied against industrial businesses would increase.

These changes would cause an overall and thorough transition of the area to an urban mixed-use pattern with some 24-hour residences interspersed throughout. Compatibility impacts would likely increase pressure on intensive or heavy industrial activities to relocate form the area over time and would rise to the level of moderate impact. However, light industrial spaces would be integrated at ground level and some area businesses could have access to new light industrial space.

Due to conversion to the MML zone for lands abutting the shoreline, incompatible use pressures in areas of Ballard south of Leary Way could be lessened over time. However, the magnitude of new residences and employees in areas north of Leary Way could exhibit spillover use compatibility pressure on some land south of Leary Way. Therefore, use incompatibilities here would be greater than the other alternatives, and rise to the level of **moderate**.

Dense employment in multi-story buildings would likely be added in the two blocks of the II in Fremont that already contain a high concentration of dense employment. Similar to Alternative 2, no major use conflict would be expected in these locations.

Overall use compatible impacts in Ballard would be the greatest of any of the alternatives and would be **moderate** under Alternative 4**.**

Interbay Dravus

Under Alternative 4, all shoreline and adjacent lands including Fisherman's Terminal, W Commodore Way lands, and the BNSF railyard would be placed in the MML zone. Use conflicts in these areas would be the same as described in alternatives 2 and 3 and reduced compared to Alternative 1—No Action.

Land north of W. Dravus Street along Thorndyke Avenue W would be zoned UI as in alternatives 2 and 3, but in Alternative 4 the zone would allow for industry supportive housing at a maximum density of 50 dwelling units per acre. An additional 175 housing units are estimated, and they would typically be located on an upper floor of a 4-6 story mixed-use development. These changes would cause an overall transition of the area to an urban mixed-use pattern with housing units interspersed, which could lead to the type of land use conflicts described in Alternative 3 where housing is introduced. However, no very heavy or largescale industrial uses are in the small area, and it is contained by defined edges of the rail track and 15th Avenue W.

As with Alternative 3, the limited size of land in this node limits the degree of potential impact. However, the greater density of homes increases likelihood of land use conflict compared to Alternative 3. Therefore, use compatibility impacts in the Interbay Dravus Subarea for Alternative 4 would be **moderate**.

Interbay Smith Cove

Under Alternative 4 the Armory site would be in the II zone, as it is in Alternative 3. The land use compatibility impacts would be the same as described for Alternative 3.

As with alternatives 2 and 3, T91 Marine Terminals and T91 uplands would be placed in the MML zone. Marine activities, and industrial use similar today would continue on those lands and would not create additional use conflict.

No additional housing is expected in the Interbay Smith Cove Subarea under Alternative 4 because of the small application of the UI zone on parcels unlikely to redevelop.

Overall use compatible impacts in Interbay Smith Cove would be **minor** under Alternative 4**.**

SODO/Stadium

Under Alternative 4, all shoreline areas and adjacent lands including Port Terminals, and expansive stretches of land currently zoned IG would be placed in the MML zone. Compatibility

impacts there would be similar to Alternative 2, and 3, and reduced compared to Alternative 1—No Action.

Under Alternative 4 a larger area of the Industry and Innovation zone (than alternative 2 or 3) is added in an expanded ½ mile walking areas to the SODO/Lander station, including blocks along 6th Avenue S north of S Holgate Street. A higher amount of new land use conflict than alternative 2 or 3 would be likely in the area as more land would potentially generate higher volumes of daytime workers unrelated to industrial operations. Land use compatibility conflicts would be similar to those described for Alternative 3 but greater in scale. Land added to the II zone in Alternative 4 would abut heavy rail tracks, freeway ramp infrastructure onramps to I-90, and the King County Metro Central Base exposing future occupants to close contact with regular effects of bus noise and emissions.

Use compatibility impacts for the II zoned area between 4th Avenue S and I-90, in the Rainier Avenue S corridor, and the WOSCA site would be the same as under alternatives 2 and 3 including the described relationships to the adjacent Chinatown/ID and Little Saigon neighborhoods.

Under Alternative 4, land in the stadium area would be zoned UI, and the UI zone would be extended further south along 1st Avenue to Starbucks Center. This would allow the area to receive an estimated 990 industry-supportive housing units. The area would also receive incremental infill development with light industrial uses, brewers/makers with large ancillary spaces, including on some smaller parcels—similar to alternatives 2 and 3. Some additional lodging uses would be expected due to the change to permit lodging in the Stadium Transition Area Overlay District (STAOD). Continued addition of large-sized office and retail uses are expected in the STAOD. These changes, including the higher proportion of housing would cause an overall transition of the area fronting 1st Avenue to an urban mixed-use pattern, with homes interspersed on upper stories of new buildings. Use compatibility conflicts would be similar to those described for Alternative 3, but greater in scale. Such impacts would rise to the level of moderate. However, there is also potential for decreases in land use conflict as the stadium area transitions to a more internally cohesive mixed-use environment with more regular patterns of patronage outside of event times.

Overall use compatibility impacts in the SODO/Stadium area in Alternative 4 would be greater than Alternative 3 but would be **moderate.**

Georgetown/South Park

Under Alternative 4, all of the riverfront lands including Port Terminals and marine operations, and expansive stretches of land currently zoned IG would be placed in the MML zone. Land use compatibility impacts there would be similar to alternatives 2 and 3 and reduced compared to Alternative 1.

Under Alternative 4 (as in Alternative 2) edges of South Park and Georgetown residential areas would be zoned UI, and increased infill development with light industrial uses, brewers/makers,

and small manufacturers with large ancillary spaces is expected. However, the zone would enable an estimated 240 industry supportive residential units interspersed in these areas. Use compatibility conflicts would be similar to those described for Alternative 3 but greater in scale.

Land use changes and resulting compatibility impacts in the triangular area that would be removed from the MIC in Georgetown and the land removed from the MIC at the edges of South Park and placed into a mixed-use zone would be the same as under Alternative 3.

Overall, while there is potential to reduce land use conflicts by creating cohesive mixed-use districts in Georgetown and South Park over time, the process would result in interim land use compatibility impacts that rise to the level of **moderate**.

Employment Mix

As seen above in **Exhibit 3.8-15**, the overall employment under Alternative 4 would increase by 59,200 jobs. The mix of industrial employment would decrease by 2.5% points compared to 53.6% in the Alternative 1—No Action, but total industrial employment would increase by 28,800 jobs. The percentage of industrial employment would remain at roughly 50% or greater in every subarea under the alternative. Although there would be an increase in non-industrial employment in office and ICT sectors, the increase in industrial employment due to stronger protections in the MML zones, inclusion of new light industrial space in II zone development, and industrial redevelopment of the Armory site would result in bigger increases in industrial employment. Since the employment mix of industrial would drop to 50.0% in Ballard—at the threshold for percentage of industrial employment in MICs per regional criteria—a minor adverse impact in employment mix is present for the Ballard Subarea.

Land Use Transitions

Alternative 4 has the greatest amount of proposed change but at the transitions from core industrial areas to nonindustrial areas result in the same or fewer impacts than Alternative 3. In this alternative some areas that are proposed to be zoned UI in Alternative 3 are proposed to be II which, like UI, precludes the potential for high impact/high intensity uses to abut or encroach on nonresidential areas but could result in some impacts related to height, bulk, scale, and aesthetics.

Ballard

The central part of the Ballard Subarea bisected by 14th Avenue W is proposed to be rezoned from IG1 to II. This change is expected to result in a mix of light industrial and commercial development. The change from IG to II will provide a better transition to nonindustrial areas to the north by reducing the likelihood of high impact/high intensity uses encroaching or abutting nonresidential areas. In northwest Ballard where industrial land abuts nonindustrial land, the proposal is to rezone existing IC zoned land to II providing a similar transition as Alternative 1—No Action and maintaining the unlikely potential for high intensity/high impact uses to abut or encroach on nonindustrial areas. However, larger and taller buildings anticipated by the II,

particularly near transit stations, have the potential for impacts related to height, bulk, scale, and aesthetics adjacent to nonindustrial areas. Impacts of the proposal in Ballard are **moderate**.

Interbay Dravus and Interbay Smith Cove

The proposed land use changes in the Interbay Dravus and Interbay Smith Cove subareas are identical to those proposed in Alternative 3 and the resulting impacts are the same.

SODO/Stadium

The proposed land use changes in the SODO/Stadium Subarea are the same as Alternative 3 except for a small node of land on the west side of Harbor Avenue SW which is proposed to be changed from IB to UI. The impacts are similar to impacts identified in the other alternatives.

Georgetown/South Park

The proposed land use changes in Interbay are identical to those proposed in Alternative 3 and the resulting impacts are the same.

Other Industrial Zoned Lands

Alternative 4 proposes the same changes for land outside the MICs that Alternative 3 proposes and there are no impacts due to lack of transition between core industrial areas and nonresidential areas.

Summary of Impacts

Exhibit 3.8-16 summarizes adverse impacts under each alternative by subarea. The degree of impact varies within subareas and may only manifest in a subset of locations. The greatest adverse impact identified within each subarea is listed in **Exhibit 3.8-16**, below.

Exhibit 3.8-16 Summary of Land Use Impacts by Subarea and Alternative

Category of Land Use Impact		Alt. 1	Alt. 2	Alt. 3	Alt. 4
Consistency with Plans & Policies	Ballard	Moderate	Minor	Moderate	Moderate
	Interbay Dravus				
	Interbay Smith Cove				
	SODO/Stadium				
	Georgetown/South Park				
Compatible Uses	Ballard	Moderate	Minor	Moderate	Moderate
	Interbay Dravus	Moderate	Minor	Minor	Moderate
	Interbay Smith Cove	Moderate	Minor	Minor	Minor
	SODO/Stadium	Moderate	Minor	Moderate	Moderate
	Georgetown/South Park	Moderate	Minor	Moderate	Moderate
Transitions	Ballard	Moderate	Moderate	Moderate	Moderate
	Interbay Dravus	Moderate	Moderate	Moderate	Moderate
	Interbay Smith Cove	None	None	None	None
	SODO/Stadium	Minor	Minor	Minor	None
	Georgetown/South Park	Minor	Minor	Minor	Minor
Employment Mix	Ballard	None	None	None	Minor
	Interbay Dravus	None	None	None	None
	Interbay Smith Cove	None	None	None	None
	SODO/Stadium	None	None	None	None
	Georgetown/South Park	None	None	None	None

Source: City of Seattle, 2021.

3.8.3 Mitigation Measures

Incorporated Plan Features

Many of the potential land use impacts are mitigated down to non-significant level by incorporated plan features that are a part of the proposal. These aspects are described elsewhere in the Chapter; especially important mitigating features are highlighted below.

- **Reduced maximum size of use limits.** Proposed MML zone standards include maximum size of use limits of 10,000 sq. ft for offices, medical services (and others), a 7,500 limit for general retail sales, and 3,000 sq. ft. for bars and restaurants. These are significant reductions compared to current IG zones. The proposed UI zone also includes reduced

maximum size of use limits for stand-alone non-industrial uses. These reductions reduce the potential for incompatible use and employment mix impacts.

- **Incentive structure in the II zone.** The incentive bonus system would ensure that any new non-industrial development includes bona-fide, newly constructed industrial space. New development of high value uses supports the construction of new space for industrial uses. This contrasts with the existing IC zone, in which new development frequently includes no industrial space. This feature mitigates potential plan consistency, incompatible use, and employment mix impacts.
- **Limits on changes to MIC boundaries.** The proposed Comprehensive Plan policy to limit changes to MIC boundaries will mitigate potential future impacts related to incompatible land uses in all alternatives.
- **Limitations on Occupancy of Industry-Supportive Housing.** The limitation on occupancy mitigates potential incompatible use and policy inconsistency impacts. With a limitation on residents to persons engaged in and familiar with industrial operations and/or making/arts, new residents introduced into industrial areas would have greater understanding of the impacts (noise, odors etc.) compared to the general population. Residents would have better understanding of safety protocols and potential hazards of an industrial area. They would be less likely to levy complaints against industrial businesses, and more likely to use protections in appropriate situation such as safety glasses and hearing protection. Potential residents would be more likely to have full awareness of any potential hazards when choosing whether to live there compared to the general population. These factors significantly reduce adverse effects typically associated with introduction of residences into an industrial area.
- **Comprehensive Plan Policy Amendments.** Comprehensive Plan goal and policy amendments set a new vision and guidance for the city's industrial areas and address new aspects such as high-capacity transit. Without the foundational policy amendments all the Action alternatives would likely have significant adverse impacts on consistency with the current Comprehensive Plan policy framework. Since the plan amendments are an integrated part of the proposal, policy inconsistency is mitigated down to a non-significant level for all Action Alternatives.
- **Development standards in the UI zone.** Reduced setbacks would allow for construction on more small sites, which provides buffering affects. The standards also include increased requirements (compared to the IB zone) for urban style streetscape improvements and would introduce the green factor landscaping requirement. Development standards for development in the UI zone These features reduce the potential for transition impacts.
- **Completion of MIC subarea plans.** The proposal includes completion of subarea plan updates for the Greater Duwamish MIC and BINMIC. The plans would be updated to reflect the umbrella policy updates in the Comprehensive Plan, and the land use and zoning changes described in this EIS. Data and information included in Chapters of this EIS and related studies would be integrated into the subarea plans. Additionally, the plans would address more location specific strategies for integration of amenity features, open spaces,

configuration of circulation improvements and other non-land use features. Completion of the plans will mitigate potential use compatibility, transition impacts.

Regulations & Commitments

Many of the potential land use impacts are mitigated down to non-significant level by the presence of existing regulatory commitments that would apply with or without the proposal.

- **Shoreline Master Program (SMP).** The existing SMP regulations are unchanged and will continue to apply to all new development. SMP regulations supersede underlying zoning. Many of the SMP regulations supporting protections for industrial maritime activities at the shorelines in industrial areas under all alternatives. These designations require water-dependent and water-related uses at the shoreline and will provide protection from incompatible land uses for all alternatives for land that is within 200' of the shoreline.
- **SEPA Project Level Review.** The existing State Environmental Policy Act (SEPA) regulations are unchanged and will continue to apply to all new development at the time of project level review. SEPA project level review would apply to any development proposal that includes 4 or more residential units, or 12,000 or more sq. ft. of non-residential development. Site specific factors would be considered at the time of project level SEPA review, and development projects could be conditioned to address any localized impacts pursuant to Chapter 25 of the SMC and other State RCW 43.21C.
- **Noise Ordinance.** Application of the City's Noise Ordinance (SMC 25.08) can mitigate impacts from poor transitions from industrial areas to nonindustrial areas by limiting noise impacts to adjacent areas.

Other Potential Mitigation Measures

Though no significant adverse land use impacts are identified, it would be possible to further mitigate the identified moderate and minor land use impacts with the following actions. Incorporation of these actions would reduce the likelihood that any of the impacts could potentially become significant.

- **Apply maximum size of use limits to industrial zones in Alternative 1.** If Alternative 1—No Action is selected, expected use incompatibility impacts and policy conflict impacts could be reduced by incorporating maximum size of use reductions for office and retail uses (similar to the MML zone) into the existing Industrial General zones. This could be stand-alone legislation. The maximum size of use limits could be applied to areas only within designated MICs in order to provide continued flexibility for IG zoned areas outside of MICs.
- **Limit the geography of industry-supportive housing and monitor.** Incompatibility, transition, and policy inconsistency impacts could be mitigated to a lower level if the proposed industry supportive housing allowances are initially limited to a smaller geography. Limits could test the concept in a pilot area, or the proposed UI zone could include versions with and without the expanded housing allowances. The City and partners could monitor the initial effects of the expanded housing allowances for an initial test

period of 3–5 years, then consider applying to more areas. Stakeholders in industrial areas such as community organizations, Business Improvement Areas (BIAs) and trade groups could be involved in the monitoring process through formation of a stewardship group.

- **Update zoning at edge areas outside of the study area in the future.** Changes include limiting significant housing development in adjacent mixed-use zones to reduce potential impacts related to inadequate transitions from industrial to nonindustrial areas, particularly where core industrial zones are located close to these transitions**.** Changes could include application of the proposed Urban Industrial zone to more areas outside of industrial areas, including in some urban villages.
- **Contributions towards equitable development.** There have been historic impacts from industrial activities on populations including indigenous communities that preceded this proposal. It is plausible that continuation of land uses according to City and regional policies could perpetuate past harms according to some populations including indigenous peoples. As a voluntary measure unrelated to impacts of any of the proposal's alternatives, current owners of land could support equitable development for indigenous groups by developing a broad-based system of contributions to community building and resilience. The contributions could take forms such as donations to ongoing community development initiatives identified in the Duwamish Valley Action Plan, or participation in the Duwamish's Real Rent program. As infrastructure investments are made in the study area, promote equitable phasing and locations to reduce historic impacts with input from affected community members. Examples include improving parks and streetscapes to reduce heat island effects, improving existing transitions to residential areas, improving noise attenuation to residential areas, and reducing existing risks of sea level rise.
- **Design Guidance for development in the UI and II zones when abutting nonindustrial areas.** Non-codified design guidance to address impacts associated with height, bulk, scale, and aesthetics, and design treatments appropriate for the edges of industrial areas could be a resource for developers and community members alike in developing projects that abut nonindustrial areas.

3.8.4 Significant Unavoidable Adverse Impacts

Across all alternatives the City found minor and moderate impacts related to land and shoreline use:

- **Inconsistency with Plans and Policies:** Some degree of inconsistency between the expected land use pattern and plans and policies was found for all the alternatives. Since consistency of land use patterns with plans and policies requires interpretation and balancing with many policies, it is common for some inconsistency to exist, while maintain an overall predominant level of consistency. Alternative 1—No Action would have moderate inconsistencies due to the likely continuing trend of stand-alone retail and office development and mini storage locating in industrial zones and MICs under existing zoning. This is inconsistent with certain policies prioritizing industrial and maritime uses in these

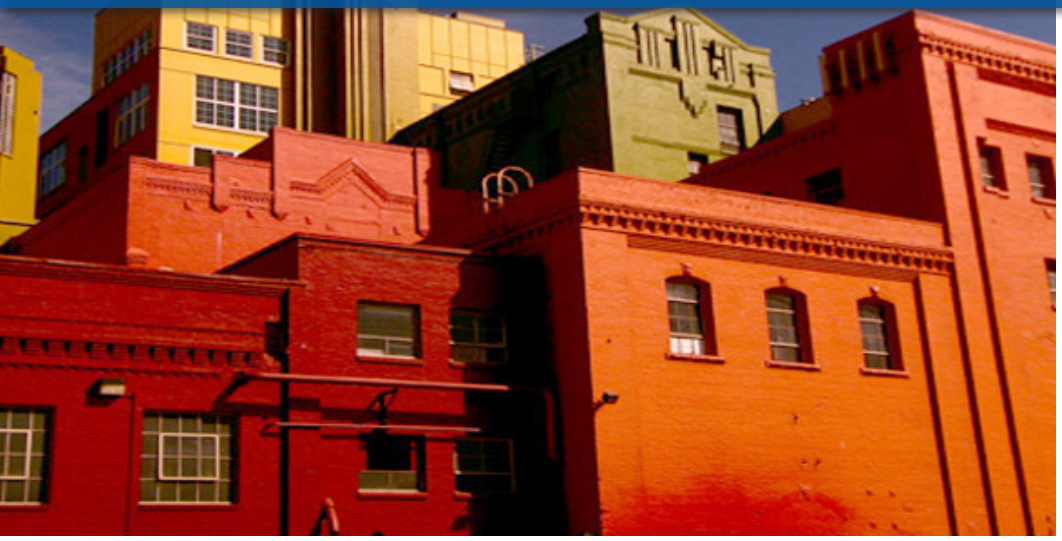
areas. Moderate inconsistencies would be present under alternatives 3 and 4 due to the introduction of increased amount of industry-supportive housing, which can be viewed as inconsistent with some regional and local policies limiting residential uses in MICs. Alternative 2 would have the fewest, and only minor, inconsistencies because Alternative 2 would reduce the prevalence of non-industrial uses in industrial areas through new standards in the proposed MML zone in larger areas than alternatives 3 and 4, and Alternative 2 does not include expanded allowances for housing.

- **Incompatible Land Uses:** Moderate incompatible use impacts are expected in all subareas under Alternative 1 due to the potential for stand-alone retail and office developments and mini storage to locate in industrial areas causing potential incompatibility with industrial uses. Alternatives 3 and 4 would see moderate incompatible use impacts in some subareas—most notably Ballard, Stadium/SODO, and Georgetown/South Park—where introduction of new buildings with dense employment in the II zone and industry-supportive housing in the UI zone could create incompatibilities between new activity patterns and adjacent areas of continued industrial uses. Alternative 2 would have the fewest, and only minor, land use incompatibilities since the application of the II and UI zones would be more limited in scale.
- **Inadequate Transitions:** Potential for inadequate transitions from industrial to nonindustrial areas is highest for the Ballard and Interbay/Dravus subareas. Moderate impacts at transitions would be expected in Interbay/Dravus under all the alternatives, and in Ballard under alternatives 1, 2, and 3. In general, portions of the study area that abut residential and urban village locations without strong physical edge features such as greenbelts, major roadways or topographical changes have greater potential for inadequate transition. Future land use under the UI zone is expected assuage potentially inadequate transitions to residential and urban village areas, thus Alternative 4, which includes more UI zoning in the Ballard subarea would have moderate transition impacts. Minor transition impacts are identified for the Georgetown/South Park subareas under all the alternatives, and for the Stadium/SODO area under alternatives 1, 2, and 3. No transition impacts are expected for Interbay/Smith Cove under any alternative primarily because of the strong physical edges around the subarea.
- **Employment Mix Impacts:** With one exception, no employment mix impacts are expected. In all subareas and under all alternatives, the projected employment mix would remain 50% or more industrial—one of the threshold criteria for regional designation as a MIC. A minor employment mix impact was identified in Alternative 4 for the Ballard subarea, where the percentage of industrial employment is projected to fall to a level approaching the 50% threshold.

Under all of the alternatives, any inconsistencies with plans and policies, incompatible land uses, undesired employment mixes, or inadequate land use transitions described above would be minimized and reduced to less than significant levels via incorporated plan features and existing regulations and commitments. No significant unavoidable adverse impacts to land or shoreline use are anticipated under any of the alternatives.

Section 3.9

Housing



This section summarizes the affected environment—including the current housing policy framework, and current housing in the study area—and compares impacts of the alternatives on housing in the study area.

Three impact thresholds were used to identify potential adverse housing impacts in the study area. Impacts of the alternatives on housing are considered significant if they:

- Result in **loss of housing due to redevelopment** and insufficient development capacity, tools, or programs to address displacement of dwellings and population.
- **Potential to increase households' exposure** to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations.
- **Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned**.

Mitigation measures and a summary of any significant unavoidable adverse impacts are included following the impacts analysis.

3.9.1 Affected Environment

The study area consists of lands used and zoned for industrial purposes, primarily in the BINMIC and Greater Duwamish MIC. Though these areas are predominantly used for employment there remain scatted residential dwellings. Some are caretakers' quarters.

The data and methods considered in this section include: housing inventory, production trends, and challenges and needs (including public health, access to opportunity and displacement risk) based on U.S. Census American Community Survey, City of Seattle, and King County Assessor data.

Current Policy & Regulatory Framework

Existing housing patterns in the study area are influenced by the current land use policy and regulatory framework. This framework flows from the State of Washington Growth Management Act (GMA), the Puget Sound Regional Council's (PSRC's) Multi-County Planning Policies (MPPs), King County's County-Wide Panning Policies (CPPs) the City Comprehensive Plan (Seattle 2035), and implementation actions including development standards in the Seattle Municipal Code (SMC) and the City's Shoreline Master Program. Several other regulatory measures affect industrial land use including localized overlay districts and community agreements.

Detailed descriptions of the framework are included in **Section 3.8 Land & Shoreline Use**.

Housing Inventory & Production

This section characterizes existing housing patterns in the study area and breaks out housing patterns for the EIS subareas where information is available and useful.

Existing Housing Inventory

As of 2020, the study area included an estimated 413 housing units. More than half (54%) of housing units in the study area are in multi-unit apartment buildings while 32% of the area's housing units are in single-family buildings (as defined by the King County Assessor). Relatively smaller numbers of housing units are duplexes and 4-plexes. **Exhibit 3.9-1** below presents the units by housing type within the study area.

Exhibit 3.9-1 Study Area Housing Units by Type by Subarea, 2021

Housing Type	Ballard	Interbay Dravus	Interbay Smith Cove	SODO/ Stadium	Georgetown	Total
Single-family*	49			9	78	136
Duplex	9				15	24
4-plex	20				12	32
Apartments	111	3	1	12	91	218
**Other	3					3
Total	192	3	1	21	196	413

*Detached single family may include some accessory dwelling units. King County Assessor does not track ADUs or DADUs separately so we cannot reliably summarize the number of ADUs in this inventory. It is also possible there are many additional units in ADUs that are not included in the totals. Between 1994 and 2020, Seattle permitted 862 DADUs and about 1,900 ADUs.
**Housing units classified as "Other" include unique residence types such as houseboats, caretaker quarters, housing attached to private schools and churches, and housing units in certain historic properties.
Source: King County Assessor, 2020; BERK, 2021.

Most of the housing in the study area is in the Ballard (46%) and Georgetown/South Park (47%) subareas.

Ballard

The Ballard Subarea consists of the land between the Salmon Bay shoreline and the Ballard Urban Village. For the purposes of this analysis the subarea also includes portions of the study area in the Fremont Urban Village and along the north and east shores of Lake Union.

Housing in this subarea is located along the northern edge where the industrial areas are adjacent to more residential and commercial areas in Ballard, primarily the scattered single family and multi-family homes in blocks flanking 14th Avenue NW.

There are roughly 192 housing units in the Ballard Subarea. More than half these units are apartments. Single-family homes constitute a little more than 20% of housing units in the subarea. There are a small number of duplexes and 4-plexes. See **Exhibit 3.9-2**.

Exhibit 3.9-2 Housing Type by Structure and Units, Ballard

Housing Type	Percentage of Residential Structures	Percentage of Units
Single-family	59.7%	22.4%
Duplex	5.6%	4.7%
4-plex	5.6%	10.4%
Apartments	26.4%	57.8%
Other	2.8%	1.6%

Source: King County Assessor, 2020; BERK, 2021.

Interbay Dravus and Interbay Smith Cove

The Interbay Dravus and Interbay Smith Cove subareas consists of three distinct nodes—Fisherman's Terminal and vicinity, Dravus, and Smith Cove. These subareas stretch from the southern shoreline of Salmon Bay between the locks and ship canal on the north and Elliott Bay to the South, and are bound by the Queen Anne and Uptown neighborhoods to the east and Magnolia to the west. Both subareas contain very little housing. The Interbay Dravus Subarea includes only three units characterized as apartments in the assessor data (**Exhibit 3.9-3**) and the Interbay Smith Cover Subarea includes one apartment building (**Exhibit 3.9-4**).

Exhibit 3.9-3 Housing Type by Structure and Units, Interbay Dravus

Housing Type	Percentage of Residential Structures	Percentage of Units
Apartments	100%	100%

Source: King County Assessor, 2020; BERK, 2021.

Exhibit 3.9-4 Housing Type by Structure and Units, Interbay Smith Cove

Housing Type	Percentage of Residential Structures	Percentage of Units
Apartments	100%	100%

Source: King County Assessor, 2020; BERK, 2021.

SODO/Stadium

The SODO/Stadium Subarea includes the mouth of the Duwamish River where it outlets to Elliott Bay. The SODO/Stadium Subarea includes 21 housing units. About one-half of the units are in apartments and the other half are single-family homes. The Subarea has no duplexes or 4-plexes. See **Exhibit 3.9-5**.

Exhibit 3.9-5 Housing Type by Structure and Units, SODO/Stadium

Housing Type	Percentage of Residential Structures	Percentage of Units
Single-family	90%	48%
Apartments	10%	52%

Source: King County Assessor, 2020; BERK, 2021.

Georgetown/South Park

The Georgetown portion of the subarea is situated on the east bank of the Duwamish River. The study area surrounds two residential areas in the Georgetown neighborhood—the Van Asselt district between Ellis Avenue S and Corson Avenue S and a roughly four-block residential district between S Homer Street and S Fidalgo Street. Both areas include townhomes, single family, and multifamily housing including some new construction. Residents of these areas are closely adjacent to the surrounding industrial activities.

The South Park portion of the study area is situated on the west bank of the Duwamish River. The study area contains only the industrial lands that surround the South Park neighborhood, which is a mixed-use neighborhood that is designated as a residential urban village in Seattle's Comprehensive Plan.

Approximately 196 housing units are scattered throughout the subarea, especially along the edges. Single-family homes constitute roughly 40% of the housing units in the subarea. There are a small number of duplexes and 4-plexes. See **Exhibit 3.9-6**.

Exhibit 3.9-6 Housing Type by Structure and Units, Georgetown

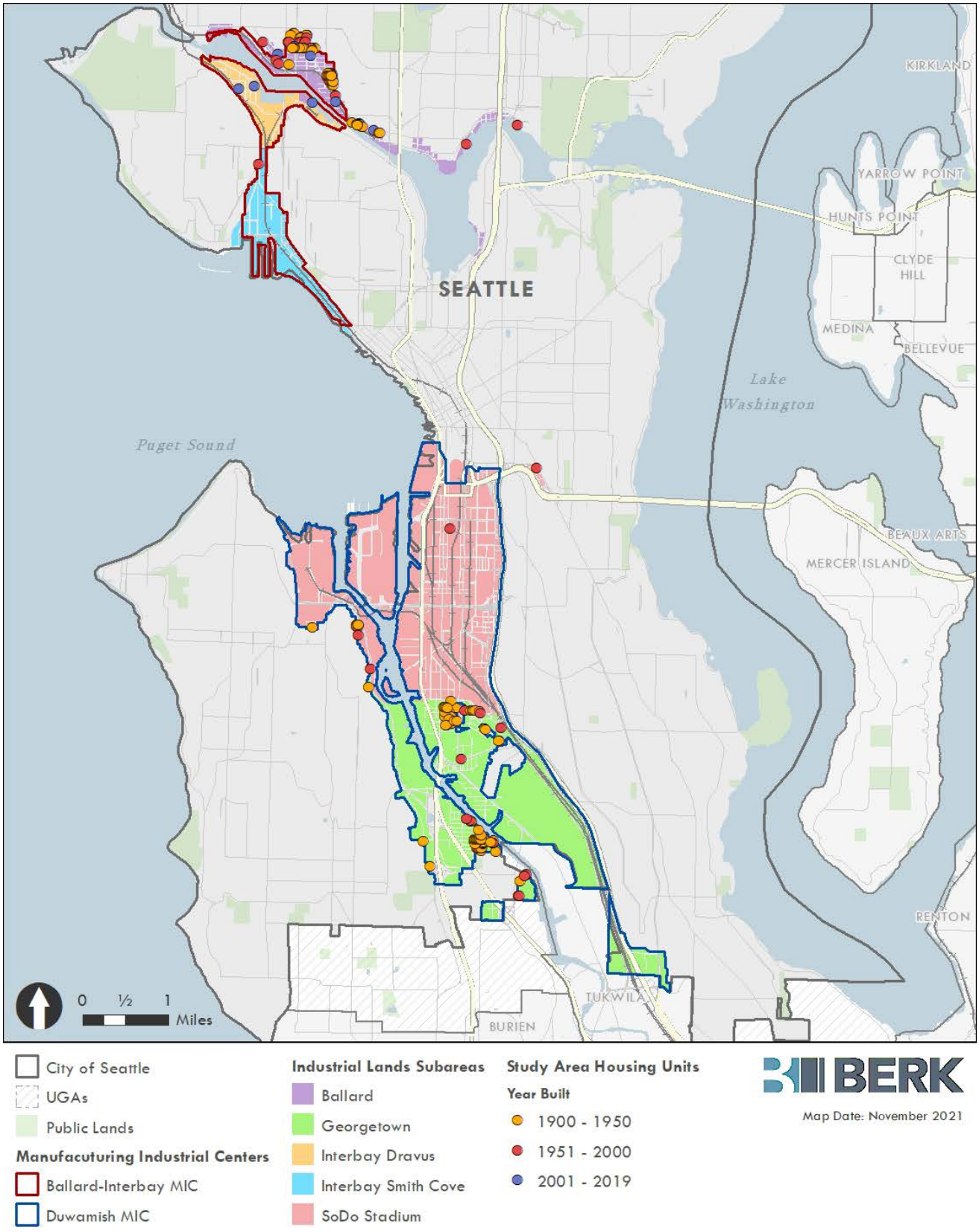
Housing Type	Percentage of Residential Structures	Percentage of Units
Single-family	84%	40%
Duplex	7%	8%
4-plex	3%	6%
Apartments	6%	46%
Other	0%	0%

This subarea includes three hotels/motels that are not included in the unit count.
Source: King County Assessor, 2020; BERK, 2021.

Age of Existing Housing

The Study Area has seen little housing development in the past twenty years. Roughly 32% of the housing in the Study Area was built prior to 1950, 62% were built between 1950 and 2000, and 17% were built in and after 2000. See **Exhibit 3.9-7**.

Exhibit 3.9-7 Housing Units by Year Built, Study Area



Source: King County Assessor, 2020; BERK, 2021.

Housing Production Trends

Citywide Trends

Between 2010 and 2019, Seattle added over 69,000 new housing units and demolished nearly 6,000 older housing units, for a net gain of over 63,000 units in total. On average, the city gained 6,300 new units per year, with annual production increasing most years from a low of 2,340 in 2011 following the last economic recession to a high of 10,651 in 2019. Citywide, however, housing production has not kept pace with employment growth, leading to an increasing supply shortage (City of Seattle 2021).

Nearly all of Seattle's capacity for residential growth is in villages/centers and corridors with mixed-use and multifamily zoning. According to analysis of development (2010-2019) by year built in King County Assessor data by far, the largest share of new development is in the Greater Downtown market area, followed by the North Central area which stretches from Ballard in the west to northeast Seattle in the east (City of Seattle 2021).

Subarea Trends

City permit data shows that the industrial areas are not locations for significant housing development. A total of 62 housing units were added to the subareas between 2000 and 2021. Housing ancillary to units attached to commercial development accounted for the bulk of these units. See **Exhibit 3.9-8**.

Exhibit 3.9-8 New Housing Added by Permit Class, 2000-2021

	Ballard	Interbay Dravus	Interbay Smith Cove	SODO/ Stadium	Georgetown/ South Park	Total
Single Family/Duplex	1	0	0	0	0	1
Multifamily	0	0	0	1	0	1
Commercial	11	16	4	8	1	40
Industrial	3	0	2	1	3	9
Institutional	0	0	0	1	0	1
Vacant Land	0	0	2	0	8	10
Total	15	16	8	11	12	62

Source: City of Seattle permit data, 2021.

Housing Challenges, Needs, & Considerations

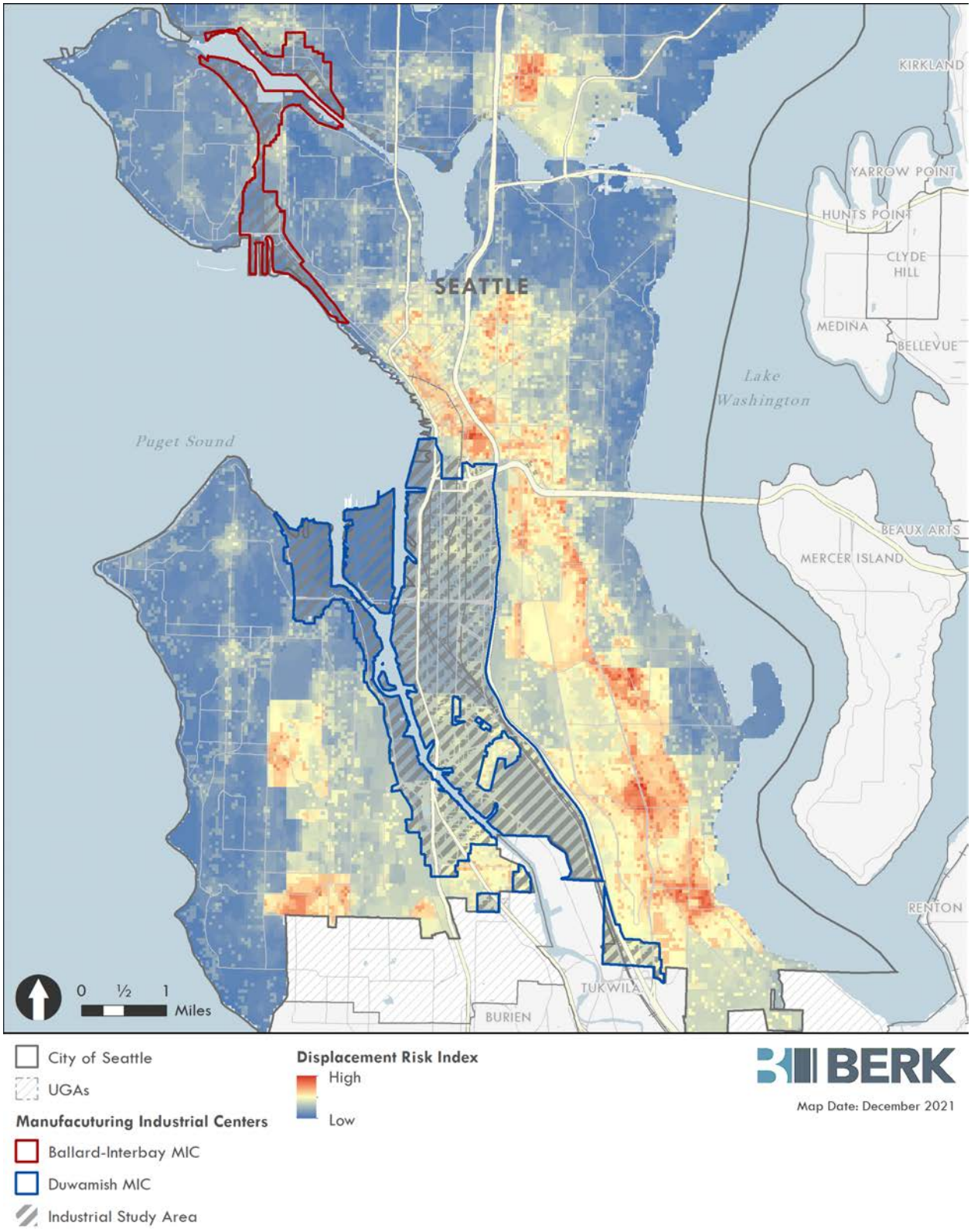
Displacement Risk

As a companion document to the Seattle 2035 Comprehensive Plan EIS, Seattle's Growth and Equity Analysis examined demographic, economic, and physical factors to evaluate the risk of displacement and access to opportunity for marginalized populations across Seattle neighborhoods. The findings are expressed as the Displacement Risk Index in this section and the Access to Opportunity Index in the following section.

The Displacement Risk Index identifies areas of Seattle where displacement of marginalized populations may be more likely. It combines data about demographics, economic conditions, and the built environment into a composite index of displacement risk. It focuses on displacement that affects marginalized populations, defined in the Seattle 2035 Comprehensive Plan as people of color, people with low incomes, English-language learners, and people with disabilities. It reflects data on vulnerability, amenities, development capacity, and rent to identify where displacement of those populations is more likely to occur. The map below shows areas of the city according to their level of displacement risk.

Exhibit 3.9-9 illustrates this index for Seattle and the study area. Overall, parcels within the study area are at low or moderate risk for displacement.

Exhibit 3.9-9 Displacement Risk Index



Source: City of Seattle, 2016; BERK, 2021.

Access to Opportunity

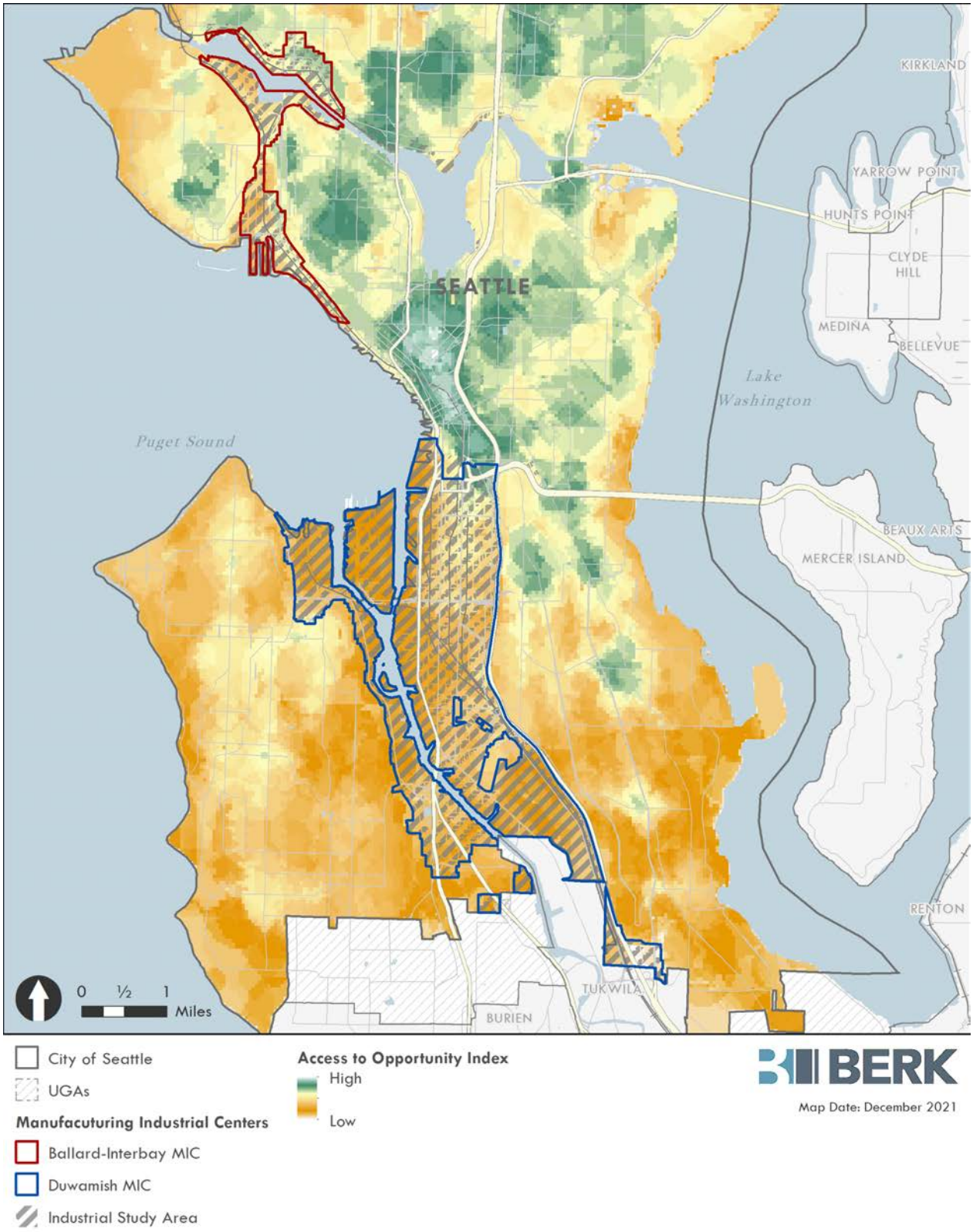
Historic practices such as redlining, and more modern policies have shaped access to opportunity across the city. As a result, access to neighborhoods with large parks, more trees, and walkable streets varies significantly by race. Marginalized populations tend to live in areas (in Seattle or elsewhere) with fewer opportunities.

Seattle's Growth and Equity Analysis (2016) examined demographic, economic, and physical factors to evaluate the risk of displacement and access to opportunity for marginalized populations across Seattle neighborhoods. The findings are expressed as the Access to Opportunity Index in this section and the Displacement Risk Index in the previous section.

The analysis considers marginalized populations' access to some key determinants of social, economic, and physical well-being. This includes data in the following categories: education, economic opportunity, transit, civic infrastructure, and health. The index captures a broad range of indicators that measure access to some of the resources that residents need to succeed and thrive.

Exhibit 3.9-10 illustrates this index for Seattle and the Study Area. Overall, parcels within the study area have low or moderate access to opportunity. Some limited areas in the Ballard subarea are seen to have relatively higher access to opportunity.

Exhibit 3.9-10 Access to Opportunity Index



Source: City of Seattle, 2016; BERK, 2021.

Jobs/Housing Balance

Another indicator of housing challenges is the jobs/housing ratio. Data show that housing production has not kept pace with employment growth in Seattle. In 2005 there were 1.8 jobs for every one housing unit in Seattle. Between 2005 and 2019, the city gained about 169,000 net new jobs. Over the same time, Seattle would have needed to increase its housing production by an additional 9,000 units just to maintain its 2005 jobs to housing ratio of 1.8.

Balancing jobs and housing within a city can reduce commuting and improve traffic congestion and air quality. A jobs/housing imbalance can cause upward pressure on housing costs. In employment centers, local workers may have no choice but to pay higher prices to avoid longer commutes.

Lower wage workers are especially vulnerable to displacement risks. Those who move to more affordable communities further from employment centers face longer commutes. While not all Seattle workers may wish to live in the city, workers in low-wage jobs who are commuting very long distances are a good indicator of a lack of an adequate supply of affordable housing in the city.

Exhibit 3.9-11 shows the distance traveled by workers in industrial subareas. Roughly 37% of workers (29,543) travel 10-24 miles one-way to get to their jobs. The remainder travel more than 25 miles each way between home and work.

Exhibit 3.9-11 Distance Traveled by Workers in Study Area, 2018

Distance	Count	Share
Less than 10 miles	31,471	39.7%
10 to 24 miles	29,543	37.3%
25 to 50 miles	10,592	13.4%
Greater than 50 miles	7,604	9.6%
Total All Jobs	79,210	100.0%

Source: Census LEHD Origin-Destination Employment Data, 2018; BERK, 2021.

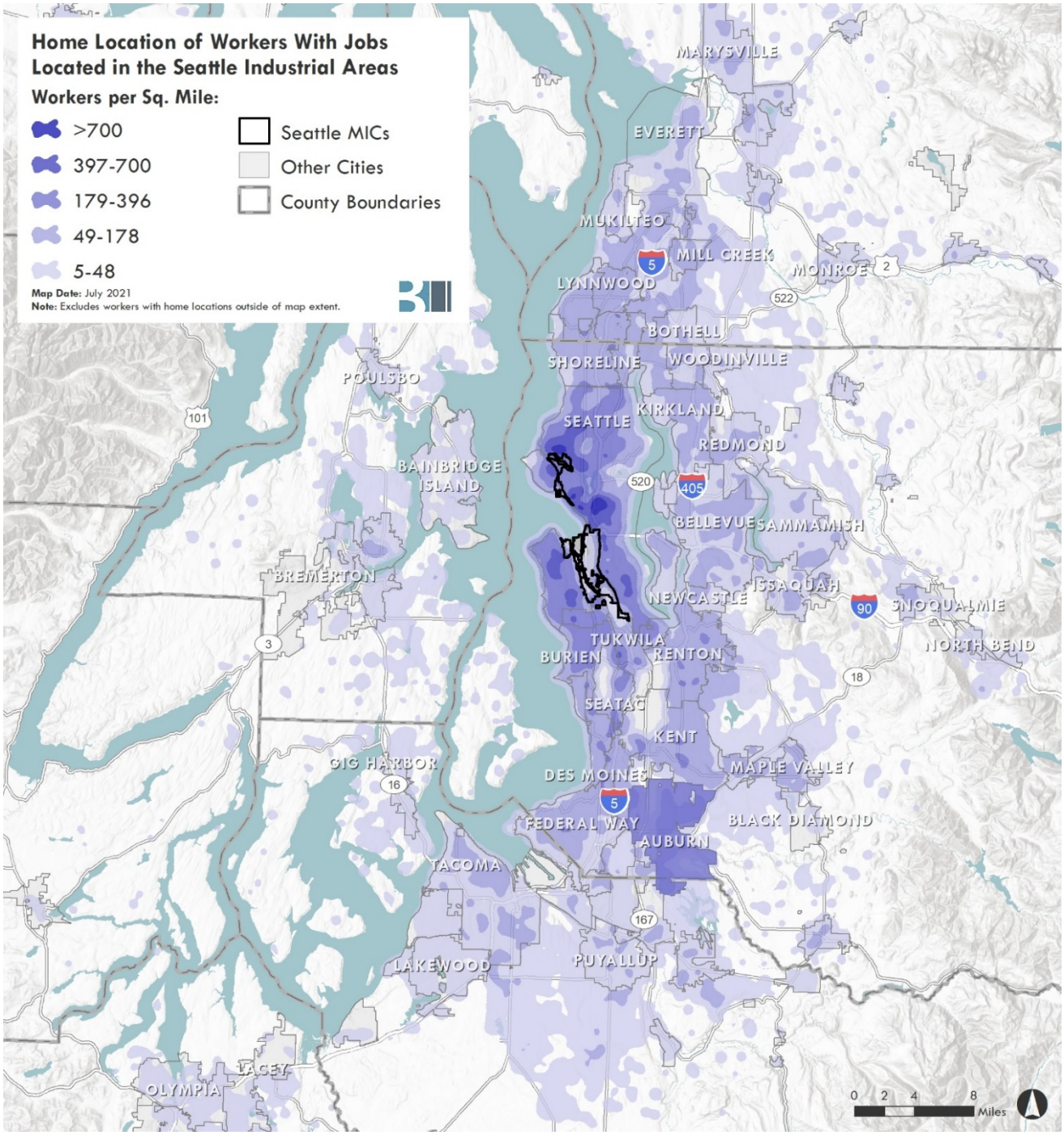
Workers in industrial areas commute from homes in Seattle, other parts of King County, Snohomish County, and Pierce County. See **Exhibit 3.9-12** and **Exhibit 3.9-13**.

Exhibit 3.9-12 Top 25 Places of Worker Residence by Count/Percent

City	Count	Share
Seattle city, WA	22,769	28.7%
Kent city, WA	2,853	3.6%
Renton city, WA	2,452	3.1%
Burien city, WA	2,108	2.7%
Tacoma city, WA	1,937	2.4%
Federal Way city, WA	1,902	2.4%
Bellevue city, WA	1,841	2.3%
Shoreline city, WA	1,419	1.8%
Auburn city, WA	1,296	1.6%
Kirkland city, WA	1,154	1.5%
Everett city, WA	1,118	1.4%
Des Moines city, WA	924	1.2%
SeaTac city, WA	921	1.2%
Edmonds city, WA	905	1.1%
Tukwila city, WA	823	1.0%
Sammamish city, WA	741	0.9%
White Center CDP, WA	738	0.9%
Lynnwood city, WA	691	0.9%
Marysville city, WA	660	0.8%
Redmond city, WA	646	0.8%
Bothell city, WA	624	0.8%
Bryn Mawr-Skyway CDP, WA	554	0.7%
Mountlake Terrace city, WA	525	0.7%
South Hill CDP, WA	521	0.7%
Issaquah city, WA	501	0.6%
All Other Locations	28,587	36.1%

Source: Census LEHD Origin-Destination Employment Data, 2018; BERK, 2021.

Exhibit 3.9-13 Home Location of Workers with Jobs in the Study Area, 2018



Source: Census LEHD Origin-Destination Employment Data, 2018; BERK, 2021.

Public Health

The Washington Environmental Health Disparities Map (EHD Map) is an existing tool created by DOH and others that ranks environmental health disparities by census tract. It is an interactive tool that combines the most comprehensive data available to rank Washington communities according to the risk each faces from environmental factors that influence health outcomes. The EHD includes fossil fuel exposure as well as social and health vulnerability measures. The map shows pollution measures such as diesel emissions and ozone, as well as proximity to hazardous waste sites. In addition, it displays measures like poverty and cardiovascular disease.

The data on the map include 19 indicators and are divided into four themes:

- Environmental Exposures (NOx-diesel emissions; ozone concentration; PM2.5 Concentration; populations near heavy traffic roadways; toxic release from facilities (RSEI model))
- Environmental Effects (lead risk from housing; proximity to hazardous waste treatment, storage, and disposal facilities (TSDFs); proximity to National Priorities List sites (Superfund Sites); proximity to Risk Management Plan (RMP) facilities; wastewater discharge)
- Sensitive Populations (death from cardiovascular disease; low birth weight)
- Socioeconomic Factors (limited English; no high school diploma; poverty; race—people of color; transportation expense; housing cost burden; unemployment)

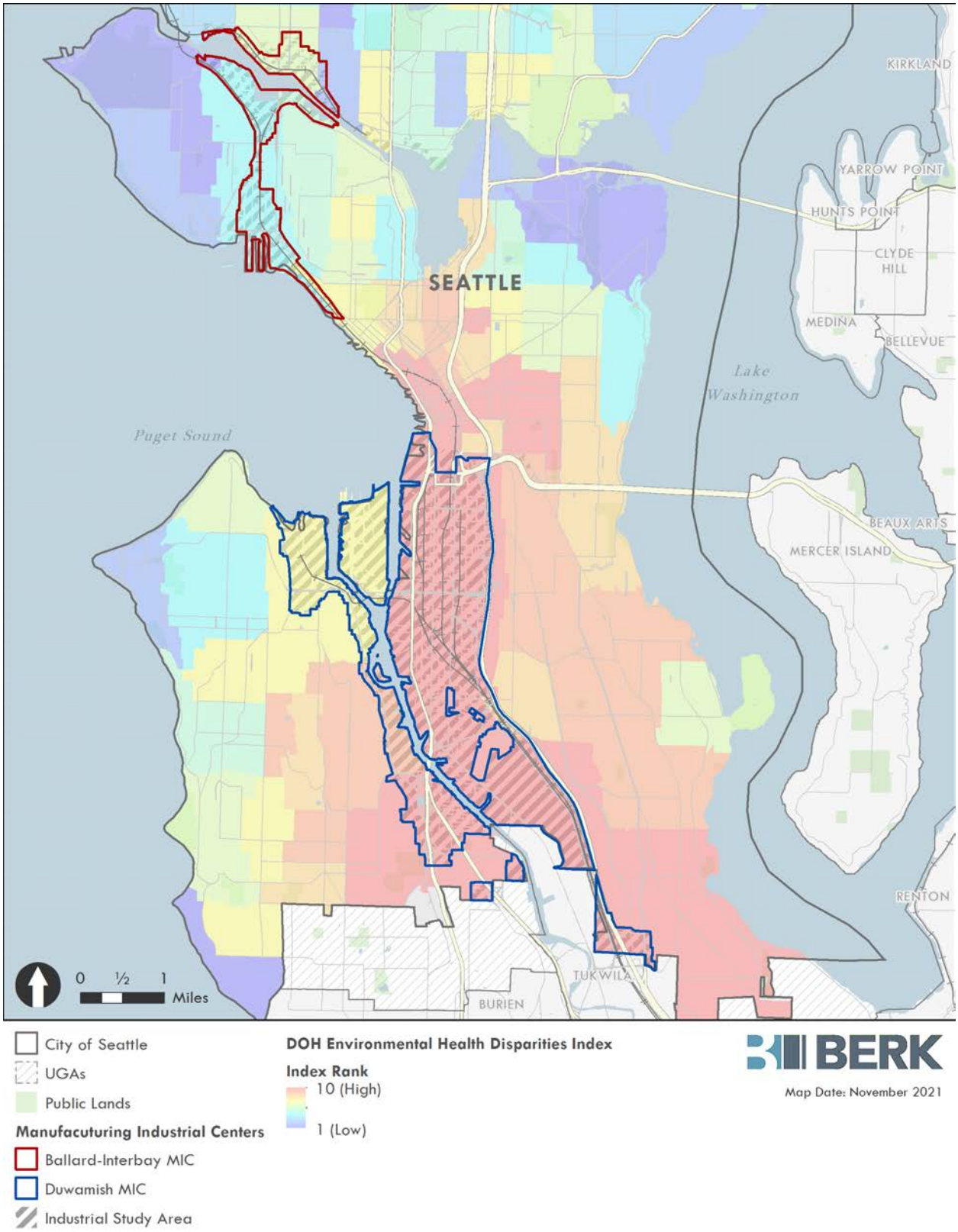
The EHD map ranks the risks communities face from environmental burdens including fossil fuel pollution and vulnerability to climate change impacts that contribute to health inequities. The EHD map is based on a conceptual formula of Risk = Threat x Vulnerability. Threat is comprised of both environmental effects and exposures, and vulnerability is comprised of socioeconomic factors and sensitive populations. It is a well-known vulnerability index for environmental health disparities and is being used by state processes to guide funding to reduce environmental health disparities.

Industrial areas in the Greater Duwamish MIC are ranked at high risk based on environmental factors that influence health. See **Exhibit 3.9-14**. This map is aligned with several studies that have documented the disproportionately high environmental health burdens and risks relative to the rest of Seattle that communities in the Duwamish Valley experience. Exposure to air pollution, noise pollution, and highways is higher in the Duwamish Valley than the city average and access to open space is lower. See **Exhibit 3.9-15** breaking down potential exposure to environmental exposures to NOx-Diesel emissions, Ozone, PM 2.5, and potential toxic releases from facilities. **Exhibit 3.9-16** illustrates census tract populations near heavy traffic roadways. **Exhibit 3.9-17** shows a moderate proximity to hazardous waste sites compared to other census tracts in Washington State.

The Duwamish River is a 5.5-mile Superfund site, and the City is working closely with the U.S. Environmental Protection Agency (EPA) on cleanup and source control efforts. While cleanup is ongoing, health advisories are still in place. The Duwamish Valley is also an area subject to flooding, which is anticipated to increase due to climate change.

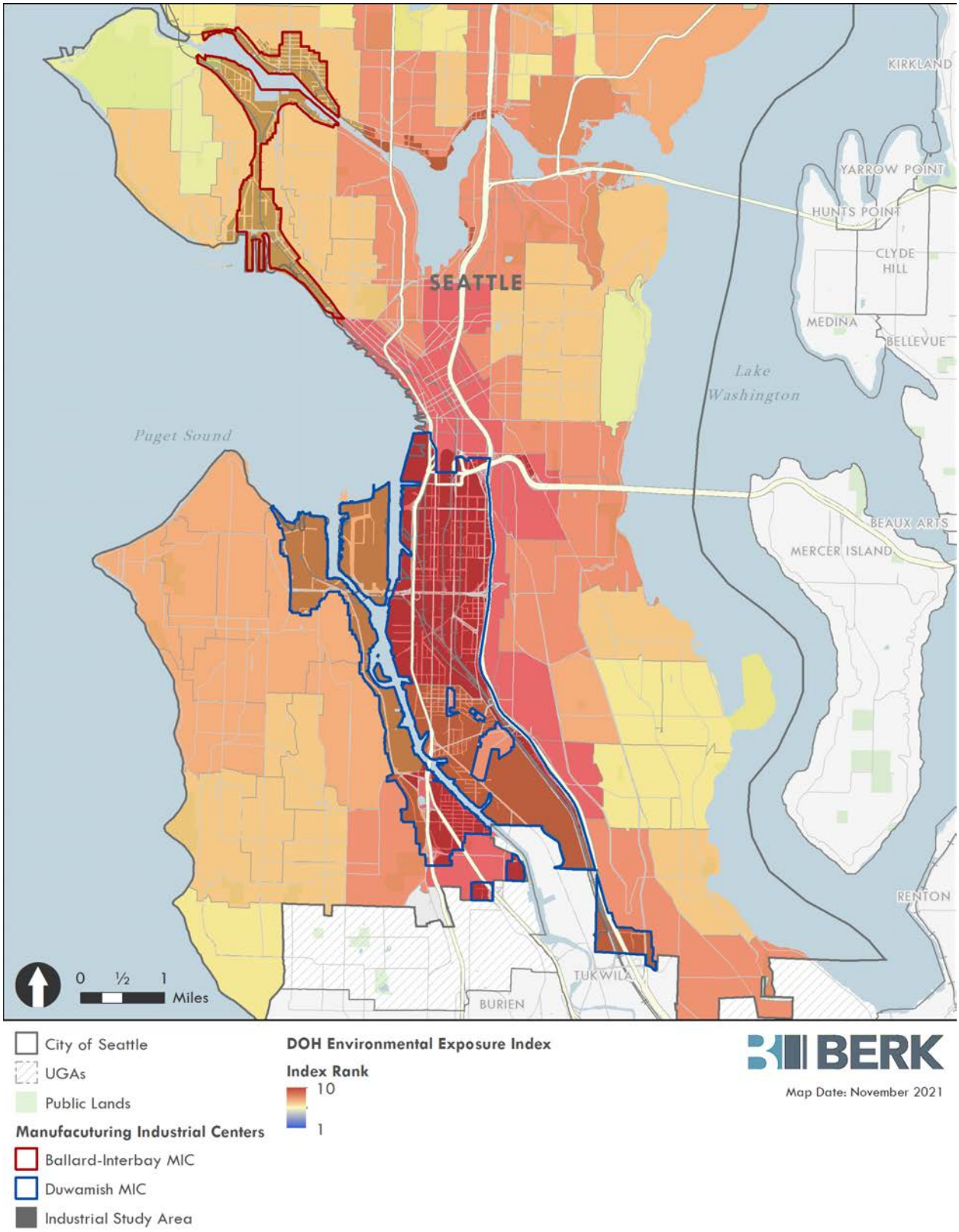
The health impacts on residents of housing in or adjacent to industrial areas must be considered carefully to ensure equitable outcomes.

Exhibit 3.9-14 Washington Environmental Health Disparities Map



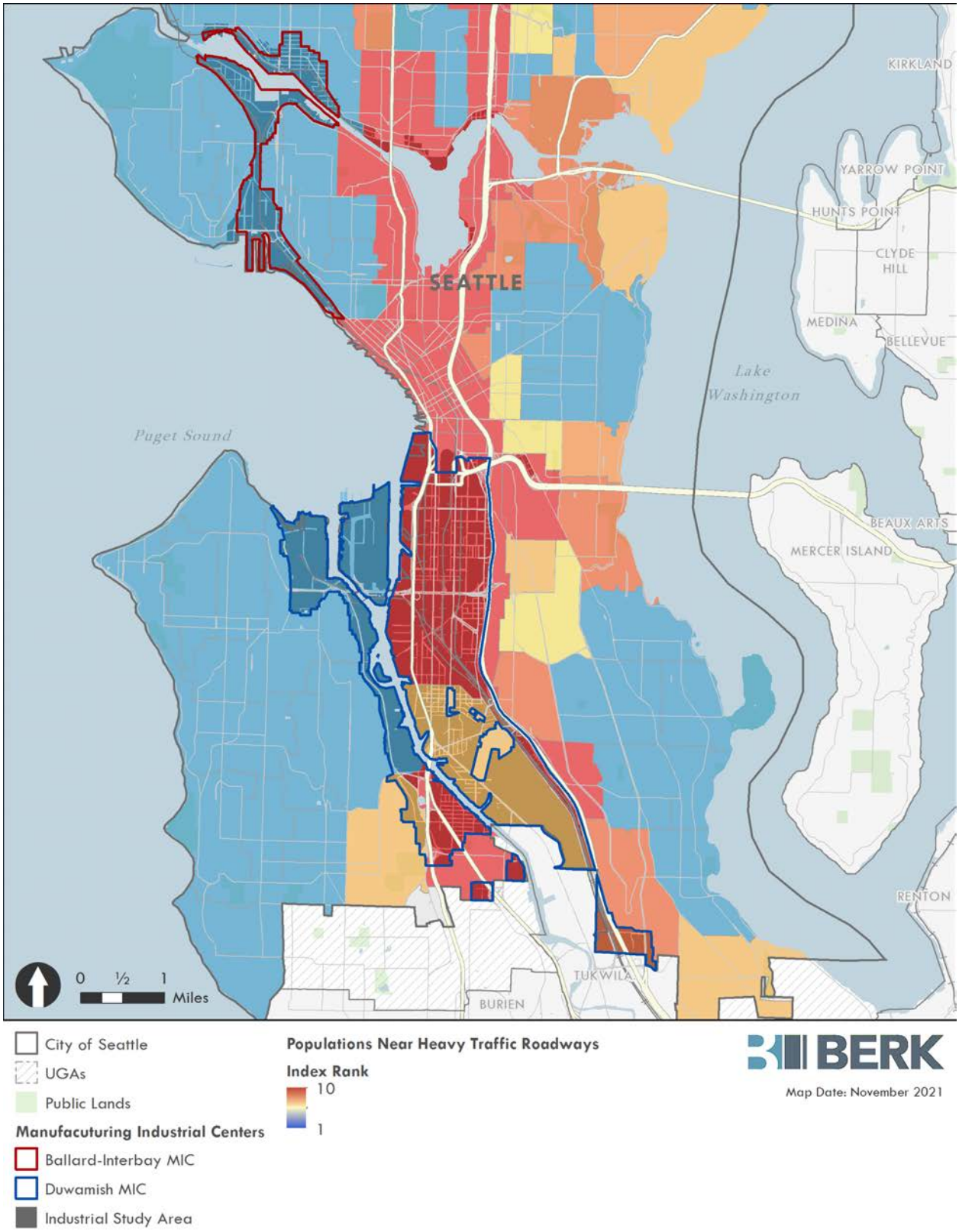
Source: Washington Department of Health, 2021.

Exhibit 3.9-15 Air Quality: Environmental Exposure Map



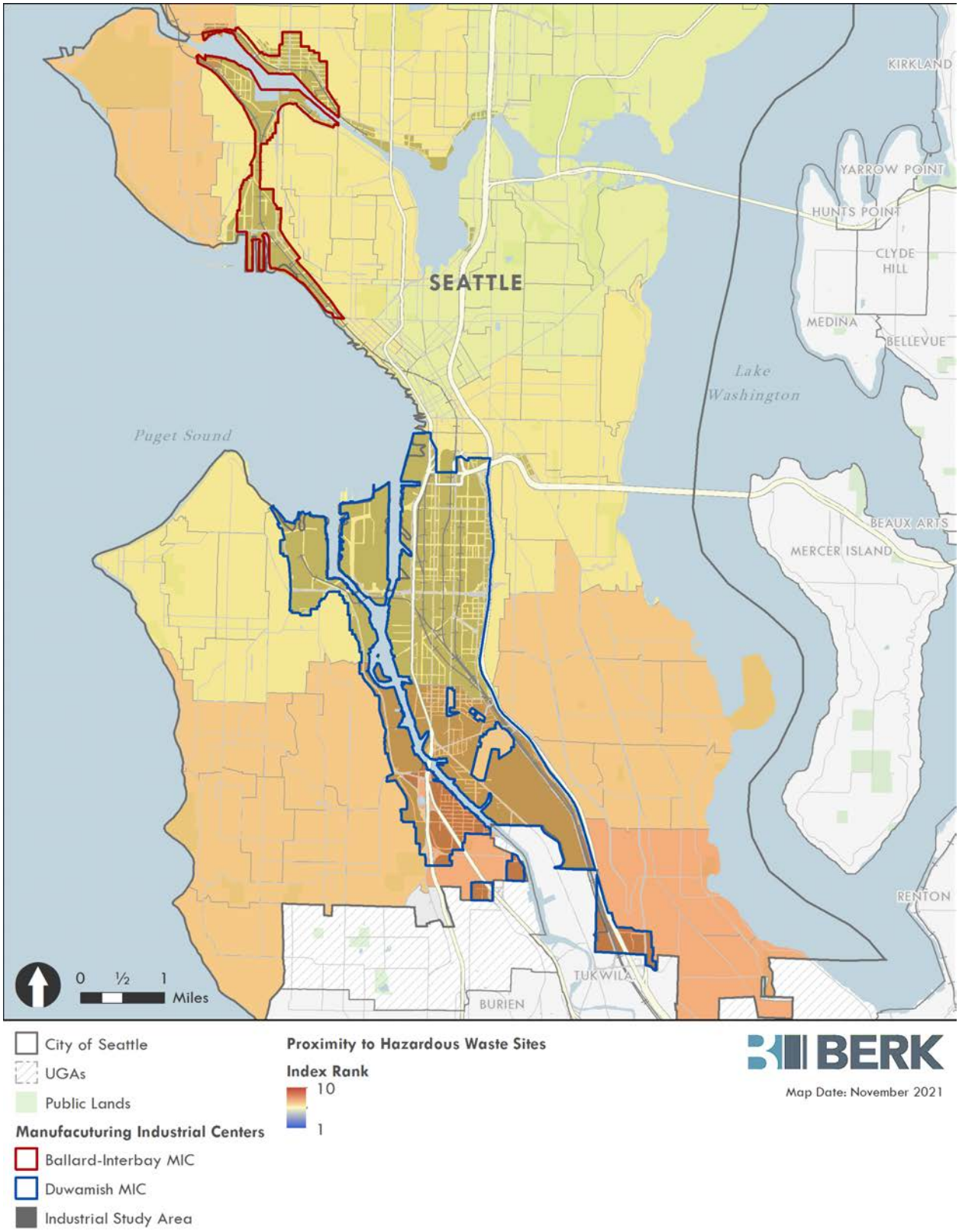
Source: Washington Department of Health, 2021.

Exhibit 3.9-16 Population Near Heavy Traffic Noise



Source: Washington Department of Health, 2021.

Exhibit 3.9-17 Proximity to Hazardous Waste Sites



Source: Washington Department of Health, 2021.

3.9.2 Impacts

As described in the introduction to this section, three impact thresholds were used to identify potential adverse housing impacts in the study area and at a subarea level (where applicable). Impacts of the alternatives on housing are considered significant if they:

- Result in **loss of housing due to redevelopment** and insufficient development capacity, tools, or programs to address displacement of dwellings and population.
- **Potential to increase households' exposure** to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities (e.g., exposure to diesel emissions and ozone or proximity to hazardous waste sites) and with sensitive populations (e.g., poverty, cardiovascular disease) based on the Washington Department of Health Environmental Health Disparities Index.
- **Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned**.

Equity & Environmental Justice Considerations

Jobs/Housing Balance

Housing production has not kept pace with employment growth in Seattle putting pressure on prices. While roughly 29% of workers in the study area live in Seattle, the majority of workers live in places across the region and travel long distances to get to their jobs. **Exhibit 3.9-11** shows the distance traveled by workers in industrial subareas. Roughly 37% of workers (29,543) travel 10-24 miles one-way to get to their jobs. More than 10,000 workers travel 25-50 miles one-way to get to their jobs. Some of these workers may prefer to live closer to their jobs if adequate and affordable housing were available.

The continued regulatory support for industry-related housing (caretakers' residences and artist lofts) and the slight increases in housing envisioned in alternatives 3 and 4 can add to the housing supply and allow some workers to live close to where they work. Applying the Mandatory Housing Affordability (MHA) regulations to the proposed new Industry & Innovation (II) zone can also mitigate some of the housing impacts on the study area. Additional housing supply near jobs can reduce the costs of commuting. In addition, adding capacity for additional housing in areas adjacent to or connected by transit to these employment centers can also mitigate the impacts of increased employment growth on housing.

Access to Opportunity

A key concern around adding housing to industrial areas is whether this would perpetuate historic patterns of increasing housing capacity in areas with low opportunities. The City's Access to Opportunity Index shows that parcels within the study area have low or moderate access to opportunity. No significant new housing in these areas of low or moderate opportunity is anticipated under any of the Alternatives. While there are slight increases in housing envisioned

in alternatives 3 and 4, in the Ballard and SODO/Stadium subareas, these increases are tied to a change to zoning from the existing zones to Urban Industrial (UI) zoning. UI zoning is intended to create thoughtful integration between the edges of these industrial areas and adjacent neighborhoods. UI zoning would seek to improve environmental health, walkability, and comfort in these areas. These changes tied to zoning are likely to ensure that the limited amount of housing allowed within the UI zone is accompanied by changes that add amenities to the area.

Public Health

Residents of industrial areas in the Greater Duwamish MIC are at high risk of environment-related health problems. Exposure to air pollution, noise pollution, and highways is higher in the Duwamish Valley than the city average and access to open space is lower. In addition, health advisories are in place for the Duwamish River as the City works with the U.S. Environmental Protection Agency (EPA) on cleanup and source control efforts. The Duwamish Valley is also an area subject to flooding, which is anticipated to increase due to climate change.

The Action Alternatives limit new housing in industrial zones and focus primarily on industrial uses. Alternatives 3 and 4 add mixed-use housing opportunities near Georgetown/South Park, addressed by alternative below. Given the health impacts of housing proximity to industrial areas, especially the Duwamish area, limiting the amount of housing in these areas avoids impacts on health equity.

Impacts of Alternative 1 No Action

Loss of housing due to redevelopment and insufficient development capacity, tools, or programs to address displacement of dwellings and population. Under Alternative 1 No Action, the full study area would support 488 total housing units or an addition of 75 housing units from the existing 413 units. As the area grows, the mix of land uses under Alternative 1 will remain similar to the existing condition. There is likely to be some redevelopment in areas adjacent to Seattle's designated urban villages, in areas where the Industrial Commercial (IC) zone applies, but concentrated development of housing is not anticipated. See **Exhibit 3.9-18**.

Exhibit 3.9-18 Alternative 1—No Action Jobs and Housing, Existing and 2044

	Existing	2044
Industrial Jobs	54,500 (2018)	66,400
Total Jobs	98,500 (2018)	122,000
Residential Dwellings	413 (2021)	488

Sources: CAI, 2021; City of Seattle, 2021.

As noted earlier most of the modest increase in housing is anticipated to be in typologies that remain similar to the forms that exist today.

Under Alternative 1 No Action, most industrial jobs as well as total jobs are located in the SODO/Stadium and Georgetown/South Park subareas, with relatively less in the Ballard, Interbay Dravus, and Interbay Smith-Cove subareas. Since housing is limited to those connected to industrial activities, increases in housing are also anticipated to be concentrated in the SODO/Stadium and Georgetown/South Park subareas. See **Exhibit 3.9-19**.

Exhibit 3.9-19 Alternative 1—No Action Housing by Subarea

Subarea		Existing (2021)	Total	Growth
Ballard	10%	192	199	7
Interbay Dravus	10%	3	11	8
Interbay Smith Cove	10%	1	9	8
SODO/Stadium	40%	21	51	30
Georgetown/South Park	30%	196	218	22
Grand Total Housing in Study Area		413	488	75

Sources: CAI, 2021; City of Seattle, 2021.

The City's Displacement Risk Index identifies areas of Seattle where displacement of marginalized populations may be more likely. It reflects data on vulnerability, amenities, development capacity, and rent to identify where displacement of those populations is more likely to occur. Overall, parcels within the study area are at low or moderate risk for displacement.

Very little housing growth and related redevelopment is anticipated under Alternative 1. With a mix of land uses and housing typologies similar to existing conditions, there is unlikely to be any significant loss of housing due to redevelopment within the study area under Alternative 1.

Potential to increase households' exposure to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations**.** Under Alternative 1, the number of dwellings is only projected to increase by 75 units, with most of this increase assumed to be in the form of caretakers' units and artist/studio quarters. Under this Alternative, housing is limited to those connected with industrial activities, and modest increases are anticipated in the SODO/Stadium and Georgetown/South Park subareas. While these are areas with high disparities, the increase in housing of 75 units is not considered significant.

Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned. Alternative 1 anticipates an increase in total jobs in the study area. Increases in employment growth envisioned under this Alternative could shift some of the overall expected citywide employment growth into industrial areas. This could have an impact on housing, especially if additional new employment were added to industrial areas not subject to the MHA regulations. Overall, the increased employment growth envisioned in Alternative 1 is addressed within the City's 2035

Comprehensive Plan and will be within the amount that the City will plan for in the 2024 major Comprehensive Plan update for 2044. Similarly, the City will evaluate the overall citywide demand for housing consistent with its growth targets.

Impacts of Alternative 2

Loss of housing due to redevelopment and insufficient development capacity, tools, or programs to address displacement of dwellings and population. Little new housing is envisioned in this Alternative**.** Under Alternative 2, housing units are expected to increase slightly by only 80 units to 493 from the existing 413 units. Similar to existing conditions, and Alternative 1 No Action, the housing types that are added are likely to be caretakers' quarters and some artist/studios. See **Exhibit 3.9-20**.

Exhibit 3.9-20 Alternative 2 Jobs and Housing, Existing and 2044

	Existing	2044
Industrial Jobs	54,500 (2018)	66,400
Total Jobs	79,400 (2018)	132,900
Residential Dwellings	413 (2021)	493

Sources: CAI, 2021; City of Seattle, 2021.

Modest increases in housing under Alternative 2 are anticipated to be concentrated in the SODO/Stadium and Georgetown/South Park subareas. See **Exhibit 3.9-21**.

Exhibit 3.9-21 Alternative 2 Housing by Subarea

Subarea	Total	Growth
Ballard	200	8
Interbay Dravus	11	8
Interbay Smith Cove	9	8
SODO/Stadium	53	32
Georgetown/South Park	220	24
Grand Total Housing in Study Area	493	80

Sources: CAI, 2021; City of Seattle, 2021.

As noted earlier the City's Displacement Risk Index shows the study area with low or moderate risk of displacement. While some changes to housing patterns may be possible under this Alternative, this is an expected part of a changing urban environment. There is unlikely to be any significant loss of housing due to redevelopment within the study area under Alternative 2.

Potential to increase households' exposure to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations**.** Housing growth is relatively higher in SODO/Stadium and Georgetown/South Park subareas under this Alternative. These are areas with high disparities. However, only an estimated 80 new homes would be added in caretakers' quarters and artist/studios under this Alternative. This modest addition is not considered significant.

Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned*.* Under Alternative 2, employment is projected to grow substantially more than under Alternative 1 No Action. A total of 34,400 additional jobs are projected for the study area, an increase of 35%.

Increases in employment growth envisioned under this Alternative could shift some of the overall expected citywide employment growth into industrial areas. This could have an impact on housing, especially if additional new employment were added to industrial areas not subject to the MHA regulations. Demand for new housing could be shifted to areas of the city closer to locations of dense employment growth (II zones), but outside of the study area. The II zones are in the closest locations to light rail (1/4–1/2 mile) and locations with fast access by light rail to these areas may see some shifts in demand.

Overall, the increased employment growth envisioned in Alternative 2 is within the citywide amount that the City will plan for in the 2024 major Comprehensive Plan update; similarly, the City will plan for its housing growth target and address the citywide demand for housing.

Impacts of Alternative 3

Loss of housing due to redevelopment and insufficient development capacity, tools, or programs to address displacement of dwellings and population. Under Alternative 3, housing units are projected to increase by 610 units in addition to 413 existing units. Housing types are expected to include caretakers' quarters and makers' studios as well as newer industry-supportive formats allowed under the UI zone such as live/work units, and housing connected to makers' studios. See **Exhibit 3.9-22**.

Exhibit 3.9-22 Alternative 3 Jobs and Housing, Existing and 2044

	Existing	2044
Industrial Jobs	54,500 (2018)	83,500
Total Jobs	98,500 (2018)	155,900
Residential Dwellings	413 (2021)	1,023

Sources: CAI, 2021; City of Seattle, 2021.

The following section describes the anticipated changes to housing by subarea under this Alternative. See **Exhibit 3.9-23**.

- **Ballard.** While Alternative 3 adds housing in the Ballard Subarea, it does so in limited locations along the edge or transition areas between industrial areas and the neighborhood. Land in the Ballard uplands in the 14th Avenue NW corridor north of NW Leary would be placed in the UI zone, and the zone would allow industry supportive housing at a maximum density of 25 dwelling units / acre. Housing allowed under the new UI zone would include development standards that limit the types of housing to those that are industry-supportive. An additional 260 units are anticipated.
- **Interbay Dravus**. Land north of Dravus Street along Thorndyke Avenue W would be in the UI zone as in Alternative 2. However, in Alternative 3 the zone would allow for supportive housing at a maximum density of 25 dwelling units / acre. An additional 75 housing units are estimated, and they would typically be located on an upper floor of a 3-4 story mixed-use development.
- **Interbay Smith Cove**. UI zoned areas in the four blocks along 15th Avenue NW would be the location for an estimated 15 housing units.
- **SODO/Stadium.** Under Alternative 3 land in the stadium area in the UI zone could receive an estimated 200 industry-supportive housing units.
- **Georgetown/South Park.** Under Alternative 3 edges of South Park and Georgetown residential areas would be zoned UI, which is anticipated to enable an estimated 60 industry supportive residential units interspersed in these areas. Under Alternative 3, the triangular area of Georgetown bounded by Corson Avenue S, Carleton Avenue S and I-5 would be removed from the MIC and placed into a mixed-use zone. The area would likely develop with a high concentration of urban mixed-use structures with ground level retail and residential above. An estimated 1,078 housing units could be added. Land removed from the MIC at the edges of South Park would be placed in a mixed-use zone. Some of it would likely redevelop with mixed-use structures including housing on upper floors. This would add capacity for a range of housing in these areas. These areas currently include a mix of industrial service and repair businesses, and small-scale commercial uses.

Exhibit 3.9-23 Alternative 3 Housing by Subarea

Subarea	Total	Growth
Ballard	452	260
Interbay Dravus	78	75
Interbay Smith Cove	16	15
SODO/Stadium	221	200
Georgetown/South Park	256	60
Total: Ind Zone Housing (Caretaker/Artist)	1,023	610
		Added MU Housing
With MIC Adjustments—Seattle Mixed-Use Zone Housing		1,078
Grand Total Housing in Study Area	2,101	1,688

Sources: CAI, 2021; City of Seattle, 2021.

Potential to increase households' exposure to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations**.** Alternative 3 adds housing in the SODO/Stadium and Georgetown/ South Park area and has the potential to add more residents in a census tract shown to have greater exposure to air pollution, noise sources and health disparities. Application of mitigation measures under air quality and noise (**Sections 3.2 and 3.6**) could help reduce potential impacts, e.g., building design, distance, landscaping, and others.

Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned*.* Overall employment under Alternative 3 would increase by 57,000 jobs.

Increases in employment growth envisioned under this Alternative could shift some of the overall expected citywide employment growth into industrial areas. This could have an impact on housing, especially if additional new employment were added to industrial areas not subject to the MHA regulations. Demand for new housing could be shifted to areas of the city closer to locations of dense employment growth (II zones), but outside of the study area. The II zones are in the closest locations to light rail (1/4–1/2 mile) and locations with fast access by light rail to these areas may see some shifts in demand.

Overall, the increased employment growth envisioned in Alternative 3 is within the citywide amount that the City will plan for in the 2024 major Comprehensive Plan update; likewise, the City will plan for its housing growth target in 2024 and address the citywide demand for housing.

Impacts of Alternative 4

Loss of housing due to redevelopment and insufficient development capacity, tools, or programs to address displacement of dwellings and population. Alternative 4 expands limited housing allowances to the greatest degree of any of the alternatives. Under Alternative 4 about 2,195 new homes would be added in UI zoned portions of industrial areas due to increased flexibility for caretakers' quarters and makers' studios. Housing types in this Alternative are likely to be a combination of existing and newly allowed formats such as caretakers' quarters, makers' studios, live/work units, and housing in conjunction with small production spaces. See **Exhibit 3.9-24**.

Exhibit 3.9-24 Alternative 4 Jobs and Housing Existing and 2044

	Existing	2044
Industrial Jobs	54,500 (2018)	66,400
Total Jobs	98,500 (2018)	157,700
Residential Dwellings	413 (2021)	2,608*

* With MIC adjustments—Seattle Mixed-Use Zone Housing

Sources: CAI, 2021; City of Seattle, 2021.

The following section describes the anticipated changes to housing by subarea under this Alternative. See **Exhibit 3.9-25**.

- **Ballard**. Under Alternative 4 land in the Ballard uplands in the 14th Avenue corridor north of NW Leary would be placed in a combination of the II zone and the UI zone. The UI zone would allow a greater density of industry supportive housing at a maximum density of 50 dwelling units / acre. Other areas that are north of NW Leary and in Fremont north of 36th Street would be placed in the UI zone and would likely receive a substantial amount of increased infill development. An additional 790 housing units are estimated and would typically be located on several upper floors of a 4-6 story mixed-use development.
- **Interbay Dravus**. Within the Interbay Dravus subarea, land north of Dravus Street along Thorndyke Avenue W would be zoned UI as in alternatives 2 and 3, but in Alternative 4 the zone would allow for industry supportive housing at a maximum density of 50 dwelling units per acre. An additional 175 housing units are estimated, and they would typically be located on an upper floor of a 4-6 story mixed-use development.
- **Interbay Smith Cove**. No additional housing is expected in the Interbay Smith Cove Subarea under Alternative 4 because of the small application of the UI zone on parcels unlikely to redevelop.
- **SODO/Stadium.** Under Alternative 4, land in the stadium area would be zoned UI, and the UI zone would be extended further south along 1st Avenue to Starbucks Center. This would allow the area to receive an estimated 990 industry-supportive housing units.
- **Georgetown/ South Park.** Under Alternative 4 (as in Alternative 2) edges the residential areas would be zoned UI, and increased infill development with light industrial uses, brewers/makers, and small manufacturers with large ancillary spaces is expected. However, the zone would enable an estimated 240 industry supportive residential units interspersed in these areas.

  Similar to Alternative 2, under Alternative 4, the triangular area of Georgetown bounded by Corson Avenue S, Carleton Avenue S and I-5 would be removed from the MIC and placed into a mixed-use zone. An estimated 1,078 housing units could be added.

  Land removed from the MIC at the edges of South Park would be placed in a mixed-use zone. Some of it would likely redevelop with mixed-use structures including housing on upper floors. This would add capacity for a range of housing in these areas. These areas currently include a mix of industrial service and repair businesses, and small-scale commercial uses.

  Alternative 4 adds more housing than alternative 1, 2, or 3. Housing added to the Ballard subarea would be part of mixed-use infill development. New zone standards would allow small parcels to accommodate new structures as well. Areas that are changing to the Urban Industrial Zone in SODO under Alternative 3 currently has no significant amounts of housing.

  Redevelopment in the areas zoned for UI may be more likely to add housing under the industry-supportive housing formats allowed under UI zone rather than displace existing

housing. As noted earlier the City's Displacement Risk Index shows the study area overall with low or moderate risk of displacement. While some loss of existing housing may be possible under this Alternative this is an expected part of a changing urban environment. There is unlikely to be any significant loss of housing due to redevelopment within the study area under Alternative 4.

Exhibit 3.9-25 Alternative 4 Housing by Subarea

Subarea	Total	Growth
Ballard	982	790
Interbay Dravus	178	175
Interbay Smith Cove	1	0
SODO/Stadium	1011	990
Georgetown/South Park	436	240
Total: Ind Zone Housing (Caretaker/Artist)	2,608	2,195
		Added MU Housing
With MIC Adjustments—Seattle Mixed-Use Zone Housing	1078	
Grand Total Housing in Study Area	3,686	3,273

Sources: CAI, 2021; City of Seattle, 2021.

Potential to increase households' exposure to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations**.** Similar to Alternative 3, adding housing in the Seattle Mixed zone under Alternative 4, particularly in the South Park area, and housing growth in the SODO/Stadium and Georgetown areas, could add more residents in a census tract shown to have greater exposure to air pollution, noise sources and health disparities. Similar to Alternative 3, the air quality and noise mitigation measures (**Sections 3.2 and 3.6**) could help reduce potential impacts of housing located in or near the study area, e.g., building design, distance, landscaping, and others.

Creation of demand for housing that cannot be accommodated within the city in adjacent districts or areas where housing is planned. Under Alternative 4, employment is projected to grow substantially more than under Alternative 1 No Action and Alternative 2, and by a similar amount to Alternative 3. A total of 59,2000 additional jobs are projected for the study area, an increase of 59%.

Increases in employment growth envisioned under this Alternative could shift some of the overall expected citywide employment growth into industrial areas. This could have an impact on housing, especially if additional new employment were added to industrial areas not subject to the MHA regulations. Demand for new housing could be shifted to areas of the city closer to locations of dense employment growth (II zones), but outside of the study area. The II zones are

in the closest locations to light rail (1/4–1/2 mile) and locations with fast access by light rail to these areas may see some shifts in demand.

Overall, the increased employment growth envisioned in Alternative 4 is within the citywide amount that the City will plan for in the 2024 major Comprehensive Plan update; similarly, the City will plan for its housing growth target and address the citywide demand for housing.

3.9.3 Mitigation Measures

Incorporated Plan Features

The Seattle Comprehensive Plan designates the MICs as major industrial employment centers. While alternatives 2, 3, and 4 include some expansions in allowed housing, the scale of housing growth is significantly smaller than employment growth. The addition of small amounts of housing in limited locations is intended to foster vibrant industrial districts that support a mix of uses that include local manufacturing, production, arts. This mix has the potential to address the shortage of small or affordable space for makers and creatives.

Increases in housing units under alternatives 2, 3, and 4 will be subject to the development standards developed under the UI zone. These include pedestrian and cyclist-oriented frontage improvements, development of green public spaces, access to planned transit and non-motorized transportation connections that support new development. The integration of public green open spaces, pedestrian-oriented amenities, and the access to transit, helps to soften potential impacts of locating housing in areas of intensive industrial activity and employment growth. Access to open space is an amenity that can be used for recreation, community gathering, access to nature, and a variety of environmental benefits. Housing in proximity to transit can help potential employees in the industrial centers live closer to their jobs. See Other Potential Mitigation Measures regarding reducing health disparities.

Regulations & Commitments

Seattle's City Code contains regulations that help to address potential displacement. A summary of these regulations, which would mitigate impacts associated with the alternatives, is presented below.

SEPA Review

Section 25.05 of Seattle Municipal Code contains environmental procedures that govern the issues to be addressed during development review under the State Environmental Policy Act (SEPA). SEPA addresses issues related to height, bulk, scale, and land use compatibility. Future site-specific development would be subject to additional SEPA review.

Development Regulations

Title 23 contains Seattle's Land Use Code, which establishes zoning and development regulations. These development regulations contain provisions governing the design of buildings, site planning, and provisions for adaptive reuse of existing buildings. Industrial zones generally contain provisions relating to limits of housing designed in industry supportive formats. Regulations are in place to address housing development related to the implementation of Alternative 1.

Existing Programs to Address Potential Displacement

- **Seattle's Tenant Relocation Assistance Ordinance**. This provides relocation assistance to very low-income households and provide notice to all households prior to relocation. Renters are considered displaced when their housing is scheduled to be torn down or undergo substantial renovation, have its use changed (for example, from an apartment building to a hotel), or have certain rent or income restrictions removed (for example a property is no longer required to rent only to low-income renters under a federal program).
- **Notice of Intent to Sell Ordinance.** The Notice of Intent to Sell ordinance reauthorized by Council in 2019, provides the City with information about the intention to sell residential rental property with at least one unit rented at 80% of Area Median Income (AMI) or below. The City, in partnership with the Seattle Housing Authority and community partners, can use the notification information to evaluate properties and deploy a range of property preservation tools, including incentives and acquisition. The notice can also help residents seek tenant protections and relocation resources if necessary.
- **Rental Registration and Inspection Ordinance.** The Rental Registration and Inspection Ordinance (RRIO) helps ensure that all rental housing in Seattle is safe and meets basic housing maintenance requirements. All rental property owners in Seattle must register their properties with the City. Inspectors will make sure all registered properties comply with minimum housing and safety standards at least once every 5–10 years. RRIO helps improve and maintain the quality of Seattle's rental housing over time.

This patchwork of programs and regulations works to address displacement in the areas in which they are applied. These rules would be in place under all alternatives.

Other Potential Mitigation Measures

Impacts of anticipated residential growth under the alternatives are not significant based on the thresholds identified in the EIS.

Comprehensive Plan Update

The City will plan for the citywide amount of housing growth in the Comprehensive Plan EIS on a citywide scale. As part of this ongoing commitment, the City could consider

- Adding additional capacity for housing in urban villages and residential areas in locations that will have fast access to the new II zones to help address the shifts in demand for housing in response to employment growth in industrial areas. The II zones are in the closest locations to light rail (1/4–1/2 mile), and light rail will provide good access to these areas.
- Adding additional capacity for housing in urban village and residential areas in locations adjacent to new UI zones to address the shifts in demand for housing in response to employment growth in the industrial areas.

Mandatory Housing Affordability

Given the potential for employment growth to shift demand for housing, the City could consider the following mitigation measures:

- Apply MHA regulations to the to the proposed new Industry and Innovation zone. Increases in employment growth envisioned under the Alternatives could shift some of the overall expected citywide employment growth into industrial areas. This could have an impact on housing, especially if additional new employment were added to industrial areas not subject to the MHA regulations. Applying MHA to the proposed new Industry and Innovation zone can mitigate this shift in demand.
- The City can also mitigate negative impacts of industrial development on nearby residents as follows (see **Section 3.2 Air Quality & GHG** and **Section 3.6 Noise** for details)**:**
  - Include policy guidance that recommends that residences and other sensitive land uses be separated 500 feet or appropriate distance from freeways, railways, and port facilities.
  - Add a denser tree canopy near high-volume roadways and industrial areas.
  - Impose greater noise reduction standards in residential buildings where exterior noise levels greater than 65 dBA are likely to occur.
  - Install noise reducing pavement on major arterials and roadways that experience relatively high traffic volumes and speeds.

3.9.4 Significant Unavoidable Adverse Impacts

Under all alternatives additional growth and development will occur in the study area, with small changes in the mix of housing. This change is unavoidable but is not considered significant or adverse within an urban area designated as an employment center in the Comprehensive Plan. No significant loss of existing housing due to redevelopment is anticipated under any of the alternatives. The potential impacts related to these changes may differ in intensity and location in each of the alternatives. However, with existing and new development regulations, anti-displacement programs currently in place, no significant adverse impacts are anticipated.

Increases in housing, particularly under alternatives 3 and 4, could increase households' exposure to air pollution, noise pollution, or environmental hazards in census tracts identified as having high environmental health disparities and with sensitive populations. With the application of air quality and noise mitigation measures, no significant unavoidable adverse noise impacts would occur under any of the alternatives.

Increases in employment growth in the study area may shift some demand for housing. The increment of employment growth in all alternatives is within the citywide amount that the City will plan for in the 2024 Major Comprehensive Plan update. With the application of mitigation measures, including the application of MHA regulations to the II zone, and citywide planning for housing capacity through the Comprehensive Plan, no significant unavoidable impacts would occur under any of the alternatives.

Section 3.10

Transportation

This chapter presents a multimodal transportation evaluation of the potential impacts of implementing the range of land use alternatives under consideration. The chapter presents existing transportation conditions within the study area and future transportation conditions under four alternatives: Alternative 1 No Action representing a continuation of the City's adopted land use plan in the study area and three Action Alternatives reflecting varying increases in the amount of growth accommodated by 2044 as a result of the proposal. Significant transportation impacts and potential mitigation strategies are identified for the Action Alternatives based on the policies and recommendations established in local plans.

Thresholds of significance utilized in this impact analysis include:

- Lengthy travel times on key corridors.
- Peak hour volumes on key corridors that cannot be accommodated by roadway capacity.
- Mode shares in conflict with City goals.
- Transit demand on key corridors that cannot be accommodated by planned service.
- Increases in pedestrian and bicycle demand in locations with network gaps or preclusion of planned pedestrian and bicycle improvements.
- Substantive increases in parking demand in excess of parking supply.
- Increases in serious and fatal crash rates in the study area.

More specific thresholds are described in **Section 3.10.2**.

3.10.1 Affected Environment

This section presents existing transportation conditions within the study area for all modes as well as the methodologies used to quantitatively evaluate the current performance of the transportation network. This includes evaluations of autos, freight, transit, people walking and biking, parking, and safety.

Primary & Secondary Study Areas

The study area includes the areas designated as Manufacturing/Industrial Centers (MICs) by the Puget Sound Regional Council (PSRC) as well as some nearby areas with similar uses. The study area is mapped in **Exhibit 3.10-1**. The Ballard Interbay Northend MIC (BINMIC) includes the secondary subareas of Ballard, Interbay Dravus, and Interbay Smith Cove. The Greater Duwamish MIC includes the secondary subareas of SODO/Stadium and Georgetown/South Park.

Exhibit 3.10-1 Study Area, 2021

Sources: Fehr & Peers, 2021.

Data & Methods

A variety of data were collected and compiled to assess transportation conditions in the study area. This section describes the data and methods used to evaluate key transportation metrics.

Travel Time

Travel time along major arterials was selected as a performance measure because it is easily relatable and addresses the fundamental concern of most travelers—the time it takes to move within and through the study area. This metric is relevant for autos, freight, and transit that travel along these corridors. To assess existing conditions, PM peak hour travel times were analyzed using October 2019 data; this time period represents conditions before the COVID-19 pandemic as well as before the West Seattle Bridge was closed for emergency repairs. Based on the data collected, 4:45-5:45 PM was found to be the peak hour of the PM period. Data for the month of October 2019 was obtained from Wejo, which supplies raw data collected from connected vehicle data. For all observed trips during the PM peak hour, the total travel time and distance traveled along each study corridor was summed, and then a 25th percentile speed was calculated for the entire corridor.

EIS Analysis Years

This EIS considers two distinct time periods for analysis: 2019 as the baseline of existing conditions and 2044 as a horizon year at which the outcomes of the alternatives are compared. A variety of events have occurred over the past two years that have disrupted transportation patterns in the study area. These include global events like the COVID-19 pandemic which has changed longstanding commute patterns and created supply chain bottlenecks at West Coast ports including the Port of Seattle. Locally, the closure of the West Seattle Bridge has fundamentally changed travel patterns through the study area. For this reason, 2019 was selected as a more representative year for baseline travel conditions. While these factors are profoundly affecting the transportation system as of the publication of this EIS, it is assumed that they will be resolved in the next several years and therefore not meaningfully affect operations by the horizon year of 2044.

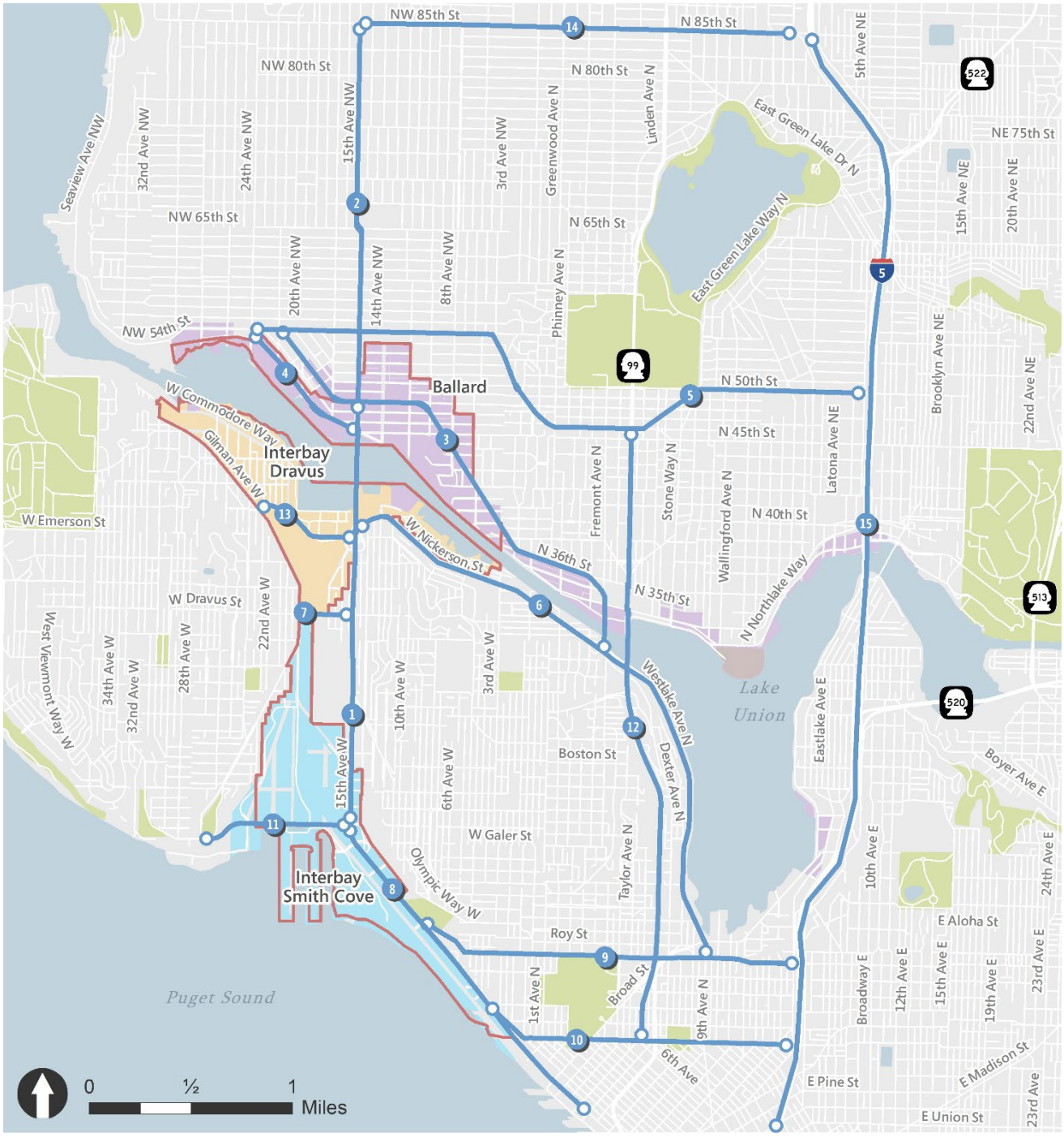
To provide context for the results, the concept of level of service (LOS) is used to describe traffic operations by assigning a letter grade of A through F, where A represents free-flow conditions and F represents highly congested conditions. This study uses concepts from the 6th Edition of the Highway Capacity Manual (HCM) to define thresholds for each LOS grade, as shown in **Exhibit 3.10-2**. The ranges shown in the table below represent the ratio between observed travel time and free-flow travel time (i.e., at the speed limit). For example, if you are traveling at half the free-flow speed, your travel time will be twice that of the free-flow travel time, which equates to the breakpoint between LOS C and LOS D. The travel time study corridors are shown in **Exhibit 3.10-3** and **Exhibit 3.10-4**.

Exhibit 3.10-2 LOS Thresholds for Travel Speeds and Travel Time

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Threshold for Ratio of PM Peak Hour Travel Time to Travel Time at Free-Flow Speed	<1.25	<1.5	<2.0	<2.5	<3.0	≥3.0

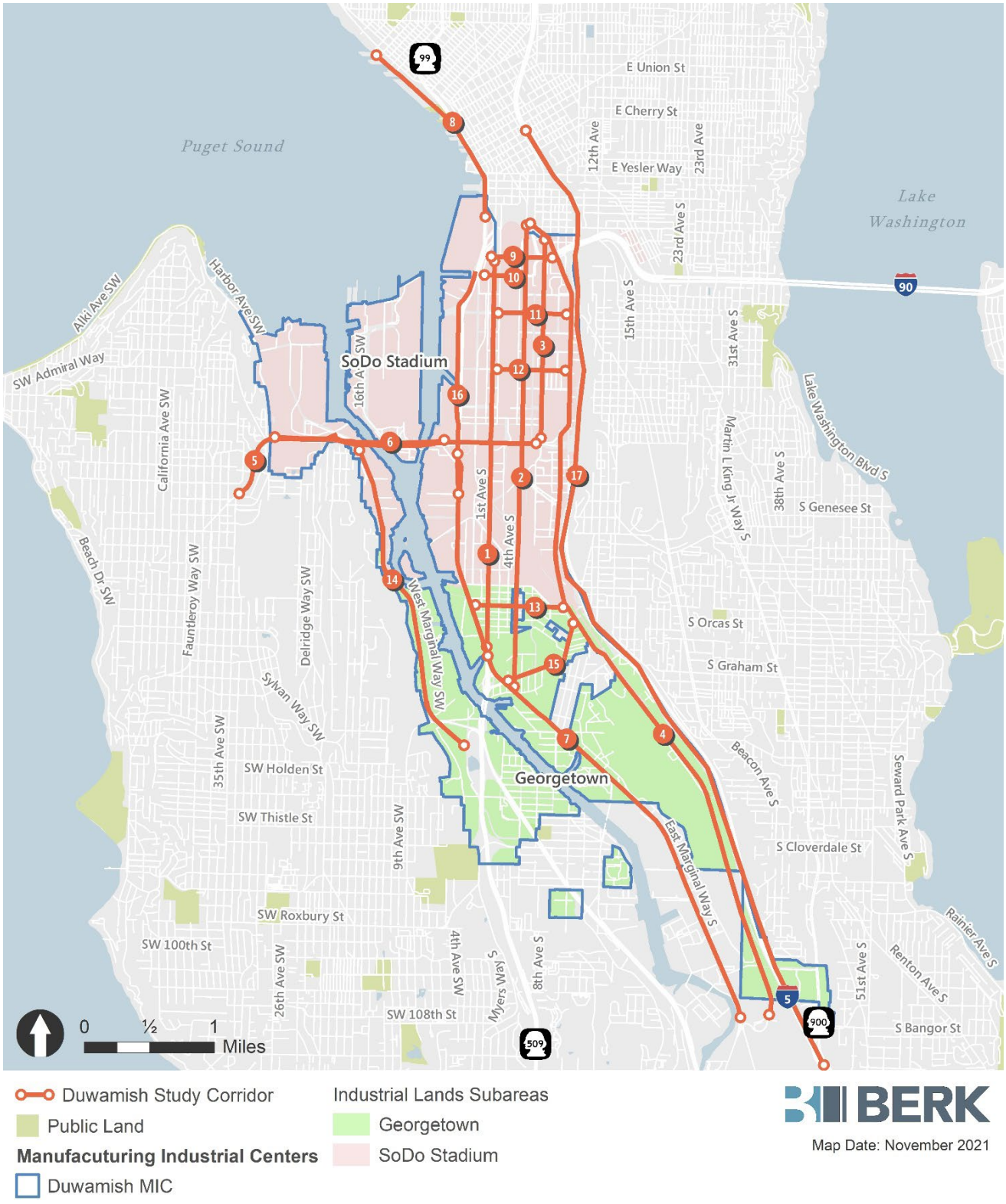
Source: Highway Capacity Manual, 6th Edition, 2016.

Exhibit 3.10-3 Study Corridors—Ballard Interbay Northend MIC, 2021



Sources: Fehr & Peers, 2021.

Exhibit 3.10-4 Study Corridors—Greater Duwamish MIC, 2021



Sources: Fehr & Peers, 2021.

Mode Share

The *Seattle 2035* Comprehensive Plan uses the concept of mode share to evaluate Seattle's transportation network. Mode share is analyzed at a sector level rather than citywide; the analysis geographies are shown in **Exhibit 3.10-5**. For this EIS, mode share and single occupant vehicle (SOV) trips are evaluated for trips originating from or destined to the Northwest Seattle, Magnolia/Queen Anne, and Duwamish sectors during the PM peak period. All trip types are included in the analysis, and the existing mode share estimates are from the PSRC's most recently available Soundcast activity-based model which has a base year of 2014. Data from the PSRC 2017-2019 Household Survey sample was also reviewed but were found to have too small of a sample size at the sector level to estimate mode share. Mode share is used as one of the impact identification criteria as described in **Section 3.10.2**.

Screenlines

Prior to shifting to the mode share method, the City used a "screenline" methodology to evaluate transportation LOS for locally-owned arterials. Screenlines were used to evaluate autos, freight, and transit since buses usually travel in the same traffic stream as autos. A screenline is an imaginary line across which the number of passing vehicles is counted, often including multiple corridors. As stated in *Seattle 2035*, this methodology recognizes that no single intersection or arterial operates in isolation and motorists choose among multiple routes to minimize travel times, among other factors. This analytic methodology focuses on a "traffic-shed" where the screenlines measure groups of arterials among which drivers logically can choose to travel.

The City set an LOS threshold in the form of a volume-to-capacity (v/c) ratio: the number of vehicles crossing the screenline compared to the designated capacity of the roadways crossing the screenline. This method is also used to evaluate the magnitude of vehicles using the City's roadway network; this EIS focuses on the 11 screenlines most relevant to the study area. **Exhibit 3.10-5** and **Exhibit 3.10-6** summarize the location of each screenline, as well as its LOS threshold. Screenlines are used as one of the impact identification criteria as described in **Section 3.10.2**.

Exhibit 3.10-5 Mode Share Sectors and Screenlines

Sources: City of Seattle, 2020; Fehr & Peers, 2021.

Exhibit 3.10-6 LOS Thresholds for Screenlines

Screenline	Location	Volume-to-Capacity Threshold
2	Magnolia	1.0
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2
4.13	South City Limit—SR 99 to Airport Way S	1.0
5.11	Ship Canal—Ballard Bridge	1.2
5.12	Ship Canal—Fremont Bridge	1.2
5.13	Ship Canal—Aurora Bridge	1.2
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0
8	South of Lake Union	1.2
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0

Source: *Seattle 2035* Comprehensive Plan Transportation Appendix, 2020.

Transit Load Factor

In addition to considering the roadway conditions on which buses operates, this EIS also includes a metric to evaluate whether there is sufficient transit capacity to accommodate demand. Specifically, King County Metro guidelines are used to measure bus passenger loads on transit routes through the study areas. The King County Metro Strategic Plan Service Guidelines define overcrowded routes as trips with average maximum loads greater than the thresholds for the entire service change period, and routes with standing loads (the amount of time passengers on the bus exceed the number of seats) greater than 20 minutes.

For this EIS, overcrowding is identified when the average maximum load of a bus trip exceeds the passenger load threshold. It is calculated by dividing the average maximum number of passengers on a particular route by the number of seats on the bus plus the number of standing people that can fit on the bus, assuming a standing person uses 4 square feet of floor space. In other words, the calculation represents the average maximum load factor over the PM peak period at the highest ridership location along the route. For this study, transit load factor is calculated for all transit routes that cross five screenlines:

- A: East of 8th Avenue NW (NW Market Street to Leary Way NW)
- B: Ballard Bridge
- C: Elliott Avenue W north of W Mercer Place
- D: North of S Lander Street (SR 99 to Airport Way S)
- E: West Seattle Bridge

This report also summarizes light rail passenger load information from the Sound Transit 2020 Service Implementation Plan (reflecting ridership from the 2018-2019 pre-pandemic time period).

Current Policy & Regulatory Frameworks

Relevant policies related to transportation in Seattle are summarized below. The City of Seattle has a 10-year strategic plan outlined in Move Seattle (2015). Seattle also has master plans for transit, freight, pedestrians, and bicycles. More detailed information is available in the specified documents.

Seattle Transportation Plan

The City has adopted citywide modal plans for pedestrian, bicycle, transit, and freight travel. SDOT will soon be embarking on a process to create a unified, multimodal Seattle Transportation Plan that will integrate the City's modal network visions into a single, holistic transportation plan.

Move Seattle

Move Seattle is a strategic document published in 2015 that guides SDOT's work over the following ten years with an updated workplan published in 2018. The plan identifies the following three key elements:

- Organizing daily work around core values: a safe, interconnected, vibrant, affordable, and innovative city.
- Integrating modal plans to deliver transformational projects: this includes creating a near-term strategy to integrate recommendations from the freight, transit, walking, and bicycling 20-year modal plans.
- Prioritizing projects and work to identify funding: in 2015, voters approved a nine-year $930 million Levy to Move Seattle. This funding source replaces the prior Bridging the Gap levy which expired in 2015. SDOT is using the levy funds to implement projects including safety improvements, new facilities, as well as maintenance of existing infrastructure.

SDOT provides annual reports summarizing accomplishments and delivery plans for the coming year.

Transit Master Plan

The *Transit Master Plan (TMP)* is a 20-year plan that outlines the needs to meet Seattle's transit demand through 2030. It prioritizes capital investment to create frequent transit services that meet the needs of residents and workers. It outlines the high priority transit corridors and the preferred modes along each corridor. This document specifies capital projects to improve speed and reliability. Goals include:

- Meet sustainability, growth management and economic development goals.
- Make it easier and more desirable to take transit.
- Respond to needs of transit-reliant populations.

- Create great places where modes connect.
- Advance implementation within constraints.

The elements of the document include policies and programs, transit corridors and service, access and connections to transit, and funding and performance monitoring.

Pedestrian Master Plan

The *Pedestrian Master Plan* (PMP) envisions Seattle as the most walkable and accessible city in the nation. To achieve that vision, the following goals are identified:

- Reduce the number and severity of crashes involving pedestrians;
- Develop a connected pedestrian environment that sustains healthy communities and supports a vibrant economy;
- Make Seattle a more walkable city for all through public engagement, service delivery, accessibility, and capital investments that promote equity; and
- Get more people moving to improve health and increase mobility.

The plan documents existing pedestrian facilities and creates a Priority Investment Network to guide future improvements.

Bicycle Master Plan

The Seattle *Bicycle Master Plan* (BMP) provides guidance on future investments in bicycle facilities in Seattle, with a vision for bicycling as a safe and convenient mode for people of all ages and abilities on a daily basis. Goals include increasing bicycle ridership, safety, connectivity, equity, and livability. The document outlines the existing network and over 400 miles of planned future network for the city. Strategies for end-of-trip facilities, programs, maintenance, project prioritization and funding are included. SDOT publishes reports every two years to update the public on its progress toward implementing BMP projects and meeting the identified performance measures.

Freight Master Plan

The *Freight Master Plan* (FMP) was adopted by the City in 2016. Its purpose is to ensure efficient and predictable goods movement in the region to promote economic activity and international trade. It analyzes the current freight facilities and their ability to accommodate future freight growth. The plan identifies six main goals with a total of 92 actions that address economy, safety, mobility, state of good repair, equity, and the environment in order to create a comprehensive freight network. This document is especially important for the two designated manufacturing and industrial centers, the BINMIC and Greater Duwamish MIC, and the Port of Seattle.

Transportation Capital Improvement Program

For the 2021 to 2026 period, the Capital Improvement Program (CIP) plans to invest more than $1.5 billion on developing, maintaining, and operating Seattle's transportation system. The CIP aims to promote safe and efficient movement of people and goods and to enhance the quality of life, environments and economy within the city and surrounding areas. Funding has been designated for projects in all four of the adopted modal plans. Highlighted improvement projects include:

- New sidewalks, particularly near schools;
- School safety improvements;
- Pedestrian crossing improvements and stairway rehabilitation;
- Neighborhood greenways, bicycle lanes, and bicycle parking;
- Madison Street Bus Rapid Transit;
- RapidRide Roosevelt and Multimodal Corridor;
- South Lander Street Grade Separation Project;
- Bridge rehabilitation and replacement; and
- Alaskan Way Main Corridor and Overlook Walk and East-West Connections Project.

Complete Streets

This 2006 policy directs SDOT to consider roadway designs that balance the needs of all roadway users, including pedestrians, bicyclists, transit riders and people of all abilities, as well as automobiles and freight. Design decisions are based on data, such as the adjacent land uses and anticipated future transportation needs. There is no set design template for complete streets as every situation requires a unique balance of design features within the available right-of-way. However, the SDOT has developed a Right-of-Way Improvements Manual, called Seattle Streets Illustrated, which helps property owners, developers, engineers, and architects who are involved in the design, permitting, and construction of local streets. Streets Illustrated sets standards for a variety of elements of the public right-of-way including sidewalks, landscaping, bicycle lanes, transit stop amenities, and vehicle lane widths.

Intelligent Transportation Systems (ITS) Strategic Plan

For the 2010-2020 period, the Intelligent Transportation Systems (ITS) Strategic Plan provides a 10-year approach for implementing ITS across Seattle. ITS employs electronic and communication technologies on the streets, as well as automated traffic systems, to enhance mobility for all modes by increasing the efficiency and safety of the transportation infrastructure. The goal of the strategic plan is to ensure the existing ITS infrastructure is maintained and preserved, maximize the value of the existing infrastructure, and expand ITS to provide additional geographic coverage and services to travelers.

Current Conditions

This section describes current transportation conditions for all modes in the study area. Where applicable, more detail is provided at the subarea level.

Active Transportation

The pedestrian network is composed of sidewalks, walkways, crosswalks, staircases, curb ramps, and multi-use trails. The presence, connectivity, and quality of the pedestrian network varies throughout the area often correlating with the prevailing land use. Industrial areas tend to have fewer pedestrian facilities and limited connectivity while adjacent commercial and residential areas usually have moderately dense pedestrian networks with sidewalks on at least one side of nearly all streets, and most intersections have marked crosswalks and curb ramps. Some pedestrian crossing locations have been enhanced with signage and/or curb extensions which shorten crossing distances. SDOT maintains an inventory of pavement condition which indicates that conditions tend to be poorer in more industrial areas such as SODO, South Park, and waterfront areas within the BINMIC.

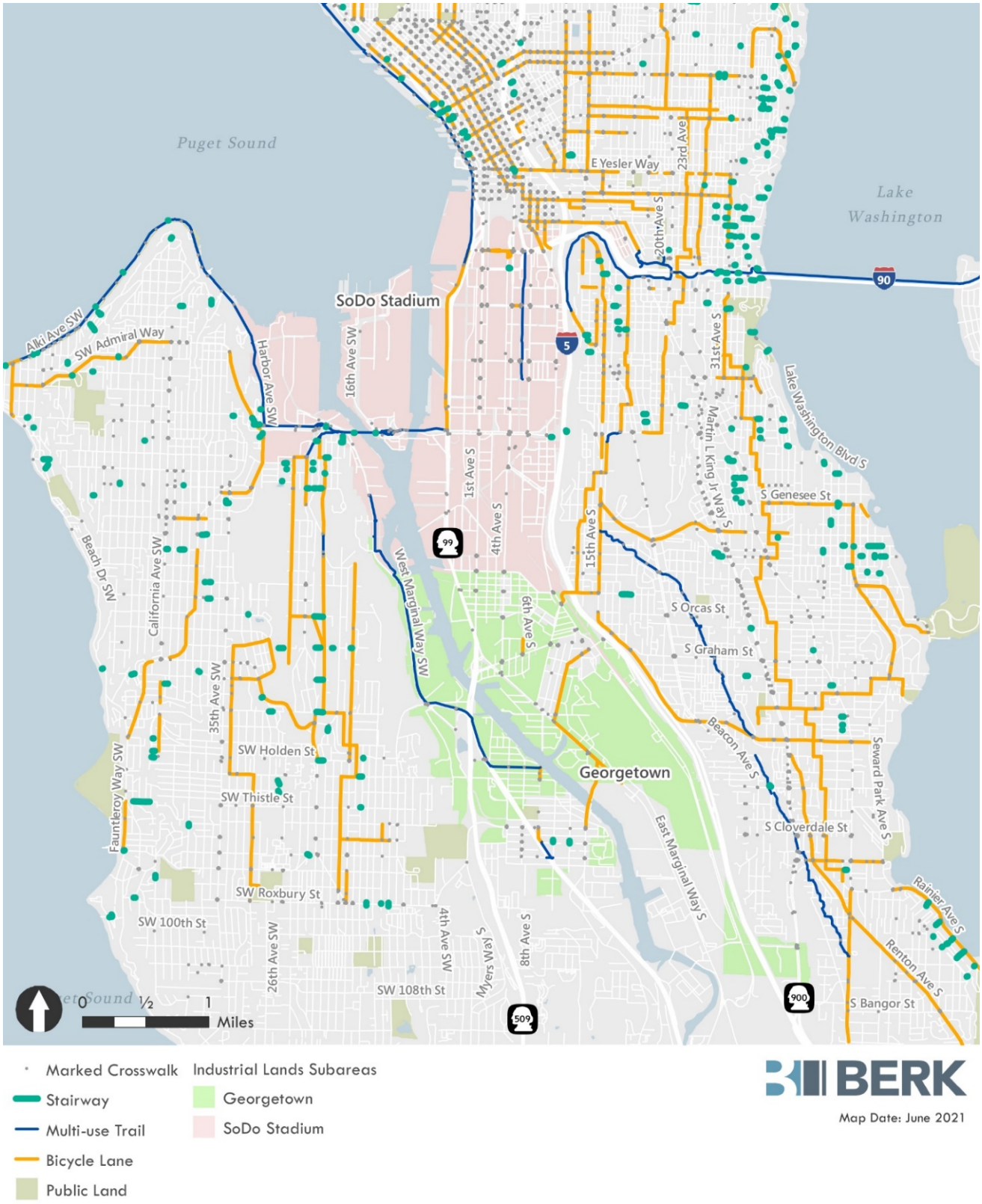
The existing bicycle network is made up of bicycle lanes, cycle tracks (protected bike lanes), multi-use trails, signed routes, and shared streets known as Neighborhood Greenways designated with "sharrow" markings. Bicycle facilities are distributed throughout the city but are most prevalent in the Center City area situated between the MICs. The study area includes a variety of multi-use trails along waterways adjacent to industrial areas. This includes the Burke-Gilman Trail and Ship Canal Trail in the Ballard and Interbay Dravus areas; the Elliott Bay Trail connecting the Interbay Smith Cove Subarea to SODO; and the SODO Trail, West Seattle Bridge Trail, and Duwamish River Trail in the SODO/Stadium and Georgetown/South Park subareas.

Pedestrian and bicycle facilities are mapped in **Exhibit 3.10-7** and **Exhibit 3.10-8**. The City of Seattle maintains data layers showing existing sidewalk and curb ramps; findings and trends from this data are described in the following sections. However, these data are not shown in the following exhibits due to legibility of the maps at the study area level.

Exhibit 3.10-7 Existing Active Transportation Facilities—Ballard Interbay Northend MIC, 2021

Source: City of Seattle, 2020; Fehr & Peers, 2021.

Exhibit 3.10-8 Existing Active Transportation Facilities—Greater Duwamish MIC, 2021



Source: City of Seattle, 2020; Fehr & Peers, 2021.

Ballard

Within the Ballard Subarea, there are sidewalks on both sides of nearly all streets within the study area. However, sidewalks and pedestrian connectivity are more limited closest to the waterfront where there are large parcels of industrial uses. There are limited marked crosswalks in the study area, most of which are located on Leary Way NW at major intersections. Curb ramps are generally present within the street grid, but there are some missing stretches, particularly along 14th Avenue NW and NW 50th Street, as well as within the industrial areas along the waterfront.

The Ballard study area includes a portion of the Burke-Gilman Trail, which includes frequent marked crossings west of Leary Way NW. There are also separated bike lanes on NW 45th Street that connect to the Burke-Gilman Trail at 11th Avenue NW. The Ballard Subarea is home to the "missing link" of the Burke-Gilman Trail which stretches from 11th Avenue NW to the Ballard Locks. Construction is underway along Market Street to include a shared use trail and sidewalk with plans to complete the trail along Shilshole Avenue NW and NW 45th Street. To cross the Ship Canal, people walking and biking share narrow pathways on either side of the Ballard Bridge. Due to the limited width of the facilities, it is difficult for people to pass one another comfortably, as shown in **Exhibit 3.10-9**.

Exhibit 3.10-9 Pedestrian and Bicycle Facility Constraints

Note: Photo at left shows the Ballard Bridge and photo at right shows the Elliott Bay Trail between Terminal 91 and the BNSF Railyard.
Source: Seattle Department of Transportation, 2020.

Interbay Dravus

Interbay Dravus has a relatively complete pedestrian network along the main arterials; however, most other roadways in this industrial area have no sidewalks. There are limited marked pedestrian crossings, with marked crosswalks and curb ramps only at the major intersections along W Dravus Street and W Emerson Street. W Dravus Street and W Emerson Place/Street serve as the only connections across the railway between the North Queen Anne and Southeast Magnolia neighborhoods. W Dravus Street provides sharrows from 15th Avenue W to 20th Avenue W as well as sidewalks along the bridge. The Ship Canal Trail transitions to a cycle track along W Emerson Place. Both facilities connect with separated bike lanes on Gilman Avenue W and 20th Avenue W that provide bicycle connections to the Elliott Bay Trail to the south.

Interbay Smith Cove

The Interbay Smith Cove Subarea has minimal public pedestrian facilities, as the Seattle Armory and Port of Seattle properties comprise most of the subarea. Outside of this industrial area, there are sidewalks on both sides of nearly all streets, including the major thoroughfare of 15th Avenue W/Elliott Avenue W. Marked crosswalks and curb ramps exist about every fifth of a mile along this corridor. However, pedestrian and bicycle comfort along the corridor is affected by the width, traffic volumes, and speeds along the roadway.

East-west connectivity across the subarea is very limited. Travelers can use the Elliott Bay Trail around the perimeter of Terminal 91 or the Magnolia Bridge, which is the only roadway that provides public access east/west in Interbay Smith Cove. The Elliott Bay Trail has a constrained section, shown in **Exhibit 3.10-9**, where the trail passes through the Terminal 91 area. The Magnolia Bridge has a narrow sidewalk on one side; the bridge can be used to connect to 16th Avenue W beneath the Magnolia Bridge or to the Magnolia neighborhood to the west though the grade is steep.

SODO/Stadium

In the SODO/Stadium Subarea, the pedestrian network is generally complete north of the West Seattle Bridge, with sidewalks on both sides of nearly all streets. Marked crosswalks and curb ramps exist at the major intersections within the area, along the north/south corridors of 1st Avenue, 4th Avenue, 6th Avenue, and Airport Way. However, the major east/west corridors in the subarea are spaced about a half-mile apart, which limits crossing options and increases travel distances for people looking to cross the street between these intersections. South of the bridge, sidewalks only exist along E Marginal Way, 1st Avenue S, and 4th Avenue S, with very limited marked crossings. West of the waterway on Harbor Island and Terminal 5, sidewalks exist on portions of 16th Avenue SW and along the lower Spokane Street Bridge, but the only marked crosswalks are at the port access intersections along the Spokane Street Bridge.

In the subarea, there are minimal bicycle facilities, with sharrows along 1st Avenue S and S Lander Street. The multi-use SODO Trail provides a bicycle connection between the SODO and

Stadium Link Light Rail stations and there are bike lanes along E Marginal Way S connecting the Waterfront Trail and the West Seattle Bridge Trail.

Georgetown/South Park

The Georgetown/South Park Subarea has a less dense pedestrian network, with sidewalks on both sides of the streets along the arterials such as Airport Way S, Ellis Avenue S, and S Michigan Street. Sidewalks also exist in the residential neighborhood located between Corson Avenue S and Ellis Avenue S. However, there are limited pedestrian crossings in the area, as marked crosswalks and curb ramps exist at only a few major intersections.

The Duwamish River Trail runs along the west side of the subarea providing a north-south route along the west side of the waterway. Bicycle sharrows exist on some local streets within the subarea, and separated bike lanes are present on Ellis Avenue S and E Marginal Way S. Connections across the Duwamish Waterway are limited: there is a shared use facility running alongside the 1st Avenue Bridge and sidewalks are provided on both sides of the 16th Avenue S Bridge. The Georgetown to South Park connection, to be constructed in 2022, will link the two neighborhoods via E Marginal Way and 16th Avenue S.

Transit

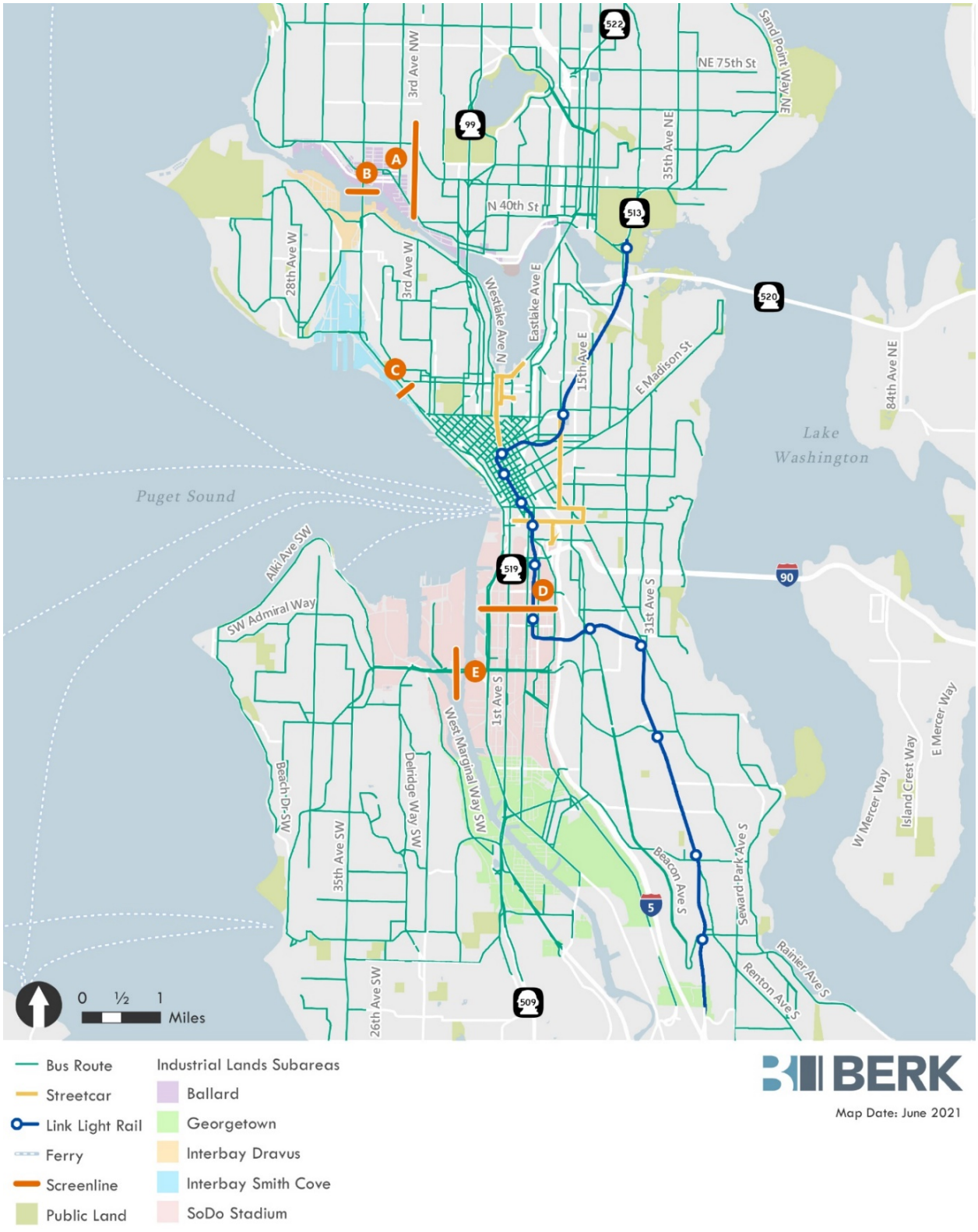
The study area and surrounding neighborhoods are served by King County Metro and Sound Transit public transit including local, rapid, and express fixed route bus services as well as light rail.

- King County Metro operates a fixed route bus system that includes RapidRide, a separately-branded set of frequent transit routes in West Seattle, Ballard, and Downtown.
- Sound Transit Express and Community Transit operate buses that provide service from outside the City of Seattle.
- Rail transit services include Sound Transit Link Light Rail, City-operated streetcars in South Lake Union and First Hill, and the Sounder commuter train that provides service from King Street Station north to Everett and south to Tacoma.

Sound Transit's expansion of Link Light Rail will provide expanded rail service to the SODO, Interbay Smith Cove, Interbay Dravus, and Ballard study areas. **Exhibit 3.10-10** displays the existing transit services as well as the five screenlines used to summarize demand along key transit corridors in the study area.

Sound Transit reports its ridership and passenger load trends in its annual Service Implementation Plan. According to the 2020 Service Implementation Plan, which reflects conditions in 2019 before the COVID-19 pandemic disrupted typical travel patterns, Link light rail between Angle Lake and the University of Washington had average weekday boardings of over 80,000. Peak loads typically occur between the CID and Pioneer Square stations just north of the SODO/Stadium Subarea. During the PM peak period, peak flows are in the southbound direction through the subarea as people travel outbound from center city. Sound Transit monitors the passenger loads on each trip and found only one trip consistently exceeding the loading standard.

Exhibit 3.10-10 Existing Transit Network, 2021



Source: King County Metro, 2021; Sound Transit, 2021; Fehr & Peers, 2021.

King County Metro ridership data for the PM peak period was summarized for each route that crosses a study area screenline. The average maximum load for each trip was extracted and compared to the capacity of the trip (i.e., the number of seats on the bus plus standing room) to determine if the trip exceeded King County Metro's crowding threshold. Note that the maximum load does not necessarily occur at the screenline. For instance, routes leaving downtown for outlying areas tend to have maximum loads occurring closer to the center city. The average maximum loads for the study area routes were aggregated at the screenline level and results are reported in **Exhibit 3.10-11**.

Exhibit 3.10-11 Passenger Load Factors on Bus Route across Transit Screenlines

	Average Maximum Load Factor on Routes Crossing Screenline	
Screenline	Inbound	Outbound
A: East of 8th Avenue NW	0.63	1.21
B: Ballard Bridge	0.98	1.13
C: North of W Mercer Place	0.86	1.08
D: North of Lander St	0.51	0.93
E: West Seattle Bridge	0.49	0.95

Note: Inbound refers to travel into the downtown area and outbound travel out of the downtown area.
Source: King County Metro, Fall 2018; Fehr & Peers, 2021.

Because the analysis period is the PM peak period, the outbound load factors are higher than the inbound load factors; the inverse pattern would be present during the AM peak period. The data show that many of the routes traveling across the study area screenlines operate over their crowding threshold at some point along their trip. Specific routes are discussed below.

Travel Patterns of Industrial Workers

While the most congested transit conditions occur during conventional AM and PM peak periods, some industrial land uses generate different temporal patterns. For example, some workers need to commute during off-peak periods for their shifts when transit options are more limited. Moreover, workers within the study area commute from a wide geographic area. As summarized in Exhibit 3.9-11 and mapped in Exhibit 3.9-13, roughly 40% of study area workers commute less than 10 miles; 37% commute 10-24 miles; 13% commute 25-50 miles; and 10% commute more than 50 miles. Therefore, the challenge in accessing transit service for some industrial workers may be the availability or convenience of the service.

Ballard, Interbay Dravus, & Interbay Smith Cove

The Ballard Bridge screenline includes routes traveling north-south through the Interbay area and into areas of center city. Nearly all of the routes traveling across the bridge exceed their crowding threshold at some point for more than half of their PM peak period trips. This includes the D Line (both inbound and outbound), Route 15, and Route 18. The screenline east of 8th Avenue NW captures routes 28, 40, and 44. All three of those routes exceed their crowding threshold on most of their PM peak period trips; however, the highest loads tend to occur closer to downtown or the U District rather than in the study area.

The screenline north of Mercer Place captures routes traveling along the Elliott Way/15th Avenue NW corridor. Several of these routes also cross the Ballard Bridge as described above. This screenline also includes routes serving Magnolia, Uptown, Fremont, Wallingford, and the U District. In addition to the D Line, Route 15, and Route 18 as mentioned above, Route 32 exceeds its crowding threshold on the majority of its PM peak period trips, with the maximum load usually occurring nearer to the U District.

SODO/Stadium & Georgetown

The north of Lander Street screenline captures a large number of routes that travel through the SODO/Stadium area as they approach center city. Most routes generally operate below their crowding thresholds. The exceptions are the outbound C Line, Route 118, and Route 101. The West Seattle Bridge screenline captures a variety of routes; however, only the C Line and Route 118 exceed their crowding thresholds on a majority of PM peak period trips.

Auto & Freight

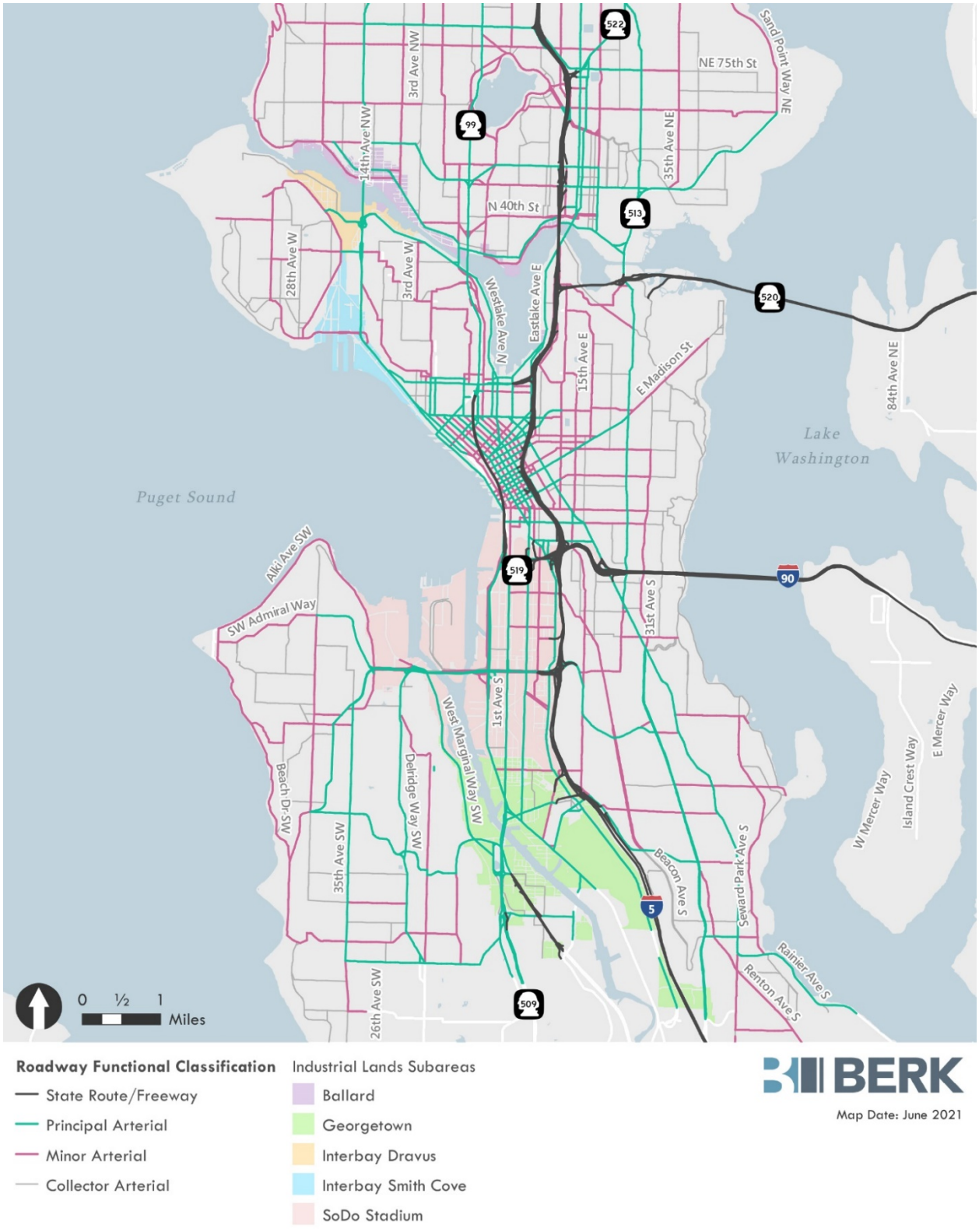
The City of Seattle is served by a dense roadway system of principal, minor, and collector arterials, as shown in **Exhibit 3.10-12**. Auto and freight travel also access several state highways—I-5, SR 99, and SR 509—which run north-south through the city. Bridges in the study

area play a central role in facilitating travel across waterways and steep topography; these include the Ballard Bridge, Magnolia Bridge, West Seattle Bridge, 1st Avenue S Bridge, and South Park Bridge. The study area includes some of the most constrained areas of the city given the nature and location of water crossings and maritime and industrial land uses.

The City has designated a major truck street network throughout the city as shown in **Exhibit 3.10-13**. In the study area, the major truck street network includes most major arterials, including SR 99, SR 509, W Marginal Way SW, E Marginal Way S, 1st Avenue S, 4th Avenue S, Elliott Way, 15th Avenue W, and Leary Way.

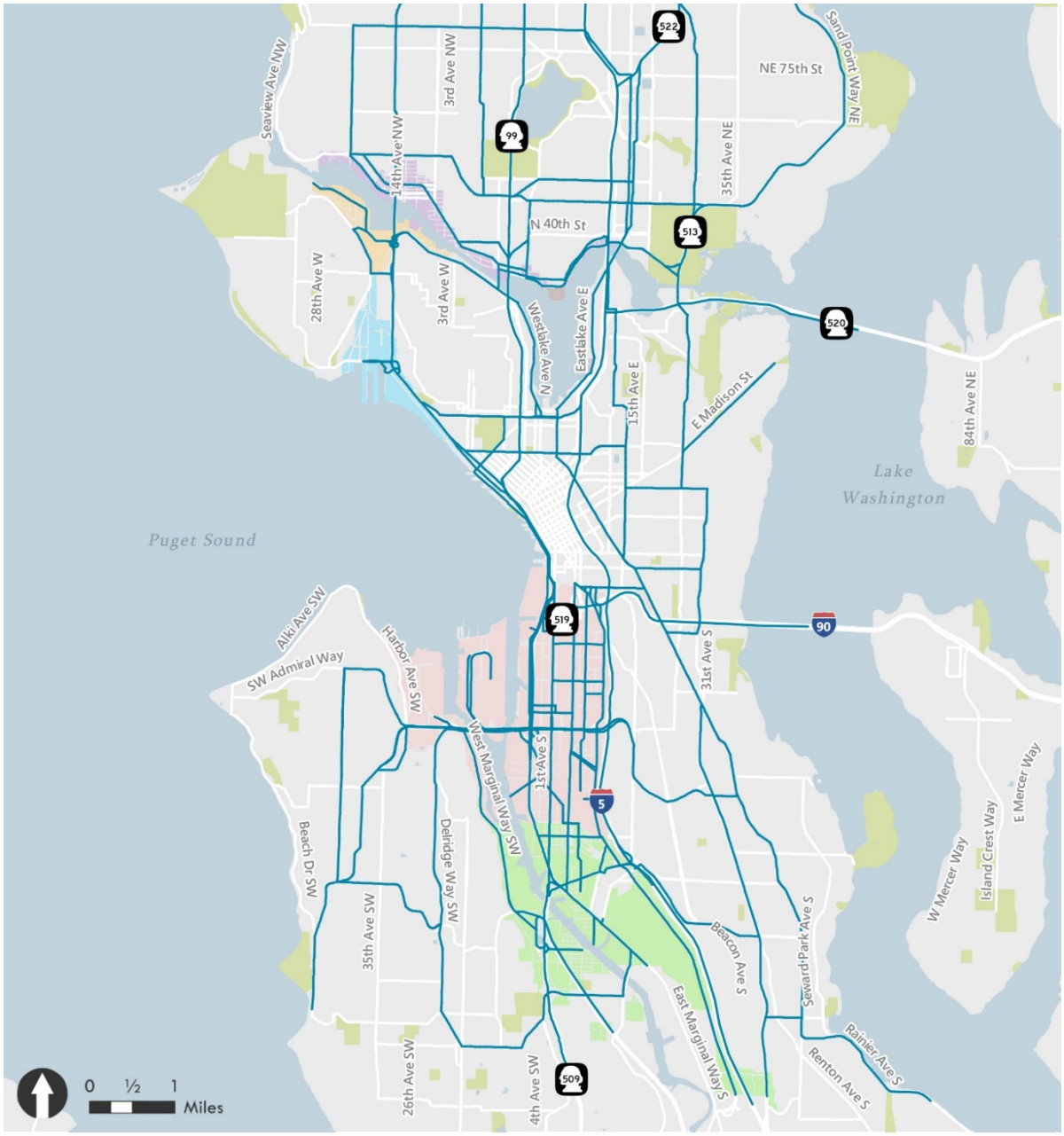
The Seattle Zero Emissions Freight Study included an evaluation of multiple data sources to understand freight activity throughout the city. The study found that roughly 2% of all vehicles in the Interbay area are freight vehicles while roughly 5% of vehicles in SODO are freight vehicles. In both areas, approximately one-quarter of freight vehicles are light-duty commercial vehicles and over one-half are medium-duty trucks. Most delivery VMT within the city is generated by medium-duty trucks. An analysis of freight activity within the Greater Duwamish MIC found that 50-70% of all medium- and heavy-duty truck trips in the Duwamish Valley are pass-through trips while 75-80% of medium- and heavy-duty truck trips in South Park—where SR 99, SR 509, and the South Park Bridge are located—are pass-through trips.

Exhibit 3.10-12 Existing Roadway Network, 2021



Source: City of Seattle, 2021; Fehr & Peers, 2021.

Exhibit 3.10-13 Existing Freight Network, 2021



Source: City of Seattle, 2021; Fehr & Peers, 2021.

Travel Time

Using the HCM guidelines for defining LOS thresholds as described in the Data & Methods section, **Exhibit 3.10-14** summarizes the travel time conditions along each of the study corridors. The existing travel time was calculated using the 25th percentile speeds for PM peak hour (4:45-5:45pm) for each direction of the study corridors. In other words, the travel time estimates reflect a somewhat more congested condition than the average day. Traffic congestion is more difficult for freight to navigate and trucks typically travel at slower speeds than general auto traffic. However, much of the daily freight movement activity occurs in the midday when traffic congestion is less pronounced.

For facilities that have peak directional patterns, the AM peak hour is typically expected to have similar characteristics in the opposite direction than those shown for the PM peak hour. For example, 15th Avenue W shows longer travel times northbound in the PM peak hour so similar conditions are expected southbound during the AM peak hour. The travel times shown below are rounded to the nearest half minute.

Exhibit 3.10-14 Existing PM Peak Hour LOS

		PM Peak Hour LOS		Observed Travel Time (Minutes)	
ID	Corridor	N/E	S/W	N/E	S/W
Ballard Interbay Northend MIC					
1	15th Ave W from Magnolia Bridge to NW Leary Way	E	A	11.5	4.5
2	15th Ave NW from NW Leary Way to N 85th St	E	C	9.5	6.5
3	Leary Ave NW/ Leary Way NW/ N 36th S/ Fremont Bridge between NW Market St and W Nickerson St/Westlake Ave	C	C	11.0	12.0
4	Shilshole Ave NW between NW Market and 15th Ave NW	B	D	2.5	3.5
5	NW Market St/N 50th/ 46th St between 24th Ave NW and I-5	C	D	14.0	16.5
6	W Nickerson St/Westlake Ave N between 15th Ave W and Mercer St	C	C	13.0	11.5
7	W Dravus St between 15th Ave W and 20th Ave W	E	D	2.0	1.5
8	Elliott Ave W between Magnolia Bridge and Wall St	B	B	5.5	6.0
9	W Mercer St from Elliott Ave W to I-5	F	F	32.0	22.0
10	Denny Way from Elliott Ave W to I-5	F	E	14.5	11.0
11	Magnolia Bridge between 15th Ave W and Thorndyke Ave W	B	A	2.5	1.5
12	SR 99 between N 46th St and Denny Way	C	E	8.5	14.0
13	W Emerson St between 15th Ave W and Gilman Ave W	F	F	6.0	4.0
14	N 85th St between 15th Ave NW and I-5	E	E	13.0	14.5
15	I-5 between N 85th Street and Madison Street	F	F	19.0	24.0

ID	Corridor	PM Peak Hour LOS		Observed Travel Time (Minutes)	
		N/E	S/W	N/E	S/W
Greater Duwamish MIC					
1	1st Ave S between S Royal Brougham Way and SR 99	C	C	11.0	11.0
2	4th Ave S between Seattle Blvd S to E Marginal Way S	C	C	12.0	12.5
3	6th Ave S between Seattle Blvd S to Spokane St Viaduct	C	C	6.5	6.0
4	Airport Way S/ Seattle Blvd S between S Royal Brougham Way to S Boeing Access Rd	A	A	16.5	15.5
5	West Seattle Bridge/Spokane St Viaduct between 35th Ave SW and I-5	C	E	6.5	10.0
6	Spokane St Bridge between Harbor Ave SW and SR 99	B	B	4.5	4.5
7	E Marginal Way S between SR 99 and S Boeing Access Rd	C	D	8.5	10.5
8	Alaskan Way S from Broad St to SR 99	D	F	9.0	13.0
9	S Royal Brougham Way between SR 99 and Airport Way S	F	D	4.5	3.0
10	Edgar Martinez Dr S between SR 99 and 4th Ave	F	F	2.5	2.5
11	S Holgate St between 1st Ave and Airport Way S	D	F	3.0	4.5
12	S Lander St between 1st Ave and Airport Way S	E	E	4.0	4.0
13	S Lucile St between SR 99 and Airport Way S	D	E	4.0	5.0
14	W Marginal Way SW between West Seattle Bridge and 2nd Ave SW	A	A	5.0	4.5
15	S Michigan St/ Corson Ave S between E Marginal Way S and I-5	C	E	3.5	5.5
16	E Marginal Way S/SR 99 between S Atlantic Street and 1st Ave S Bridge	A	A	9.0	9.0
17	I-5 between Madison Street and SR 599	E	F	25.5	30.0

Source: Wejo, 2019; Fehr & Peers, 2021.

During the PM peak hour, most corridors operate at LOS E or better in both directions. Corridors operating at LOS F include:

- Both directions of W Mercer St from Elliott Avenue W to I-5
- Eastbound Denny Way from Elliott Avenue W to I-5
- Both directions of W Emerson St from Gilman Avenue W to 15th Avenue W
- Both directions of I-5 between N 85th Street and Madison Street
- Southbound Alaskan Way S from Broad St to SR 99
- Eastbound S Royal Brougham Way between SR 99 and Airport Way S
- Both directions of Edgar Martinez Dr S between SR 99 and 4th Avenue
- Westbound S Holgate St from Airport Way S to 1st Avenue
- Southbound I-5 from Madison Street to SR 599

Ballard

In the Ballard Subarea, principal arterials include 15th Avenue NW and Leary Way NW. These roadways, as well as Shilshole Avenue NW, carry high volumes of freight traffic in the area. Along 15th Avenue NW, the peak direction of travel during the PM peak hour is northbound with more balanced volumes on Leary Avenue NW and Shilshole Avenue NW. All study corridors in the Ballard Subarea operate at LOS E or better during typical conditions.

Interbay Dravus

The principal arterials and freight corridors in the Interbay Dravus Subarea include 15th Avenue W, W Dravus Street, W Emerson Street, and W Nickerson Street. All study corridors except W Emerson Street operate at LOS E or better in the Interbay Dravus study area during typical conditions.

Interbay Smith Cove

In the Interbay Smith Cove Subarea, the principal arterials and freight routes include 15th Avenue W, W Mercer Street, Denny Way, and Elliott Avenue W. The Magnolia Bridge is classified as a minor arterial as well as a freight route. Congestion stemming from the I-5 on-ramps affects travel times in the eastbound direction of both Denny Way and W Mercer St which operate at LOS F. Both routes typically have less congestion on the western ends closer to the study area, but congestion increases along the corridors as they near center city and I-5.

SODO/Stadium & Georgetown

In the SODO/Stadium Subarea, 1st Avenue S, 4th Avenue S, and E Marginal Way are primary arterials, and most other roadways are minor arterials. The West Seattle Bridge and the Spokane Street Bridge both span the Duwamish Waterway. The West Seattle Bridge has been closed since March 2020, resulting in major travel pattern changes and increased demand on alternate routes. However, the existing conditions discussed in this report focuses on the 2019 period, when operations were more "typical," both in terms of the available network and pre-pandemic travel demand.

Because of the predominantly industrial land uses, all arterials in the subarea are designated as freight routes. In particular, East Marginal Way S carries a high percentage of cargo trucks and provides access to multiple terminal entrances. Most corridors operate at LOS E or better during the PM peak hour, with the exception of the east/west corridors of S Holgate Street, S Royal Brougham Way, and Edgar Martinez Drive S.

Georgetown/South Park

In the Georgetown/South Park Subarea, all minor and principal arterials are designated freight corridors, including E Marginal Way S, 1st Avenue S, and S Michigan Street. Airport Way S is often used as a bypass of I-5 when the interstate is highly congested due to collisions or construction. As noted above, this area has been experiencing an increase in traffic volumes

since March 2020 when the closure of the West Seattle Bridge caused motorists to seek alternate routes. Under typical 2019 conditions, almost all corridors operate at LOS E or better.

Mode Share

The existing SOV mode share in the City of Seattle is summarized by sector using the PSRC Soundcast model and is shown in **Exhibit 3.10-15**. Within the study area, the Duwamish sector has the highest share of PM peak period SOV trips at 53.5%. Magnolia/Queen Anne and Northwest Seattle have lower SOV percentages, as these sectors contain a larger mix of residential and commercial uses.

Exhibit 3.10-15 Existing SOV Mode Share—PM Peak Period

Sector	Existing SOV Share
Duwamish	53.5%
Magnolia/Queen Anne	43.1%
Northwest	41.6%

Source: PSRC, 2021; Fehr & Peers, 2021.

Screenlines

The City's screenline thresholds are in the form of a volume-to-capacity (v/c) ratio: the number of vehicles crossing the screenline compared to the designated capacity of the roadways crossing the screenline. **Exhibit 3.10-16** summarizes the location of the study area screenlines, as well as their LOS threshold and current v/c ratio. All screenline locations are currently under the LOS threshold defined by the City of Seattle.

Exhibit 3.10-16 Existing PM Peak Hour LOS

Screenline	Location	Volume-to-Capacity Threshold	2019 PM Peak Period v/c Ratio	
			N/E	S/W
2	Magnolia	1.0	0.51	0.54
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2	0.57	0.53
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2	0.54	0.51
4.13	South City Limit—SR 99 to Airport Way S	1.0	0.40	0.45
5.11	Ship Canal—Ballard Bridge	1.2	1.01	0.75
5.12	Ship Canal—Fremont Bridge	1.2	0.59	0.66
5.13	Ship Canal—Aurora Bridge	1.2	0.30	0.34
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0	0.54	0.62

Screenline	Location	Volume-to-Capacity Threshold	2019 PM Peak Period v/c Ratio	
			N/E	S/W
8	South of Lake Union	1.2	0.62	0.69
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0	0.47	0.48
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0	0.58	0.66

Source: City of Seattle count data, 2019; Fehr & Peers, 2021.

Parking

The City of Seattle sets goals and policies related to parking in its Comprehensive Plan. Goals include managing the on-street parking supply to achieve auto trip reduction and improved air quality. In addition, the City recognizes that the primary transportation purpose of the arterial street system is to move people and goods.

The City regulates on-street parking by issuing on-street permits, charging by the hour, setting time limits, and defining loading zones. Some areas of the study area have time-limited paid parking, in effect between 8 AM and 6 or 8 PM, with rates between $0.50 and $5 per hour depending on location. Some blocks have free time-limited parking, unrestricted parking, carpool only parking, or freight loading only zones.

Conditions in specific subareas are described below. One common trend is that on-street parking tends to be more informal in industrial areas, with the frontage of many parcels lacking curbs or delineated spaces. This type of parking can create obstacles for pedestrians and bicycles. More formal parking configurations are typically implemented as frontage improvements occur.

Ballard

In the Ballard Subarea, most roadways have unrestricted parking. Portions of NW Leary Way and Shilshole Avenue NW have free, time-limited parking. The only paid parking is along streets within a few blocks north and south of NW Market St between 26th Avenue NW and 15th Avenue NW. Parking in the industrial areas tends to be informal, with no curbs or delineated spaces.

Interbay Dravus

The Interbay Dravus Subarea has unrestricted parking on most streets within the subarea except for W Commodore Way, Thorndyke Avenue W, and several blocks west of the W Dravus Street Bridge which have time-limited parking. There is no on-street parking permitted on 15th Avenue W north of W Dravus Street. There is no paid parking within the Interbay Dravus Subarea.

Interbay Smith Cove

The Interbay Smith Cove Subarea has unrestricted parking on the residential streets east of 15th Avenue W, and west of the Magnolia Bridge. There are stretches of time-limited parking along portions of 15th Avenue W/Elliott Way. The southbound curb lane is bus only during the AM commute period and the northbound curb lane is bus only during the PM commute period. Outside of those hours, on-street parking is permitted. There is no paid parking within the Interbay Smith Cove Subarea.

SODO/Stadium

Near the stadiums and within the SODO/Stadium Subarea, most streets have time-limited parking. Multiple blocks surrounding the stadiums, and along 1st Avenue S, 4th Avenue S, 6th Avenue S, and Airport Way S do not allow parking. The only on-street paid parking within the subarea is along 1st Avenue S and Occidental Avenue S just west of Lumen Field. The north/south arterials tend to have more formal parking in front of businesses, with curbs and delineated spaces. Along many industrial parcels, parking is more informal as those areas often lack curbs and delineated spaces.

Georgetown/South Park

In the Georgetown/South Park Subarea, a variety of streets offer time-limited parking; there is no paid parking. Many of the local roadways have no restrictions on parking. On the west side of the Duwamish waterway, West Marginal Way SW does not include on-street parking. Adjacent land uses include off-street parking throughout the corridor.

Safety

The City has a Vision Zero policy that aims to reduce the number of fatalities and serious injuries to zero by 2030. The Vision Zero program includes a variety of strategies, including reduced speed limits, Safe Routes to Schools investments, safety improvements at high-risk locations, enforcement, and education. In 2019, there were 26 fatalities and 194 serious injuries in the city. Although fatalities on city streets had been on a downward trend, there has been a recent increase, a trend similar to what has been observed nationwide. Of the 26 fatalities resulting from collisions within the city in 2019, three occurred within the study area. These included a pedestrian/bus collision on SR 509, a bicyclist/vehicle collision at Alaskan Way & S Spokane St, and a vehicle/vehicle collision at Airport Way/Hinds Street. Of the 194 serious injuries in the city, 20 occurred within the study area, with the SODO subarea accounting for just over half.

Modal conflicts between trucks, pedestrians, and bicyclists are of particular concern given the size and visibility of trucks and the vulnerability of people walking and biking. As documented in the Freight Master Plan, trucks typically represent a higher proportion of fatal collisions than any other type of collision.

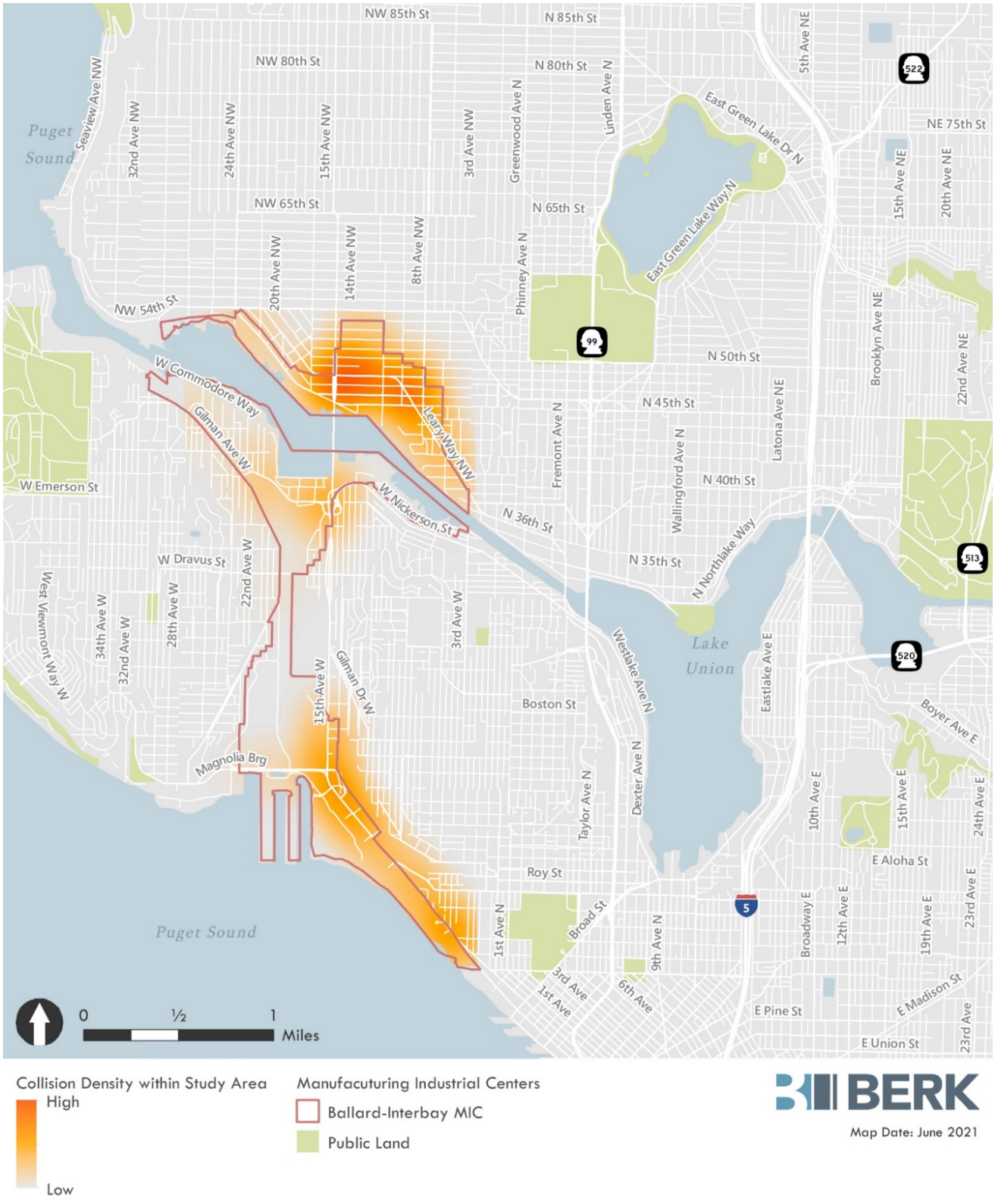
Exhibit 3.10-17 Modal Conflicts in Industrial Areas

Sources: Seattle Department of Transportation, 2020.

Exhibit 3.10-18 and **Exhibit 3.10-19** are heat maps created using five years (2016-2020) of recent collision data. Within the study area, most fatal and serious injury collisions occur on the major arterials, including Leary Way, 15th Avenue W, 4th Avenue S, E Marginal Way S, and 1st Avenue S. Other hot spots for collisions of all severities include Spokane Street, Edgar Martinez Drive, and Emerson Place.

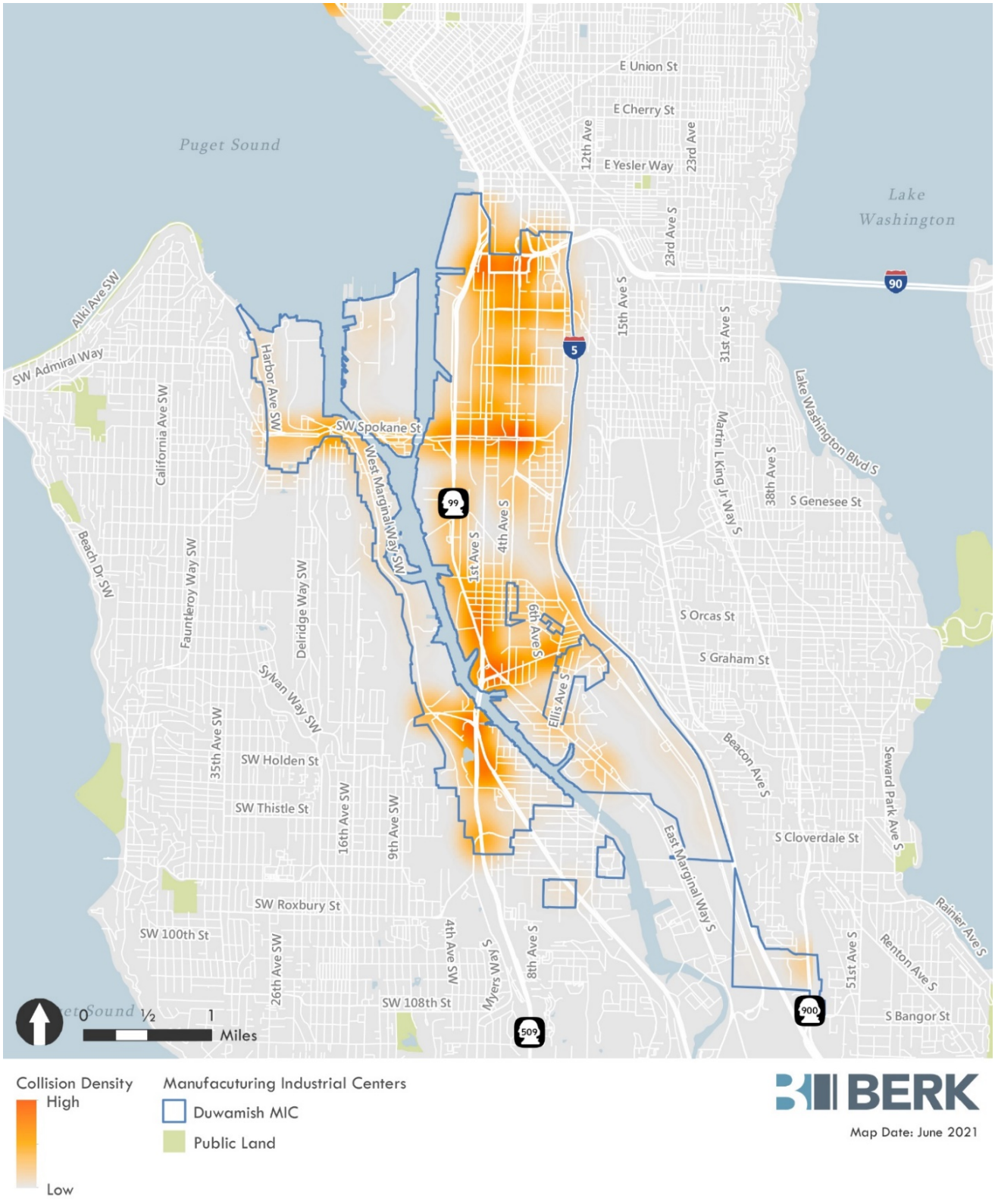
SDOT also completed a Bicycle and Pedestrian Safety Analysis (BPSA) in 2020 which identified locations that should be prioritized for improvements based on pedestrian and bicycle crash data. Findings related to each subarea are included below.

Exhibit 3.10-18 Collisions—Ballard Interbay Northend MIC, 2016-2020



Source: WSDOT, 2016-2020; Fehr & Peers, 2021.

Exhibit 3.10-19 Collisions—Greater Duwamish MIC, 2016-2020



Source: WSDOT, 2016-2020; Fehr & Peers, 2021.

Ballard, Interbay Dravus, & Interbay Smith Cove

Within the Ballard study area, collisions are most concentrated along Leary Way, in particular at the intersection of Leary Way NW and 15th Avenue NW. The majority of collisions throughout the Interbay subareas occur along the 15th Avenue NW corridor with multiple collisions near the intersections of the Galer Way Flyover and Magnolia Bridge.

The BPSA identified several locations in the study area as priority areas for improvements: the intersection of W Emerson Place and Gilman Avenue W, several locations along Leary Way, and a large cluster of locations in south Fremont near the waterfront (i.e., the vicinity of the Fremont Bridge and Burke-Gilman Trail).

SODO/Stadium & Georgetown/South Park

In the SODO/Stadium Subarea, collisions are most concentrated along the north/south arterials, including E Marginal Way S, 1st Avenue S, 4th Avenue S, and 6th Avenue S, with the greatest number of fatal and serious injury collisions on 4th Avenue S. The most pronounced "hotspots" are surrounding the intersection of Edgar Martinez Drive and 4th Avenue S, along the I-90/I-5 on-ramps, and along Spokane Street. The SODO area accounted for more than half of the serious injuries and fatalities that occurred within the study area in 2019.

In the Georgetown/South Park Subarea, collisions were most common along the major arterials, including E Marginal Way S and 1st Avenue S. The largest hotspot in the subarea is the intersection of the 1st Avenue S Bridge and E Marginal Way S.

The BPSA identified a substantial number of priority areas for improvements in the Greater Duwamish MIC. Locations including a large cluster in the Chinatown-International District; along 1st Avenue S between Downtown and the West Seattle Bridge; the convergence of Delridge Way, West Marginal Way SW, and the West Seattle Bridge; the SR 509/SR99 interchange area; and the southern end of the South Park Bridge.

3.10.2 Impacts

This section describes the potential impacts of each future year alternative. The impacts of the Action Alternatives are measured against conditions expected under Alternative 1 No Action.

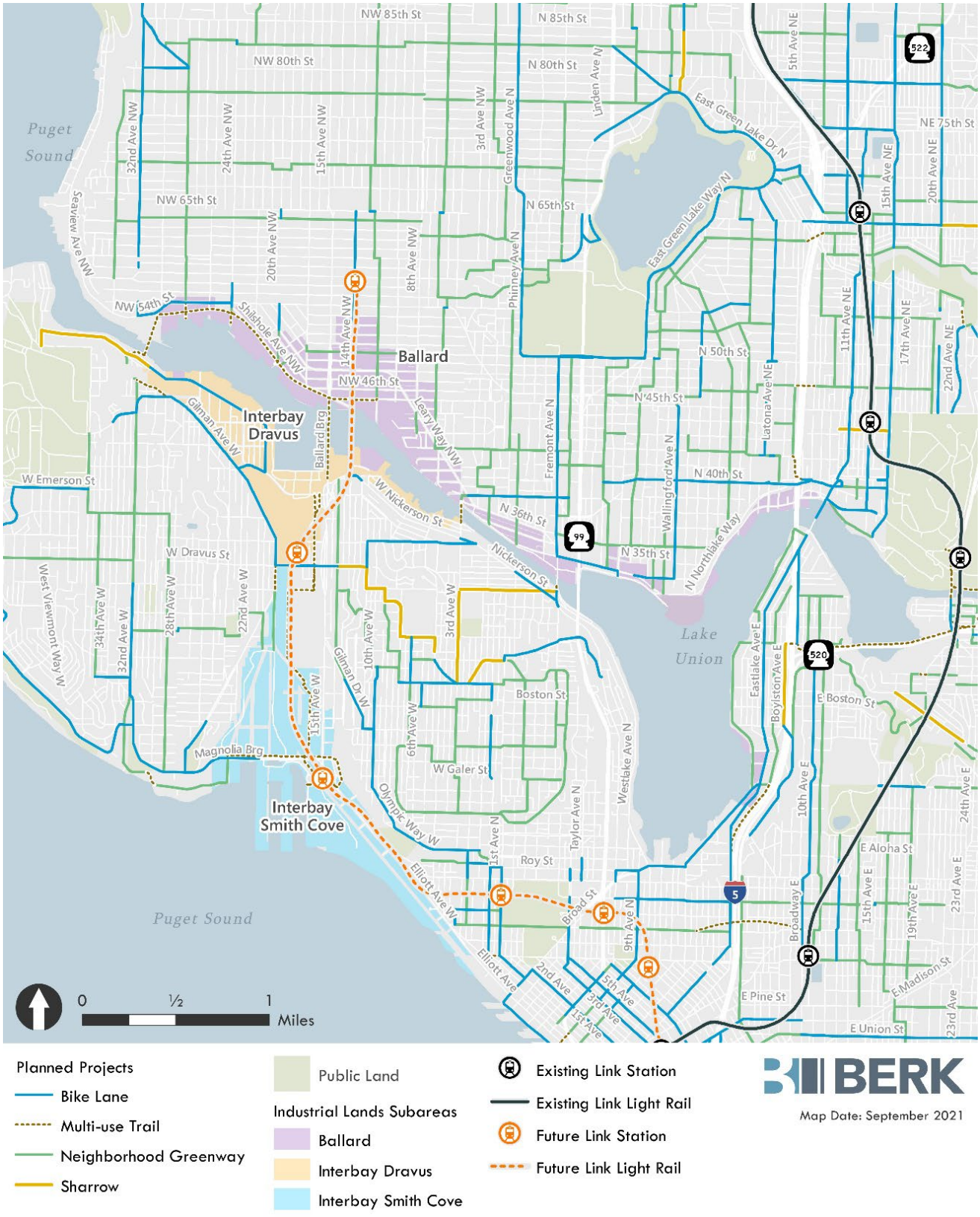
Analysis Methodology & Planning Scenarios Evaluated

Four alternatives are evaluated under future year 2044 conditions: Alternative 1 No Action and three Action Alternatives. Alternative 1 No Action is consistent with the City's current zoning and adopted plans. The Action Alternatives would increase the amount of growth within the study area. A full description of the land use assumptions may be found in **Chapter 2**. All alternatives assume improvements included in current City and regional plans, as shown in **Exhibit 3.10-20** and **Exhibit 3.10-21**. Key projects include the West Seattle and Ballard Link light rail extensions, Waterfront Seattle improvements along Alaskan Way, and an expanded network of bicycle infrastructure.

To develop the future forecasts for this project, Fehr & Peers applied a version of the PSRC model developed for the West Seattle and Ballard Link Extension (WSBLE) project and the Ballard-Interbay Regional Transportation (BIRT) System project. This version of the PSRC model is an appropriate tool for this project given its level of detail in the study area (in terms of both land uses and transportation network), assumptions for transit investments, and future land use assumptions that are consistent with growth anticipated through 2042. While the No Action Alternative reflects land uses anticipated through 2042, the potential land use changes under the Action Alternatives extend slightly farther to a 2044 horizon year. This provides a conservative basis to evaluate potential impacts of the Action Alternatives compared to Alternative 1 No Action.

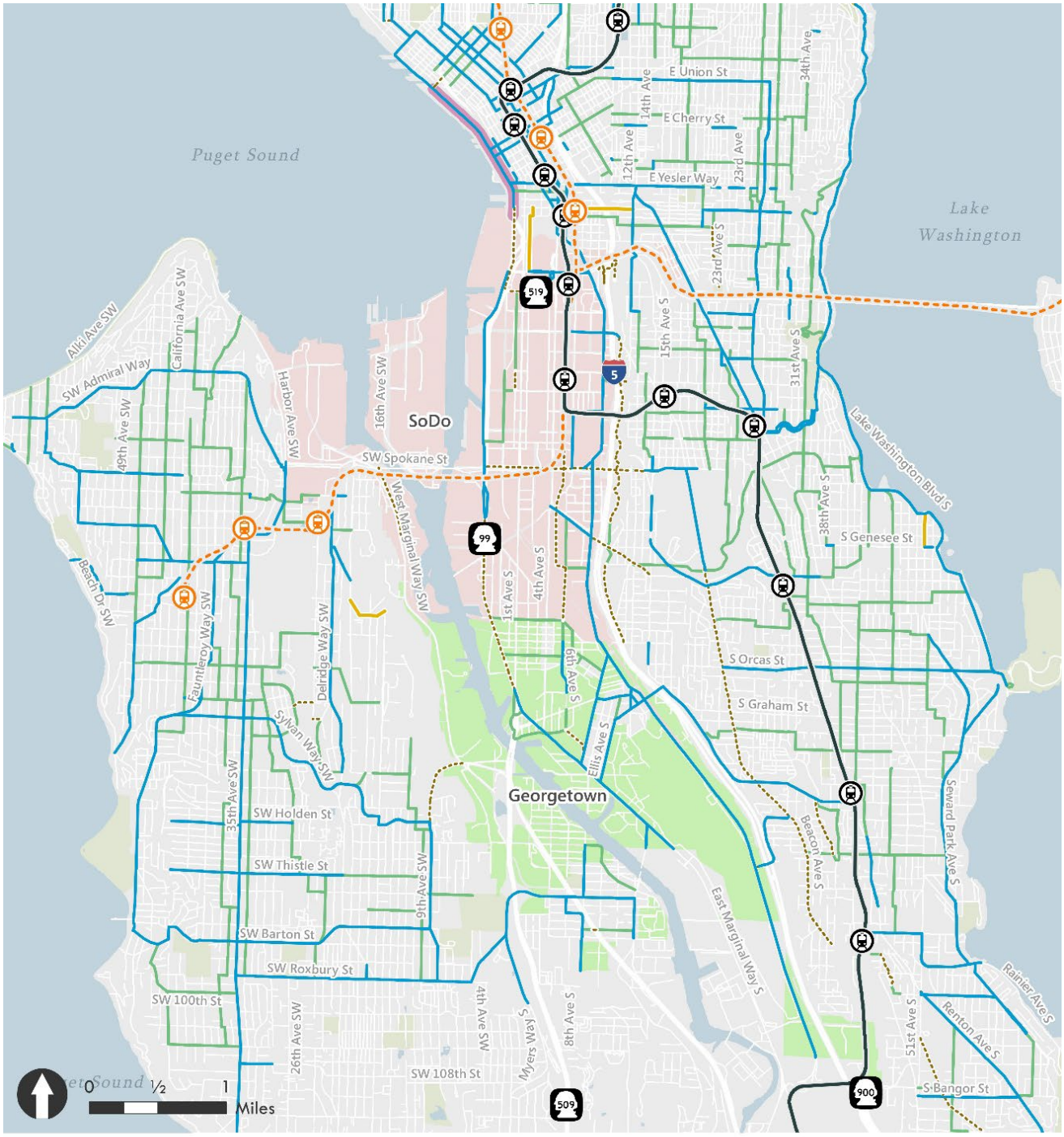
The model contains household and employment forecasts consistent with regional assumptions from PSRC and the City's MHA growth distributions. The model also incorporates planned transportation facilities into the model network, such as the Link light rail extensions to Ballard and West Seattle. Note that the Alternative 1 No Action model reflects the current capacities and configurations for the Magnolia Bridge and Ballard Bridge.

Exhibit 3.10-20 Planned Transportation Network Improvements—Ballard Interbay Northend MIC, 2044



Source: Fehr & Peers, 2021.

Exhibit 3.10-21 Planned Transportation Network Improvements—Greater Duwamish MIC, 2044



Source: Fehr & Peers, 2021.

Thresholds of Significance

This section outlines the thresholds used to determine impacts of Alternative 1 No Action and the Action Alternatives. A transportation impact under *Alternative 1 No Action* is identified if:

- A corridor would have a travel time LOS grade of F.
- A screenline would exceed the threshold stated in the Seattle Comprehensive Plan by at least 0.01.
- A sector would have a percentage of SOV travel exceeding the target stated in the Seattle Comprehensive Plan.
- A transit screenline would have passenger load factor exceeding 1.0.

Potential impacts of Alternative 1 No Action related to active transportation, parking, and safety are discussed qualitatively.

A transportation impact is identified under an *action alternative* if:

- A study corridor that would operate at an acceptable travel time LOS under Alternative 1 No Action would operate at LOS F **or** the travel time along a study corridor identified as an impact under Alternative 1 No Action would increase by at least 5%.
- A screenline that would operate acceptably under Alternative 1 No Action would exceed the threshold **or** a screenline that is identified as an impact under Alternative 1 No Action would increase by at least 0.01.
- A sector that would operate acceptably under Alternative 1 No Action would exceed its mode share target **or** the mode share in a sector that is identified as an impact under Alternative 1 No Action would increase by at least 0.5%.
- A transit screenline that would operate acceptably under Alternative 1 No Action would exceed 1.0 **or** a transit screenline that is identified as an impact under Alternative 1 No Action would increase by at least 0.05.

Potential impacts of the Action Alternatives related to active transportation, parking, and safety are discussed qualitatively based on the following considerations:

- Active Transportation: A significant impact is identified if an action alternative would preclude planned pedestrian and bicycle investments or increase the number of people walking or biking compared to Alternative 1 No Action in locations with network gaps.
- Parking: A significant impact is identified if an action alternative is expected to result in parking demand exceeding supply for a sustained period and by a substantive amount compared to Alternative 1 No Action.
- Safety: A significant impact is identified if an action alternative is expected to increase the rate of serious and fatal collisions in the study area compared to Alternative 1 No Action.

Impacts Common to All Alternatives

Active Transportation

The City is continually planning and implementing improvements to active transportation facilities through the *Pedestrian Master Plan* (PMP), *Bicycle Master Plan* (BMP), and various subarea planning efforts. The City will soon be developing a citywide transportation plan that will bring together its individual modal plans into a single integrated document.

The PMP includes the identification of a Priority Investment Network (PIN) which designates street segments that should be prioritized for investment. However, the PIN identifies many more locations than can be improved in the near term given the high cost of infrastructure. Given the City's emphasis on prioritizing neighborhoods with historical underinvestment, areas within the Greater Duwamish MIC would likely be prioritized higher than areas in the BINMIC. Among many other factors, the planning process will consider development trends and changes in land use patterns for continued prioritization and phasing of infrastructure improvement projects.

SDOT publishes a BMP Implementation Plan every two years detailing the infrastructure projects that will be constructed over the following four years. Between 2016 and 2020, SDOT completed more than 45 miles of bicycle facility improvements including bike lanes, protected bike lanes, trails, and neighborhood greenways. It is assumed that the City will continue to implement its BMP network under whichever alternative is pursued, though the pace of improvements will vary over time depending on funding availability.

Sound Transit's light rail extensions to Ballard and West Seattle is planned to be complete by 2044, providing frequent, high-capacity service along the Elliott Avenue W/15th Avenue NW corridor in the BINMIC and across the Duwamish Waterway in the Greater Duwamish MIC. These Link extensions would construct three stations within the BINMIC—Ballard, Interbay (in the vicinity of Dravus Street), and Smith Cove—and one new station in Delridge on the western edge of the Greater Duwamish MIC. The Greater Duwamish MIC also includes the existing Stadium and SODO stations. The light rail expansion would include a new station at SODO for the West Seattle Link Extension and potentially relocating the Stadium Station for the Ballard Link Extension (depending on the alternative selected).

It is expected that pedestrian and bicycle activity will continue to increase compared to existing conditions, both due to overall growth in the study area as well as an increasing share of people walking and biking. Therefore, under Alternative 1 No Action, there would be more demand in areas that lack sidewalks, curb ramps, pedestrian crossings, and dedicated bicycle facilities, particularly in industrial areas (as detailed in the Affected Environment section). While many locations in the study area would benefit from improvements to make walking and biking more comfortable, capacity constraints on active transportation facilities are rare throughout the study area and are typically only a concern at network bottlenecks (for example the walkway along the Ballard Bridge) or areas of extremely high pedestrian activity. Specific areas

that may experience substantial increases in the number of people walking and biking are discussed in the following sections.

The Action Alternatives are not expected to preclude any planned pedestrian and bicycle improvements and would likely result in improved infrastructure in the areas zoned as Industry & Innovation and Urban Industrial because they would be subject to development standards for pedestrian and cyclist-oriented frontage improvements. However, because the Action Alternatives would result in higher levels of growth than Alternative 1 No Action, there would likely be more people walking and biking in areas with existing network gaps. Therefore, a significant impact to pedestrian and bicycle travel is identified under alternatives 2, 3, and 4.

Ballard, Interbay Dravus, & Interbay Smith Cove

The BMP includes a variety of planned projects in the vicinity of the BINMIC including completion of the Burke-Gilman Trail "missing link" and multi-use trails on the Ballard Bridge and West Galer Street Flyover. Bicycle network connections are also recommended between the Ballard Locks and the Ship Canal Trail, 20th Avenue W between Thorndyke Avenue W and the Elliott Bay Trail, and across the W Dravus Street bridge, among other areas.

Pedestrian and bicycle activity would increase substantially in the vicinity of the planned light rail stations as all riders would access the stations by walking, biking, transit, or pickup/dropoff (no on-site parking is being provided). Among the new stations, the highest numbers of people walking and biking would occur near the Ballard station as walking and biking access are more limited near the Interbay and Smith Cove stations due to topography, connectivity, and surrounding land uses. Key connections to the stations would include the Elliott Bay Trail, Ship Canal Trail, Magnolia Connector Trail, West Galer Street Flyover, and Helix pedestrian bridge depending on which station options are selected.

Based on the proposed development standards, the areas that would be zoned as Industry & Innovation and Urban Industrial would be the most likely to see substantial increases in people walking and biking. Within the Ballard, Interbay Dravus, and Interbay Smith Cove areas, the Action Alternatives would implement those development standards along the north side of Lake Union, slightly inland areas of Fremont and Ballard, and along the 15th Avenue W/Elliott Avenue W corridor.

SODO/Stadium & Georgetown

Among other projects, the BMP recommends improvements such as an extension of the SODO Trail south to Georgetown, a combination of protected bike lanes and a multi-use trail along E Marginal Way S between S Spokane Street and Ellis Avenue S, and extending the Duwamish River Trail from its current northern terminus to the West Seattle Bridge.

While the SODO and Stadium stations are already hubs of pedestrian and bicycle activity, the growing ridership with Sound Transit's system expansion will also increase the number of people walking and biking in the immediate vicinity of the stations. In contrast, the Delridge

station will be a new hub of activity as the neighborhood is currently primarily residential. No on-site parking is being provided so all riders will access the stations by walking, biking, transit, or pickup/dropoff.

Based on the proposed development standards, the areas that would be zoned as Industry & Innovation, Urban Industrial, and Seattle Mixed would be the most likely to see substantial increases in people walking and biking. Within the SODO/Stadium and Georgetown/South Park Subareas, the Action Alternatives would implement those development standards in areas of SODO north of S Lander Street, Georgetown, South Park, and north Delridge.

Parking

The City prioritizes the use of its public right-of-way to balance competing needs, including people walking, biking, taking transit, and driving whether for personal travel or for goods movement. The "flex zone" along the curb may be used for parking, bus stops, passenger loading, freight loading, travel lanes during peak times or other activating uses such as parklets or play streets. Decisions on the use of the flex zone will continue to be made by the City as the context evolves throughout the study area. While the use of the flex zone will vary by location, it is unlikely that the overall supply of on-street parking in any subarea would increase under any of the alternatives. Industrial areas may be more likely to see changes in parking supply as redevelopment triggers frontage improvements such as adding curbs and delineating parking spaces in rights-of-way that were previously used for informal parking.

While parking demand varies throughout the study area, there are some localized areas where on-street parking demand exceeds parking supply. Given projected growth throughout the city and that on-street parking is unlikely to increase in the future, a parking impact is expected under Alternative 1 No Action. With the increase in development expected under the Action Alternatives, parking demand would be higher than Alternative 1 No Action. Because the Action Alternatives are expected to increase demand in localized areas that already exceed supply, potentially for a sustained period and by a substantive amount compared to Alternative 1 No Action, significant adverse parking impacts are expected under all of the Action Alternatives. Impacts are expected to be greater under alternatives 3 and 4, which have higher levels of development planned than Alternative 2.

The location and severity of impacts would vary by alternative depending on the concentrations of land use. The degree of parking supply impacts experienced in any given neighborhood would depend on many factors, including how much off-street parking is provided by future development projects, as well as varying conditions related to on-street parking patterns and City regulations (e.g., pricing, enforcement, RPZ permits, etc.) within each neighborhood.

Ballard, Interbay Dravus, & Interbay Smith Cove

The Ballard, Interbay Dravus, and Interbay Smith Cove subareas will experience a substantial transportation change with the construction of new light rail stations for the Ballard Link light rail extension. The flex zones in the immediate vicinities of the stations (specific locations are

still to be determined) are likely to experience changes as they will accommodate bus stops, pickup/dropoff areas, and potentially bus layover areas. None of the stations are planned to include parking facilities. While Sound Transit is planning for most access to occur via transit, walking, biking, and pickup/dropoff, some riders may drive to the station and seek parking in nearby areas, increasing baseline parking demand within walking distance of each station.

The City has already developed approaches to manage this type of "hide and ride" parking demand at new light rail stations, such as the U District and Roosevelt. It is assumed similar efforts will be made for the new light rail stations in the study area. The City's management strategies include on-street parking surveys before station openings to identify and implement appropriate mitigation elements prior to station opening; mitigation measures such as paid parking meters, time-limit signs, passenger drop-off/pick-up zones, truck and load/unload zones, and residential parking zones (RPZs) within a 1/4-mile radius of each station; ongoing monitoring of parking controls after the system opens to determine if RPZ boundaries or other on-street controls are insufficient; and parking enforcement.

Based on the proposed development standards and locations, the areas that would be zoned as Industry & Innovation and Urban Industrial would be the most likely to see increases in parking demand that exceed parking supply. Within the Ballard, Interbay Dravus, and Interbay Smith Cove areas, the Action Alternatives would implement those development standards along the north side of Lake Union, areas of Fremont and Ballard, and along the 15th Avenue W/Elliott Avenue W corridor.

SODO/Stadium & Georgetown

The SODO/Stadium area includes two existing light rail stations which will have ridership increases with the expansion of the light rail system. Improvements at these stations may result in changes to the flex zones in the immediate vicinity but they are likely to be minor. The new Delridge station would be located near the edge of the study area and would result in changes to the flex zones in the immediate vicinity to accommodate uses such as bus stops and pickup/dropoff areas. No parking facility is planned for the station area. While Sound Transit is planning for most access to occur via transit, walking, biking, and pickup/dropoff, it is possible some riders may drive to the station and seek parking in nearby areas, increasing baseline parking demand within walking distance of each station. The management approaches described above for the Ballard Link light rail extension would also likely be in place for the station areas within the Greater Duwamish MIC.

Based on the proposed development standards and locations, the areas that would be zoned as Industry & Innovation, Urban Industrial, and Seattle Mixed would be the most likely to see increases in parking demand that exceed available supply. Within the SODO/Stadium and Georgetown/South Park Subareas, the Action Alternatives would implement those development standards in areas of SODO north of S Lander Street, Georgetown, South Park, and north Delridge.

Safety

The City has a Vision Zero policy that aims to reduce the number of fatalities and serious injuries to zero by 2030. This goal, and the policies and strategies supporting it, will continue to be pursued under whichever land use alternative is selected. Recent examples of policy changes include widespread reductions in speed limits along city streets and the introduction of leading pedestrian intervals to make people walking more visible to vehicles (timing signals to give people walking a head start before the vehicles receive a green light). SDOT also regularly studies intersections and corridors that have been identified as needing safety improvements by the community or through collision data review. The types of location-specific measures that can be implemented depending on the context include traffic calming treatments, new traffic signals, separation of facilities for vulnerable users, and hardened centerlines (small rubber barrier that require drivers making left turns to slow down and make squarer left turns). The City will continue to monitor traffic safety and take any necessary steps to address areas of high need particularly for the most vulnerable users. Over time, it is expected that the safety program will result in decreases to the number of traffic fatalities and serious injuries.

The Action Alternatives are expected to result in between 0.8 to 2.5% more vehicle miles traveled than Alternative 1 No Action in the Greater Duwamish MIC area and roughly 1.4 to 5.1% more vehicle miles travelled than Alternative 1 No Action in the BINMIC area. This could potentially lead to an increase in the number of collisions. In addition, the Action Alternatives may result in an increased number of truck and vehicle conflicts with vulnerable users such as people walking and biking in industrial areas, as outlined in the 2020 Bicycle and Pedestrian Safety Analysis. Because trucks represent a higher proportion of fatal collisions than any other type of collision (as documented in the *Freight Master Plan*), it is reasonably likely that the Action Alternatives could result in an increased rate of serious and/or fatal collisions in the study area.

Due to the potential increase of collisions between trucks/vehicles and vulnerable users, a significant impact is expected under the Action Alternatives. Site-specific issues cannot be addressed at this level of analysis. However, individual development applications would be reviewed through the City's permitting process, at which time the City may identify required safety features for the specific site.

Pavement Condition

As noted above, the Action Alternatives are expected to result in an increased number of vehicle miles traveled in the Greater Duwamish MIC and BINMIC, areas of which already have worn pavement condition due to regular heavy vehicle use. While increased use of these roadways may incrementally degrade pavement condition further, vehicles are subject to gas taxes and weight-based license fees that can be directed toward more frequent maintenance of facilities. Therefore, while the Action Alternatives may cause some impact to roadway pavement condition, it is not expected to rise to a level of significance.

Equity & Environmental Justice Considerations

The City of Seattle developed a Racial and Social Equity Index that combines data on race, ethnicity, and socioeconomic and health disadvantages to identify neighborhoods with large proportions of priority populations as residents. Much of the SODO/Stadium Subarea as well as the South Park neighborhood were found to have among the highest disadvantages in the city.

The Action Alternatives—particularly alternatives 3 and 4—would result in more land use growth compared to Alternative 1 No Action particularly in the SODO/Stadium and South Park neighborhoods. With respect to transportation, this growth could provide both beneficial and adverse impacts to equity and environmental justice. Additional growth would bring increased traffic volumes, which in turn may bring impacts to the safety of people walking and biking, parking availability, and travel time delays to areas with high proportions of priority populations. At the same time, increased development could also bring improved infrastructure to neighborhoods with histories of long-term underinvestment. This is particularly the case for areas that would be rezoned as Industry & Innovation and Urban Industrial because those land use concepts would have development standards requiring frontage improvements such as sidewalks, pedestrian lighting, and street trees—all of which could be beneficial in progress toward more safe, connected, and accessible neighborhoods.

Impacts of Alternative 1 No Action

This section summarizes analysis results and environmental impacts of Alternative 1 No Action. Alternative 1 No Action serves as the baseline for the impact analysis of the Action Alternatives. It represents the operation of the transportation system if no zoning or network changes were made in the study area. However, growth would continue to occur under Alternative 1 No Action consistent with current adopted zoning. Alternative 1 No Action is expected to result in roughly 23,500 additional jobs in the study area compared to existing conditions. Residential development would be very minor—approximately 75 new dwellings over the study area. For both employment and residential uses, the growth is expected to be highest in the SODO/Stadium and Georgetown/South Park subareas.

Transit

As noted in the Active Transportation section, the study area would experience a fundamental change in transit service by 2044. Sound Transit's light rail extensions to Ballard and West Seattle would be complete, providing frequent, high-capacity service along the Elliott Avenue W/15th Avenue NW corridor in the BINMIC and across the Duwamish Waterway in the Greater Duwamish MIC. In addition to these routes directly affecting the study area, Sound Transit's light rail system would also include extensions north to Everett, east to Redmond and Issaquah, and south to the Tacoma Dome. Fixed route bus service would be restructured, where appropriate, to better connect surrounding neighborhoods to light rail stations and have fewer routes running into the downtown core.

For the existing conditions evaluation, there is extremely granular data available identifying the maximum load that occurs along an entire route for every trip in the peak period. For the future conditions evaluation, transit load factors are estimated using average passenger loads, as that is the metric available from traditional travel demand modeling tools. On average across the studied routes, the maximum passenger load is approximately 78% higher than the average passenger load, though typically only for a short segment of the transit route. To reflect an appropriately conservative capacity against which *average* passenger loads should be measured, Sound Transit's planning load of 148 passengers per car is used as the light rail capacity and the number of seats on each bus is used as the bus capacity. In other words, both types of transit vehicles are able to accommodate higher capacities than are used for this analysis. The forecasted passenger loads for Alternative 1 No Action are consistent with Sound Transit's ongoing planning for the West Seattle and Ballard Link Extensions.

Exhibit 3.10-22 summarizes the average PM peak hour passenger load factor for the transit routes that would operate along key corridors in the study area. The passenger load factors include both light rail and bus services.

Exhibit 3.10-22 PM Peak Hour Passenger Load Factors—Alternative 1 No Action

	Alternative 1 No Action—Average Passenger Load Factor	
Screenline	Inbound	Outbound
A: East of 8th Avenue NW	0.57	1.28
B: Ballard Bridge	0.09	0.39
C: North of W Mercer Place	0.29	0.59
D: North of Lander St	0.21	0.75
E: West Seattle Bridge	0.12	0.35

Note: Inbound refers to travel into the downtown area and outbound travel out of the downtown area.
Source: King County Metro, Fall 2018; Fehr & Peers, 2021.

As is the case under current conditions, outbound transit (i.e., routes leaving Downtown or the U District) are expected to have higher passenger loads than inbound routes during the PM peak hour with the inverse true during the AM peak hour. While some of the routes traveling across the study area screenlines may operate over their crowding threshold for some individual trips, the load factors indicate that there would be adequate transit capacity across most of the transit screenlines. The exception is the outbound direction across 8th Avenue NW (from the U District to Ballard) which is expected to have a passenger load impact under Alternative 1 No Action. Specific routes are discussed below.

Ballard, Interbay Dravus, & Interbay Smith Cove

The Ballard Link Extension would construct three stations within the BINMIC: Ballard, Interbay (in the vicinity of Dravus Street), and Smith Cove. With trips running approximately every five

minutes and each trip able to comfortably carry nearly 600 riders,[15] transit capacity along the corridor would dramatically increase compared to existing conditions. This is reflected in the average outbound passenger load factor of 0.39 across the Ballard Bridge and 0.59 north of W Mercer Place which indicate that transit demand would be accommodated by the planned capacity.

The screenline east of 8th Avenue NW shows a different trend as it includes east-west bus service between Ballard and the U District which would not be replaced by high-capacity transit. Demand across that screenline is expected to grow in the future with average passenger loads exceeding seated capacity indicating some passengers would need to stand. In practice, King County Metro continually reallocates resources based on demand and it is likely that frequencies would be increased if necessary for those crosstown routes to alleviate crowding.

SODO/Stadium & Georgetown/South Park

Both the Ballard-Tacoma and West Seattle-Everett Link lines, along with multiple bus routes, would cross the screenline north of Lander Street. With the enhanced capacity, average passenger loads are expected to be roughly 0.75 indicating most trips would operate within the planned capacity.

The majority of transit riders crossing the West Seattle Bridge would use the new Link light rail extension which is expected to run roughly every six minutes. With the large increase in capacity, passenger loads are expected to be well within planned capacity, at 0.35 for an average passenger load during the PM peak hour.

Auto & Freight

Under Alternative 1 No Action, growth would continue throughout the city and region, resulting in increases in traffic volumes. However, traffic volume growth rates within the study area are expected to be relatively low given that many facilities already operate with congestion during peak periods and new high-capacity transit options would be available, making non-auto modes increasingly competitive. This is consistent with traffic growth patterns over the past decade. According to SDOT's 2020 Traffic Report, average daily traffic volumes remained essentially flat over

Magnolia Bridge Replacement

All alternatives assume that the Magnolia Bridge retains the same fundamental configuration and connections as exist today. However, the City is also considering an option that would instead replace the Magnolia Bridge with a new bridge along Armory Way connecting to Thorndyke Avenue W at W Halladay Street. Refer to the BIRT Report for more information.

[15] This assumes four-car trains at Sound Transit's planning load of 148 passengers per car.

the 2009-2019 period despite a 24% increase in the City's population and a 23% increase in regional employment.[16]

Travel Time

Using the HCM guidelines for defining LOS thresholds as described in the Data & Methods section, **Exhibit 3.10-23** summarizes travel time conditions along each of the study corridors under the No Action Alternative. Travel times for 2019 are also shown to illustrate change over time under Alternative 1 No Action. Note that these results also represent freight operations which travel in the same lanes as auto traffic. Although freight uses the same facilities, traffic congestion is more difficult for large trucks to navigate, and trucks typically travel at slower speeds than general auto traffic. While the actual travel times for large trucks may be higher, the magnitude of change is still reflective of how conditions will vary across alternatives. The travel times below are rounded to the nearest half minute.

[16] Seattle Department of Transportation, 2020 Traffic Report. Available at: https://www.seattle.gov/Documents/Departments/SDOT/About/DocumentLibrary/Reports/2020_Traffic_Report.pdf. Accessed September 7, 2021.

Exhibit 3.10-23 PM Peak Hour Travel Time LOS—Alternative 1 No Action

		PM Peak Hour LOS / Travel Time (minutes)			
		Existing Conditions		Alternative 1 No Action	
ID	Corridor	N/E	S/W	N/E	S/W
Ballard Interbay Northend MIC					
1	15th Ave W from Magnolia Bridge to NW Leary Way	E / 11.5	A / 4.5	E / 12.5	A / 5
2	15th Ave NW from NW Leary Way to N 85th St	E / 9.5	C / 6.5	E / 9.5	C / 6.5
3	Leary Ave NW/ Leary Way NW/ N 36th S/ Fremont Bridge between NW Market St and W Nickerson St/Westlake Ave	C / 11	C / 12	C / 11	D / 13
4	Shilshole Ave NW between NW Market and 15th Ave NW	B / 2.5	D / 3.5	B / 2.5	D / 4
5	NW Market St/N 50th/ 46th St between 24th Ave NW and I-5	C / 14	D / 16.5	C / 14	D / 16.5
6	W Nickerson St/Westlake Ave N between 15th Ave W and Mercer St	C / 13	C / 11.5	C / 13.5	C / 12.5
7	W Dravus St between 15th Ave W and 20th Ave W	E / 2	D / 1.5	E / 2	D / 1.5
8	Elliott Ave W between Magnolia Bridge and Wall St	B / 5.5	B / 6	B / 6	B / 6.5
9	W Mercer St from Elliott Ave W to I-5	F / 32	F / 22	F / 32	F / 22.5
10	Denny Way from Elliott Ave W to I-5	F / 14.5	E / 11	F / 15	F / 11.5
11	Magnolia Bridge between 15th Ave W and Thorndyke Ave W	B / 2.5	A / 1.5	B / 2.5	A / 1.5
12	SR 99 between N 46th St and Denny Way	C / 8.5	E / 14	D / 10.5	F / 14.5
13	W Emerson St between 15th Ave W and Gilman Ave W	F / 6	F / 4	F / 6	F / 4
14	N 85th St between 15th Ave NW and I-5	E / 13	E / 14.5	E / 13.5	E / 14.5
15	I-5 between N 85th Street and Madison Street	F / 19	F / 24	F / 22.5	F / 26
Greater Duwamish MIC					
1	1st Ave S between S Royal Brougham Way and SR 99	C / 11	C / 11	C / 11	C / 12
2	4th Ave S between Seattle Blvd S to E Marginal Way S	C / 12	C / 12.5	C / 12.5	C / 13.5

		PM Peak Hour LOS / Travel Time (minutes)			
		Existing Conditions		Alternative 1 No Action	
ID	Corridor	N/E	S/W	N/E	S/W
3	6th Ave S between Seattle Blvd S to Spokane St Viaduct	C / 6.5	C / 6	C / 6.5	C / 6.5
4	Airport Way S/ Seattle Blvd S between S Royal Brougham Way to S Boeing Access Rd	A / 16.5	A / 15.5	A / 16.5	A / 16
5	West Seattle Bridge/Spokane St Viaduct between 35th Ave SW and I-5	C / 6.5	E / 10	C / 6.5	E / 10
6	Spokane St Bridge between Harbor Ave SW and SR 99	B / 4.5	B / 4.5	B / 4.5	B / 4.5
7	E Marginal Way S between SR 99 and S Boeing Access Rd	C / 8.5	D / 10.5	C / 8.5	D / 10.5
8	Alaskan Way S from Broad St to SR 99	D / 9	F / 13	E / 10.5	**F / 14.5**
9	S Royal Brougham Way between SR 99 and Airport Way S	F / 4.5	D / 3	**F / 4.5**	D / 3
10	Edgar Martinez Dr S between SR 99 and 4th Ave	F / 2.5	F / 2.5	**F / 3**	**F / 2.5**
11	S Holgate St between 1st Ave and Airport Way S	D / 3	F / 4.5	D / 3	**F / 4.5**
12	S Lander St between 1st Ave and Airport Way S	E / 4	E / 4	E / 4	E / 4
13	S Lucile St between SR 99 and Airport Way S	D / 4	E / 5	D / 4	E / 5
14	W Marginal Way SW between West Seattle Bridge and 2nd Ave SW	A / 5	A / 4.5	A / 5	A / 5
15	S Michigan St/ Corson Ave S between E Marginal Way S and I-5	C / 3.5	E / 5.5	C / 3.5	E / 5.5
16	E Marginal Way S/SR 99 between S Atlantic Street and 1st Ave S Bridge	A / 9	A / 9	A / 9	A / 9
17	I-5 between Madison Street and SR 599	E / 25.5	F / 30	**F / 27.5**	**F / 31**

Note: Cells shown in bold indicate an impact.
Sources: Wejo, 2019; Fehr & Peers, 2021.

Overall, travel times along the study corridors are expected to remain relatively consistent between 2019 and 2044. During the PM peak hour under the 2044 Alternative 1 No Action, most corridors would continue to operate at LOS E or better in both directions with travel time increases of up to two minutes (the exception is northbound I-5 from Madison Street to N 85th Street with an increase of 3.5 minutes). Corridors operating at LOS F in both existing and 2044 Alternative 1 No Action, constituting an impact to auto and freight, include:

- Both directions of W Mercer Street from Elliott Avenue W to I-5
- Eastbound Denny Way from Elliott Avenue W to I-5
- Both directions of W Emerson Street from Gilman Avenue W to 15th Avenue W
- Both directions of I-5 between N 85th Street and Madison Street
- Southbound Alaskan Way S from Broad Street to SR 99
- Southbound Alaskan Way S from Broad Street to SR 99
- Eastbound S Royal Brougham Way between SR 99 and Airport Way S
- Both directions of Edgar Martinez Drive S between SR 99 and 4th Avenue
- Westbound S Holgate Street from Airport Way S to 1st Avenue
- Southbound I-5 from Madison Street to SR 599

In addition to these corridors, the following corridors that operated at LOS E or better under existing conditions would operate at LOS F under 2044 Alternative 1 No Action, constituting an impact to auto and freight:

- Westbound Denny Way from Elliott Avenue W to I-5
- Southbound SR 99 between N 46th Street and Denny Way
- Northbound I-5 from SR 599 to Madison Street

The following corridors are expected to have the largest increases in travel times, but would still operate at LOS E or better:

- Northbound SR 99 between N 46th Street and Denny Way
- Northbound Alaskan Way between SR 99 and Broad Street

Buses that operate on the impacted corridors would also experience the same travel time conditions.

Mode Share

The Alternative 1 No Action SOV mode share in the City of Seattle is summarized by sector using the PSRC model and is shown in **Exhibit 3.10-24**. The model predicts that SOV mode shares would decrease by 2044, with changes ranging from one to three percent depending on the sector. The smallest decrease is expected in the Duwamish sector while the Magnolia/Queen Anne sector would experience the largest decrease of drive-alone trips. Although all three sectors are expected to have lower SOV shares under the 2044 Alternative 1 No Action scenario than existing conditions, they are still expected to be two to three percentage points above the City's 2035 SOV targets. Therefore, there are expected to be mode share impacts for all three study area sectors under Alternative 1 No Action.

Exhibit 3.10-24 2044 Alternative 1 No Action SOV Mode Share—PM Peak Period

Sector	2035 SOV Target	Existing SOV Share	Alternative 1 No Action SOV Share
Duwamish	51%	53.5%	**52.6%**
Magnolia/Queen Anne	38%	43.1%	**40.1%**
Northwest	37%	41.6%	**39.7%**

Note: Cells shown in bold indicate an impact.
Source: PSRC, 2021; Fehr & Peers, 2021.

Screenlines

The City's screenline thresholds are in the form of a volume-to-capacity (v/c) ratio: the number of vehicles crossing the screenline compared to the designated capacity of the roadways crossing the screenline. **Exhibit 3.10-25** summarizes the projected PM peak hour v/c ratios across each screenline in 2044. All screenline locations are forecasted to be under the LOS threshold defined by the City of Seattle, therefore no screenline impacts are expected under Alternative 1 No Action. There are no substantial capacity projects planned for construction within the study area between the existing and 2044 forecast year, so all changes in v/c ratios are due to traffic volume increases.

Within the study area, the greatest v/c ratio increases are seen at the South City Limit screenline, the Ballard Bridge, the Fremont Bridge, and south of Jackson Street. The Ballard Bridge screenline is the closest to reaching the City's screenline threshold.

Exhibit 3.10-25 Screenline Volume-to-Capacity Ratio—Alternative 1 No Action

Screenline	Location	v/c Ratio Threshold	PM Peak Period v/c Ratio			
			Existing Conditions		Alt. 1 No Action	
			N/E	S/W	N/E	S/W
2	Magnolia	1.0	0.51	0.54	0.51	0.54
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2	0.57	0.53	0.57	0.53
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2	0.54	0.51	0.53	0.52
4.13	South City Limit—SR 99 to Airport Way S	1.0	0.40	0.45	0.47	0.50
5.11	Ship Canal—Ballard Bridge	1.2	1.01	0.75	1.11	0.78
5.12	Ship Canal—Fremont Bridge	1.2	0.59	0.66	0.68	0.68
5.13	Ship Canal—Aurora Bridge	1.2	0.30	0.34	0.35	0.35
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0	0.54	0.62	0.55	0.64
8	South of Lake Union	1.2	0.62	0.69	0.43	0.51
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0	0.47	0.48	0.51	0.49
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0	0.58	0.66	0.65	0.68

Source: City of Seattle count data, 2019; Fehr & Peers, 2021.

Impacts of Alternative 2

This section summarizes analysis results and environmental impacts for Alternative 2 (Future of Industry—Limited) in 2044. Compared to Alternative 1 No Action, Alternative 2 would result in 10,900 additional jobs and residential growth would remain essentially flat. As with Alternative 1 No Action, most of the new growth would be concentrated in the Greater Duwamish MIC.

Transit

Exhibit 3.10-26 summarizes the average PM peak hour passenger load factor for a transit trip along key corridors under Alternative 2. The average passenger load factors include both light rail and bus services. Passenger load factors under Alternative 2 would be similar to those under Alternative 1 No Action. This reflects both the modest magnitude of growth between the two alternatives and also the type of growth as industrial employees are often less likely to commute by transit than those of other employment sectors. While some of the routes traveling across the study area screenlines may operate over their crowding threshold for some individual trips, load factors indicate there would generally be adequate transit capacity across most of the transit screenlines (with the exception of the 8th Avenue NW screenline). No significant impacts to transit load are expected under Alternative 2.

Exhibit 3.10-26 PM Peak Hour Average Passenger Load Factors—Alternative 2

	Alternative 1 No Action		Alternative 2	
Screenline	Inbound	Outbound	Inbound	Outbound
A: East of 8th Avenue NW	0.57	1.28	0.58	1.28
B: Ballard Bridge	0.09	0.39	0.09	0.39
C: North of W Mercer Place	0.29	0.59	0.30	0.59
D: North of Lander St	0.21	0.75	0.21	0.76
E: West Seattle Bridge	0.12	0.35	0.12	0.35

Note: Inbound refers to travel into the downtown area and outbound travel out of the downtown area.
Source: Fehr & Peers, 2021.

Auto & Freight

Under Alternative 2, traffic volumes would be higher than Alternative 1 No Action though the magnitude of change would be relatively small in relation to the amount of background traffic in the city. The PM peak vehicle miles traveled (VMT) within the Greater Duwamish MIC would increase by roughly 0.8% and the PM peak VMT within the BINMIC would increase by roughly 1.4%. The effects of this additional traffic in terms of travel time, mode share, and screenline volumes, are detailed below.

Travel Time

Exhibit 3.10-27 summarizes travel time conditions along each of the study corridors under Alternative 2. Travel times for Alternative 1 No Action are also shown to illustrate how travel times would change compared to development expected to occur by 2044 under current zoning. The travel times below are rounded to the nearest half minute.

Peak Spreading

As growth throughout the city continues, the city will likely experience "peak spreading." Peak spreading refers to travelers shifting their departure times to avoid the heaviest traffic congestion. The result is that while the peak hour may retain similar characteristics, the length of the congested period may grow.

During the PM peak hour under the 2044 Alternative 2, most corridors would continue to operate at similar levels of congestion as under Alternative 1 No Action with travel times increasing by no more than 4% on any study segment. Based on the criteria for travel time impacts, one significant travel time impact is expected under Alternative 2:

- Eastbound W Dravus Street between 15th Avenue W and 20th Avenue W
- W Dravus Street would be impacted because the increase in travel time would cause the segment to fall from LOS E under Alternative 1 No Action to LOS F under Alternative 2 though the magnitude of change is expected to be less than 3%. Because freight operates on the same corridors as autos, a freight impact is also identified along eastbound W Dravus Street. Any buses operating on that corridor in the future would also be impacted.
- All of the study segments expected to operate at LOS F under Alternative 1 No Action would continue to operate at LOS F and with slightly higher travel times under Alternative 2. However, these are not considered impacts caused by Alternative 2 because none of the travel time increases would reach the 5% impact threshold.
- At this programmatic level of analysis, it is not possible to know how freight may be impacted by changes to loading zones or access needs. These are potentially significant impacts that would need to be analyzed and mitigated at the project level.

Exhibit 3.10-27 PM Peak Hour Travel Time LOS—Alternative 2

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 2	
ID	Corridor	N/E	S/W	N/E	S/W
Ballard Interbay Northend MIC					
1	15th Ave W from Magnolia Bridge to NW Leary Way	E / 12.5	A / 5	E / 12.5	A / 5
2	15th Ave NW from NW Leary Way to N 85th St	E / 9.5	C / 6.5	E / 10	C / 6.5
3	Leary Ave NW/ Leary Way NW/ N 36th S/ Fremont Bridge between NW Market St and W Nickerson St/Westlake Ave	C / 11	D / 13	C / 11	D / 13.5
4	Shilshole Ave NW between NW Market and 15th Ave NW	B / 2.5	D / 4	B / 2.5	D / 4
5	NW Market St/N 50th/ 46th St between 24th Ave NW and I-5	C / 14	D / 16.5	C / 14	D / 16.5
6	W Nickerson St/Westlake Ave N between 15th Ave W and Mercer St	C / 13.5	C / 12.5	C / 13.5	C / 12.5
7	W Dravus St between 15th Ave W and 20th Ave W	E / 2	D / 1.5	F / 2	D / 1.5
8	Elliott Ave W between Magnolia Bridge and Wall St	B / 6	B / 6.5	B / 6	B / 6.5
9	W Mercer St from Elliott Ave W to I-5	F / 32	F / 22.5	F / 32.5	F / 22.5
10	Denny Way from Elliott Ave W to I-5	F / 15	F / 11.5	F / 15	F / 11.5
11	Magnolia Bridge between 15th Ave W and Thorndyke Ave W	B / 2.5	A / 1.5	B / 2.5	A / 1.5
12	SR 99 between N 46th St and Denny Way	D / 10.5	F / 14.5	D / 10.5	F / 14.5
13	W Emerson St between 15th Ave W and Gilman Ave W	F / 6	F / 4	F / 6	F / 4
14	N 85th St between 15th Ave NW and I-5	E / 13.5	E / 14.5	E / 13.5	E / 14.5
15	I-5 between N 85th Street and Madison Street	F / 22.5	F / 26	F / 22.5	F / 26
Greater Duwamish MIC					
1	1st Ave S between S Royal Brougham Way and SR 99	C / 11	C / 12	C / 11	C / 12
2	4th Ave S between Seattle Blvd S to E Marginal Way S	C / 12.5	C / 13.5	C / 12.5	C / 13.5

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 2	
ID	Corridor	N/E	S/W	N/E	S/W
3	6th Ave S between Seattle Blvd S to Spokane St Viaduct	C / 6.5	C / 6.5	C / 6.5	C / 6.5
4	Airport Way S/ Seattle Blvd S between S Royal Brougham Way to S Boeing Access Rd	A / 16.5	A / 16	A / 16.5	A / 16.5
5	West Seattle Bridge/Spokane St Viaduct between 35th Ave SW and I-5	C / 6.5	E / 10	C / 6.5	E / 10
6	Spokane St Bridge between Harbor Ave SW and SR 99	B / 4.5	B / 4.5	B / 4.5	B / 4.5
7	E Marginal Way S between SR 99 and S Boeing Access Rd	C / 8.5	D / 10.5	C / 8.5	D / 10.5
8	Alaskan Way S from Broad St to SR 99	E / 10.5	F / 14.5	E / 10.5	F / 14.5
9	S Royal Brougham Way between SR 99 and Airport Way S	F / 4.5	D / 3	F / 4.5	D / 3
10	Edgar Martinez Dr S between SR 99 and 4th Ave	F / 3	F / 2.5	F / 3	F / 2.5
11	S Holgate St between 1st Ave and Airport Way S	D / 3	F / 4.5	D / 3	F / 4.5
12	S Lander St between 1st Ave and Airport Way S	E / 4	E / 4	E / 4	E / 4
13	S Lucile St between SR 99 and Airport Way S	D / 4	E / 5	D / 4	E / 5
14	W Marginal Way SW between West Seattle Bridge and 2nd Ave SW	A / 5	A / 5	A / 5	A / 5
15	S Michigan St/ Corson Ave S between E Marginal Way S and I-5	C / 3.5	E / 5.5	C / 3.5	E / 5.5
16	E Marginal Way S/SR 99 between S Atlantic Street and 1st Ave S Bridge	A / 9	A / 9	A / 9	A / 9
17	I-5 between Madison Street and SR 599	F / 27.5	F / 31	F / 27.5	F / 32

Note: Cells shown in bold indicate an impact.
Source: Fehr & Peers, 2021.

Mode Share

The Alternative 2 mode share is summarized by sector using the PSRC model and is shown in **Exhibit 3.10-28**. The model predicts that SOV mode shares would remain very similar between Alternative 1 No Action and Alternative 2. Therefore, as is the case under Alternative 1 No Action, all three sectors are expected to have higher SOV shares than the City's 2035 SOV targets.

The Duwamish and Northwest sectors, where the largest changes in industrial employment would be concentrated, are expected to have a slightly higher SOV share though the magnitude of change is less than the 0.5% threshold for a significant impact. Therefore, no significant mode share impacts are expected under Alternative 2.

Exhibit 3.10-28 2044 Alternative 2 SOV Mode Share—PM Peak Period

Sector	2035 SOV Target	Alternative 1 No Action SOV Share	Alternative 2 SOV Share
Duwamish	51%	52.6%	52.8%
Magnolia/Queen Anne	38%	40.1%	40.1%
Northwest	37%	39.7%	39.8%

Source: Fehr & Peers, 2021.

Screenlines

Exhibit 3.10-29 summarizes the projected PM peak hour v/c ratios across each screenline under Alternative 2. Although traffic volumes would increase under Alternative 2, the PM peak hour v/c ratios are expected to remain very similar to those under Alternative 1 No Action. All screenline locations are forecasted to be under the LOS threshold defined by the City of Seattle; therefore, no significant screenline impacts are expected under Alternative 2.

Within the study area, the largest v/c ratio increases between Alternative 1 No Action and Alternative 2 are expected at the South City Limit screenline and the Ballard Bridge.

Exhibit 3.10-29 Screenline Volume-to-Capacity Ratio—Alternative 2

Screenline	Location	v/c Ratio Threshold	PM Peak Period v/c Ratio			
			Alt. 1 No Action		Alt. 2	
			N/E	S/W	N/E	S/W
2	Magnolia	1.0	0.51	0.54	0.52	0.54
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2	0.57	0.53	0.57	0.53
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2	0.53	0.52	0.53	0.52
4.13	South City Limit—SR 99 to Airport Way S	1.0	0.47	0.50	0.47	0.52
5.11	Ship Canal—Ballard Bridge	1.2	1.11	0.78	1.13	0.78
5.12	Ship Canal—Fremont Bridge	1.2	0.68	0.68	0.69	0.68
5.13	Ship Canal—Aurora Bridge	1.2	0.35	0.35	0.35	0.35
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0	0.55	0.64	0.55	0.64
8	South of Lake Union	1.2	0.43	0.51	0.43	0.51
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0	0.51	0.49	0.51	0.49
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0	0.65	0.68	0.65	0.68

Source: Fehr & Peers, 2021.

Impacts of Alternative 3

This section summarizes analysis results and environmental impacts for Alternative 3 (Future of Industry—Targeted) in 2044. Compared to Alternative 1 No Action, Alternative 3 would result in 33,900 additional jobs and 535 additional dwelling units. As with Alternative 1 No Action, most of the new employment growth would be concentrated in the Greater Duwamish MIC; the Ballard Subarea would have the highest increase in residential growth.

Transit

Exhibit 3.10-30 summarizes PM peak hour average passenger load factors (including both light rail and bus) under Alternative 3. The largest increases in passenger load would occur eastbound across the 8th Avenue NW screenline toward the University District, and southbound on 15th Avenue NW toward Downtown. These increases reflect the expected travel patterns of additional employees leaving the BINMIC area to travel home during the PM peak hour. Southbound travel demand across Lander Street would also increase slightly. Overall capacity across these screenlines is expected to be adequate for the demand—some routes traveling across the study area screenlines, however, may operate over their crowding threshold for some individual trips. Although a minor increase is expected westbound across 8th Avenue NW (which is already expected to have crowded transit routes under Alternative 1 No Action), the magnitude of change is less than the threshold for a significant impact. Therefore, no significant transit passenger load impacts are expected under Alternative 3.

Exhibit 3.10-30 PM Peak Hour Average Passenger Load Factors—Alternative 3

	Alternative 1 No Action		Alternative 3	
Screenline	Inbound	Outbound	Inbound	Outbound
A: East of 8th Avenue NW	0.57	1.28	0.64	1.29
B: Ballard Bridge	0.09	0.39	0.09	0.39
C: North of W Mercer Place	0.29	0.59	0.34	0.58
D: North of Lander St	0.21	0.75	0.21	0.77
E: West Seattle Bridge	0.12	0.35	0.12	0.35

Note: Inbound refers to travel into the downtown area and outbound travel out of the downtown area.
Source: Fehr & Peers, 2021.

Auto & Freight

Under Alternative 3, traffic volumes would be slightly higher than Alternative 1 No Action. The PM peak vehicle miles traveled (VMT) within the Greater Duwamish MIC would increase by roughly 2.3% and the PM peak VMT within the BINMIC would increase by roughly 4.3%. The effects of this additional traffic in terms of travel time, mode share, and screenline volumes, are detailed below.

Travel Time

Exhibit 3.10-31 summarizes travel time conditions along each of the study corridors under Alternative 3 and compares them to travel times under Alternative 1 No Action. The travel times below are rounded to the nearest half minute.

During the PM peak hour under the 2044 Alternative 3, most corridors would continue to operate at similar levels of congestion as under Alternative 1 No Action with travel time increases of up to 2 minutes. Based on the criteria for travel time impacts, three significant travel time impacts are expected under Alternative 3:

- Northbound 15th Avenue W from Magnolia Bridge to NW Leary Way
- Eastbound W Dravus Street between 15th Avenue W and 20th Avenue W
- Southbound I-5 from Madison Street to SR 599

The first two segments would be impacted because the increase in travel time would cause the segment to fall from LOS E under Alternative 1 No Action to LOS F under Alternative 3. The I-5 segment is already expected to operate at LOS F under Alternative 1 No Action and under Alternative 3 is expected to experience a 6% increase in travel time compared to Alternative 1, exceeding the criteria for a significant impact. Because freight operates on the same corridors as autos, freight impacts are also identified along northbound 15th Avenue W, eastbound W Dravus Street, and southbound I-5. Any buses operating on those corridors in the future would also be impacted.

At this programmatic level of analysis, it is not possible to know how freight may be impacted by changes to loading zones or access needs. These are potentially significant impacts that would need to be analyzed and mitigated at the project level.

Exhibit 3.10-31 PM Peak Hour Travel Time LOS—Alternative 3

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 3	
ID	Corridor	N/E	S/W	N/E	S/W
Ballard Interbay Northend MIC					
1	15th Ave W from Magnolia Bridge to NW Leary Way	E / 12.5	A / 5	F / 13	A / 5
2	15th Ave NW from NW Leary Way to N 85th St	E / 9.5	C / 6.5	E / 10	C / 6.5
3	Leary Ave NW/ Leary Way NW/ N 36th S/ Fremont Bridge between NW Market St and W Nickerson St/Westlake Ave	C / 11	D / 13	C / 11.5	D / 13.5
4	Shilshole Ave NW between NW Market and 15th Ave NW	B / 2.5	D / 4	B / 2.5	D / 4
5	NW Market St/N 50th/ 46th St between 24th Ave NW and I-5	C / 14	D / 16.5	C / 14	D / 16.5
6	W Nickerson St/Westlake Ave N between 15th Ave W and Mercer St	C / 13.5	C / 12.5	C / 13.5	C / 12.5
7	W Dravus St between 15th Ave W and 20th Ave W	E / 2	D / 1.5	F / 2	D / 1.5
8	Elliott Ave W between Magnolia Bridge and Wall St	B / 6	B / 6.5	B / 6	B / 6.5
9	W Mercer St from Elliott Ave W to I-5	F / 32	F / 22.5	F / 32.5	F / 22.5
10	Denny Way from Elliott Ave W to I-5	F / 15	F / 11.5	F / 15	E / 11.5
11	Magnolia Bridge between 15th Ave W and Thorndyke Ave W	B / 2.5	A / 1.5	B / 2.5	A / 1.5
12	SR 99 between N 46th St and Denny Way	D / 10.5	F / 14.5	D / 10.5	F / 14.5
13	W Emerson St between 15th Ave W and Gilman Ave W	F / 6	F / 4	F / 6	F / 4
14	N 85th St between 15th Ave NW and I-5	E / 13.5	E / 14.5	E / 13.5	E / 14.5
15	I-5 between N 85th Street and Madison Street	F / 22.5	F / 26	F / 22.5	F / 26
Greater Duwamish MIC					
1	1st Ave S between S Royal Brougham Way and SR 99	C / 11	C / 12	C /11	C / 12
2	4th Ave S between Seattle Blvd S to E Marginal Way S	C / 12.5	C / 13.5	C / 12.5	C / 14

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 3	
ID	Corridor	N/E	S/W	N/E	S/W
3	6th Ave S between Seattle Blvd S to Spokane St Viaduct	C / 6.5	C / 6.5	C / 6.5	C / 7
4	Airport Way S/ Seattle Blvd S between S Royal Brougham Way to S Boeing Access Rd	A / 16.5	A / 16	A / 16.5	B / 17.5
5	West Seattle Bridge/Spokane St Viaduct between 35th Ave SW and I-5	C / 6.5	E / 10	C / 6.5	E / 10
6	Spokane St Bridge between Harbor Ave SW and SR 99	B / 4.5	B / 4.5	B / 4.5	B / 4.5
7	E Marginal Way S between SR 99 and S Boeing Access Rd	C / 8.5	D / 10.5	C / 8.5	D / 11
8	Alaskan Way S from Broad St to SR 99	E / 10.5	F / 14.5	E / 10.5	F / 14.5
9	S Royal Brougham Way between SR 99 and Airport Way S	F / 4.5	D / 3	F / 4.5	D / 3
10	Edgar Martinez Dr S between SR 99 and 4th Ave	F / 3	F / 2.5	F / 3	F / 2.5
11	S Holgate St between 1st Ave and Airport Way S	D / 3	F / 4.5	D / 3	F / 4.5
12	S Lander St between 1st Ave and Airport Way S	E / 4	E / 4	E / 4	E / 4
13	S Lucile St between SR 99 and Airport Way S	D / 4	E / 5	D / 4	E / 5
14	W Marginal Way SW between West Seattle Bridge and 2nd Ave SW	A / 5	A / 5	A / 5	A / 5
15	S Michigan St/ Corson Ave S between E Marginal Way S and I-5	C / 3.5	E / 5.5	C / 3.5	E / 5.5
16	E Marginal Way S/SR 99 between S Atlantic Street and 1st Ave S Bridge	A / 9	A / 9	A / 9	A / 9.5
17	I-5 between Madison Street and SR 599	F / 27.5	F / 31	F / 27.5	**F / 33**

Note: Cells shown in bold indicate an impact.
Source: Fehr & Peers, 2021.

Mode Share

The Alternative 3 mode share is summarized by sector using the PSRC model and is shown in **Exhibit 3.10-32**. The model predicts that SOV mode shares under Alternative 3 would remain similar or slightly higher than Alternative 1 No Action. Therefore, as is the case under Alternative 1 No Action, all three sectors are expected to have higher SOV shares than the City's 2035 SOV targets.

The Duwamish sector is expected to have the same SOV share as Alternative 1 No Action and the Magnolia/Queen Anne and Northwest sectors are expected to have slightly higher SOV shares. Because the SOV mode share in the Magnolia/Queen Anne sector is expected to increase by 0.5% compared to Alternative 1 No Action, a significant mode share impact is expected in that sector.

Exhibit 3.10-32 2044 Alternative 3 SOV Mode Share—PM Peak Period

Sector	2035 SOV Target	Alternative 1 No Action SOV Share	Alternative 3 SOV Share
Duwamish	51%	52.6%	52.6%
Magnolia/Queen Anne	38%	40.1%	**40.6%**
Northwest	37%	39.7%	39.9%

Note: Cells shown in bold indicate an impact.
Source: Fehr & Peers, 2021.

Screenlines

Exhibit 3.10-33 summarizes the projected PM peak hour v/c ratios across each screenline under Alternative 3. Although traffic volumes would increase under Alternative 3, all screenline locations are forecasted to be under the LOS threshold defined by the City of Seattle. Therefore, no significant screenline impacts are expected under Alternative 3.

Within the study area, the largest v/c ratio increases between Alternative 1 No Action and Alternative 3 are expected at the Magnolia screenline, South City Limit screenline, and the Ballard Bridge.

Exhibit 3.10-33 Screenline Volume-to-Capacity Ratio—Alternative 3

Screenline	Location	v/c Ratio Threshold	PM Peak Period v/c Ratio			
			Alt. 1 No Action		Alt. 3	
			N/E	S/W	N/E	S/W
2	Magnolia	1.0	0.51	0.54	0.55	0.55
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2	0.57	0.53	0.57	0.53
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2	0.53	0.52	0.54	0.52
4.13	South City Limit—SR 99 to Airport Way S	1.0	0.47	0.50	0.48	0.56
5.11	Ship Canal—Ballard Bridge	1.2	1.11	0.78	1.15	0.77
5.12	Ship Canal—Fremont Bridge	1.2	0.68	0.68	0.69	0.69
5.13	Ship Canal—Aurora Bridge	1.2	0.35	0.35	0.35	0.35
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0	0.55	0.64	0.55	0.64
8	South of Lake Union	1.2	0.43	0.51	0.43	0.52
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0	0.51	0.49	0.52	0.50
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0	0.65	0.68	0.65	0.68

Source: Fehr & Peers, 2021.

Impacts of Alternative 4

This section summarizes analysis results and environmental impacts for Alternative 4 (Future of Industry—Expanded) in 2044. Compared to Alternative 1 No Action, Alternative 4 would result in 35,700 additional jobs and 2,120 additional dwelling units. Most of the new employment growth would be concentrated in the Greater Duwamish MIC. The Ballard and SODO/Stadium subareas would have the highest increases in residential growth.

Transit

Exhibit 3.10-34 summarizes PM peak hour average passenger load factors under Alternative 4. The passenger load factors include both light rail and bus services. The largest increases in passenger load would occur eastbound across the 8th Avenue NW screenline toward the University District, and southbound on 15th Avenue NW toward Downtown. These increases reflect the expected travel patterns of additional employees leaving the BINMIC area to travel home during the PM peak hour. Southbound travel demand across Lander Street would also increase slightly. Overall capacity across these screenlines is expected to be adequate for the demand—some routes traveling across the study area screenlines, however, may operate over their crowding threshold for some individual trips. Although a minor increase is expected westbound across 8th Avenue NW (which is already expected to have crowded transit routes under Alternative 1 No Action), the magnitude of change is less than the threshold for a significant impact. Therefore, no transit passenger load impacts are expected under Alternative 4.

Exhibit 3.10-34 PM Peak Hour Average Passenger Load Factors—Alternative 4

	Alternative 1 No Action		Alternative 4	
Screenline	Inbound	Outbound	Inbound	Outbound
A: East of 8th Avenue NW	0.57	1.28	0.67	1.30
B: Ballard Bridge	0.09	0.39	0.09	0.39
C: North of W Mercer Place	0.29	0.59	0.35	0.58
D: North of Lander St	0.21	0.75	0.21	0.77
E: West Seattle Bridge	0.12	0.35	0.12	0.35

Note: Inbound refers to travel into the downtown area and outbound travel out of the downtown area.
Source: Fehr & Peers, 2021.

Auto & Freight

Among the alternatives, traffic volumes would be highest under Alternative 4. The PM peak vehicle miles traveled (VMT) within the Greater Duwamish MIC would increase by roughly 2.5% and the PM peak VMT within the BINMIC would increase by roughly 5.1%. The effects of this additional traffic in terms of travel time, mode share, and screenline volumes, are detailed below.

Travel Time

Exhibit 3.10-35 summarizes travel time conditions along each of the study corridors under Alternative 4 and compares them to travel times under Alternative 1 No Action. The travel times below are rounded to the nearest half minute.

During the PM peak hour under the 2044 Alternative 4, most corridors would continue to operate at similar levels of congestion as under Alternative 1 No Action with travel times increases of up to 2 minutes. Based on the criteria for travel time impacts, three significant travel time impacts are expected under Alternative 4:

- Northbound 15th Avenue W from Magnolia Bridge to NW Leary Way
- Eastbound W Dravus Street between 15th Avenue W and 20th Avenue W
- Southbound I-5 from Madison Street to SR 599

The first two segments would be impacted because the increase in travel time would cause the segment to fall from LOS E under Alternative 1 No Action to LOS F under Alternative 4. The I-5 segment is already expected to operate at LOS F under Alternative 1 No Action and under Alternative 4 is expected to experience a 7% increase in travel time compared to Alternative 1, exceeding the criteria for a significant impact. Because freight operates on the same corridors as autos, freight impacts are also identified along northbound 15th Avenue W, eastbound W Dravus Street, and southbound I-5. Any buses operating on those corridors in the future would also be impacted.

At this programmatic level of analysis, it is not possible to know how freight may be impacted by changes to loading zones or access needs. These are potentially significant impacts that would need to be analyzed and mitigated at the project level.

Exhibit 3.10-35 PM Peak Hour Travel Time LOS—Alternative 4

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 4	
ID	Corridor	N/E	S/W	N/E	S/W
Ballard Interbay Northend MIC					
1	15th Ave W from Magnolia Bridge to NW Leary Way	E / 12.5	A / 5	F / 13	A / 5
2	15th Ave NW from NW Leary Way to N 85th St	E / 9.5	C / 6.5	E / 10	C / 6.5
3	Leary Ave NW/ Leary Way NW/ N 36th S/ Fremont Bridge between NW Market St and W Nickerson St/Westlake Ave	C / 11	D / 13	C / 11.5	D / 13.5
4	Shilshole Ave NW between NW Market and 15th Ave NW	B / 2.5	D / 4	B / 2.5	D / 4
5	NW Market St/N 50th/ 46th St between 24th Ave NW and I-5	C / 14	D / 16.5	C / 14	D / 16.5
6	W Nickerson St/Westlake Ave N between 15th Ave W and Mercer St	C / 13.5	C / 12.5	C / 13.5	C / 12.5
7	W Dravus St between 15th Ave W and 20th Ave W	E / 2	D / 1.5	F / 2	D / 1.5
8	Elliott Ave W between Magnolia Bridge and Wall St	B / 6	B / 6.5	B / 6	B / 6.5
9	W Mercer St from Elliott Ave W to I-5	F / 32	F / 22.5	F / 32.5	F / 22.5
10	Denny Way from Elliott Ave W to I-5	F / 15	F / 11.5	F / 15	E / 11.5
11	Magnolia Bridge between 15th Ave W and Thorndyke Ave W	B / 2.5	A / 1.5	B / 2.5	A / 1.5
12	SR 99 between N 46th St and Denny Way	D / 10.5	F / 14.5	D / 10.5	F / 14.5
13	W Emerson St between 15th Ave W and Gilman Ave W	F / 6	F / 4	F / 6	F / 4
14	N 85th St between 15th Ave NW and I-5	E / 13.5	E / 14.5	E / 13.5	E / 14.5
15	I-5 between N 85th Street and Madison Street	F / 22.5	F / 26	F / 22.5	F / 26.5
Greater Duwamish MIC					
1	1st Ave S between S Royal Brougham Way and SR 99	C / 11	C / 12	C / 11	C / 12
2	4th Ave S between Seattle Blvd S to E Marginal Way S	C / 12.5	C / 13.5	C / 12.5	C / 14

		PM Peak Hour LOS / Travel Time (minutes)			
		Alternative 1 No Action		Alternative 4	
ID	Corridor	N/E	S/W	N/E	S/W
3	6th Ave S between Seattle Blvd S to Spokane St Viaduct	C / 6.5	C / 6.5	C / 6.5	C / 7
4	Airport Way S/ Seattle Blvd S between S Royal Brougham Way to S Boeing Access Rd	A / 16.5	A / 16	A / 16.5	B / 17.5
5	West Seattle Bridge/Spokane St Viaduct between 35th Ave SW and I-5	C / 6.5	E / 10	C / 6.5	E / 10
6	Spokane St Bridge between Harbor Ave SW and SR 99	B / 4.5	B / 4.5	B / 4.5	B / 4.5
7	E Marginal Way S between SR 99 and S Boeing Access Rd	C / 8.5	D / 10.5	C / 8.5	D / 11
8	Alaskan Way S from Broad St to SR 99	E / 10.5	F / 14.5	E / 10.5	F / 14.5
9	S Royal Brougham Way between SR 99 and Airport Way S	F / 4.5	D / 3	F / 4.5	D / 3
10	Edgar Martinez Dr S between SR 99 and 4th Ave	F / 3	F / 2.5	F / 3	F / 2.5
11	S Holgate St between 1st Ave and Airport Way S	D / 3	F / 4.5	D / 3	F / 4.5
12	S Lander St between 1st Ave and Airport Way S	E / 4	E / 4	E / 4	E / 4
13	S Lucile St between SR 99 and Airport Way S	D / 4	E / 5	D / 4	E / 5
14	W Marginal Way SW between West Seattle Bridge and 2nd Ave SW	A / 5	A / 5	A / 5	A / 5
15	S Michigan St/ Corson Ave S between E Marginal Way S and I-5	C / 3.5	E / 5.5	C / 3.5	E / 5.5
16	E Marginal Way S/SR 99 between S Atlantic Street and 1st Ave S Bridge	A / 9	A / 9	A / 9	A / 10
17	I-5 between Madison Street and SR 599	F / 27.5	F / 31	F / 27.5	**F / 33**

Note: Cells shown in bold indicate an impact.
Source: Fehr & Peers, 2021.

Mode Share

The Alternative 4 mode share is summarized by sector using the PSRC model and is shown in **Exhibit 3.10-36**. The model predicts that SOV mode shares under Alternative 4 would remain similar or slightly higher than Alternative 1 No Action. Therefore, as is the case under Alternative 1 No Action, all three sectors are expected to have higher SOV shares than the City's 2035 SOV targets.

The Duwamish sector is expected to have the same SOV share than Alternative 1 No Action and the Magnolia/Queen Anne and Northwest sectors are expected to have slightly higher SOV shares. Because the SOV mode share in the Magnolia/Queen Anne sector is expected to increase by 0.5% compared to Alternative 1 No Action, a significant mode share impact is expected in that sector.

Exhibit 3.10-36 2044 Alternative 4 SOV Mode Share—PM Peak Period

Sector	2035 SOV Target	Alternative 1 No Action SOV Share	Alternative 4 SOV Share
Duwamish	51%	52.6%	52.6%
Magnolia/Queen Anne	38%	40.1%	**40.6%**
Northwest	37%	39.7%	39.9%

Note: Cells shown in bold indicate an impact.
Source: Fehr & Peers, 2021.

Screenlines

Exhibit 3.10-37 summarizes the projected PM peak hour v/c ratios across each screenline under Alternative 4. Although traffic volumes would increase under Alternative 4, all screenline locations are forecasted to be under the LOS threshold defined by the City of Seattle. Therefore, no significant screenline impacts are expected under Alternative 4.

Within the study area, the largest v/c ratio increases between Alternative 1 No Action and Alternative 4 are expected at the Magnolia screenline, South City Limit screenline, and the Ballard Bridge.

Exhibit 3.10-37 Screenline Volume-to-Capacity Ratio—Alternative 4

Screenline	Location	v/c Ratio Threshold	PM Peak Period v/c Ratio			
			Alt. 1 No Action		Alt. 4	
			N/E	S/W	N/E	S/W
2	Magnolia	1.0	0.51	0.54	0.55	0.55
3.11	Duwamish River—West Seattle Bridge and Spokane Street	1.2	0.57	0.53	0.57	0.53
3.12	Duwamish River—1st Avenue S and 16th Avenue S	1.2	0.53	0.52	0.54	0.52
4.13	South City Limit—SR 99 to Airport Way S	1.0	0.47	0.50	0.48	0.56
5.11	Ship Canal—Ballard Bridge	1.2	1.11	0.78	1.15	0.77
5.12	Ship Canal—Fremont Bridge	1.2	0.68	0.68	0.69	0.69
5.13	Ship Canal—Aurora Bridge	1.2	0.35	0.35	0.35	0.35
7.11	West of Aurora Avenue—Fremont Place N to N 65th Street	1.0	0.55	0.64	0.55	0.64
8	South of Lake Union	1.2	0.43	0.51	0.43	0.51
9.12	South of Spokane Street—E Marginal Way to Airport Way S	1.0	0.51	0.49	0.52	0.50
10.11	South of S Jackson Street—Alaskan Way S to 4th Avenue S	1.0	0.65	0.68	0.66	0.68

Source: Fehr & Peers, 2021.

Summary of Impacts

Exhibit 3.10-38 summarizes significant transportation impacts anticipated under each alternative. The purpose of this EIS is to disclose how potential actions by the City may impact the transportation system in comparison to what is expected to occur with currently adopted zoning codes and development standards. Therefore, the impacts of the Action Alternatives are assessed against Alternative 1 No Action. Impacts identified under Alternative 1 No Action would remain throughout the Action Alternatives even if those alternatives would not result in additional impacts. While the focus of the EIS is not to mitigate conditions under the currently adopted zoning code and development standards (i.e., Alternative 1 No Action), many of the mitigation measures identified for the Action Alternatives would also benefit conditions under Alternative 1 No Action.

In summary, Alternative 1 No Action is expected to have significant impacts to active transportation, auto, and freight in terms of travel time, mode share, transit, parking, and safety. Alternative 2 is expected to result in additional significant impacts to autos and freight on one corridor as well as impacts to active transportation, parking, and safety. Alternatives 3 and 4 are expected to result in additional significant impacts to auto and freight on two corridors and one mode share sector as well as impacts to active transportation, parking, and safety. The locations of the corridors impacted by the Action Alternatives are mapped in **Exhibit 3.10-39** and **Exhibit 3.10-40**.

Exhibit 3.10-38 Summary of Significant Transportation Impacts

Type of Impact	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4
Active Transportation	Yes	Yes	Yes	Yes
Auto & Freight				
Travel Time	10 LOS F corridors	1 impacted corridor	3 impacted corridors	3 impacted corridors
Mode Share	3 sectors	No	1 impacted sector	1 impacted sector
Screenline	No	No	No	No
Transit	1 screenline	No	No	No
Parking	Yes	Yes	Yes	Yes
Safety	Yes	Yes	Yes	Yes

Source: Fehr & Peers, 2021.

Exhibit 3.10-39 Impacted Study Corridors—Ballard Interbay Northend MIC, 2044

Source: Fehr & Peers, 2021.

Exhibit 3.10-40 Impacted Study Corridors—Greater Duwamish MIC, 2044

Source: Fehr & Peers, 2021.

3.10.3 Mitigation Measures

The City of Seattle is committed to investing in supportive transportation investments to improve access, mobility, and safety to allow the industrial and maritime sector to strengthen and grow. Because many industrial and maritime-related trips will remain as SOV due to the nature of the industry, reducing the SOV mode share for other types of trips is key to limiting the potential severity of transportation impacts. Lowering SOV mode share when possible would not only reduce travel time, mode share, and parking demand impacts, but is consistent with numerous other goals and policies in the Comprehensive Plan.

This section identifies a range of potential mitigation strategies that could be implemented to help reduce severity of the adverse impacts of the Action Alternatives identified in the previous section. These include impacts to active transportation, travel time along key arterial corridors, mode share, parking, and safety.

Secondary Impacts

It should be noted that some transportation mitigation projects could have secondary impacts. For example, converting a general-purpose travel lane or a parking lane to a transit lane, truck-only lane, or cycle track would reduce capacity for autos to travel or park. As required, the City would prepare additional analysis and take public and stakeholder input into consideration before implementing specific transportation improvement projects. Given the programmatic nature of this study, this EIS simply lists the types of projects that could be considered to mitigate potential impacts of the proposed alternatives.

Incorporated Plan Features

The Action Alternatives propose three new land use concepts: Maritime, Manufacturing, and Logistics (MML), Industry and Innovation (II), and Urban Industrial (UI). Each concept includes development standards, some of which would influence the transportation network and/or transportation behavior. These include:

- Standards for pedestrian and cyclist-oriented frontage improvements (sidewalks, pedestrian lighting, street trees, etc.)—Industry & Innovation and Urban Industrial
- Vehicle parking maximums and strong commute trip reduction program requirements—Industry & Innovation
- Proximity to a light rail station—Industry & Innovation

Regulations & Commitments

In addition to the development standards incorporated into the proposed land use concepts, the City of Seattle has numerous ongoing strategies to support non-SOV travel modes and increase the overall efficiency of the transportation system for all Seattle residents and employees. These strategies would be pursued as part of any of the future year alternatives. Strategies are discussed beginning with those expected to be most effective in mitigating impacts.

Transportation Systems Management and Operations (TSMO)

Transportation systems management and operations (TSMO) is a philosophy that encompasses strategies to optimize the existing transportation system by understanding the root causes of poor performance, improving collaboration, encouraging behavior changes through travel demand management, and using technology to manage how the system operates. TSMO strategies focus on cost-effective, near-term, multimodal improvements to better operate the City's infrastructure and systems.

Project Highlight: East Marginal Way Corridor Improvement Project

The recently announced $20 million federal grant for the East Marginal Way Corridor Improvement Project is an example of how TSMO strategies can be integrated with enhanced maintenance and safety projects. The grant will fund improvements including widening and strengthening the corridor to accommodate larger and heavier truck traffic; construction of dedicated space for people walking and biking along the corridor; and installation of more advanced traffic signals to reduce traffic congestion, particularly for freight accessing the Port.

Seattle has an ongoing program to improve the operations of traffic signals and provide drivers with more information about congestion and travel times in an effort to make more efficient use of the City's streets. The City will continue to implement new traffic signal systems, such as adaptive signal control which is already in place along the Mercer Street corridor and will soon be implemented along Denny Way. Adaptive signal control is a coordinated traffic signal system that gathers real-time vehicle demand data and dynamically adjusts signal timing to optimize traffic flow. These programs are designed to specifically reduce traffic congestion and improve freight and vehicle flow.

TSMO strategies can be targeted to high priority roadway users, including freight and transit. The *Transit Master Plan* and *Freight Master Plan* identify speed and reliability improvements throughout the city that could benefit those particular modes. In particular, the Freight Master Plan identifies truck-only lanes on highly used truck routes as one potential strategy to improve freight mobility while the BIRT Study proposes joint-use Freight and Transit lanes along 15th Avenue W. SDOT is currently considering policy guidance on Freight-Transit Only Lanes and Truck-Only Lanes. Other potential strategies include:

- intelligent transportation systems (ITS) applications such as dynamic message signs to alert travelers to blocking incidents or give travel time information about route choices;
- truck detection and signal priority to allow traffic signals to recognize an approaching truck so the green light may be extended to let the truck travel through the intersection (providing both freight mobility and safety benefits);
- wayfinding for trucks to improve route decisions and reduce illegal movements;
- geometric improvements at intersections to better design for key truck turning movements; and
- freight operations management to prioritize freight movements during certain times in certain locations.

Many of these types of improvements could be funded through the Move Seattle Levy which commits $14 million over the nine-year life of the levy for the Freight Spot Improvements Project.

Travel Demand Management (TDM)

Managing demand for auto travel is an important element of reducing overall congestion impacts that affect auto, freight, transit, and parking demand. There are well-established travel demand management programs in place, including Transportation Management Programs (TMPs), the Commuter Benefit Ordinance, and the State's Commute Trip Reduction (CTR) program. Because CTR and TMPs typically focuses on large employers, the City could pursue expansions of those programs tailored to smaller employers and residential buildings or support the creation of Transportation Management Associations (TMAs).

A TMA is an organization that provides transportation services and information in a defined area (for example, an office or industrial park or a commercial district). TMAs are typically oriented around TDM programs and focused on commuters but can also serve shoppers, hospital visitors, or residents depending on the characteristics of area they serve and the needs of their members. In some cases, TMAs are developed to advance shared goals among members around sustainability, employee retention, and congestion management. Seattle currently has a TMA in the Downtown area (Commute Seattle) and previously had an active TMA in the Duwamish area (currently TDM programs and services are supported by the SODO Business Improvement Area). There is local precedent for compelling participation in a TMA through code requirements; however, to fully implement a robust TMA, this would also need to be paired with a budget action to establish a funding and governance structure.

Industrial areas can be challenging for TDM due to the characteristics of workers' schedules. For example, many workers need to commute during off-peak periods for their shifts when transit options are more limited and workers often live relatively far from worksites (see **Exhibit 3.9-11** and **Exhibit 3.9-13** for commute length data). Potential TDM measures suited to the study area could include last-mile shuttle systems between key transit nodes and the MICs; coordination with King County Metro and/or Sound Transit to provide off-peak transit service tailored to shift workers with irregular hours; subsidized vanpools; rideshare matching to limit the number of drive-alone commute trips; and micromobility options such as scooters or bicycles to make last-mile connections.

The City could consider updating municipal code and/or Director's Rules related to Transportation Management Plans to tailor requirements for transportation demand management measures that are most effective in industrial settings. This may include membership in a TMA and discounted or free transit passes and/or car share and bike share memberships. For residential buildings, the City could also consider extending Transportation Management Plans or requiring travel options programs (such as GreenTRIP in California).

Research by the California Air Pollution Control Officers Association (CAPCOA), which is composed of air quality management districts in that state, has shown that implementation of

travel demand management programs can substantially reduce vehicle trip generation, which in turn reduces congestion for transit, freight, and autos. Reduced auto travel can indirectly mitigate on-street parking impacts. The City could consider modifying specific measures described below or expanding current strategies. It should be noted that any changes to off-street parking policies would be considered in consultation with stakeholders and in conjunction with improvements to make transit a more competitive option for workers.

- Parking maximums that would limit the number of parking spaces which can be built with new development.
- Review the parking minimums currently in place for possible revisions.
- Review on-street parking management strategies in concert with any adjustment to off-street parking standards to reduce the impact of spillover parking.
- Unbundling of parking to separate parking costs from total property cost, allowing buyers or tenants to forgo buying or leasing parking spaces.
- Increased parking taxes/fees.
- Review and revise transit pass provision programs for employees.
- Encourage or require transit pass provision programs for residents—King County Metro has a Passport program for multifamily housing that is similar to its employer-based Passport program. The program discounts transit passes purchased in bulk for residences of multifamily properties.

Pedestrian & Bicycle System Improvements

Potentially significant impacts to active transportation have been identified under all future year alternatives because all are expected to result in more people walking and biking in areas with network gaps. To mitigate this impact, the City would need to improve the facilities provided for people walking and biking, with particular attention to areas that have safety concerns and areas of historic underinvestment.

Specific projects and high priority areas for improvement may be found in:

- Pedestrian Master Plan
- Bicycle Master Plan
- Bicycle and Pedestrian Safety Analysis
- Ballard-Interbay Regional Transportation (BIRT) System Report
- Georgetown Mobility Study

The City has developed a citywide *Pedestrian Master Plan* and citywide *Bicycle Master Plan* along with other subarea plans focused on particular neighborhoods. These plans and documents include myriad projects that, if implemented, would improve the environment for people walking and biking. Representative projects that could improve conditions for people walking and biking in the study areas include: facilities such as sidewalks, asphalt walkways, or painted walkways; signals to make crossing roadways easier; treatments such as rectangular rapid flashing beacons to alert drivers to people crossing the street; marked crosswalks; curb bulbs or extensions to shorten crossing distances and make people walking more visible to drivers; bicycle lanes (including protected and buffered bicycle lanes); and multi-use trails. This work will be refined and integrated into a

single multimodal plan in the upcoming Seattle Transportation Plan which will include a holistic framework for system improvements. SDOT also has ongoing safety programs that are aimed at reducing the number of collisions, benefiting both safety and reliability of the transportation system. Projects could be implemented through City-led efforts or in partnership with new development through the development review and permitting process.

In addition to creating a better connected and safer walking and riding environment, pedestrian and bicycle infrastructure investments would encourage travelers to choose walking or biking rather than driving. This creates the secondary benefit of contributing toward mitigation of the mode share, travel time, and parking impacts.

Parking Strategies

The City has multiple ongoing programs to manage on-street parking including the Community Access and Parking Program, Performance-Based Parking Pricing Program, and Restricted Parking Zone (RPZ) Program. These approaches could be modified and/or applied at the neighborhood level to manage the increased demand for the city's limited parking supply.

SDOT's Community Access and Parking Program works with community members to identify parking challenges and opportunities within a neighborhood and implement changes. Parking recommendations could include new time-limit signs, load zones, paid parking, restricted parking zones, bicycle parking, or other changes.

The City is expected to continue managing on-street paid parking through SDOT's Performance-Based Parking Program which evaluates data to determine if parking rates, hours of operation and/or time limits could be adjusted to achieve the City's goal of one to two available spaces per block face throughout the day. The City could continue to manage on-street paid parking through existing programs, redefine subareas and manage them with time-of-day pricing, and/or institute paid parking in new areas.

The study area does not have any current RPZs defined. However, if SDOT determines a RPZ would be a beneficial tool to manage parking demand as growth continues, one or more RPZs could be created. RPZs have typically been implemented in residential neighborhoods where there is high parking demand generated by a use such as a business district, hospital, or school; RPZs allow short-term parking for customers or visitors but limit long-term use by employees or commuters. Within the context of the alternatives considered in this EIS, this situation would be most likely to arise in the denser, mixed-use Industry & Innovation and Urban Industrial zones that are located near light rail stations and/or urban villages. Subsequent management changes could include splitting existing RPZs into multiple zones, adding new RPZs, or adjusting RPZ boundaries. The City could also review the RPZ program and its policies in areas that are oversubscribed (where there are more permits issued than parking spaces) to limit the number of permits issued.

Potential Mitigation Measure Funding

Programs like the City's Business Improvement Area (BIA) are possible models for future funding sources. A BIA is an organization funded by property owners and businesses within a local district to collectively fund the maintenance and improvement of their area. There are currently ten BIAs established in the city, including the SODO and Ballard neighborhoods. BIAs can help to fund and promote TMAs that focus on tailored TDM strategies for the local context.

Through the Department of Construction and Inspection's permitting processes, the City can negotiate a proportional share developer contribution toward multimodal transportation improvements needed to mitigate impacts of the project. Given the temporal travel characteristics of industrial land uses (not necessarily following a conventional peak period travel pattern), a proportional share could be estimated based on the expected daily trips of the project.

To support delivery of multimodal projects, the City of Seattle could also implement a Growth Management Act (GMA) compliant multimodal Transportation Impact Fee (TIF) program. The City has already done some initial research into what a program could look like, including consideration of the projects it could fund, how to consider growth, and how development projects' impacts could be measured. Some of the initial findings include that a multimodal TIF program in Seattle could help fund a project list that includes complete streets, transit supportive infrastructure, freight network improvements, and investments to create a more complete network for walking and biking. To align with City's mode-share level of service policy, the TIF program would likely be based on person trips rather than vehicle trips given the strong nexus between new development and the need to expand the City's multimodal transportation network. To implement the program, the City would need to complete a rate study establishing a nexus between the impact fee project list and rates charged and the City Council would need to adopt an impact fee ordinance and associated code language that directs how impact fees would be assessed and spent. RCW 82.02.050–.110 and WAC 365-196-850 provide direction for how counties, cities, and towns planning under the Growth Management Act (GMA) can impose impact fees.

Other Potential Mitigation Measures

Location-specific mitigation measures are discussed for the following two travel time corridor and transit screenline impacts:

- 15th Avenue W between Magnolia Bridge and NW Leary Way
- W Dravus Street between 15th Avenue W and 20th Avenue W

Travel Time Impact: 15th Avenue W between Magnolia Bridge and NW Leary Way

A travel time impact is expected along 15th Avenue W between Magnolia Bridge and NW Leary Way under both alternatives 3 and 4. The BIRT Study analyzed the 15th Avenue NW corridor in detail and outlines potential investments, some of which would mitigate the travel time

impacts. The scale of each project's potential efficacy in improving the transportation system is evaluated as either transformative or small. These include:

- Intersection operations refinements along 15th Avenue W at W Armory Way, Gilman Drive W and W Howe Street (transformative). This would include improvements such as turning radii adjustments to better accommodate frequent freight turning movements and signal phasing adjustments to shorten the amount of time needed for traffic flow crossing the 15th Avenue W corridor.
- Installation of an adaptive signal system along the corridor (transformative). Adaptive signal control is a coordinated traffic signal system that gathers real-time vehicle demand data and dynamically adjusts signal timing to optimize traffic flow.
- Joint-use of the existing bus-only lanes by both transit and freight on 15th Avenue W between Denny Way and Market Street during off-peak times (small).
- Replacement of the Ballard Bridge to improve northbound traffic flow (transformative). There are currently two options under consideration: a mid-level and a low-level replacement. The mid-level bridge would reduce the frequency of bridge span openings making travel times across the bridge more reliable and shorter on average while the low-level option would provide an easier grade for people walking and biking. Both options would include a Single Point Urban Interchange (SPUI) at W Nickerson Street/W Emerson Street which would improve travel time reliability for trucks entering and exiting the BINMIC.

Travel Time Impact: W Dravus Street between 15th Avenue W and 20th Avenue W

A travel time impact is expected along W Dravus Street between 15th Avenue W and 20th Avenue W under alternatives 2, 3, and 4. The BIRT Study outlines potential investments along the W Dravus Street corridor, some of which would mitigate the travel time impacts. These include:

- Signal operations improvements and ITS strategies (small). This could include optimizing traffic signal timing along W Dravus Street to support both general purpose traffic and freight reliability to and from the Terminal 91 North Gate if it reopens. Signal timing and hardware improvements at the 15th Avenue W and W Dravus Street ramps could also ensure vehicle queues on the bridge have cleared to give trucks adequate space to turn, minimizing the delays currently experienced at this location.
- Roadway striping/channelization modifications to remove geometric constraints for large trucks (small). This would include improving the turn radii at 15th Avenue W and W Dravus Street so trucks could more easily make the turn to and from the ramps, minimizing the delays currently experienced at this location.
- Access management enhancements at frequent and busy driveway access points (small).
- Replacement and/or widening of the W Dravus Street bridges (transformative). Options could include roadway rechannelization, conversion to a roundabout at 17th Avenue W, and/or widening the Dravus Street bridge west of 17th Avenue W.

Travel Time Impact: I-5 between Madison Street and SR 599

A travel time impact is expected along I-5 between Madison Street and SR 599 (stretching along the east side of the Greater Duwamish MIC) under alternatives 3 and 4. While the City of Seattle works closely with WSDOT regarding facilities running through the city limits, I-5 is owned and operated by the State. In 2019, WSDOT and the City of Seattle jointly applied for a federal grant to move planning efforts for the I-5 system forward; however, the project was not awarded any funding at that time. Both agencies continue to work toward securing funding for I-5 improvements, as well as coordinate with the PSRC on potential approaches to address congestion on regional highways. However, for the purposes of this EIS, no location-specific capital improvement-based mitigation measures are assumed that would address travel time impacts along I-5.

Regarding land use mix and trips, under alternatives 3 and 4, the City could consider the balance of employment uses and plan for greater industrial jobs, and a smaller share of non-industrial jobs (e.g., retail, services, office) in the Greater Duwamish MIC to reduce trips. The City could consider a preferred alternative that has less of the employment-dense Industry and Innovation zone than is found in alternatives 3 and 4 but more than Alternative 2 and still avoid significant adverse impacts on I-5.

3.10.4 Significant Unavoidable Adverse Impacts

This section describes the significant and unavoidable adverse impacts to transportation that would occur as a result of implementation of the Action Alternatives. Travel demand and associated congestion is expected to increase over time regardless of the alternative pursued. In addition to citywide transportation capacity improvements largely focused on improved transit, bicycle, pedestrian, and freight connections, the City will manage demand using policies, programs, and investments aimed at shifting travel to non-SOV modes. However, city streets will remain congested during peak periods as growth continues to occur. With respect to the three Action Alternatives studied in this Draft EIS, potentially significant adverse impacts are identified for active transportation, corridor travel times (affecting autos, freight, and buses), mode share, on-street parking, and safety.

Potential mitigation measures for the 15th Avenue W and W Dravus Street corridors impacted by the Action Alternatives are proposed above. If these measures are implemented, it is expected that the travel time impact could be brought to a less-than-significant level in relation to Alternative 1 No Action. At this time, no location-specific mitigation measures along I-5 are expected to fully mitigate the travel time impact to autos, freight, and buses under alternatives 3 and 4. Modifications to alternatives 3 and 4 that reduce the total amount of future employment in the SODO subarea could potentially mitigate the impact to I-5. Therefore, a significant travel time impact may be avoided on I-5 if the reduction in trips brings travel time increases below the threshold of significance.

Some combination of the travel demand management strategies discussed in **3.10.3 Mitigation Measures** could be implemented to reduce the magnitude of SOV travel. Given the small magnitude of difference projected between Alternative 1 No Action and alternatives 3 and 4, it is expected that the mode share impact could be reduced to a less-than-significant level.

Parking impacts are anticipated to be brought to a less-than significant level by implementing a range of possible mitigation strategies such as those discussed in **3.10.3 Mitigation Measures**. While there may be short-term impacts as individual developments are completed (causing on-street parking demand to exceed supply), it is expected that with expanded paid parking zones, revised RPZ permitting, more sophisticated parking availability metrics, and continued expansion of non-auto travel options, the on-street parking situation will reach a new equilibrium as residents, employees, and visitors adjust to the new context. Therefore, no significant unavoidable adverse impacts to parking are expected.

Significant impacts were identified to both active transportation and safety due to the projected increase in people walking and biking in areas with network gaps and the increased potential for vehicle conflicts (particularly trucks) with vulnerable users. While the City can pursue a variety of mitigation measures to improve facilities for people walking and biking and pursue supplemental funding through federal or state programs, it is not expected that all network gaps can be addressed given the number of locations needing improvement and the limited funding available. Therefore, it is expected that the Action Alternatives could have significant unavoidable adverse impacts to active transportation and safety.

Section 3.11

Historic, Archaeological, & Cultural Resources

This section details the current historic, archaeological, and cultural resources policy and regulatory frameworks, describes the current conditions (affected environment), analyzes the alternatives' potential impacts on historic, archaeological, and cultural resources, and suggests possible mitigation measures. Finally, it summarizes any significant unavoidable adverse impacts.

Impacts of the alternatives on historic, archaeological, and cultural resources are considered significant if they result in:

- Substantial adverse changes to, alteration, or loss of a resource that impacts its eligibility for inclusion in the National Register of Historic Places (NRHP) or the Washington Heritage Register (WHR), or as a City of Seattle Landmark (SL). Resources that are not eligible for these registers will not be adversely impacted by the proposed alternatives.

3.11.1 Affected Environment

This section describes the prehistoric, ethnographic, and historic contexts of the areas within the MICs as background by which to address the potential for impacts to historic, archaeological, and cultural resources.

Precontact Period Context

Based upon current scientific understandings of the archaeological record, the earliest human occupations in the Pacific Northwest were characterized by highly mobile bands of broad-spectrum foragers. The widespread Clovis culture, the first well-defined cultural complex in North America, has been dated to between 12,800 and 13,200 calibrated years before present (cal. B.P.) (Ames and Maschner 1999:65–66; Kirk and Daugherty 2007:13). Recent research suggests that large stemmed projectile points (i.e., Western Stemmed complex) may have been produced by populations pre-dating Clovis (e.g., Jenkins et al. 2012). These early Paleoindian cultures consisted of small, nomadic bands that specialized in hunting a variety of small- to large-sized game animals, including megafauna that went extinct across North America at the end of the Pleistocene (e.g., wooly mammoth [*Mammuthus primigenius*], mastodon [*Mammut americanum*], ancient bison [*Bison antiquus*]) (Kirk and Daugherty 2007:13).

Following the Clovis period, early and middle Archaic populations across western Washington produced large, willow leaf-shaped ("Olcott" phase) projectile points, in addition to lanceolate points and scrapers (Ames and Maschner 1999; Kopperl et al. 2016; Nelson 1990:483). Similar projectile points have been found in sites from the Fraser River Valley in British Columbia down to the margins of the Columbia River, indicating the wide dispersal of related groups across the broader Northwest Coast during this period. Sites containing Olcott material are most commonly documented well inland from the coast along rivers, suggesting that these populations were likely still subsisting largely upon terrestrial plant and animal resources and had not yet developed the extensive reliance upon riverine and coastal food resources observed among later Coast Salish peoples (Kopperl et al. 2016; Nelson 1990:483).

Between approximately 6400 and 2500 cal. B.P., there was a gradual shift across the Northwest Coast to an increasingly heavy reliance on marine and riverine resources for subsistence. This shift was coincident with a general trend toward increasing sedentism as more sites were settled along river courses, estuaries, and productive marine environments (Ames and Maschner 1999:93–94; Nelson 1990:483). During this period, settlements began to be occupied on a seasonal basis. Larger, denser artifact concentrations have been identified within sites dating from 6400 to 2400 cal. B.P., and deep shell middens have been dated to as early as 5,200 years ago (Larson and Lewarch 1995; Mierendorf 1986:57; Wessen 1988). It was during this time that coastal and neighboring inland communities developed their complex suites of lithic, bone, and antler tool technologies suited for marine mammal hunting, riverine fishing, and the further exploitation of terrestrial plant and animal resources (Ames and Maschner 1993:93–95; Blukis Onat et al. 1980:29–30; Kopperl et al. 2016:117–118).

Along with steady population growth and increasingly intensive resource utilization across the broader Northwest Coast, Late Pacific (2400–200 cal. B.P.) precontact archaeological sites in the region demonstrate the emergence of status differentiation and complex social hierarchies (Ames and Maschner 1999:95–96). Increased reliance on stored foods and controlled access to resources, including salmon and shellfish, also developed during this period. By this time, the general ethnographic (prior to Euroamerican influence) pattern observed along the Northwest Coast had become well-developed, although these societies saw swift and dramatic changes with the arrival of Euroamerican explorers, traders, and settlers beginning in the late 1700s (Ames and Maschner 1999:95–96, 112).

Ethnographic Background

This section presents an Ethnographic Background prepared by Historic Resources Associates to provide context for Historic, Archaeological, & Cultural Resources evaluated in this EIS. See **Section 3.8 Land & Shoreline Use** for an overview of historical planning and land use decisions developed by the City of Seattle in support of this EIS.

The EIS study area is within the traditional territory of the Lushootseed-speaking Duwamish people. The settlements of this ethnographically documented Coast Salish group were principally located along the Duwamish, Black, and Cedar Rivers, as well as along the coasts of Puget Sound and Lake Washington in the vicinity of present-day Seattle (Duwamish Tribal Services 2018; Ruby and Brown 1992:72). The Duwamish were part of the broader Southern Coast Salish culture, which was generally adapted toward the intensive utilization of marine and riverine resources (Suttles and Lane 1990). A principal division among the Duwamish existed between the Sxwaldja$\acute{E}$bc ("saltwater dwellers") who lived in settlements on Puget Sound and the Xatcua$\acute{E}$bc ("lake dwellers") who lived along the shores of Lake Washington. The latter, as well as Duwamish groups living along the interior rivers of the region, were considered to be poorer and lower-status than the coastal communities (Hilbert et al. 2001:45; Ruby and Brown 1992:72–73; Suttles and Lane 1990:485–486; Swanton 1952:26).

Like other Southern Coast Salish peoples, the Duwamish relied heavily upon salmon and other fish for subsistence and utilized a diverse suite of technologies to harvest them in different settings. They made use of trolling, seine, and gill net technologies to harvest fish in Puget Sound, while weirs, nets, gaff hooks, harpoons, and spears were all employed in rivers (Suttles and Lane 1990:488–489). Terrestrial mammals, especially black-tailed deer and elk were also hunted by the Duwamish and neighboring Tribes using the bow and arrow, and they gathered a great variety of plant foods, including edible roots, bulbs, and berries (Duwamish Tribal Services 2018; Gunther 1945; Suttles and Lane 1990:489).

The Duwamish lived a semi-sedentary lifestyle, spending part of the year in permanent winter villages and the warmer months in temporary encampments from which they fished, hunted, and gathered plant resources. Smaller bands would travel across their territory to hunt and forage for plant resources during the summer months, returning to their permanent settlements for the ceremonially rich winter season and to intensively fish in the spring and autumn (Duwamish Tribal Services 2018; Suttles and Lane 1990).

In 1855, members of the Duwamish and neighboring Puget Sound tribes signed the Treaty of Point Elliott, which directed the removal of Tribal members to reservations. The Duwamish were ordered to relocate to the Port Madison Reservation, along with the Suquamish (Lane 1975:3–4). Many Duwamish remained along the Black River in defiance of government orders but were removed by the early 1900s (Lewarch et al. 1996:3–13). The Duwamish Indian Tribe petitioned for federal recognition in 1979. In 2001, the federal government rejected the petition, reversing the decision of the previous administration to recognize its Tribal status. The Duwamish Indian community continues to pursue recognition, build their community, and maintain their cultural traditions (Duwamish Tribal Services 2018; Thrush 2007:196–197).

An important Duwamish village, *šəlšúl* ("Tucked Away Inside"), was located at the west end of the Ballard portion of the Ballard Interbay Northend Manufacturing Industrial Center (MIC). The village site was situated along the northwestern shore of Salmon Bay and was destroyed during the construction of the Hiram M. Chittenden Locks in the 1910s (Hilbert et al. 2001:54–55; Thrush 2007:221–223). Several Duwamish villages were recorded within the Greater Duwamish MIC around the former mouth and lower reaches of the Duwamish River. The village of yəlíqʷad ("basketry cap") was named for the distinctive woven hats worn by peoples such as the Yakama, perhaps because its residents participated in trade networks that spanned the Cascades (Dailey 2020; Hilbert et al. 2001:119; Thrush 2007:236–237). This village was located along the west bank of the Duwamish River west of Kellogg Island. Site 45KI23 (the Duwamish No. 1 Site) has been identified at this location, and likely represents the archaeological remains of the village. The village of túʔulʔaltxʷ ("where herring live" or "herring house"), was situated to the west of the mouth of the Duwamish River under the West Seattle bluff. An unknown Euroamerican settler burned the town down in 1893, and its name was eventually given to the Terminal 107 Park (Hilbert et al. 2001:46; Thrush 2007:234). A third village, dxʷqʷíƛ̓əd ("Place of the Fish Spear"), was located atop a large flat next to the Duwamish River at what is presently the north end of Boeing Field (Hilbert et al. 2001:47; Thrush 2007:240).

Historic Period Context

Early Settlement

European visitation to the Puget Sound Region began in 1792 when George Vancouver and his crew explored the region. Within the next 100 years, Native populations plummeted due to repeated outbreaks of introduced diseases such as smallpox, influenza, and typhoid fever (Boyd 1990; Suttles and Lane 1990). The Treaty of Washington in 1852 conveyed the territory to the United States, and the Donation Land Claim Act drew settlers into land occupied by the Duwamish and their neighbors. In 1855, members of the Duwamish and neighboring Puget Sound tribes signed the Treaty of Point Elliott, which provided for the removal of Tribal members to reservations, including the Port Madison Reservation (Suquamish/Fort Kitsap). Some Duwamish people continued to live in and around Seattle, maintaining friendly relations, working for, and trading with incoming settlers. Many others, meanwhile, relocated to the Port Madison Reservation, but due to undesirable conditions were compelled to leave. Many then attempted to return to their ancestral lands, and a few were able to claim or purchase land (Ruby and Brown 1992; Thrush 2007).

Tribal lands and fishing rights continued to be eroded through the late 1800s and 1900s, culminating, in the late 1900s, in a series of lawsuits and court cases that upheld certain treaty rights (Marino 1990; Ruby and Brown 1992). The federally-recognized Muckleshoot, Snoqualmie, Suquamish, and Tulalip Tribes are the descendant Tribes that represent the various tribes and bands with territorial interests in the portion of Seattle addressed by this EIS, that were signers of the Point Elliott Treaty. The Duwamish Tribe is not currently federally recognized but continues to fight for this distinction. See **Section 3.8 Land & Shoreline Use** for related information on f historical planning and land use decisions developed by the City of Seattle in support of this EIS.

It was in 1851 that the first Euroamerican settlers arrived in what is now the Seattle area. They were the Denny Party, which included Arthur A. Denny and his brother David T., John N. Low, Carson D. Boren, William N. Bell, Charles C. Terry and his brother Lee, and their families (Denny 1888:7–13, 16–17; Fiset 2001; USSG 1856, 1863). These early settlers encouraged additional settlement by adjusting their claims to accommodate new arrivals, such as sawmill owner, Henry L. Yesler in 1852, and filed the first plat for the town of Seattle. Logging, which began with local men working with oxen and small timber mills, became the primary industry of this period (Caldbick 2014; Denny 1888:16–22; Fiset 2001). Over time, larger mills were constructed in the area and the industry offered steady employment for incoming settlers (Sanborn Map Co. 1884, 1888, 1893).

To the north, Dr. Henry Smith with his wife, mother, and sister settled in the Interbay area in 1853 and filed for land claims. More settlers followed, made claims, and supported themselves by farming and logging (Wilma 2001a). To the south, Luther Collins, Jacob Maple, Samuel Maple, and Henry Van Asselt settled along the Duwamish River on lands that now make up Georgetown, with farming the main industry in this area (Wilma 2001b).

By 1860, the population of settlers in Seattle had risen to 302, and many of them were working to grow the town into something more substantial. While most of the industry and commercial activity had grown along the eastern shore of Elliott Bay, sparse residential and family farms were beginning to pop up in the areas surrounding Seattle's central core (Bagley 1929).

Maritime Commerce & Industrial Development

In the 1870s, the discovery of large deposits of coal near present-day Newcastle and Renton, created a need for transportation to Seattle docks on Elliott Bay. Initially, the coal was transported on barges across Lake Washington, then unloaded to wagons and transported overland to Lake Union, where it would be loaded back onto barges and shipped southwest across the lake. Then the coal was once again unloaded onto wagons for the final leg of the route to Elliott Bay. In an attempt to simplify this onerous shipping system, a narrow-gauge rail line was constructed in 1872 between Lake Union's south shore to the coal dock on Elliott Bay. Five short years later, the line was abandoned as the Seattle and Walla Walla Railroad (S&WW) was constructed by the enterprising locals in Seattle from Elliott Bay south to the coal fields near Renton and then north to those near present-day Newcastle (Link 2004:3; MacIntosh and Crowley 1999). In 1884, the Northern Pacific Railroad built its line to Seattle, spurring additional growth (Chesley 2009).

Seattle's economy boomed with shipping, railroads, timber extraction and milling, coal mining and shipping, commercial and industrial manufacturing such as iron works, and service industry support. At this time, Seattle's economy was closely tied to other Pacific ports, especially those in California. At various times, a substantial percentage of lumber shipped from Seattle went to San Francisco to aid in its reconstruction from catastrophic fires and, later, the 1906 earthquake that was accompanied by a fire that destroyed some 25,000 buildings. The close connection between these ports can be seen in the creation of Ballast Island, an artificial landform on the Seattle waterfront, that is largely made up of rock mined from outcrops in San Francisco and dumped in Elliott Harbor to make space for the Seattle products shipped in return sailings. This rise in production created jobs and encouraged population growth.

In response to Seattle's growth, the pace of construction in the surrounding neighborhoods began accelerating in the late 1880s and early 1890s. Mills and other commercial ventures were built on the available lands, existing lumber mills and manufacturing companies expanded, and support services such as restaurants, hotels, breweries, laundries, creameries, soap works, and other similar enterprises were established throughout the neighborhoods. As well, houses were constructed to accommodate increasing numbers of employees, both management and labor, and business owners (Fiset 2001; Sanborn Map Co. 1884, 1888, 1893). Cable cars and electric streetcars crisscrossed Seattle's neighborhoods, ferries transported passengers across Lake Union, and systems of staircases, first constructed of wood and later of concrete, were built for ease of travel over the area's hilly topography (Fiset 2001; Thompson and Marr 2013). According to Sanborn maps, in 1884 the population of Seattle was 7,000 persons; this number more than doubled by 1888 to 16,000 (Sanborn Map Co. 1884, 1888).

Like many cities in the United States, Seattle was devastated by fire. The Great Seattle Fire occurred in 1889 and leveled the city's 18-block waterfront and 40 blocks of the city center. Destroyed were not only wood-frame buildings and structures, but those constructed of brick and stone, including wharves, piers, depots, mills, warehouses, businesses, offices, banks, stores, hotels, apartment buildings, and some residences. Rebuilding began almost immediately. The City widened some streets and raised others, implemented a new building code, banned wood buildings in the fire zone, and established a city water works (Caldbick 2020a, 2020b). Many of Seattle's sawmills that had been destroyed in the fire moved north to the north side of Salmon Bay, to what is now Ballard (Wilma 2001a).

After the fire, in the 1890s, the Great Northern Railway Company's president, James J. Hill, constructed docks, a grain terminal, grain elevator and warehouse at Smith Cove to facilitate maritime commerce with the Far East. Other private docks and warehouses were also built in the area (McClary 2013).

Around the turn of the twentieth century, construction in Seattle's neighborhoods included educational buildings, religious facilities, and multi-unit apartment buildings in support of the rapidly expanding population (Baist 1905; Fiset 2001). Additionally, religious organizations, commercial enterprises, and industrial operations were upgrading their wood-frame buildings with more substantial masonry versions in the wake of the fire (Link 2004:6). Industry boomed as well, spreading north and south of Seattle to more accommodating topography and expansive rail and waterway transportation systems (Langloe 1946). Private wharves, piers, warehouses, and mills were built south of the city, many were linked to the Northern Pacific lines to handle freight shipped into and out of Seattle. During this time, Georgetown's identity as Seattle's party area began to shift towards industry, especially after annexation by Seattle. By 1904, the population of Seattle had swelled to over 150,000. This number tripled to 456,000 by 1928 (Sanborn Map Co. 1905, 1928; Wilma 2001b).

The onset of the 1910s saw big changes for Seattle's maritime and industrial services. Between 1912 and 1917, the U.S. Army Corps of Engineers (USACE) constructed a canal between Puget Sound and Lake Washington following Ross Creek, which had been widened ca. 1885 for use as a log canal (Chrzastowski 1983:6). The Chittenden/Ballard Locks was completed in 1917, opening a major shipping route that connected Lake Washington, Lake Union, and Salmon Bay Waterway to Puget Sound. The project was funded by King County and the federal government. Simultaneous to the construction of the Canal, the City of Seattle completed bridge construction, street grading, and built the Third Avenue West Tunnel to provide a route for utilities to pass under the new Canal (Fiset 2001; Walton Potter 1977:12).

Other large projects during that time included the flattening of Denny Hill and streets north of downtown Seattle, known as regrades, which allowed for easier transportation routes in and out of the city (Link 2004:8). Much of the earth removed in the regrades was used to fill in wetlands and tidal flats. In 1912, the Great Northern docks at Smith Cove were sold to the newly created Port of Seattle for construction of a deep-sea terminal. The Port's comprehensive plan also included the construction of Fisherman's Terminal on Salmon Bay, the Bell Street Pier,

wharves and warehouses on the East Waterway pier and a second pier on the East Waterway, a public wharf and warehouse at the end of Bell Street, a grain elevator at Hanford Street, and a new ferry service on Lake Washington (Oldham 2020).

Additionally, man-made alterations along the Duwamish River—rerouting, straightening, and channelizing the river, and draining, dredging, and filling tidelands—and extensive logging, created land for agriculture and industry. The dredged material was used to construct Harbor Island, that split the mouth of the river into two channels. The Port of Seattle would later plan extensive terminals on Harbor Island. The renamed Duwamish Waterway supported shipping and large industrial complexes, such as shipbuilders, foundries, clay and coal plant, terracotta factory, antimony smelting and refining plant, iron works, flour mill, meat packer and slaughterhouse, creosoting works, lumber mills, warehouses, and Boeing Company's Plant 1 (Oldham 2020; Sanborn Map Co. 1905, 1928, 1950; Updegrave 2016). This industrial growth created additional employment opportunities and additional residences and apartment buildings were constructed to house the influx of workers (Sanborn Map Co. 1905, 1928).

Like most of the United States, the Great Depression hit Seattle hard, as the area's industries faltered, jobs were lost, and subsequently, the population fell (Fiset 2001; Link 2004:13). The arrival of World War II and the corresponding growth in war supporting industries slowed the decline. During this time, the city's earliest residential neighborhoods were in flux due to pressure of commercial and industrial interests. Additionally, the 1949 earthquake, which damaged numerous buildings, hastened the shift away from mixed residential and commercial neighborhoods towards those with a mix of commercial and industrial (Thompson and Marr 2013).

The gradual rebuilding began in the late 1950s, in part stimulated by the rezoning of the some of Seattle's neighborhoods to general manufacturing (Link 2004:14). Years in the planning, in 1959 work began on U.S. Interstate 5 (I-5) through Washington. The freeway aligned north–south along the east side of Eastlake Avenue E, cutting many neighborhoods in half, disrupting traffic patterns and routes, and introducing visual and auditory impacts. Much of I-5 through Seattle was completed in 1967, but the entire I-5 project was completed in 1969 (Dougherty 2010).

Although Seattle began as a sparsely populated region whose settlers supported nearby lumber mills, by the turn of the twentieth century, it had become the Pacific Northwest's powerhouse city with considerable commercial, transportation, industrial, and maritime industries. Today the city is home to modern hi-tech, retail, commercial, and multi-family infill construction in villages. While some single-family homes and small commercial ventures make way for denser urban infill most of the city's acres are still in low density residential use.

Current Conditions

Data & Methods

To analyze historic and cultural resources in the study areas for the purposes of this report, HRA's GIS Specialist gathered building data from the King County Assessor's website and the Department of Archaeology and Historic Preservation's (DAHP's) online database, the Washington Information System for Architectural and Archaeological Records Data (WISAARD), for cultural resource survey reports, archaeological site records, historic property inventory forms (HPIs), cemetery records, and National Register of Historic Places (NRHP)- and Washington Heritage Register (WHR)-listed and eligible resources in the MICs/project subareas. Additionally, HRA's architectural historian reviewed the Seattle Landmarks (SL) designated Landmarks List and Landmarks Districts map on the City's website.

For the architectural resources analysis, the GIS Specialist created maps showing the locations of the parcels that meet the 50-years or older threshold, properties that have been recorded on an HPI form, and NRHP-listed properties and districts.

HRA's in-house library was used to obtain information on the environmental, archaeological, and historical context of the project vicinity. HRA research staff also examined General Land Office (GLO) plats, available online through the Bureau of Land Management (BLM) website, to locate potential historical features. These nineteenth-century maps, arranged by township and range, indicate locations of then-extant historical structures, trails, and features. Although most of these structures are no longer extant, the maps indicate where historic period cultural resources could be encountered. Researchers reviewed additional historic maps (e.g., U.S. Geological Survey [USGS] maps, Sanborn Fire Insurance maps, County atlases) available through online resources.

Based on environmental characteristics, ethnographic data, and the distribution of previously recorded cultural resources, HRA formulated initial expectations about the sensitivity of the MICs for containing historic-period architectural and archaeological resources. DAHP's statewide predictive model layer was also reviewed for probability estimates of the presence of precontact cultural resources.

Full Study Area

Cultural resources identified in or adjacent to the Full Study Area include districts, sites, buildings, structures, or objects (BSOs) that are 45 years old or older, and listed or eligible for listing in the NHL Program, NRHP, WHR, WHBR, or the SL program, whose age threshold for inclusion is 25 years old or older.

Architectural Resources

Within the full study area, there is 1 NHL property and a number of properties that are listed in the NRHP, WHR, and SL. There are 3 NRHP-listed historic districts in the study area, 12 NRHP-

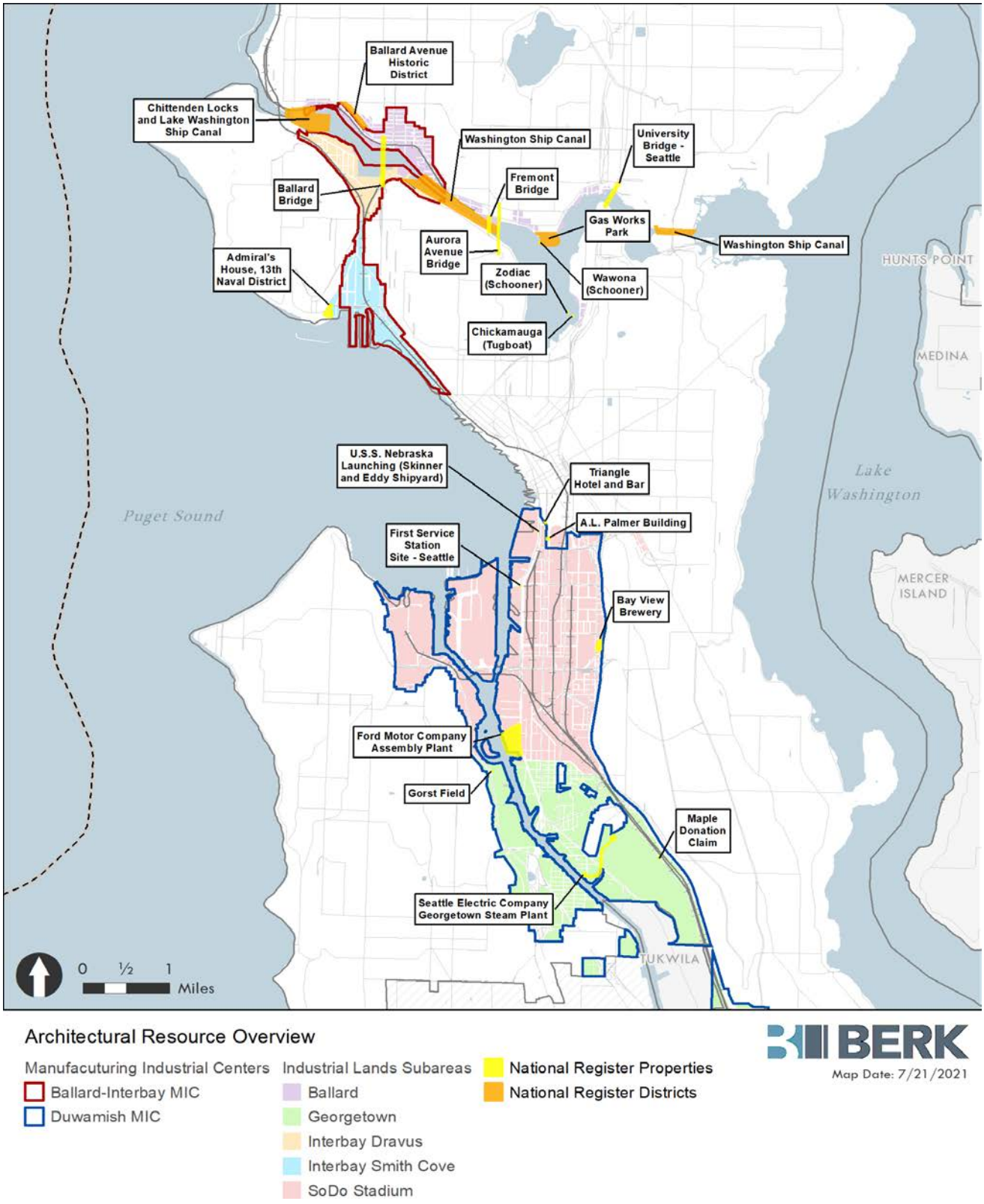
and WHR-listed historic properties, 5 properties that are listed in the WHR, and 15 historic properties designated Seattle Landmarks (**Exhibit 3.11-1**). There are no historic barns listed in the WHBR within the study area. There are several Seattle Landmarks in the Study Area, some of which are listed by the NRHP. See **Exhibit 3.11-2**.

According to the King County Tax Assessor, there are 865 historic-period buildings within the full study area, of which 774 are commercial/industrial buildings and the remaining 91 are residential buildings.

In contrast, DAHP online WISAARD records show 1,566 individual historic-period architectural resources within the full study area that have been previously recorded on HPI forms. Of these, 73 were determined eligible for listing in the NRHP and 154 were determined not eligible. The remaining 1,339 resources have no formal determinations of eligibility, and many were created by data transfer for an Assessors Data Project for King County (**Exhibit 3.11-2**). These resources were not formally surveyed and recorded and have neither eligibility recommendations nor determinations of eligibility.

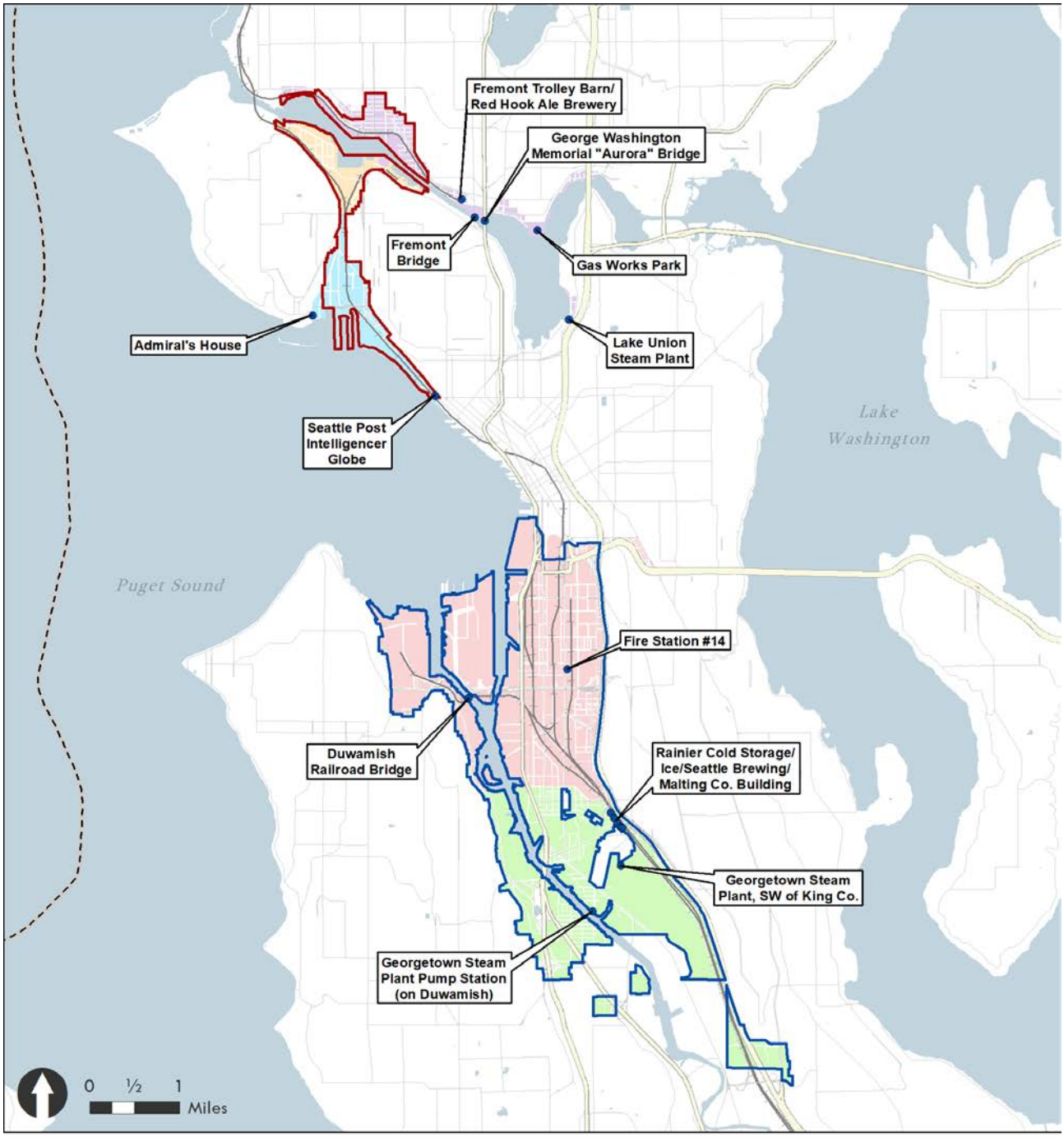
The discrepancy between the Assessor's and DAHP's records are likely due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database.

Exhibit 3.11-1 National Register of Historic Places Listed Architectural Properties and Districts



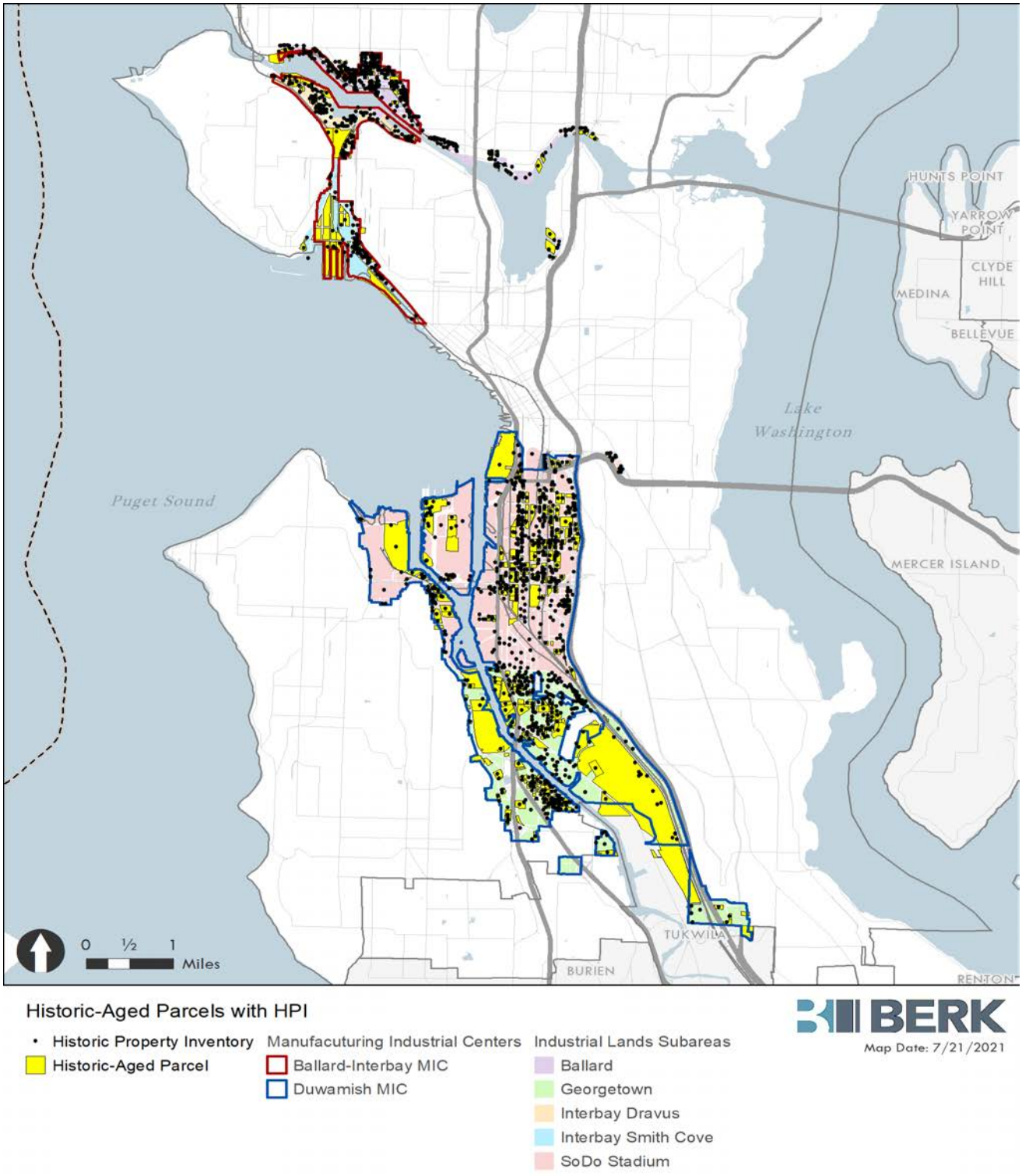
Source: HRA, 2021.

Exhibit 3.11-2 Seattle Designated Landmarks



Source: HRA, 2021.

Exhibit - Recorded Historic Period Buildings, Structures, and Objects in the Study Area



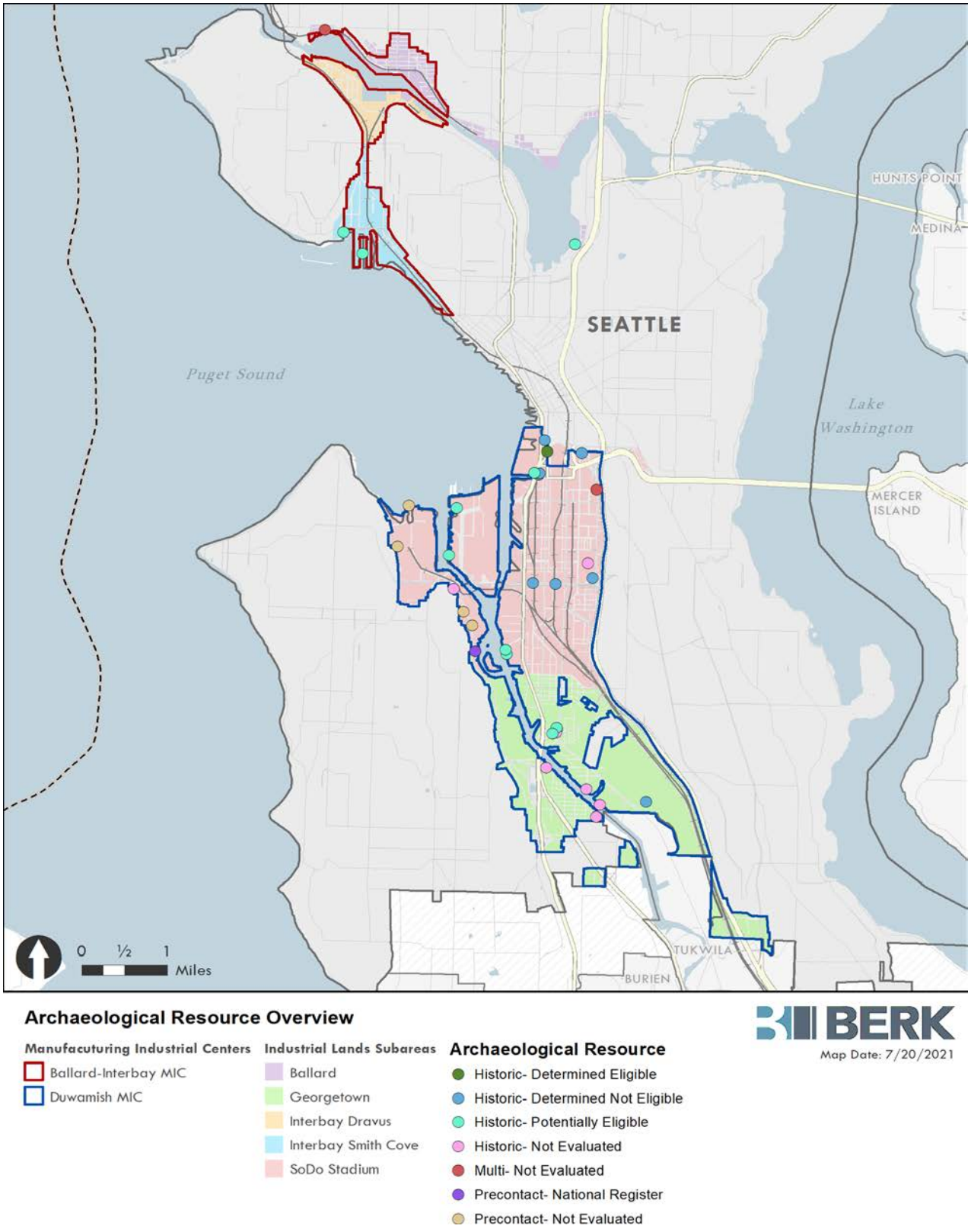
Source: HRA, 2021.

Archaeological Resources

Within the full study area, there are 31 archaeological sites recorded by 83 previous studies that included archaeological investigations **(Exhibit 3.11-3**). One precontact site is listed in the NRHP and WHR, one historic period site has been determined eligible for inclusion in the NRHP, eleven historic period sites have been determined not eligible for inclusion in the NRHP, and the remaining sites, all of which date to the historic period, have not been formally evaluated.

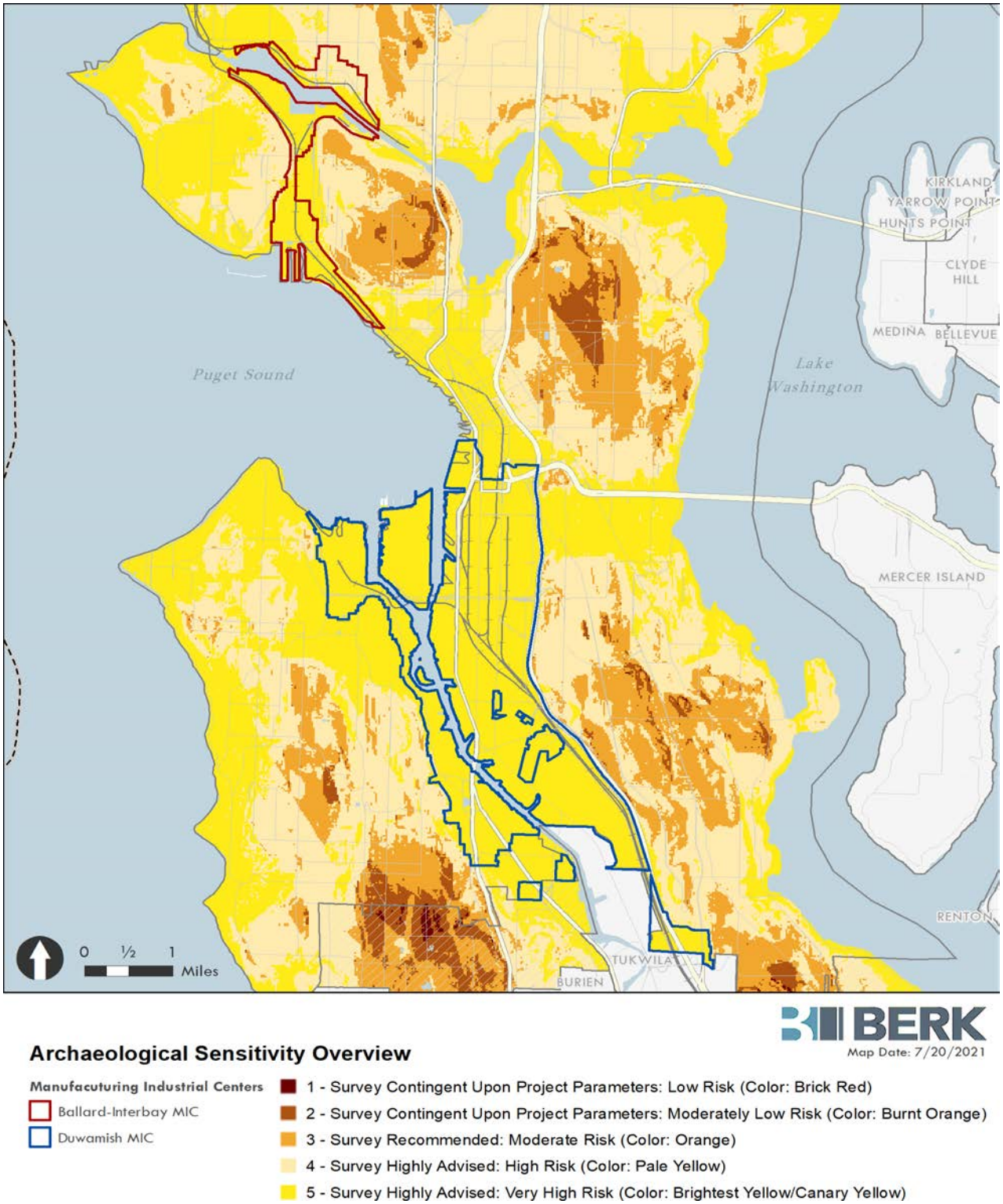
All of the project subareas are considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model (**Exhibit 3.11-4**).

Exhibit 3.11-3 Recorded Archaeological Resources



Source: HRA, 2021.

Exhibit 3.11-4 Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2021.

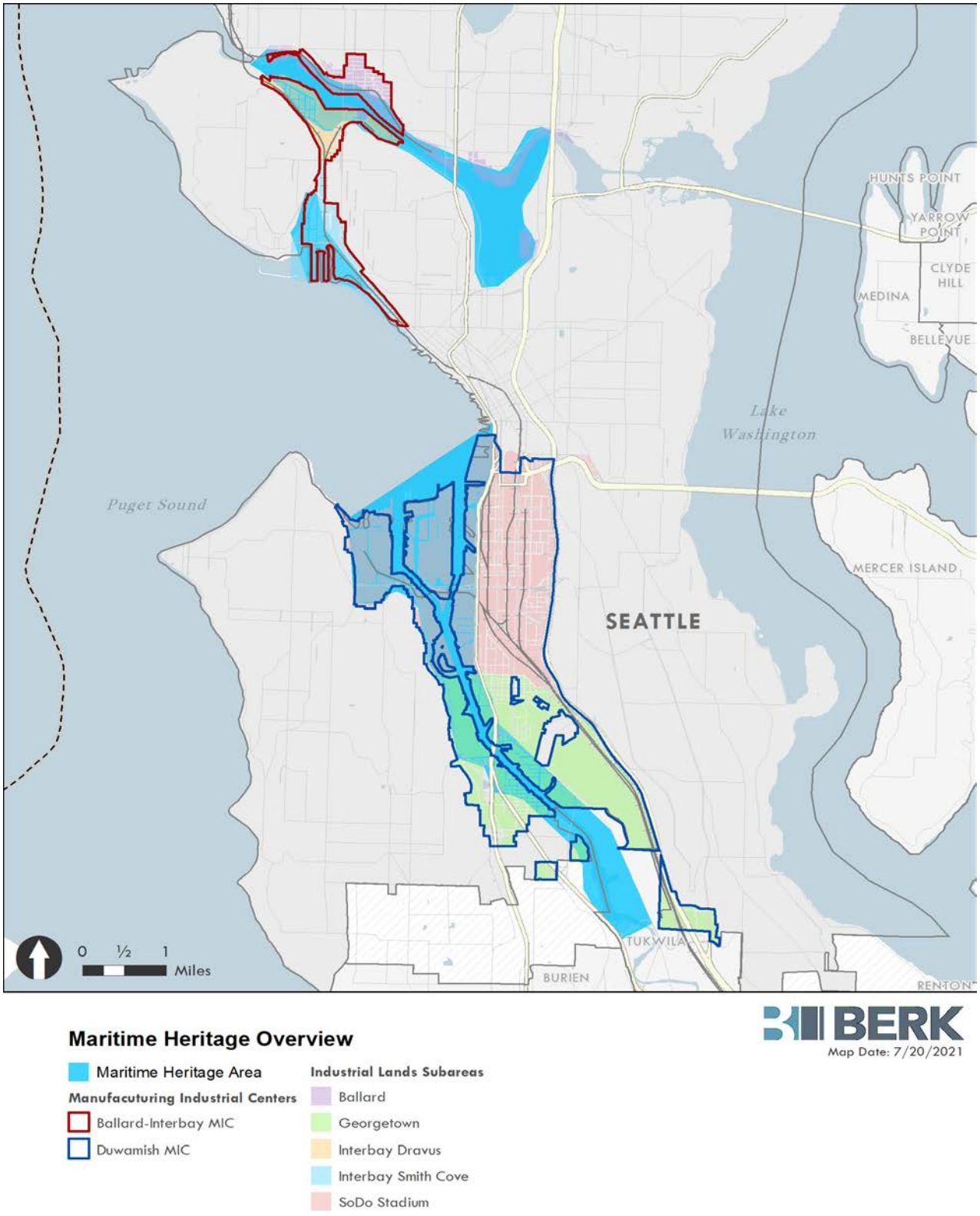
Maritime Washington National Heritage Area

The Maritime Washington National Heritage Area (MW NHA) was designated by Congress in 2019 as a place recognized for its nationally important natural, cultural, historic, and recreational resources, which combine to form a nationally important landscape. The MW NHA stretches along 3,000 miles of coastline from Grays Harbor County to the Canadian border. The MW NHA encompasses 18 federally recognized Tribes, 13 counties, 32 incorporated cities, and 30 port districts in Washington state. The MW NHA is non-regulatory but is controlled by grassroots organizations and is facilitated by the Washington Trust for Historic Preservation (WTHP), Washington's statewide nonprofit historic preservation organization, with technical assistance and funding from the National Park Service (NPS). The MW NHA is a cooperative organization with regional representation that is supportive of tourism and economic development, and functions to build partnerships to support communities in maintaining and sharing their unique resources and telling the stories of those places.

After receiving designation, the WTHP with partners and community stakeholders were tasked with developing a management plan that typically includes an education plan, rehabilitation strategy for historic sites or vessels, a tourism enhancement strategy, a strategy for improvement of local museums, and other related activities. After completion of the management plan, the MW NHA will be able to receive grants and other federal funds, should funding be available.

Exhibit 3.11-5 shows the portion of the MW NHA that occurs within the study area of this EIS. For more information, go to the WTHP website, http://www.preservewa.org/wp-content/uploads/2019/04/NationalMaritimeHeritageAreaStudy.pdf.

Exhibit 3.11-5 Maritime Washington Heritage Area that Occurs Within the Study Area



Source: HRA, 2021.

Ballard

There are three NRHP-listed historic districts and six individually listed resources within or adjacent to the BINMIC, all of which are found in the Ballard Subarea. Also, there is one WHR-listed resource within the area.

The first district is the Ballard Avenue Historic District, which is immediately adjacent to the MIC boundary. The District was designated a Seattle Landmark and listed in the NRHP in 1976. The District is associated with a pattern of events that contributed to the development of Ballard (Criterion A), under the themes of commerce, industry, politics/government, and transportation, and the District embodies the distinctive characteristics of modest commercial architecture (Criterion C), with a period of significance 1890–1930, and, when nominated, contained around 50 contributing resources.

The second is the Chittenden Locks and Lake Washington Ship Canal Historic District, which was listed in the NRHP in 1978. With a period of significance of 1906–1917, the District is significant under Criterion A for its contributions to commerce and politics/government, and under Criterion C under the themes landscape engineering, engineering, and architecture. The District encompasses about 16 contributing resources, including the dam, double locks, channels, and various associated accessory buildings/structures.

The third NRHP-listed historic district is the Gas Works Park Historic Landscape, which was listed was listed in 2013 with a period of significance 1950–1974, and 1975–2000. The landscape is significant under Criterion A, for the theme of industry, and under Criterion C under the themes of landscape architecture/engineering. The District contains 20 contributing resources, including sites, structures, objects, and buildings such as the north lawn, concrete railroad trestle, tanks, generator towers, the Foamite house, and others.

Also found within the Ballard Subarea is the NRHP-listed Ballard Bridge. Listed in 1982 under the Historic Bridges and Tunnels in Washington State Multiple Property Documentation form (MPD), the Ballard Bridge is significant under Criterion A for its contributions to transportation and under Criterion C under the theme of engineering as a double-leaf bascule bridge. The bridge has a period of significance of 1900–1924.

Three additional bridges adjacent to the Ballard Subarea were listed in the NRHP under the Historic Bridges and Tunnels in Washington State MPD in 1982. They are the University Bridge (1919), under Criterion C under the theme of engineering as a double-leaf trunnion bascule bridge; the Fremont Bridge (1919), under Criterion C under the theme of engineering as a double-leaf trunnion bascule bridge; and Aurora Avenue Bridge (1931), under Criterion C under the theme of engineering as a cantilever truss bridge.

Two ships in the Ballard Subarea were listed in the NRHP. One is the *Wawona* schooner (1897), which was listed in 1977 under Criterion A for the themes of commerce, industry, and maritime transportation. The second is the *Zodiac* schooner (1924), which was listed in 1982, under Criterion C, for its architectural significance.

Listed in the WHR in 2001, was the tugboat, *Chickamauga*, with its period of significance 1915, the year it was built. The ship was listed for its significance related to events as first diesel powered tugboat in the U.S. (Criterion 3), for its association with Arthur McNealy (Criterion 6), for its engineering as a representative example of the transition from steam to diesel power (Criterion 7), and for its design by Leslie Edward "Ted" Geary (Criterion 8).

King County Tax Assessor records show that within the Ballard Subarea, there are 156 historic-period buildings. Of these, 141 are commercial/industrial buildings, while the remaining 15 are residential buildings.

DAHP records show 274 individual historic-period architectural resources have been documented on HPI forms within the Ballard Subarea. Of these, only 9 were determined eligible for listing in the NRHP.

DAHP records show seven cultural resources studies that included archaeological resources investigations have been conducted within the Ballard Subarea. Two sites were recorded by these studies.

Interbay Dravus

There are two NRHP-listed resources found partially within the boundaries of the Interbay Dravus Subarea of the BINMIC. They are the aforementioned Chittenden Locks and Lake Washington Ship Canal Historic District, and the southern end of the NRHP-listed Ballard Bridge. Also found in the Interbay Dravus Subarea is one SL designated building, Alexander Hall.

According to the King County Tax Assessor, within the Interbay Dravus Subarea, there are 56 historic-period buildings, all of which are commercial or industrial buildings. DAHP records show 141 individual historic-period architectural resources have been recorded on HPI forms within the Interbay Dravus Subarea. Of these, 2 were determined eligible for listing in the NRHP.

DAHP records show three cultural resources studies that included archaeological resources investigations have been conducted within the Interbay Dravus Subarea. No sites were recorded by these studies.

Interbay Smith Cove

There are five SL-designated historic-period architectural resources within the Interbay Smith Cove Subarea of the BINMIC. These are the 14th Avenue W Group and include 2000, 2006, 2010, 2014, and 2016 14th Avenue W. There are no NRHP-, NHL-, or WHR/WHBR-listed architectural resources in this Subarea. Adjacent to the Interbay Smith Cove Subarea is one NRHP-listed architectural resource, the Admiral's House, 13th Naval District (Quarters A). Listed in 2013, the Admiral's House is significant under Criterion A, for its association with the U.S.

Navy and its role in Seattle, and under Criterion C, as a representative example of the Colonial Revival style. The property has a period of significance of 1944–1960.

According to the King County Tax Assessor, within the Interbay Smith Cove Subarea, there are 35 historic-period buildings, of which, 23 are commercial or industrial buildings, and the remaining 12 are residential buildings. DAHP records show 96 individual historic-period architectural resources have been documented on HPI forms within the Interbay Smith Cove Subarea. Of these, 8 were determined eligible for listing in the NRHP.

DAHP records show seven cultural resources studies that included archaeological resources investigations have been conducted within the Smith Cove Subarea. Two historic period sites were recorded, but the sites have not been formally evaluated.

SODO/Stadium

Within the boundaries of the SODO/Stadium Subarea are nine historic properties listed in the various registers. Listed in 1976 in both the NRHP and SL is the Triangle Hotel and Bar, also known as the Flatiron Building. The building is significant under Criterion A for commerce and Criterion C for architecture, with a period of significance 1909–1910. The A. L. Palmer Building was listed in the NRHP in 2008 for its contributions to commerce and industry (Criterion A) and under the theme of architecture (Criterion C), with a period of significance of 1910. The Bay View Brewery was listed in the NRHP in 2013, under Criterion A for commerce and industry, Criterion B for its association with brewery owners and operators, Andrew Hemrich and Emil Sick, and Criterion C for architecture. The building's period of significance is 1886–1962. The Ford Motor Company Assembly Plant is also found in this subarea. Listed in 2013, this resource is significant for its contributions to industry and commerce (Criterion A), and for its architecture (Criterion C). The building has a period of significance of 1932, the date of its initial construction.

There are two WHR-listed architectural resources in the SODO/Stadium Subarea. One is the First Service Station Site, which was listed in 1970, as the World's First Service Station. It was listed under Criterion A, for commerce, industry, and transportation, with a period of significance of 1907, the date of its initial construction. The second is the *USS Nebraska* Launching (1904) and Skinner and Eddy Shipyard (1916–1920), which was listed in the WHR in 1970 for its significant contributions to Maritime and Naval history, industry, and transportation (Criterion A), and for engineering (Criterion C).

The SODO/Stadium Subarea also contains three SL-designated resources, including Fire Station #14, the Duwamish Railroad Bridge, and the Flatiron Building. Additionally, located immediately adjacent to the northern boundary of the SODO/Stadium Subarea of the Greater Duwamish MIC is the Pioneer Square Preservation District, an SL-designated district.

According to the King County Tax Assessor, within this subarea, there are 331 historic-period buildings, 310 of which are commercial or industrial buildings, and the remaining 21 are residential buildings. DAHP records show 620 individual historic-period architectural resources

have been documented on DAHP HPI forms within the SODO/Stadium Subarea. Of these, 38 were determined eligible for listing in the NRHP.

DAHP records show 40 cultural resources studies that included archaeological resources investigations within the SODO/Stadium Subarea. One precontact site, a 2.25-acre shell midden site, was discovered in 1975 when the landowner demolished houses on a portion of the site. Subsequent archaeological investigations led to the site being listed in the NRHP and WHR. The current Duwamish longhouse is located in the vicinity of this site (see **Exhibit 3.8-9**). Of the 15 historic period sites recorded, one has been determined eligible for inclusion in the NRHP and the WHR, nine have been determined not eligible for inclusion in the NRHP or the WHR, and five sites have not been formally evaluated.

Georgetown/South Park

Within the boundaries of the Georgetown/South Park Subarea are three historic properties listed in the NRHP and WHR. The Seattle Electric Company Georgetown Steam Plant was listed in the NRHP in 1978, for its significant contributions to the theme of engineering under Criterion C. Built in 1906, the property has a period of significance of 1900–1924. The property achieved NHL status in 1984. Listed in the WHR, are the Maple Donation Claim and Gorst Field. The Maple Donation Claim was listed in the WHR in 1970 for its significant contributions to local history (Criterion A), with a period of significance of 1851, the date the Donation Land Claim was staked. The final historic property in this subarea is Gorst Field. Listed in 1970 in the WHR, Gorst Field is significant for its contributions to commerce, industry, and transportation under Criterion A, and engineering under Criterion C. The field had a period of significance of 1920–1928.

According to the King County Tax Assessor, within this subarea, there are 286 historic-period buildings—219 of these are commercial or industrial buildings, and the remaining 67 are residential buildings. DAHP records show 434 individual historic-period architectural resources have been documented on HPI forms within or immediately adjacent to the Georgetown/South Park Subarea. Of these, 15 were determined eligible for listing in the NRHP.

DAHP records show 26 cultural resources studies that included archaeological resources investigations have been conducted within the Georgetown/South Park Subarea. Eleven historic period sites have been recorded, two of which have been determined not eligible for inclusion in the NRHP or the WHR, and the remaining have not been formally evaluated.

3.11.2 Impacts

This section considers the impacts of the alternatives on historic, archaeological, and cultural resources within the study area.

Impacts Common to All Alternatives

Full Study Area

All the alternatives have the potential to affect districts, sites, buildings, structures, or objects (BSOs) that have been listed in the NRHP and other historic registers, including the WHR, WHBR, and SL, and those resources that have been determined eligible for listing in the NRHP. Additionally, the alternatives could potentially affect the numerous BSOs and undiscovered archaeological sites that have yet to be surveyed and assessed for potential eligibility to the NRHP.

Impacts to historic, archaeological, and cultural resources in the study areas from the No Action Alternative and three Action Alternatives were identified by assessing potential for both above- and below-ground changes. Such impacts generally include physical alteration, damage, or destruction of all or part of a resource; alteration of the characteristics of the surrounding environment that contribute to the property's significance; and the introduction of visual or audible elements that are out of character with the property. In other words, actions that would alter, directly or indirectly, any of the characteristics of a historic property in such a way that would diminish its integrity of location, design, setting, materials, workmanship, feeing, and association, and would affect its eligibility to qualify for inclusion in the NRHP or other historic registers.

All Action Alternatives would result in the implementation of the Industrial and Maritime Strategy meant to support and retain maritime businesses that contribute to the maritime history of the study area. The strategy supports continued implementation of the Seattle Shoreline Master Program jointly adopted by the City and the Washington Department of Ecology according to the State Shoreline Management Act which promotes ports and shoreline industry, while protecting environmental and cultural resources. See a summary of the strategy in **Exhibit 2.2-2**.

The Action Alternatives also include proposed land use concepts such as incentivizing investments by industrial businesses to expand industrial sites; changes to development and landscaping standards addressing street frontages and parcels; incentivizing development and densification of multi-story buildings; limited caretakers' quarters and makers studios in industrial areas and some areas of mixed-use residential construction in selected locations (see **Exhibit 2.4-4**). Historic-period BSOs located in the study area could be subject to demolition for new construction, incompatible alterations/additions, and inappropriate renovation of existing buildings for reuse under all alternatives. Such demolition and construction projects could require substantial below-ground work, thus negatively and irreversibly impacting below-

ground archaeological and cultural resources. DAHP's archaeological predictive model used to establish probabilities for precontact cultural resources, depicts almost all the land within the MICs as within a Very High Risk area, primarily because of proximity of Puget Sound, Salmon Bay, Lake Union, Elliott Bay, and the Duwamish River, and the use history throughout the precontact and historic periods.

Since development may occur in any location in the study area under any alternative, it is possible that cultural resources could be impacted under each alternative. Changes to zoning that allows a wider range of industrial or non-industrial uses could spur redevelopment in those locations. This could occur, for example, where the Industry and Innovation or Urban Industrial Districts allow for more mixed industrial/office near station areas, or caretakers' quarters and makers studios for live/work options throughout the study area. This could also occur where areas are removed from the MIC and allowed for mixed-use residential near Georgetown and South Park. Even where there are no formally designated historic landmarks, there are numerous properties with historic period buildings, or a very high or high risk of archaeological resources. A qualitative summary of areas of zoning change are listed in **Exhibit 3.11-6** below.

Exhibit 3.11-6 Acres of Zoning or Land Use Concept and Qualitative Relationship to Mapped Cultural Resources

Zoning Districts	Alt 1 Acres	Land Use Concept	Alt 2 Acres	Alt 2 Zone Acres Change Description	Alt 3 Acres	Alt 3 Zone Acres Change Description	Alt 4 Acres	Alt 4 Zone Acres Change Description	Relationship to Mapped Resources
Industrial General (IG1/IG2)	6,273	Maritime, Manufacturing, and Logistics (MML)	6,251	Increase in Ballard near Lock. Small increase near West Marginal Way. Otherwise, similar to IG Zone.	5,968	Increase in Ballard near Lock. Small increase near West Marginal Way. Otherwise, similar to IG Zone. Reduced where UI or II is applied.	6,035	Increase in Ballard near Lock. Small increase near West Marginal Way. Otherwise, similar to IG Zone. Reduced where UI or II is applied.	Some acres of zoning change near listed and mapped resources (e.g., National Register Resources, Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).
Industrial Buffer (IB)	316	Urban Industrial (UI)	222	Increase/relocation in Interbay Dravus south of Ballard Bridge and near Duwamish River at city limits in South Park. Other UI similar to IB zone location.	426	Increase in Ballard north of Leary and along Lake Washington (e.g., near Gas Works Park). Similar to Alternative 2 UI extent south of Ballard Bridge. Small increase in Interbay Smith Cove. Similar to IB zone extent elsewhere.	279	Greater area of UI than Alternative 2 but less than Alternative 3 in Ballard and Interbay. Similar to Alternative 2 in SODO.	Some acres of zoning change are near or encompass listed and mapped resources (e.g., National Register Resources, Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).
Industrial Commercial (IC)	347	Industry and Innovation (II)	463	Small area added in Ballard south of NW Market. Area added in SODO area near 4th Avenue. Mostly applied in similar locations as IC zone or in place of IB zone.	516	In Ballard and Interbay, mostly applied in similar locations as IC zone, except where UI is expanded. Expanded in SODO along 1st and 4th Avenues.	600	Increase in Ballard north of Leary Way. Mostly applied in similar locations as IC zone. Greatest expansion in SODO along 1st and 4th Avenues.	Some acres of zoning change are near or encompass listed and mapped resources (e.g., National Register Resources, Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).
Mixed-Use Commercial				Not applicable.	26	Increased in Georgetown and South Park.	22	Increased in Georgetown and South Park.	Some acres of zoning change are near or encompass listed and mapped resources (e.g., Historic Period Buildings, Recorded Archeological Resources, and Very/High Risk of Archaeological Sensitivity).
Total	**6,936**		**6,936**		**6,936**		**6,936**		

Source: BERK, 2021.

Ballard

All alternatives have the potential to affect the known and unknown historic, archaeological, and cultural resources in the Ballard Subarea. The Ballard Subarea contains three NRHP-listed historic districts and six individually listed resources, one WHR-listed resource, and numerous historic-period buildings, some of which have been documented on HPI forms, and nine of those determined eligible for listing in the NRHP. Due to the area's concentration of historic-period buildings, structures, and objects—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers. Two known archaeological sites have been previously recorded in the Ballard Subarea; however, due to the area's very high probability for archaeological and cultural resources, many more unknown sites could be present.

Interbay Dravus

All alternatives have the potential to affect the known and unknown historic, archaeological, and cultural resources in the Interbay Dravus Subarea. The Interbay Dravus Subarea contains a NRHP-listed historic district, an individually listed resource, one SL-designated resource, and numerous historic-period buildings and structures, many of which have been documented on HPI forms, with two of those determined eligible. Due to the area's concentration of historic-period buildings, structures, and objects—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers. No archaeological sites have been previously recorded in the Interbay Dravus Subarea; however, due to the area's very high probability for archaeological and cultural resources, many more as yet unknown sites could be present.

Interbay Smith Cove

All alternatives have the potential to affect the known and unknown historic, archaeological, and cultural resources in the Interbay Smith Cove Subarea. While the Interbay Smith Cove Subarea contains no NRHP-, WHR-, WHBR-listed resources, there are five SL-designated historic-period architectural resources within this subarea, and numerous historic-period buildings and structures, many of which have been documented on HPI forms, with eight of those determined eligible. Also, immediately adjacent to the subarea's western boundary is a NRHP-listed resource. Due to the subarea's concentration of historic-period buildings, structures, and objects—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers. Two archaeological sites have been previously recorded in the Interbay Smith Cove Subarea but not formally evaluated; however, due to the area's very high probability for archaeological and cultural resources, many more as yet unknown sites could be present.

SODO/Stadium

All alternatives have the potential to affect the known and unknown historic, archaeological, and cultural resources in the SODO/Stadium Subarea. Four NRHP-listed, two WHR-listed, and three SL-designated historic-period architectural resources within the SODO/Stadium Subarea, and numerous historic-period buildings and structures, many of which have been documented on HPI forms, with 38 of those determined eligible. Also, immediately adjacent to the subarea's northern boundary is a SL-designated historic district. Due to the area's concentration of historic-period buildings, structures, and objects—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers. One precontact archaeological site was listed in the NRHP and WHR and 16 historic-period sites have been previously recorded in the SODO/Stadium Subarea. One has been determined eligible for the NRHP, nine have been determined not eligible, and five sites have not been formally evaluated. Due to the area's very high probability for archaeological and cultural resources, many more as yet unknown sites could be present.

Georgetown/South Park

All alternatives have the potential to affect the known and unknown historic, archaeological, and cultural resources in the Georgetown/South Park Subarea. The Georgetown/South Park Subarea contains one NRHP-listed resource that has achieved National Historic Landmark (NHL) status, two WHR-listed resources, and numerous historic-period buildings and structures, many of which have been documented on HPI forms, with 15 of those determined eligible. Due to the area's concentration of historic-period buildings, structures, and objects—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers. In the Georgetown/South Park Subarea, eleven archaeological sites have been previously recorded, with two determined not eligible and nine not formally evaluated. However, due to the area's very high probability for archaeological and cultural resources, many more as yet unknown sites could be present.

Equity & Environmental Justice Considerations

In 2015, Seattle established the City of Seattle Equity and Environment Initiative (EEI) to address the connection between race and social justice and the environment. The Community Partners Steering Committee (CPSC), working with City staff, defined EEI populations as people of color, immigrants, refugees, people with low incomes, and people with limited-English proficiency (CPSC 2016:1–8). Studies by the National Trust for Historic Preservation (NTHP) have noted that while rezoning and redevelopment can address some of the particular issues in neighborhoods with high EEI populations of historically marginalized communities, such as poor air and water quality, soil contamination, noise pollution, climate change, and unsafe, disconnected, and inaccessible neighborhoods, some of the land use concepts and strategies could lead to adverse impacts of economic displacement, and loss of locally owned small businesses, and potentially loss of fair and affordable housing. Equitable development and redevelopment

should include the voices of the EEI populations to share in the decision-making process (Canaan, et al 2021:54–55; NTHP 2021:10; Rypkema 2004).

See **Chapter 2** for a description of the City's process to develop the Industrial and Maritime Strategy and to engage EEI populations. The scoping and Draft EIS comment periods are an opportunity to gain input from EEI populations as well.

Under all alternatives, should redevelopment occur within high EEI population neighborhoods in the study areas, benefits could be realized such as reinvestment in aging buildings, increased levels of homeownership/business ownership in newly rehabilitated buildings, and renovation/adaptive re-use of vacant and abandoned properties. However, there could also be adverse impacts from these benefits such as rising rents and property taxes, loss of "power" and "ownership" by long-term residents, and rising potential for conflicting priorities between new and long-term residents (Ryberg 2010:265–266; Rypkema 2004). These adverse impacts disproportionately affect EEI populations.

All alternatives have the potential to affect historic and cultural resources in historically marginalized neighborhoods in the study areas, such as the southern end of the Seattle-Chinatown International District, SODO/Industrial District, Highland Park, South Park, Greater Duwamish, and Georgetown (OPCD 2020:2). Specifically, impacts to historic-period architectural resources could occur under all alternatives as a result of alteration, demolition, damage, or destruction. In addition, development under all alternatives could increase the probability of inadvertent discovery of archaeological and cultural resources because of foundation, circulation, and landscaping work.

Additionally, Indigenous populations may lose access to both known and potentially unrecorded cultural or spiritual sites, due to redevelopment on their traditional lands in the study areas. As the locations of such resources are considered restricted information, specifics will not be discussed here without permission from the appropriate Tribes.

Impacts of Alternative 1 No Action

Alternative 1 No Action maintains the status quo within the existing industrial zones, with no changes to current Comprehensive Plan policies, development standards, or zoning. Redevelopment and development projects due to market pressures under Alternative 1 No Action would continue to affect historic, archaeological, and cultural resources, with such impacts as alteration, demolition, damage, or destruction. Alternative 1 No Action includes no additional protections or improvements in planning for consideration of impacts to historic, archaeological, and cultural resources.

Impacts of Alternative 2

Alternative 2 (Future of Industry—Limited) applies the proposed land use concepts of Maritime Manufacturing and Logistics (MML), Industry and Innovation (II) and Urban Industrial (UI).

Typically, the II and UI are located in places where similar IC and IB zoning is applied today but with expanded use allowances and development standards. These new II and UI zones could incentivize development to increase floor area and height limits that would allow construction of dense multi-story buildings. The UI zone would allow adaptive reuse of buildings and adds flexibility for larger size of use for combination industry-retail or industry-office space. Additionally, Alternative 2 expands non-industrial ancillary uses and reduces stand-alone non-industrial size of use limits. Some areas of zoning change include increased or altered boundaries of the UI zone in the Interbay Dravus area south of the Ballard Bridge, and near the Duwamish River near South Park. The II zone is added in Ballard south of NW Market Street. An area of II is added in SODO area near 4th Avenue S. As mapped in the Affected Environment and described in **Exhibit 3.11-6** some acres of zoning change abut listed historic or recorded archaeological resources or contain mapped resources sensitivity areas (e.g., Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).

Impacts to historic, archaeological, and cultural resources could occur under Alternative 2 as a result of alteration, demolition, damage, or destruction. In addition, development under Alternative 2 could increase the probability of inadvertent discovery of archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for multi-story buildings. Additionally, without design guidelines, preservation incentives, or review, allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials. However, appropriate adaptive reuse projects guided by the *Secretary of the Interior Standards for Rehabilitation* or new city-level rehabilitation guidelines and incentives, could save some historic-period architectural resources from demolition.

Impacts of Alternative 3

Alternative 3 (Future of Industry—Targeted) also applies the MML, II, and UI land use concepts, but with a greater share than Alternative 2. This includes 7% of the land area and up to 0.50 mi around transit stations, expanding the transition area in Ballard, removing small nodes of land in Georgetown/South Park from the MIC for rezoning to mixed-use to advance community goals, allows lodging, and expands limited industry-supporting housing (610 units), such as new caretaker's quarters, makers studios, and existing non-conforming housing. Additionally, Alternative 3 expands non-industrial ancillary uses and reduces stand-alone non-industrial size of use limits.

Impacts to historic, archaeological, and cultural resources from alteration, demolition, damage, or destruction under Alternative 3 are similar to Alternative 2. Like Alternative 2, development under Alternative 3 could increase the probability of inadvertent discovery of archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for new development and multi-story buildings.

Some areas of UI would increase in Ballard north of Leary Way NW and along Lake Washington (e.g., near Gas Works Park). Similar to Alternative 2 the UI would extend south of Ballard Bridge.

There is a small increase in Interbay Smith Cove. The II is expanded in SODO along 1st and 4th Avenues. These areas of change are near or encompass listed and mapped resources sensitivity areas (e.g., National Register Resources, Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).

Industry-supporting housing and those areas in the Georgetown/South Park Subarea removed from the MIC to allow for mixed-use—especially in those historic commercial areas rezoned to Seattle Mixed where few surveys have been done—could also add to demolitions of historic-period architectural resources. The areas of zoning change to Seattle Mixed are in areas mapped with Historic Period Buildings, Recorded Archeological Resources, and Very/High Risk of Archaeological Sensitivity. A 2014 Georgetown survey noted that the great majority of the historic residential and commercial properties exhibit some degree of alteration; however, they remain generally intact and continue to convey historic character (Krafft 2015).

Additionally, without design guidelines, incentives, and project review, allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials.

Impacts of Alternative 4

Alternative 4 (Future of Industry—Expanded) also applies the MML, II, and UI land use concepts of, but with a greater share than Alternative 3, and includes 8% of the land area and wider than 0.50 mi around transit stations including land near potential stations Ballard ST3 and Stadium ST3, expanding the transition area in the Stadium district, removing small nodes of land in Georgetown/South Park from the MIC and rezoned to mixed-use to advance community goals, and allows all lodging with larger size of use limits. This alternative also allows unlimited market housing in the areas removed from the MIC and industry-supporting housing (2,195 units).

Under Alternative 4, there would be a greater area of UI zoning than Alternative 2 but less than Alternative 3 in Ballard and Interbay. The extent of UI zoning would be similar to Alternative 2 in SODO. There would be an increase in II in Ballard north of Leary Way. II is mostly applied in similar locations as IC zone. The greatest extent of II is in SODO along 1st and 4th Avenues. Some acres of zoning change are near or encompass listed and mapped resources sensitivity areas (e.g., National Register Resources, Historic Period Buildings, and Very/High Risk of Archaeological Sensitivity).

Impacts to historic, archaeological, and cultural resources from alteration, demolition, damage, or destruction under Alternative 4 are similar to alternatives 2 and 3. Like alternatives 2 and 3, development under Alternative 4 could increase the probability of inadvertent discovery of archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for new development, multi-story buildings, and new housing.

Due to market pressures, unlimited market housing in areas removed from MICs, especially in the Georgetown/South Park Subarea, and industry-supporting housing would invariably add to demolitions of historic-period architectural resources and impacts to archaeological and cultural resources. The greater allowances for caretakers/artist residences under Alternative 4 compared to all other alternatives may result in greater pressure for conversion of properties that may contain historic period structures, or that are mapped as having a high or very high risk of archaeological resources. The MIC reduction areas that would be rezoned to Seattle Mixed are near or encompass listed and mapped resources sensitivity areas (e.g., Historic Period Buildings, Recorded Archeological Resources, and Very/High Risk of Archaeological Sensitivity).

Additionally, without the implementation of design guidelines. Incentives, or project review, allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials.

3.11.3 Mitigation Measures

Incorporated Plan Features

The Action Alternatives include some land use concepts that may mitigate adverse impacts to historic, archaeological, and cultural resources, such as expansion of new land use concepts and updates to industrial land use policies to anticipate future innovations and trends that may incentivize adaptive re-use of historic-period architectural resources.

Regulations & Commitments

Federal

Projects implemented under this EIS may require compliance with a number of federal, state, and local regulations, including the National Historic Preservation Act of 1966, as amended, Archaeological Resources Protection Act of 1979, National American Graves Protection and Repatriation Act, National Environmental Protection Act of 1969, as amended, Washington Executive Order 21-02 (formerly 05-05), and the Washington State Environmental Protection Act.

- National Historic Preservation Act (NHPA) of 1966, as amended, commonly referred to as Section 106, has implementing regulations (36 CFR Part 800), that require Federal agencies (or others who have received Federal grants or funds, or a Federal permit or license) to take into account the effects of their undertakings on historic properties, by identifying historic properties, assessing adverse effects, and resolving those adverse effects.
  - The NHPA authorized the NRHP as the program to coordinate and support the Act. To be considered a historic property, resources must be determined eligible for listing in the NRHP by meeting at least one of the four established Criteria of Evaluation and retaining sufficient integrity to express its significance.

  - The National Historic Landmarks (NHL) Program functions to honor historic properties that are nationally and exceptionally significant in American history and culture. Properties must meet one of six NHL Criteria and possess a high degree of integrity.
- Archaeological Resources Protection Act (ARPA) of 1979, protects archaeological resources.
- National American Graves Protection and Repatriation Act (NAGPRA) creates protections for Native American burial sites, remains, and cultural objects.
- National Environmental Protection Act (NEPA) of 1969, as amended, requires federal agencies to assess whether a major federal action has the potential to significantly affect the human environment prior to making decisions. This is done through the preparation of an Environmental Assessment (EA) or an EIS.

State

- Washington Executive 21-02 (formerly 05-05) requires that impacts to cultural resources must be considered as part of any state-funded project or investment and must include consultation with DAHP and with Tribal governments.
- Washington State Environmental Protection Act (SEPA) has a process to identify and analyze environmental impacts to cultural resources associated with governmental decisions such as issuing permits, constructing public facilities, or adopting regulations, policies, and plans. This is accomplished through the SEPA Checklist.
- Washington State Archaeological Sites and Resources Protection Act (RCW 27.53) requires a permit to excavate or remove any archaeological resource located on public or Tribal lands.
- Registration of Historic Archaeological Resources on State-Owned Aquatic Lands (25-46 WAC) establishes to establish registration procedures for previously unreported historic archaeological resources discovered on, in, or under state-owned aquatic lands as provided for in chapter 27.53 RCW.
- The Washington Heritage Register (WHR) is an official state listing of significant sites and properties and is administered by DAHP. The list is honorary and the effects of listing in the WHR are parallel to the NRHP. Properties listed in the NRHP are automatically listed in the WHR.
- The Washington Heritage Barn Register (WHBR) honors the barns of the State that are historically significant. Administered by DAHP, the heritage barn designation allows the property owners access to matching grant funds.

Local

- King County's Historic Preservation Program (HPP) provides a number of preservation-related services including the Regional Preservation Program, Historic Resource Inventory, and the Landmarks Ordinance that is implemented through the county Landmarks Commission to ensure that the historic places, material culture, and traditions that reflect the region's history are preserved. County landmark designation and regulation is limited by law to the unincorporated area. The City of Seattle contracts with the county for archaeological review services (King County 2018).City of Seattle's Historic Preservation Program, through the Seattle Landmarks (SL) program, protects designated landmark sites, buildings, structures,

objects, and districts city wide. Protections of designated landmarks is provided by design review of proposed alterations and the issuance of a Certificate of Approval.

Other Potential Mitigation Measures

When elimination, minimization, or avoidance of impacts to historic, archaeological, and cultural resources is impossible, appropriate and meaningful mitigation should be developed in accordance with DAHP Mitigation Options and Documentation Standards and in coordination with the area's Tribes, the lead agency, and all other consulting parties. Developing a mitigation plan should be an iterative and collaborative process using a diversity of lenses, which results in mitigation that improves the public's understanding and enriches technical knowledge of the impacted resource(s) (Douglass and Manney 2020).

Some examples of mitigation for impacts for architectural resources, might include:

- Preparing DAHP Level I (Historic American Building Survey/Historic American Engineering Record [HABS/HAER]) Documentation.
- Preparing DAHP Level II Documentation.
- Funding to DAHP for improvements to WISAARD to improve mapping of resources.
- Funding City-initiated proactive landmark nominations for properties and potential historic districts identified in new neighborhood surveys.
- Prioritizing City funding for retrofitting Unreinforced Masonry (URM) buildings to those properties that meet eligibility requirements for designation as a landmark or for listing in the National Register of Historic Places.
- Developing of cultural landscape contexts, including within historically marginalized communities.
- Preparing histories of the area including Indigenous perspectives. The City could work with tribes and others to develop context statements. A context statement focused on Historical Planning and Land Use Decisions is drafted in **Section 3.8 Land & Shoreline Use**.
- Funding City-led thematic historic context inventories that focus on marginalized or underrepresented immigrant communities and preparing thematic context statements relating to those resources.
- Conducting neighborhood survey and inventory projects within underrepresented or marginalized communities
- Considering potential impacts to historic resources during development review specifically that are associated with marginalized or underrepresented immigrant communities as part of project level SEPA review, or during the design review process.
- Including development incentives for preservation of architectural resources including adaptive reuse projects in the proposed Urban Industrial zone, such as an exemption from the floor area ration calculation, or flexibility for allowable uses within the structure. Such adaptive reuse projects could follow the *Secretary of the Interior Standards for Rehabilitation* or the City could develop new rehabilitation guidelines for adaptive reuse.

- For alternatives 3 and 4, exploring or studying the possible addition of a new Seattle Landmark District for the mixed-use area of Georgetown.
- Establishing new conservation districts in order to encourage preservation of older structures (referred to in SMC as "character structures"). Establishing Transfer of Development Rights (TDR) programs within new conservation districts to provide incentives for property owners to keep existing character structures.
- Adding regulatory authority to identify resource-specific mitigation before demolition occurs.
- Requiring project proponents to nominate buildings for landmark review when demolition of properties that are over 50 years old is proposed, regardless of City permitting requirements, by modifying the SEPA exemptions thresholds in the Seattle Municipal Code at Table A for section 25.05.800, and Table B for section 25.05.800.

Mitigation for adverse impacts to archaeological or cultural resources, could include:

- Archaeological testing, excavation and data recovery/collection of artifacts, documentation, analysis, and archiving, possibly in a repository for future research.
- Public education and outreach, including interpretive signage and/or a museum exhibit.
- Interpretive signage and educational programs for the National Maritime Heritage Area.
- Development of digital and other media content, including film, to share holistic stories of the impacted resource(s).

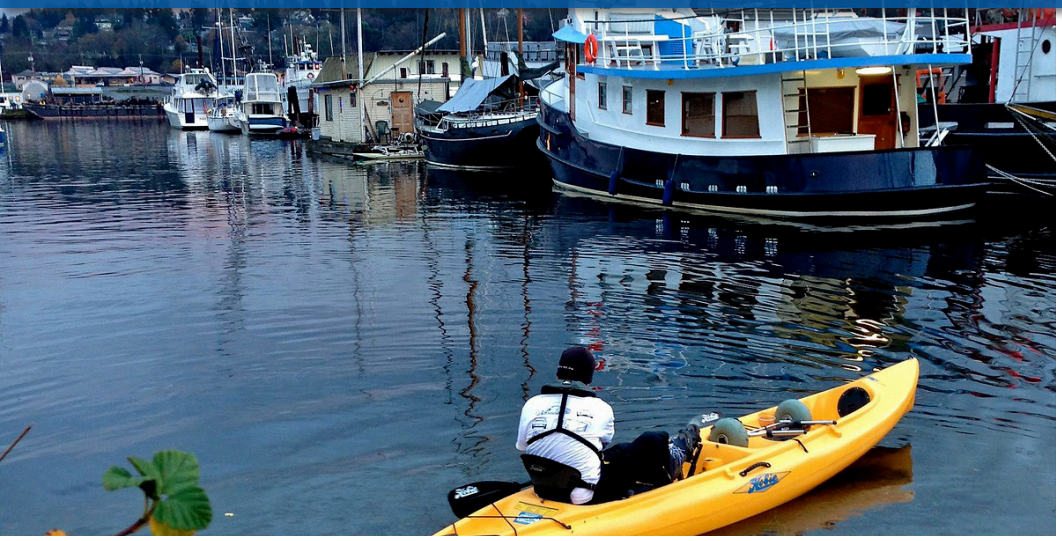
3.11.4 Significant Unavoidable Adverse Impacts

All the alternatives have the potential for significant adverse impacts to historic, archaeological, and cultural resources in the MICs. Such impacts can include physical alteration, damage, or destruction of all or part of a resource; alteration of the characteristics of the surrounding environment that contribute to the property's significance; and the introduction of visual or audible elements that are out of character with the property. Such impacts could alter the characteristics of a historic property in such a way as to diminish its integrity thus affecting its eligibility to qualify for inclusion in the NRHP. No additional significant adverse impacts are anticipated under the Action Alternatives as compared to Alternative 1 No Action.

Advanced planning to eliminate, minimize, or avoid impacts to cultural resources is crucial under all of the alternatives. Appropriate mitigation should be established and implemented by coordinating with the area's Tribes, the lead agency, and all other stakeholders and consulting parties in accordance with DAHP Mitigation Options and Documentation Standards. The ultimate outcome of such mitigation is to moderate the adverse impacts to historic, archaeological, or cultural resources before they are lost or significantly altered. With mitigation, significant impacts to historic, archaeological, and cultural resources can be avoided.

Section 3.12

Open Space & Recreation



Open space and recreation discussed in this section includes parks, trails, public shoreline access, and water access. The primary government agency offering these facilities is Seattle Parks and Recreation (SPR). The Port of Seattle also provides shoreline access and recreational opportunities in the study area(s). The Seattle Office of Sustainability and Environment (OSE) also provides partnership and coordination to advance equity and environmental justice goals. Open space and recreation facilities exist both within the Primary Study Area and in industrially zoned land in close proximity to the study area.

Impacts of the alternatives on open space and recreation are considered significant if they:

- Result in insufficient parks, open space, and trail capacity to serve expected population or employment based on levels of service.
- Feature inconsistencies with shoreline public access policies.
- Have the potential to decrease public access to parks and open space or shoreline access in census tracts identified as high disadvantage in the Seattle Racial and Social Equity Composite Index.[17]

3.12.1 Affected Environment

Data & Methods

Information about open space and recreation was collected from Seattle Parks and Recreation (SPR) and the Seattle Parks District. The plans and studies include the SPR Recreation Demand Study, Community Center Strategic Plan (2016), Parks, Recreation and Open Space (PROS) Plan (2017), Parks and Recreation Strategic Plan (2020). The annual reports from the Seattle Park District Annual Reports (2016-2019), Seattle Comprehensive Plan (2015), and Duwamish Valley Action Plan (2018) are also referenced.

Level of Service (LOS)

The City of Seattle sets level of service (LOS) standards for open space and recreation across the City. These standards are intended to help the City meet its "Citywide Open Space goal" or "Acceptable Open Space Guideline" to provide guidance and measure if park acres and facilities are meeting population growth and density, With the passage of several parks levies containing robust acquisition priorities, Seattle Parks and Recreation (SPR) has maintained and exceeded the Acceptable Population-based Open Space Goal of 1/3 acre per 100 residents since 2001 to 2016 (Seattle Parks and Recreation 2017).

With growth projections anticipating 120,000 new residents in the next 17 years, the 2017 Parks and Open Space Plan changed the Citywide acceptable guideline of 3.33 acres per 1,000

[17] See the Racial and Social Equity Index Interactive Map, 2017.

residents to a new 8 acres per 1,000 residents LOS that is needed to help provide recreational opportunities (Seattle Parks and Recreation 2017). The assumption of 8 acres of park and recreation facilities per 1,000 residents is used throughout this impacts analysis to open space and recreation.

In addition to this measure, the PROS Plan (2017) included comments from the Seattle Planning Commission about additional measures. The Seattle Planning Commission listed the measures below as metrics that could be used to assess Seattle's open space and recreation needs.

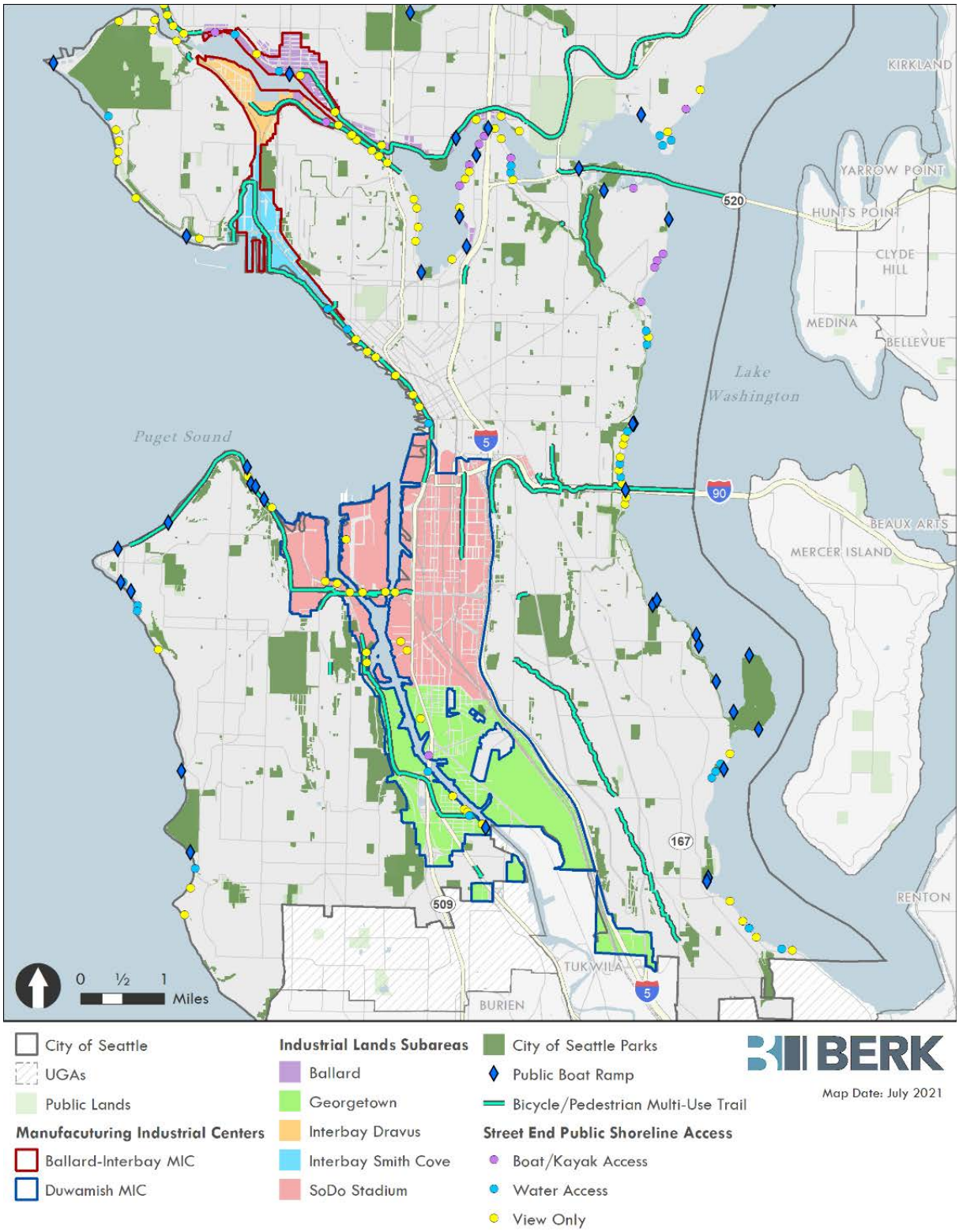
- **Size and percentage of City Land:** The median size of parks and park acreage as a percentage of a city's land area are two additional metrics that are related to the amount of parkland.
- **Park Pressure:** Park pressure is a lesser known, but helpful metric that refers to the potential demand on a park, assuming that the residents in a "parkshed" use the park closest to them.
- **Quantity and Variety of Park Amenities:** Communities should regularly assess their amenities, including playgrounds, swimming pools, sport courts and playfields, skate parks, picnic shelters, splash pads, gymnasiums, recreation centers, senior centers, restrooms, etc.
- **Condition of Park Amenities:** The condition or quality of park amenities is a key measure of park adequacy.

Resources

Seattle Parks and Recreation (SPR) manages a 6,414-acre park system with over 485 parks and natural areas. This system includes athletic fields, play areas, gardens, trails, facilities and community centers, swimming pools, education centers, golf course, and skateparks. The SPR system comprises about 12% of Seattle's land area.

The study area, the subareas, and the parks and recreation facilities available are identified in the map below (see **Exhibit 3.12-1)**.

Exhibit 3.12-1 City of Seattle Parks, Recreation, and Public Shoreline Access



Source: BERK, 2021.

Within the study area there are 22 parks, 19 trails, and 34 Shoreline access points. These facilities combine to provide 93.23 acres of parkland and 15.9 miles of trails. Together these facilities include greenbelts, multi-use trails, bike trails, rentable picnic shelters, picnic benches, green spaces, and playfields. There are also several parks that continue outside the study area totaling about 442 acres (see **Exhibit 3.12-2).**

Exhibit 3.12-2 Parks in Study Area

Subarea	Total Acres	Subarea Acres
Ballard	27.81	25.22
Interbay Dravus	7.39	0.00
Interbay Smith Cove	42.31	29.59
SODO/Stadium	59.13	24.61
Georgetown/South Park	305.04	13.81
Total	441.68	92.01

Source: Seattle GIS, 2021; BERK, 2021.

Multiuse trail miles are also found in each subarea (**Exhibit 3.12-3**).

Exhibit 3.12-3 Trails in Study Area

Subarea	Trail Length (Miles)
Ballard	2.2
Interbay Dravus	1.3
Interbay Smith Cove	3.5
SODO/Stadium	6.3
Georgetown/South Park	2.7
Total	15.9

Source: Seattle GIS, 2021; BERK, 2021.

Shoreline access is available in each subarea, with more access points in Ballard than in other subareas (**Exhibit 3.12-4**).

Exhibit 3.12-4 Shoreline Access Points

Subarea and Shoreline Access Type	Count
Ballard	11
Boat/Kayak Access	3
View Only	6
Water Access	2
Interbay Dravus	2
Boat/Kayak Access	1
View Only	1
Interbay Smith Cove	1
Water Access	1
SODO/Stadium	12
View Only	12
Georgetown/South Park	8
Boat/Kayak Access	1
View Only	5
Water Access	2
Total	34

Source: Seattle GIS, 2021; BERK, 2021.

Boat ramps include three in Ballard/Lake Union (two motorized and one hand carry), and one in Georgetown (hand carry)

- 14th Avenue NW Boat Ramp (Ballard)
- Sunnyside Avenue N Boat Ramp (Ballard)
- Fairview Walkway Boat Launch (Lake Union)
- Duwamish Waterway Park Boat Launch (Georgetown)

The exhibits below highlight the parks, trails, and shoreline access points within and around the study area (see **Exhibit 3.12-5**, **Exhibit 3.12-6**, and **Exhibit 3.12-7**, respectively). Instances where parks, trails, and shoreline access points are owned or managed by another agency are noted.

Exhibit 3.12-5 Parks in and Around the Study Area

Seattle Parks	Size (Acres)	In Study Area (Y/N)
Ballard		
14th Ave NW Boat Ramp	0.018	Yes
Fremont Canal Park	0.095	Yes
Fairview Walkway	0.0017	Yes
Gas Works Park	21.35	Yes
Waterway 20 (managed by the Department of Natural Resources)	1.77	Yes
Northlake Park	0.016	Yes
Terry Pettus Park	0.097	Yes
Waterway 19 (managed by the Department of Natural Resources)	1.86	Yes
Interbay Dravus		
Interbay Athletic Field	2.05	No. Abutting.
Interbay Golf Center	45.00	No. Abutting.
Interbay Smith Cove*		
Myrtle Edwards Park/Centennial Park (managed by the Port of Seattle)	4.80	Yes
Open Water Park	14.03	Yes
Smith Cove Park	9.51	Yes
SW Queen Anne Greenbelt	0.06	Yes
SODO/Stadium		
Herrings House Park (Tulaltx)	15.24	Yes
Longfellow Creek Greenspace	0.48	Yes
Westbridge Shops	3.41	Yes
West Duwamish Greenbelt	5.47	Yes
Georgetown/South Park		
Duwamish Waterway Park	1.38	Yes
Georgetown Playfield	5.28	Yes
Georgetown Pump Station	0.20	Yes
West Duwamish Greenbelt	6.82	Yes
Westcrest Park	0.12	Yes
Total in Study Area:	92.01 acres	21 parks

Note: Park acres only includes parks that fall within the subarea boundary.
*West Central Grounds Maintenance is within the Interbay Smith Cove Subarea but is not a public park and is inaccessible to the public.
Sources: Seattle GIS, 2021; BERK, 2021.

Exhibit 3.12-6 Trails in and Around the Study Area

Seattle Trails	Trail Length (Miles)	In Study Area (Y/N)
Ballard		
Burke Gilman Trail (owned and maintained by SDOT)	2.1	Yes
Fremont Ave N	0.11	Yes
Interbay Dravus		
3rd Ave W	0.01	Yes
Ship Canal Trail	1.27	Yes
Interbay Smith Cove		
23rd Ave W	0.14	Yes
Elliott Bay Trail (owned and maintained by SDOT)	3.12	Yes
W Thomas St Overpass	0.21	Yes
SODO/Stadium		
Alki Trail	2.4	Yes
Duwamish River Trail	0.7	Yes
Portside Trail	0.6	Yes
SoDo Trail (owned and maintained by SDOT)	1.0	Yes
SW Alaska St	0.0	Yes
SW Spokane Br	0.4	Yes
SW Spokane St	0.2	Yes
W Sea Bridge Bike Trail	0.2	Yes
West Seattle Bridge Trail	0.6	Yes
Georgetown/South Park		
Duwamish River Trail (owned and maintained by SDOT)	1.8	Yes
S Portland St	0.4	Yes
West Marginal NB Way S	0.5	Yes
Total Trails:	15.8 miles	19 trails

Notes: Park acres only includes parks that fall within the subarea boundary.
Sources: Seattle GIS, 2021; BERK, 2021.

Exhibit 3.12-7 Shoreline Access Points in and Around the Study Area

Shoreline Access Points	Access Type	In Study Area (Y/N)
Ballard		
11th Ave NW and NW 45th St	View Only	Yes
20th Ave NW and Shilshole Ave NW	View Only	Yes
24th Ave NW and NW 54th St	Water Access	Yes
28th Ave NW and NW Market St	Boat/Kayak Access	Yes
Fremont Ave N and N 34th St	View Only	Yes
15th Ave NW and Ballard Br	Water Access	Yes
Eastlake Ave NE and University Br	View Only	Yes
14th Ave NW and Shilshole Ave NW	Boat/Kayak Access	Yes
Latona Ave NE and NE Northlake Way	View Only	Yes
Sunnyside and N and N Northlake Way	Boat/Kayak Access	Yes
3rd Ave NW and NW 39th St	View Only	Yes
Interbay Dravus		
6th Ave W and W Ewing St	Boat/Kayak Access	Yes
3rd Ave W and W Ewing N St	View Only	Yes
Interbay Smith Cove		
W Thomas St and Dead End	View Access	Yes
SODO/Stadium		
East Marginal Way S and S Spokane Sr St	View Only	Yes
Spokane St—W Sea B Rp and West Seattle Br Eb	View Only	Yes
SW Edmunds St and West Marginal Way SW	View Only	Yes
Diagonal Ave S and East Marginal Way S (Port of Seattle)	View Only	Yes
SW Alaska St and West Marginal Way SW	View Only	Yes
East Marginal Way S and S Idaho St	View Only	Yes
16th Ave SW and SW Lander St	View Only	Yes
Harbor Ave SW and SW Bronson Way	View Only	Yes
West Marginal Turn Rd and SW Spokane St	View Only	Yes
Klickitat Ave SW and Dead End (Port of Seattle)	View Only	Yes
26th Ave SW and Dead End 1	View Only	Yes
Chelan Ave SW and West Marginal Way SW	View Only	Yes
Georgetown/South Park		
5th Ave S and S Fontanelle St	View Only	Yes
7th Ave S and S Holden St	View Only	Yes
1st Ave S and SW Michigan St	Water Access	Yes

Shoreline Access Points	Access Type	In Study Area (Y/N)
1st Ave S and S Michigan S St	Boat/Kayak Access	Yes
East Marginal Way S and S Fidalgo St	View Only	Yes
10th Ave S and S Kenyon St	View Only	Yes
S Riverside Dr and Dead End 1	View Only	Yes
8th Ave S and S Portland St	Water Access	Yes
Total Shoreline Access Points:	34 access points	

Notes: Park acres only includes parks that fall within the subarea boundary. Shoreline Access points are owned by Seattle Parks and Recreation (SPR), the Seattle Department of Transportation (SDOT), the Port of Seattle, and King County.
Sources: Seattle GIS, 2021; BERK, 2021.

The combination of parks, trails, and shoreline access points provide open space and recreation facilities within the industrially zoned areas of the study area. However, there are still gaps within the study area which have been identified.[18] As part of the 2017 SPR Gap Analysis Update, Seattle identified gaps in parks inside and outside of Urban Villages based on distance greater than 10-minutes to a park. As well, areas of greater population density were also considered.

Some of the gaps within the study area include:

- **Ballard**: There are limited gaps in walkability to parks in the subarea per the 2017 SPR Gap Analysis.[19] There are portions of the subarea at the southern edge that are considered "gaps within of urban villages". Overall, the subarea is within the second lowest disadvantage per the 2017 SPR Gap Analysis.
- **Interbay Dravus**: There are no walkability gaps to parks per the 2017 SPR Gap Analysis. Overall, the subarea is within the second lowest disadvantage per the 2017 SPR Gap Analysis.
- **Interbay Smith Cove**: There are some gaps at the southern / southeastern edge of the subarea per the 2017 SPR Gap Analysis. Overall, the subarea is within the lowest and the second lowest disadvantage per the 2017 SPR Gap Analysis.
- **SODO/Stadium**: Nearly the full subarea is considered a "gap outside of urban villages" in the 2017 SPR Gap Analysis Update. In addition, parts of the subarea are considered "high disadvantage" within Seattle's Racial and Social Equity Composite Index.
- **Georgetown/South Park**: Nearly the full subarea is considered a "gap outside of urban villages" in the 2017 SPR Gap Analysis Update. In addition, per Seattle's Racial and Social Equity Composite Index parts of the subarea are considered "middle disadvantage," in Georgetown, and "second highest disadvantage" and "highest disadvantage" in South Park and areas along the west side of the Duwamish waterway.

[18] 2017 Gap Analysis Update Vol 1 (seattle.gov)
[19] See 2017 Gap Analysis, available: http://www.seattle.gov/ArcGIS/SMSeries_GapAnalysisUpdate2017/index.html.

Demand

SPR anticipates parks demand in order to meet use of facilities for natural areas, trails and beaches, picnic shelters and community centers. SPR also considers the demand for sports fields which may be needed across seasons. These considerations are filtered through two methodologies based on the Recreation Conservation Office (RCO's) Planning Policies and Guidelines: Recreation Participation, and Community Satisfaction.

Measures of demand related to recreation participation include how many people use specific park facilities and the frequency of use within a year. From this information, SPR determines for each type of recreation/sports facility long-term need based on how people currently use facilities and any projected population changes.

Measures of demand related to community satisfaction include community rankings of different recreation services and facilities, feedback on resource allocation to different park types and facilities, facility use requests, and community priorities.

Goals

The City of Seattle PROS Plan (2017) provides open space and recreation goals citywide. The goals from this plan are outlined below.

PROS Plan Goals

- **Goal 1:** Provide a variety of outdoor and indoor spaces throughout the city for all people to play, learn, contemplate, and build community.
- **Goal 2:** Continue to provide opportunities for all people across Seattle to participate in a variety of recreational activities.
- **Goal 3:** Manage the city's park and recreation facilities to provide safe and welcoming places.
- **Goal 4:** Plan and maintain Seattle's parks and facilities to accommodate park users and visitors.
- **Goal 5:** Engage with community members on parks and recreation plans, and design and develop parks and facilities, based on the specific needs and cultures of the communities that the park is intended to serve.

These goals are not specific to the study area or subareas within. These goals also do not focus on open space and recreation in industrially zoned areas. The PROS plan does identify industrial lands as an opportunity for increasing the total available parkland in the City. There are, however, goals for the Georgetown/South Park Subarea which are outlined in the Duwamish Valley Action Plan (City of Seattle 2018).

The Action Plan is organized into seven priority areas: Healthy Environment, Parks & Open Spaces, Community Capacity, Mobility & Transportation, Economic Opportunity & Jobs,

Affordable Housing, and Public Safety. The Plan identifies the following goals for parks and open spaces:

- Increased area of parks and open space per capita in the Duwamish Valley.
- Culturally appropriate programming that meets the needs of the community members in the Duwamish Valley.
- Increased public access to the Duwamish River.

In the new SPR 2020-2032 Strategic Plan a "pathway to equity" is outlined as a commitment to creating an equitable parks and creation system. This commitment is supported by potential equity access goals (see **Exhibit 3.12-8**).

Exhibit 3.12-8 Potential Equity Access Goals

Facility Type	Target Goals
Community Centers	Every household in Seattle should be within 1-2 miles of a Community Center.
Aquatic Facilities	Every household in Seattle should have access to a swimming pool or swimming beach within 4 miles.
Outdoor Sports Courts and Facilities	80% of all residents will rate their access to desired outdoor facilities, such as tennis and basketball courts, as Good or Excellent.
Sports/Athletic Fields	Every household in Seattle should have access to sports fields within 2 miles.
Greenways	Continue to coordinate with SDOT on preferred routes and connections to enhance access to parks and open space.
Picnic Shelters	All picnic shelters should be ADA accessible.
Play Areas	All play areas should include facilities for a range of age groups.

Source: Seattle Parks and Recreation Open Space Plan, 2017.

These potential goals are coupled with SPR's equity commitments. These commitments include focusing work in a way that seeks to eliminate racial health disparities, seeks to minimize the impacts of climate change on those most vulnerable, strengthen outreach and engagement opportunities, and allocate resources strategically though a racial equity framework.

3.12.2 Impacts

This section considers the potential impacts to open space and recreation that may occur as a result of implementation of the alternatives. Impacts and resulting mitigation measures to open space and recreation have been assessed based on thresholds of significance.

The thresholds of significance utilized in this impact analysis include:

- Insufficient parks, open space, and trail capacity to serve expected population or employment based on levels of service.
- Inconsistencies with shoreline public access policies.
- Have the potential to decrease public access to parks and open space or shoreline access in census tracts identified as high disadvantage in the Seattle Racial and Social Equity Composite Index.[20]

Impacts Common to All Alternatives

Changes driven by housing and employment are anticipated to increase population growth within the study area. As discussed in the affected environment above, the City of Seattle maintains a goal of 8 acres of parkland per 1,000 residents. This means that across all alternatives population growth will have an impact on the acres of parkland required within the study area and the subareas.

The primary possible impacts across alternatives would be demand on existing parks and demand for future parkland. Additional impacts specific to the subareas could be connectivity. These impacts are discussed below.

Population Growth

Anticipated population growth may add pressure on existing parks within the study area. Park pressure is a metric that refers to the potential demand on a park, assuming that the residents in a "parkshed" use the park closest to them (Seattle Parks and Recreation 2017). The number of park acres available per 1,000 people within the parkshed can be used to determine demand on existing parks. It is possible that population growth will decrease the number of park acres available per 1,000 people. This impact coupled with frequency of use and availability of park amenities contribute to an impact for all alternatives.

Based on the existing conditions and the City's current LOS standard for open space and recreation the City anticipates needing additional parkland. To meet the baseline of 8 acres per 1,000 residents the City is currently considering acquiring parkland through greenbelts, natural areas, and non-SPR owned open space such as plazas downtown, college and university campus land, and industrial lands (Seattle Parks and Recreation 2017).

[20] See the Racial and Social Equity Index Interactive Map, 2017.

Connectivity/Transportation

The Action Alternatives propose three new land use concepts: Maritime, Manufacturing, and Logistics (MML), Industry and Innovation (II), and Urban Industrial (UI). Each concept includes development standards, some of which would influence the transportation network and/or transportation behavior. The proposals include standards for pedestrian and cyclist-oriented frontage improvements (sidewalks, pedestrian lighting, street trees, etc.) in the Industry & Innovation and Urban Industrial zones.

Open Space & Recreation Effects of Proposed Land Use Concepts

Maritime, Manufacturing, and Logistics (MML)

The Maritime, Manufacturing, and Logistics (MML) land use concept is designed to be applied in locations near infrastructure that supports fishing, logistics, maritime, aerospace, brewing and distilling activities. If adopted, this land use concept would amend the land use code to increase policy and zoning protections for maritime and industrial uses. This land use concept may have a minimal impact on open space and recreation in the form of parkland because it applies to existing industrial areas and uses. There are opportunities for shoreline public access where there is not a conflict with public safety.

Industry and Innovation (II)

The Industry and Innovation (II) land use concept is designed to support a combination of design and research industrial uses along with high-density employment and transit access. If adopted this land use concept would amend the land use code to support non-industrial office or technology uses and integration of high-capacity transit. Within this concept, open space and recreation could feature small greenspace increases through trees and landscaping. The location of a light rail station would increase foot traffic in and around the area and could lead to cyclist-oriented trails and plazas associated with employment buildings.

Urban Industrial (UI)

The Urban Industrial (UI) land use concept is designed to create industrial districts that can serve a mix of uses including manufacturing, production, and arts. This land use concept is also an opportunity to support place making and would be located in areas adjacent to Seattle's designated urban villages.

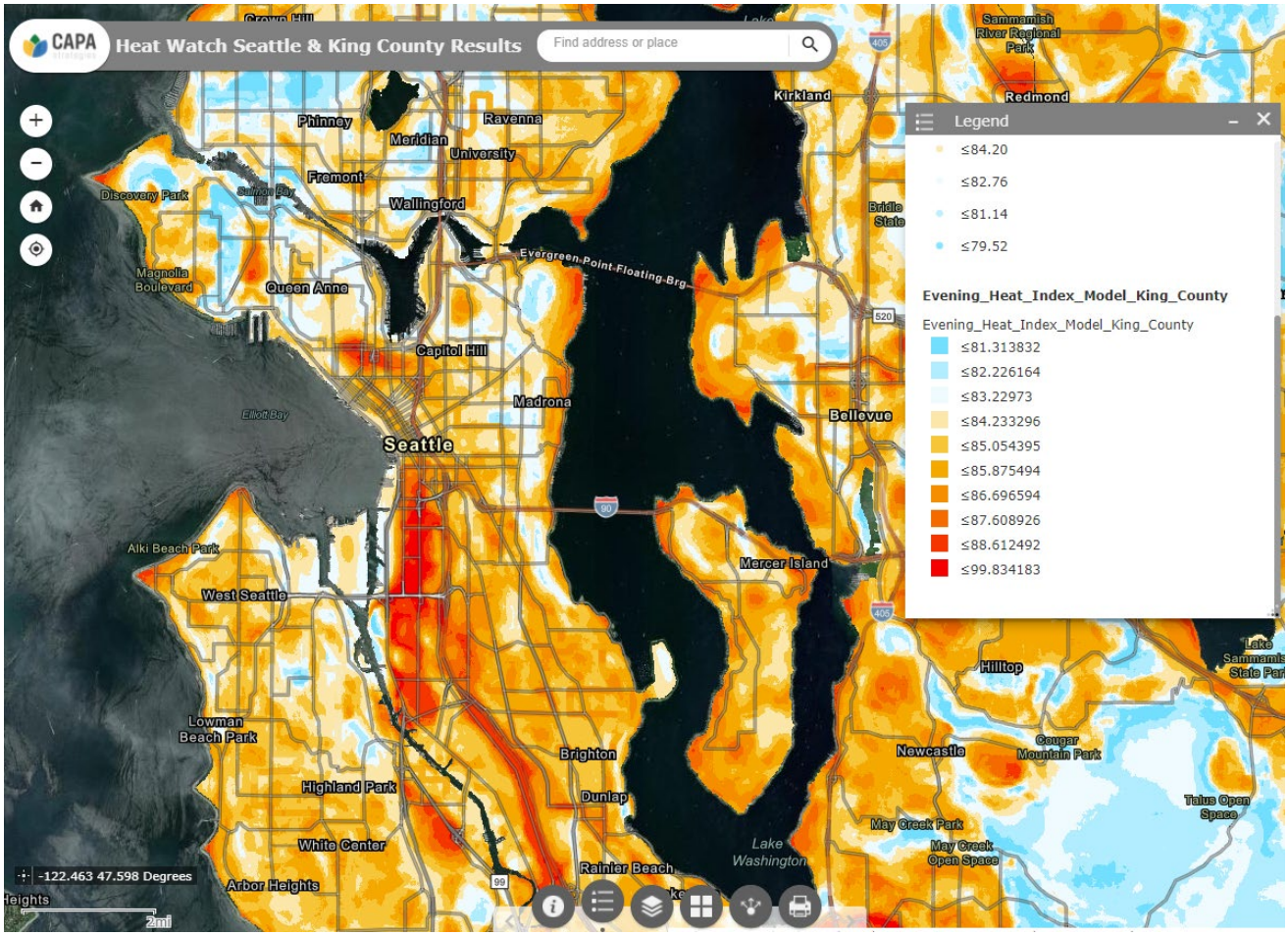
Within this concept, open space and recreation would be impacted in several different ways. This concept allows industrial uses to be integrated near urban villages which leads to the need for green open spaces, safe trails and routes that can be used for travel and as an industrial buffer, and park space to support any housing in new mixed-use buildings. If adopted, this land use concept would increase the opportunity for mixed-use housing leading to a more stable population in the area. This population would need access to open space and recreation.

Equity & Environmental Justice Considerations

Heat Islands

Based on a King County and City of Seattle Study of heat mapping, "surface-level temperatures in areas with paved landscapes, less tree canopy, and industrial activity are substantially higher during summer heat events compared to less urbanized areas." The study published in June 2021 shows that by evening, the Greater Duwamish MIC vicinity has higher levels of heat (see **Exhibit 3.12-9**). Adding trees in streetscapes, private properties, and parklands can help reduce the heat island effect.

Exhibit 3.12-9 Heat Watch and King County Results



Source: King County and City of Seattle, 2021.

Pathway to Equity

In the SPR 2020-2032 Strategic Plan, the City outlined a commitment to addressing historical racial inequities in parks and open space. In the plan a "pathway to equity" is used to describe this commitment to creating an equitable parks and recreation system. The pathway includes the following steps (Seattle Parks and Recreation 2020):

- Developing an SPR Equity and Engagement Plan to implement the City's equity goals.
- Developing an equity scorecard and map for resource allocation and planning that leverages data to identify and address disparities in underserved areas and for underserved groups.
- Revamping SPR's Race and Social Justice Initiative Outcomes, Strategies, and Actions (ROSA)10 to more intentionally ensure an equity lens is woven throughout SPR work.
- Training all SPR staff about the Pathway to Equity.
- Conducting robust and culturally responsive community outreach and engagement.
- Developing an equity dashboard and performance indicators as part of departmentwide performance management efforts.

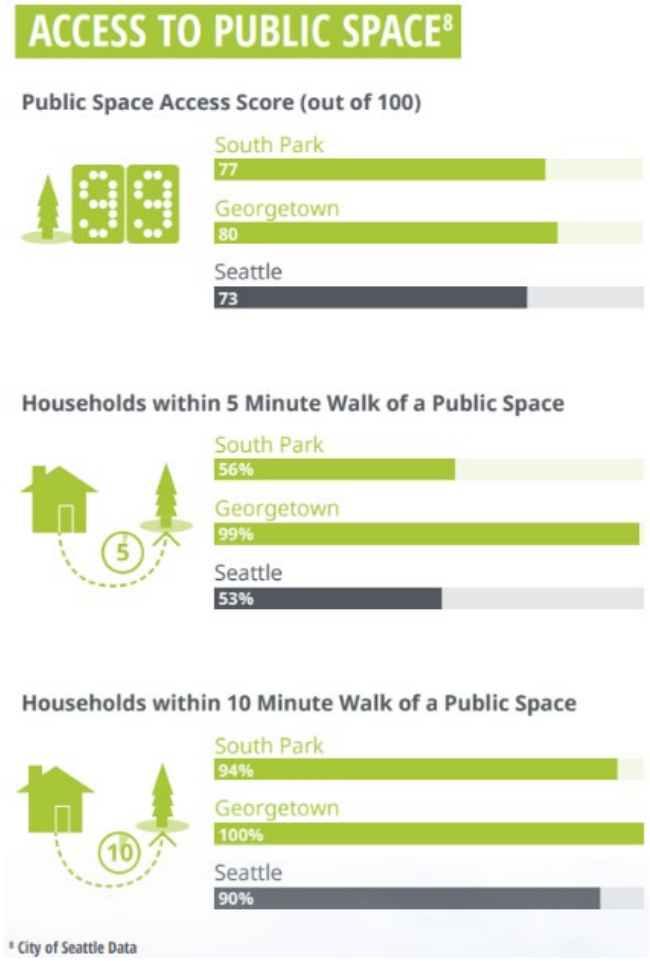
A combination of these actions could improve equitable outcomes within the study area. A map for resource allocation, an equity dashboard, and community outreach and engagement would each provide opportunities for the City to assess current disparities and create solutions with the community.

Park Pressure & Park Access

The demand on existing parks was discussed above under Impacts Common to all Alternatives. In addition to park demand being an impact for the study area there are also equity implications of park pressure. Research has demonstrated that park pressure can be used to highlight racial inequities in park access, showing that people of color and low-income groups are more likely to live close to parks with higher potential park congestion (Seattle Parks and Recreation 2017). This is most notable for park access in the Georgetown/South Park Subarea.

In Georgetown and South Park neighborhoods (within and outside of the Georgetown portion of the Greater Duwamish MIC) access to public space is comparable and, in some cases, better than the City as a whole. Georgetown and South Park scored 77 and 80 (Public Space Access Score out of 100) respectively in comparison to Seattle which scored 73 (see **Exhibit 3.12-10**).

Exhibit 3.12-10 Access to Public Space in Georgetown and South Park



Source: Seattle Duwamish Valley Action Plan (Action Plan), 2018.

While the neighborhoods have nearby parks, the total acreage per capita is half the citywide average and there may be park congestion caused by added population. Another factor related to park pressure and park access is being able to travel to and from the parks.

Impacts of Alternative 1 No Action

Alternative 1 prohibits residential uses within industrial zones except for caretaker quarters per industrial business, artist studio housing, and housing the existed before industrial zoning. Only about 75 of these industrial zone related dwellings are projected.

Growth is still expected under Alternative 1 No Action from naturally occurring population growth in the city (under current zoning) with small amounts of housing in the study area. The 2017 PROS Plan includes an aspirational LOS standard needed to accommodate the projected 120,000 additional residents citywide by 2035 (Seattle Parks and Recreation 2017). The number

of acres of parkland needed to address population growth under Alternative 1 is presented in **Exhibit 3.12-11**.

Exhibit 3.12-11 Open Space and Recreation Acres Required for Alternative 1

Subarea	Current Conditions (2018)		Alternative 1 No Action—Existing Policies (2044)	
	Existing Pop	Existing Open Space (Acres)	Expected Pop Growth	Open Space for Net Growth (Acres)
Ballard	394	25.21	15	0.12
Interbay Dravus	6	0.00	15	0.12
Interbay Smith Cove	2	28.40	15	0.12
SODO/Stadium	43	24.60	62	0.50
Georgetown/South Park	402	13.80	46	0.37
Total	847	92.01	153	1.22

Source: BERK, 2021.

The summary presented in **Exhibit 3.12-11** assumes the City maintains its desired Level of Service (LOS) standard of 8 acres of parkland per 1,000 people. Under Alternative 1, the City would need to add an additional 1.22 acres of parkland to accommodate 153 additional residents within the study area.

Growth and associated acres of needed parkland are expected to be highest in the SODO/Stadium Subarea (0.50 acres) followed by the Georgetown/South Park Subarea (0.37) under Alternative 1. The remaining subareas—Ballard (0.12 acres), Interbay Dravus, (0.12) and Interbay Smith Cove (0.12)—would have the same need for additional acres. No impacts other than those described under Impacts Common to All Alternatives are anticipated under Alternative 1.

Impacts of Alternative 2

Alternative 2 includes less land zoned UI and II than the other two Action Alternatives. This alternative would result in more job creation and minimal residential growth.

Growth under Alternative 2 is anticipated to have a minimal increase on the population (163 people). The number of acres of parkland needed to address population growth under Alternative 2 is presented in **Exhibit 3.12-12**.

Exhibit 3.12-12 Open Space and Recreation Acres Required for Alternative 2

Subarea	Current Conditions (2018)		Alternative 2 Future of Industry Limited (2044)	
	Existing Pop	Existing Open Space (Acres)	Expected Pop Growth	Open Space for Net Growth (Acres)
Ballard	394	25.21	16	0.13
Interbay Dravus	6	0.00	16	0.13
Interbay Smith Cove	2	28.40	16	0.13
SODO/Stadium	43	24.60	66	0.53
Georgetown/South Park	402	13.80	49	0.39
Total	847	92.01	163	1.30

Source: BERK, 2021.

The summary presented in **Exhibit 3.12-12** indicates a similar degree of change as seen in Alternative 1. Under Alternative 2, the City would need to add an additional 1.3 acres of parkland to accommodate 163 additional residents within the study area.

Similar to Alternative 1 No Action, growth and associated acres of needed parkland under Alternative 2 is expected to be highest in the SODO/Stadium Subarea (0.53 acres) followed by the Georgetown/South Park Subarea (0.39 acres). The remaining subareas—Ballard (0.13 acres), Interbay Dravus (0.13), and Interbay Smith Cove (0.13)—would each have the same need for additional acres of open space and recreation. No impacts other than those described under Impacts Common to All Alternatives are anticipated under Alternative 2. There will be impacts to existing open space and recreation facilities and a need for new facilities to meet anticipated demand.

Impacts of Alternative 3

Alternative 3 includes a higher degree of UI and II zoned land than Alternative 1 No Action and Alternative 2. Alternative 3 would result in a combination of industry/innovation and urban industrial zone concepts in existing areas industrially zoned and would expand limited industry-supportive housing in areas where the UI zone concept is featured. This UI zone concept is most featured in the Ballard, the SODO/Stadium, and pockets of the Georgetown/South Park subareas.

Growth under Alternative 3 is anticipated to have a larger increase in the population living in or near industrially zoned areas than alternatives 1 or 2. The number of acres of parkland needed to address population growth under Alternative 3 is presented in **Exhibit 3.12-13**.

Exhibit 3.12-13 Open Space and Recreation Acres Required for Alternative 3

Subarea	Current Conditions (2018)		Alternative 3 Future of Industry Targeted (2044)	
	Existing Pop	Existing Open Space (Acres)	Expected Pop Growth	Open Space for Net Growth (Acres)
Ballard	394	25.21	533	4.26
Interbay Dravus	6	0.00	154	1.23
Interbay Smith Cove	2	28.40	31	0.25
SODO/Stadium	43	24.60	410	3.28
Georgetown/South Park	402	13.80	123	0.98
With MIC Adjustments	0.00	0.00	2,210	17.68
Total	847	92.01	3,461	27.68

Source: BERK, 2021.

The summary presented in **Exhibit 3.12-13** indicates a much greater degree of change compared to Alternative 1 and Alternative 2. Under Alternative 3, the City would need to add an additional 27.68 acres of parkland to accommodate 3,461 additional residents within the study area. This increase in acres of open space and recreation is slightly below the PROS Plan estimates—in the plan, SPR anticipated it would need to acquire at least 40 acres of parkland to meet the adopted LOS by 2035. However, that estimate was for the entire city and not the study area alone.

Alternative 3 also includes MIC adjustments that would result in population growth. The population growth anticipated from these MIC adjustments accounts for 17.68 acres of the total 27.68 acres of parkland needed under Alternative 3. The need for more open space and recreation is highest in the Ballard (4.26 acres) and SODO/Stadium (3.28 acres) subareas, followed by the Interbay Dravus (1.23 acres), Georgetown/South Park (0.98 acres), and Interbay/Smith Cove (0.25 acres) subareas.

In addition to the impacts described under Impacts Common to All Alternatives above there could be impacts under Alternative 3 caused by balancing industrial uses with housing and transportation. The impact of Alternative 3 may also limit the types of open space and recreation to facilities other than parks. Considering the Seattle Racial and Social Equity Composite Index, the SODO/Stadium Subarea is within the highest 20% disadvantage of census tracts and the Georgetown/South Park Subarea falls within the middle 40-60% of disadvantaged tracts.[21] An increase in population in the Georgetown/South Park Subarea may place additional pressure on existing parks and more parkland needs to be acquired and

[21] See the Racial and Social Equity Index Interactive Map, 2017.

developed to meet demand in the SODO/Stadium Subarea. For both of these subareas, there will not be a limit on park access if more park acres are acquired.

Alternative 3 includes the removal of portions of two blocks of land adjacent to Duwamish Waterway Park and two blocks of land adjacent to Terminal 117/Duwamish River People's Park from the MIC designation and industrial zoning and would apply a mixed-use zone. Future development in the mixed-use zone has a higher potential for increasing integration with and access to the two open spaces from the South Park residential community. The change will increase the amount of required open space in new development near the parks and will increase the likelihood of future visual and/or physical access to river front land from privately owned parcels.

Impacts of Alternative 4

Alternative 4 features a higher degree of UI and II land use concepts than the Alternative 1 and Alternative 2. This alternative would result in a combination of industry/innovation and urban industrial zone concepts in existing areas industrially zoned. Regarding residential development, Alternative 4 would expand limited industry-supportive housing in areas where the UI zone concept is featured. This UI zone concept is most featured in Ballard, the SODO/Stadium, and pockets of the Georgetown/South Park subareas.

Growth under Alternative 4 is anticipated to have a large increase in the population living in or near industrially zoned areas that is greater than alternatives 1 or 2, and similar to the amount in Alternative 3. The number of acres of parkland needed to address population growth under Alternative 4 is presented in **Exhibit 3.12-14**.

Exhibit 3.12-14 Open Space and Recreation Acres Required for Alternative 4

	Current Conditions (2018)		Alternative 4 Future of Industry Expanded (2044)	
Subarea	Existing Pop	Existing Open Space (Acres)	Expected Pop Growth	Open Space for Net Growth (Acres)
Ballard	394	25.21	1,620	12.96
Interbay Dravus	6	0.00	359	2.87
Interbay Smith Cove	2	28.40	0	0.00
SODO/Stadium	43	24.60	2,030	16.24
Georgetown/South Park	402	13.80	492	3.94
With MIC Adjustments	0.00	0.00	2,210	17.68
Total	847	92.01	6,710	53.68

Source: BERK, 2021.

The summary presented in **Exhibit 3.12-14** indicates a much larger degree of change compared to Alternative 1 and Alternative 2. Under Alternative 4, the City would need to add an additional 53.68 acres of parkland to accommodate 6,710 additional residents within the study area. This increase in acres of open space and recreation would exceed the PROS Plan's estimated 40 additional acres needed citywide.

Like Alternative 3, Alternative 4 includes MIC adjustments that would result in population growth. The population growth anticipated from these MIC adjustments accounts for 17.68 acres of the total 53.68 acres of parkland needed under Alternative 4. The need for more open space and recreation is highest in the SODO/Stadium (16.24) and Ballard (12.96 acres) subareas. The smallest increases in Alternative 4 would occur in the Georgetown/South Park (3.94 acres) and Interbay Dravus (2.87 acres) subareas. However, with the SM zoned areas, there would also need to be 17.68 acres in the Georgetown/South Park Subarea. Each of the alternatives feature a concentration of growth and subsequent demand for open space in SODO/Stadium Subarea.

In addition to the impacts described under Impacts Common to All Alternatives above there could be impacts under Alternative 4 that were discussed in Alternative 3. There is a need to balance industrial uses with housing and transportation. Most notably, in Alternative 4 the UI land use concept is featured throughout the study area which will result in new mixes of uses that may have been industrially zoned previously.

Considering the Seattle Racial and Social Equity Composite Index, the Ballard Subarea is within the lowest 40% of disadvantaged tracts across the city, while the SODO/Stadium Subarea is within the highest 20% disadvantage of census tracts.[22] For the SODO/Stadium Subarea in particular, there is an existing limit of available parkland; an increase in population would lead to the need for more park land in the subarea.

Alternative 4 includes the removal of portions of two blocks of land adjacent to Duwamish Waterway Park and two blocks of land adjacent to Terminal 117/Duwamish River People's Park from the MIC designation and industrial zoning and would apply a mixed-use zone. Future development in the mixed-use zone has a higher potential for increasing integration with and access to the two open spaces from the South Park residential community. The change will increase the amount of required open space in new development near the parks and will increase the likelihood of future visual and/or physical access to river front land from privately owned parcels.

[22] See the Racial and Social Equity Index Interactive Map, 2017.

3.12.3 Mitigation Measures

Incorporated Plan Features

The Action Alternatives propose three new land use concepts: Maritime, Manufacturing, and Logistics (MML), Industry and Innovation (II), and Urban Industrial (UI). Each concept features design principles that would help mitigate impacts to open space and recreation:

- The Industry & Innovation land use concept includes standards for frontage improvements (sidewalks, pedestrian lighting, etc.), trees and landscaping, and maximum limits on vehicle parking areas. This concept would also include a need for circulation routes which could be used as trails.
- The Urban Industrial land use concept incorporates open space and landscaping, which support open space and recreation demand and help meet LOS standards. This concept also includes standards for frontage improvements (sidewalks, pedestrian lighting, etc.) and could make use of landscaping on or around buildings.
- The Maritime, Manufacturing, and Logistics land use concept could result in the location of new boat ramps and shoreline access areas within the study area.
- Alternatives 3 and 4 remove land adjacent to parks in the South Park neighborhood from a MIC designation, increasing the likelihood for increasing integration with and access to river front open spaces from the South Park residential community.

Regulations & Commitments

The study area is located within King County in the City of Seattle. Open space and recreation in Seattle is managed by separate local governments with overlapping boundaries. Relevant plans include SPR's Recreation Demand Study, Community Center Strategic Plan, PROS Plan, and Parks and Recreation Strategic Plan. Additional open space and recreation needs and commitments are identified in annual reports from the Seattle Park District Annual Reports, the Seattle Comprehensive Plan, and the Duwamish Valley Action Plan.

These various plans provide a framework for the City when assessing and planning for open space and recreation needs. The SPR Strategic Plan provides strategies arranged by healthy people, healthy environment, strong communities, and organizational excellence. The Duwamish Valley Action Plan builds upon the Equity & Environment Agenda and the Duwamish Valley Program, two commitments from the City to genuinely collaborate with communities to further social justice goals in policy and development. The PROS Plan outlines the City's existing open space and recreational facilities, capital funding, and projects being funded and a 6-year vision for the future.

In addition to these plans, the Seattle Land Use Code (Seattle Municipal Code Title 23) contains development regulations, including standards governing the design and placement of exterior site and building illumination. Future development in the study area will be required to comply

with the standards established for industrial zones in SMC Chapter 23.50 and 23.49 as it pertains to open space.

Other Potential Mitigation Measures

While parks are a great source of open space, the combination of existing uses and new land use concepts within the alternatives may present challenges that may not be resolved with new parks. Other potential mitigation measures the City could explore outside of creating new parks include creating linear parks and trails, increasing frequency of maintenance to offset an increase in park usage, and building resilient parks. The City could also explore transportation to and from parks and potentially increase connectivity between parks. Finally, the City might explore the use of community gardens (permitted on some rooftops in individual zones) as a way to provide open space and an urban agricultural use.

3.12.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to open space and recreation are anticipated. While population and employment growth would occur under all studied alternatives, there are opportunities to meet the City's level of service for parkland through implementation of the Seattle plans and current and proposed development regulations.

Section 3.13

Public Services

Public services discussed in this section include fire, police, school, and library services. The primary providers of these services for the study area are the Seattle Fire Department (SFD), the Seattle Police Department (SPD), the Port of Seattle Police Department (POSPD), Seattle Public Schools (SPS), and the Seattle Library System (SLS). The Primary Study Area includes industrially zoned lands both inside and outside of the manufacturing industrial centers. Secondary Study Areas include fire stations, police stations, schools, and libraries in proximity to the Primary Study Area.

Impacts of the alternatives on public services are considered significant if they:

- Negatively affect the response times for police and/or fire and emergency medical services.
- Increase demand for special emergency services beyond current operational capabilities of service providers.
- Result in increases in students and lack of facilities unanticipated in district plans or that would reduce adopted levels of service.

3.13.1 Affected Environment

Fire & Emergency Medical Services

Data & Methods

Information about fire and emergency medical services was collected from the Seattle Fire Department. SFD publishes an annual report each year which includes information about the department, incident response trends and response standards, preventative measures taken (e.g., fire code implementation), public events/education, and other notable highlights. The City of Seattle also publishes geolocated call data on its Open Data Portal. SFD's 2012-2017 Strategic Plan and the City's proposed 2022 Budget and 2022-2027 CIP were also referenced.

Services & Resources

The Seattle Fire Department provides fire and rescue response, fire prevention and public education, fire investigation, and emergency medical services (EMS) throughout the city, including the study area. Emergency medical services include basic life support (BLS) and advanced life support (ALS). SFD also has specially trained technical teams that provide technical and heavy rescue, dive rescue, tunnel rescue, marine fire/EMS response, and hazardous materials response. In addition, SFD provides mutual aid response to neighboring jurisdictions.

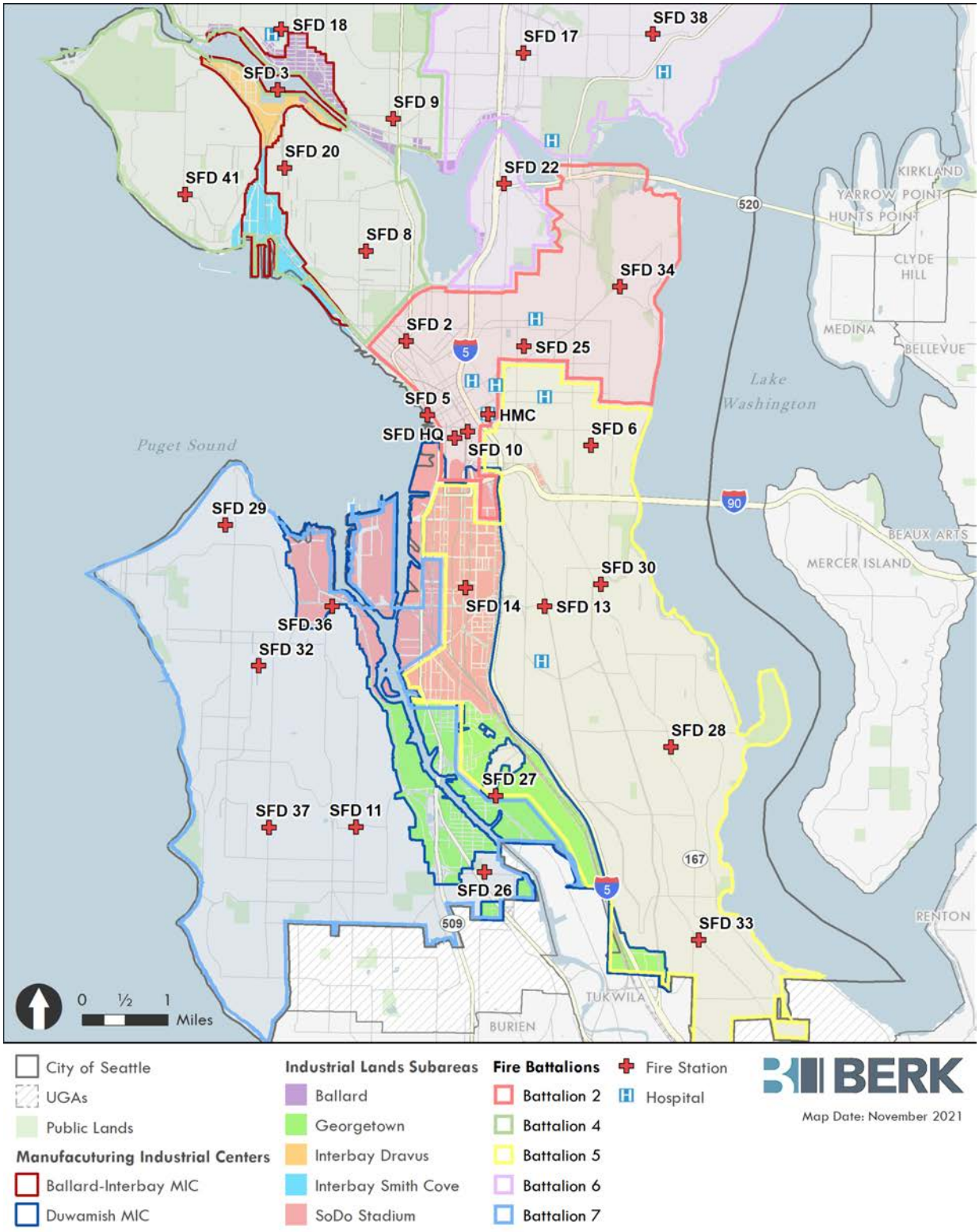
SFD provides emergency response services through five battalions consisting of 33 fire stations (plus Battalion 3/Medic One at Harborview Medical Center) strategically placed around the city to maximize coverage and minimize response time (see **Exhibit 3.13-1**). The study area is mostly within Battalions 4, 5, and 7 and is primarily served by the following stations:

- BINMIC: Stations 3, 5, 8, 9, 18, 20, and 41
- Greater Duwamish MIC: Stations 5, 10, 11, 13, 14, 26, 27, 29, 33, and 36

Marine fire response is provided by Station 3 at Fisherman's Terminal and Station 5 on Seattle's Waterfront (Station 5 is currently under construction concurrent with portions of the Seattle Waterfront project)—fire boats at these stations are prepared to respond to ship fires, marina fires, water rescues, and other water related emergencies. Other industrial lands along the north side of Salmon Bay are served by stations 9 and 17, and industrial lands in Eastlake are served by Station 22. Emergency support may come from other stations depending on resource needs and availability.

All SFD stations are staffed 24 hours a day, seven days a week, by four separate shifts of firefighters. There are 216 members responding to emergencies every day across the city (220 with upstaffing for 2 daytime aid cars). In total, SFD currently has 1,008 uniformed personnel and 77 civilian personnel—uniform personnel include 940 firefighter/EMTs (including 36 chiefs) and 68 firefighter/paramedics (Seattle Fire Department 2020).

Exhibit 3.13-1 Fire Battalions and Stations



Source: City of Seattle, 2021; BERK, 2021.

A variety of ladder trucks, fire engines, fireboats, aid cars (BLS), medic units (ALS), and other specialty teams are housed at stations serving the study area (see **Exhibit 3.13-2**). Ladder trucks and fire engines are staffed by teams of four personnel while aid cars are staffed by teams of two personnel. Medic One at Harborview Medical Center also provides the city with ALS activities that, in the past, could only be performed by licensed physicians. In addition to responding to medical emergencies, medic units respond to all working fires, hazardous materials, and rescue responses citywide.

Exhibit 3.13-2 SFD Facility Locations, Equipment, and Staffing for Stations Serving the Study Area

Facility	Location	Equipment & Staffing
Headquarters*	301 2nd Avenue S	Does not serve as a working fire station, but houses the Executive Team, Deputy 1, Safety Chief, Fire Investigation Unit, and other administrative functions.
Medic One / Harborview Medical Center	325 9th Ave	Battalion 3, Medic 1, Medic 10, Medic 44, and Medic 55
3—Fisherman's Terminal	1735 W Thurman	Fireboat Chief Seattle, Fireboat 1, FB1, FB3 and FB4
5—Seattle Waterfront	925 Alaskan Way	Fireboat Leschi, Fireboat 2, Rescue Boat 5, Engine 5, and PT520. *Note: Station 5 is currently under construction.*
8—Queen Anne	110 Lee St	Fire Engine 8 and Ladder Truck 6
9—Fremont	3829 Linden Ave N	Fine Engine 9
10—International District	400 S Washington St	Fire Engine 10, Ladder Truck 1, Aid Car 5, Aid Car 10, Staff 10, and the Hazardous Materials Team—includes the city's Fire Alarm Center and Emergency Operation Center
11—Highland Park	1514 SW Holden St	Fire Engine 11
13—Beacon Hill*	3601 Beacon Ave S	Fire Engine 13 and Battalion 5
14—SODO District*	3224 4th Ave S	Ladder Truck 7, Aid Car 14, and Rescue One (Technical Rescue Team)
17—University District	1050 NE 50th St	Fire Engine 17, Ladder Truck 9, Medic 17, and Battalion 6
18—Ballard	1521 NW Market St	Fire Engine 18, Ladder Truck 8, Medic Unit (ALS) 18, Hose 18, and Battalion 4
20—West Queen Anne	2800 15th Ave W	Fire Engine 20
22—Roanoke	901 E Roanoke	Fire Engine 22, Command and Communications Van
26—South Park	800 S Cloverdale St	Fire Engine 26 and Medic Unit (ALS) 26**
27—Georgetown	1000 S Myrtle St	Fire Engine 27, REHAB1, and DECON1
29—Admiral District	2139 Ferry Ave SW	Fire Engine 29
33—Rainier Beach	9645 Renton Ave S	Fire Engine 33
36—Delridge & Harbor Island	3600 23rd Ave SW	Fire Engine 36 and Marine 1
41—Magnolia	3216 34th Ave W	Fire Engine 41

Note: Ladder trucks and fire engines are staffed by teams of four personnel. Aid cars are staffed by teams of two personnel.
*Indicates a historic building.
**SFD staffed an additional ladder truck (Ladder 13) and medic unit (Medic 26) to serve the residents of West Seattle in response to the closure of the West Seattle Bridge. Ladder Truck 13 is housed at Station 37 and Medic Unit 26 at Station 26.
Source: Seattle Fire Department Annual Report, 2020; Seattle 2035 Capital Facilities Appendix, 2020.

Stations and associated equipment and staffing serving each of the subareas are summarized below:

- **Ballard**: The Ballard Subarea is in the service area of stations 9 and 18. Station 18—the primary station serving the Ballard portion of the study area—houses Fire Engine 18, Ladder Truck 8, Medic Unit (ALS) 18, Hose 18, and Battalion 4 while Station 9 in Fremont houses one fire engine.
- **Interbay Dravus**: The Interbay Dravus Subarea is in the service area of stations 3, 20, and 41. Station 3 at Fisherman's Terminal houses Fireboat Chief Seattle, Fireboat 1, FB1, FB3, and FB4. Station 20 in West Queen Anne and Station 41 in Magnolia each house a fire engine.
- **Interbay Smith Cove**: The Interbay Smith Cove Subarea is in the service area of stations 5, 8, and 20. Station 8 in Queen Anne houses a fire engine and ladder truck while Station 20 in West Queen Anne house a single fire engine. Station 5 houses two fire boats, one rescue boat, one fire engine, and the specialty unit PT520.
- **SODO/Stadium**: The SODO/Stadium Subarea is in the service area of stations 5, 10, 13, 14, 27, 29, and 36. Together these stations house two fire boats, six fire engines, two ladder trucks, three aid cars, and several specialty units, including SFD's Hazardous Materials Team, Rescue One (Technical Rescue Team), REHAB1, DECON1, Marine 1, and PT520.
- **Georgetown/South Park**: The Georgetown/South Park Subarea is in the service area of stations 11, 26, 27, and 33. Together these stations house four fire engines, one medic unit (ALS), REHBA1, and DECON1.
- **Other Industrial Zoned Lands**: Other industrial lands along the north side of Salmon Bay are served by stations 9 and 17, and industrial lands in Eastlake are served by Station 22. Stations 9 and 17 north of Salmon Bay house two fire engines, one ladder truck, one medic unit (ALS), and Battalion 6, while Station 22 in Eastlake houses one fire engine and SFD's Command and Communications Van.

Performance

Incident Response Trends

Between 2017 and 2020, total Seattle Fire Department incident responses ranged from 80,316 to 96,822. As shown in **Exhibit 3.13-3**, the number of total responses remained relatively constant in 2017 and 2018, then decreased in 2019 and 2020. The COVID-19 pandemic drove a decrease in EMS calls in 2020—a trend SFD believes resulted from fewer people being outside their homes coupled with a fear of being exposed to the virus—and a rise in fire responses. Total incident responses decreased from 2017-2019 by 5% and by 17% from 2017-2020.

Fire incident response increased 9% from 2017-2019. However, Seattle has fewer fires than the national average and of other cities with similar population size—Seattle averages 0.9 fires annually per 1,000 residents compared to the national average of 3.9 (Seattle City Budget Office 2021, 325). EMS incident responses decreased 7% from 2017-2019. The proportion of fire

incident responses compared to EMS incident responses has correspondingly increased. EMS calls still make up over three-quarters of total responses though, accounting for 81% of total responses in 2017 and 80% in 2019.

Exhibit 3.13-3 Seattle Fire Department Emergency Response Incidents, 2018-2020

Year	EMS Incidents: BLS & ALS	Fire & Specialty Incidents	Other & Mutual Aid	Total
2017	78,758 (81%)	16,548 (17%)	1,111 (1%)	96,822
2018	76,484 (81%)	17,080 (18%)	1,128 (1%)	94,780
2019	72,980 (80%)	18,088 (20%)	648 (1%)	91,716
2020	61,717 (77%)	18,094 (23%)	505 (1%)	80,316

Note: EMS incidents include BLS and ALS incidents. Other incidents include transfers to other agencies where a fire unit was also dispatched and, for 2020, includes responses where a single battalion chief was dispatched.
Source: Seattle Fire Department Annuals Reports, 2019 and 2020.

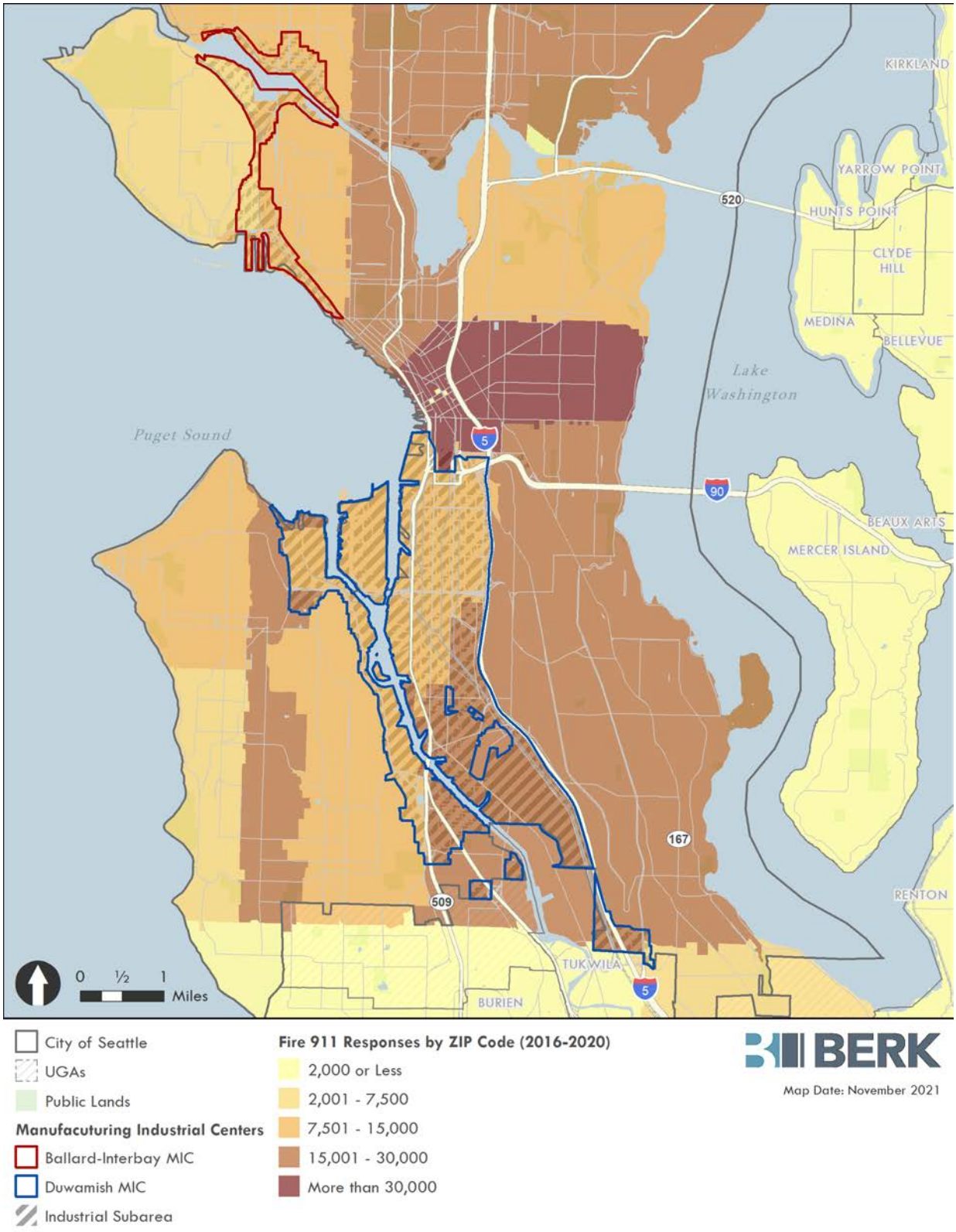
SFD received fewer calls for service citywide and within the study area in 2020 than in the four years prior (see **Exhibit 3.13-4**), likely because of the overall decrease in EMS related calls as a result of the pandemic (EMS incidents make up about 80% of incidents overall). Within the study area, the fewest calls were received in the Ballard Subarea and the most were received in the SODO/Stadium Subarea. Calls for service in the study area decreased by 19% from 2019 to 2020 but stayed relatively constant citywide (increased by 0.4%). Less than 0.2% of calls for service citywide were located in the study area each year from 2016 to 2020. As shown in **Exhibit 3.13-5**, SFD calls for service from 2016-2020 were more heavily concentrated in non-industrial areas of the city, including Downtown, east of Downtown near the hospitals, and in areas with large institutions such as the University of Washington. The Georgetown/South Park Subarea received more calls from 2016-2020 than other parts of the study area.

Exhibit 3.13-4 Calls for Fire and EMS Services by Subarea, 2016-2020

Subarea	2016	2017	2018	2019	2020	Total
Ballard	17	12	13	8	12	62
Interbay Dravus	39	31	35	31	29	165
Interbay Smith Cove	27	19	13	35	12	106
SODO/Stadium	47	56	51	46	32	232
Georgetown/South Park	45	43	31	21	20	160
Study Area Total	175	161	143	141	105	725
Citywide Total	101,974	102,947	101,485	102,368	93,495	502,269

Note: Citywide calls for service are higher than the number of response incidents in Exhibit 3.13-3 as not all calls for service result in in an emergency incident response.
Sources: Real Time Fire 911 Calls, 2021 (https://data.seattle.gov/Public-Safety/Seattle-Real-Time-Fire-911-Calls/kzjm-xkqj); BERK, 2021.

Exhibit 3.13-5 Total Calls for Fire and EMS Services in the Study Area and Surrounding Vicinity, 2016-2020



Sources: Real Time Fire 911 Calls, 2021 (https://data.seattle.gov/Public-Safety/Seattle-Real-Time-Fire-911-Calls/kzjm-xkqj); BERK, 2021.

Response Time

Maintaining or improving emergency response times is the core of Seattle Fire Department operations (Seattle Fire Department 2012). SFD's response standards specify the minimum criteria needed to effectively and efficiently deliver fire suppression, special operations response, and emergency medical services (Seattle Fire Department 2020). The Capital Facilities Appendix of *Seattle 2035* establishes the following response time standards for the Department (City of Seattle 2020, 529-530):

- Call Processing Time: 60 seconds for phone answered to first unit assigned for 90% of calls.
- Fire Response Time: Arrival within 4 minutes for first-arriving engine at a fire for 90% of calls, and arrival within 8 minutes of the full first alarm assignment of 15 firefighters, for 90% of calls.
- Basic Life Support: Arrival within 4 minutes of the first medical unit with two EMTs, for 90% of calls.
- Advanced Life Support: Arrival within 8 minutes for 90% of calls.

Exhibit 3.13-6 shows the statistics the Department uses to measure response time performance. These statistics generally correspond with the Department's response time standards. Between 2016 and 2020 the Department fell short of meeting its response time standards, with the exception of meeting its call processing time standard in 2018 and its full first alarm assignment standard in 2018, 2019, and 2020.

Exhibit 3.13-6 Response Statistics, 2016-2020

Year	Call Processing Time within 60 Seconds	First Arriving Engine at Fire within 4 Minutes	Full First Alarm Assignment at Fire within 8 Minutes	First Arriving Unit for a BLS Incident within 4 Minutes	First Arriving Unit for an ALS Incident within 8 Minutes
Adopted Standard	90%	90%	90%	90%	90%
2016	85%	84%	86%	84%	89%
2017	84%	77%	71%	79%	86%
2018	92%	76%	93%	79%	86%
2019	64%	75%	94%	76%	86%
2020	66%	78%	92%	73%	81%

Note: SFD updated data for 2018 and 2019 in the 2020 Annual Report to reflect more accurate information from their system. 2016 and 2017 information are from the 2018 Annual Report.
Source: Seattle Fire Department Annual Report, 2018 and 2020.

Planning

Facilities

The Seattle Department of Finance & Administrative Services designs, builds, and maintains City-owned buildings, including fire facilities. They coordinate with SFD to ensure facility plans are consistent with strategic planning for fire services.

In 2003, a Fire Facilities and Emergency Response Levy was approved by Seattle voters. The levy provided funding for major facility improvements across the Seattle Fire Department including upgrades, renovations, or replacements of 32 neighborhood fire stations (including all stations serving the study area), construction of a new training facility, establishment of emergency preparedness facilities, renovation of the Chief Seattle Fireboat (located at Station 3 Fisherman's Terminal), and construction of 2 new fireboats (Department of Finance and Administrative Services 2021). New facilities were built with excess physical capacity (City of Seattle 2020).

Seattle's 2022-2027 proposed CIP includes funding for a new Station 31 in North Seattle,[23] replacement of the existing dock at Station 5 on the downtown waterfront, seismic assessments at five public safety facilities, and general maintenance to facilities system-wide (Seattle City Budget Office 2021). The City also anticipates it will need to replace Station 3 and the Fire Marshal office, acquire, or develop a new facility for SFD Headquarters, replace or expand the commissary and fire garage, develop a fire station in South Lake Union, and develop a freshwater marine fire suppression facility (City of Seattle 2020).

The 2022 Proposed Budget adds funding to enhance SFD operations in several areas including emergency responses, diversity recruitment, dispatch training, and IT system upgrades. In response to extensive research into community response models and on best practices gleaned from around the country, SFD will add a new specialized triage response program (Seattle City Budget Office 2021, 326).

Strategic Planning

The Department's 2012-2017 Strategic Plan is a road map for SFD and a guide for identifying priorities for emergency response services into the future. The plan identifies internal and external challenges facing the Department. Internal challenges include providing adequate leadership development and operations training and maintaining employee involvement and engagement. External challenges include financial constraints, growth of non-emergency calls, and changing demographics. The plan sets forth six goals and related strategies and action

[23] Station 31 in Northgate closed in June 2019 in response to air quality concerns. Units were temporarily reassigned to neighboring stations until an interim facility is established. The interim Fire Station 31 at 10503 Interlake Avenue North is planned to open in fall 2021 and will house Engine 31, Ladder 5, Aid 31, and Medic 31 (Seattle Fire Department 2021). Construction on a new permanent fire station is tentative but could be ready for general contractor bid in 2023 (Seattle Fire Department 2020). Station 31 is located north of the study area but could be called upon to provide emergency support if assistance is requested.

steps to address these challenges and to support the Department's mission. One of the goals is to maintain quality equipment, apparatus, facilities, and technology. The strategies and action steps under this step support facilities planning and coordination with the Department of Finance & Administrative Services.

Police

Data & Methods

Information about police services was collected from the Seattle Police Department, Port of Seattle Police Department, and Burlington Northern Santa Fe Railroad Police. SPD publishes calls for service, response times, and crime reports annually. Independent researches at Seattle University also collect data at the micro-community level through the annual Seattle Public Safety Survey (available via SPD's Survey Results Dashboard). SPD's 2019 Strategic Plan and the City's adopted 2021 Budget and 2021-2026 CIP were also referenced. Median response times by precinct were calculated from call data published on the City of Seattle's Open Data Portal.

The Port of Seattle Police Department publishes an annual report. BNSF Railway does not publish statistics about its police unit.

Services & Resources

Seattle Police Department

The Seattle Police Department (SPD) provides police protection services to the City of Seattle, including the study area. Its primary duties include foot, car, and bike patrols, harbor patrols, 911 calls, investigations, traffic enforcement, parking enforcement, homeland security, and specialty units such as Special Weapons and Tactics (SWAT), gang, bomb/arson, and canine units. SPD currently has 1,325 deployable sworn officers (1,433 total sworn officers) and 631 civilian employees (Seattle Police Department 2021).

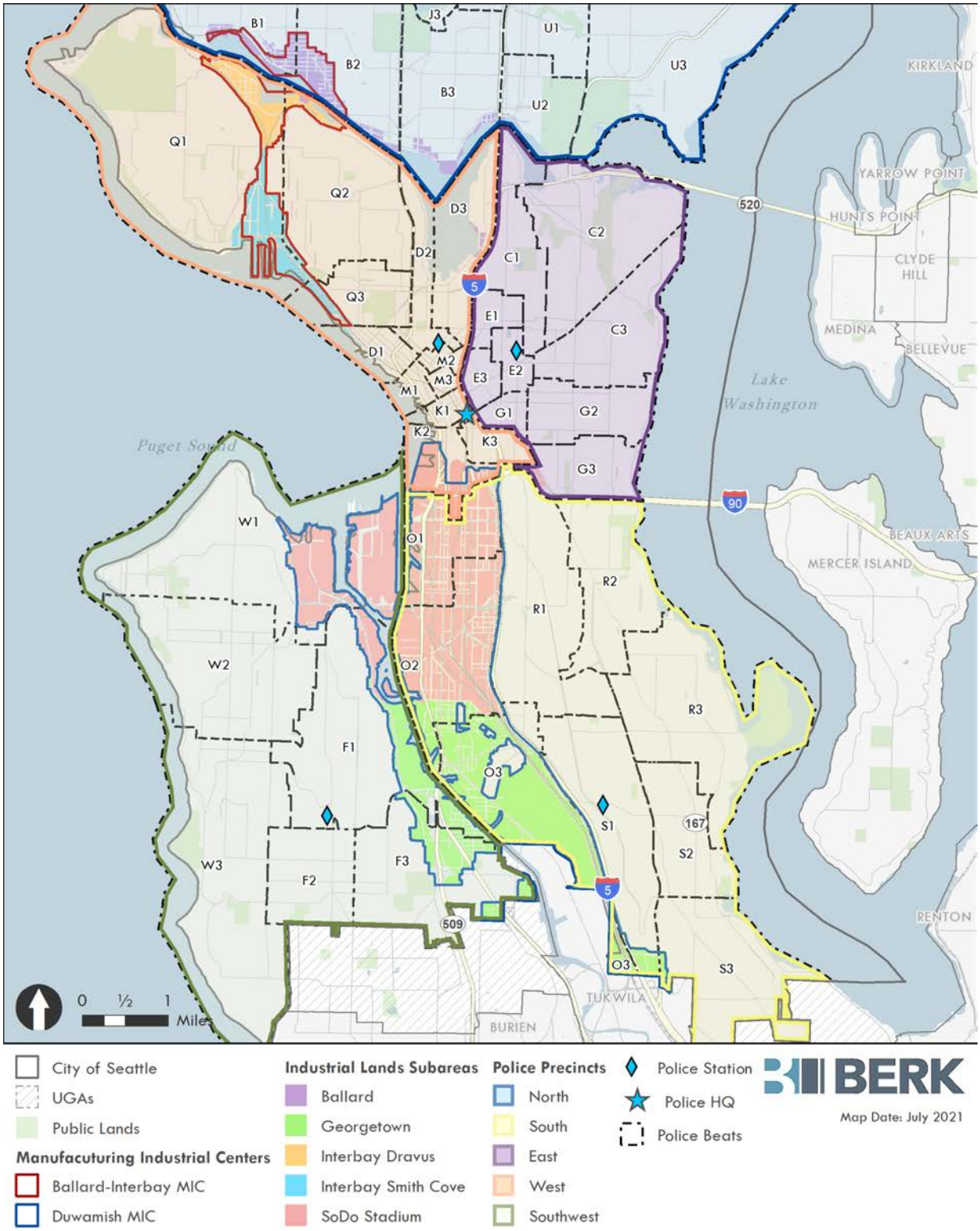
The Department is divided into five precincts, each with a police station that serves as the base of operations for that precinct (see **Exhibit 3.13-7**). The BINMIC portion of the study area is in the North and West precincts while the Greater Duwamish MIC portion is primarily in the South and Southwest precincts (the area near the stadiums is in the West Precinct and a small portion near I-90 is in the East Precinct). Other industrial lands along the north side of Salmon Bay are served by the North Precinct, and industrial lands in Eastlake are served by the West Precinct. Precincts are further divided into smaller geographic areas called sectors and beats (there are three beats per sector; e.g., Ocean Sector is divided into beats O1, O2, and O3). Individual patrol officers are assigned responsibility based on beats (Seattle Police Department 2021). The location of the study area relative to police service areas is shown in **Exhibit 3.13-8**.

Exhibit 3.13-7 SPD Station Locations and Areas Served

Precinct	Location	Primary Area Served	Sq. Ft.	Year Built
North	10049 College Way N (NE of the study area)	North of the Ship Canal to city limits	16,434	1984
West	810 Virginia St (E of the study area)	Queen Anne, Magnolia, the Downtown core, and the area west of I-5	46,231	1999
East	1519 12th Ave (E of the study area)	Eastlake and the area north of I-90 to the Ship Canal and east of I-5	61,580	1926 (updated 1985)
South	3001 S Myrtle St East (E of the study area)	South of I-90 to city limits and west of the Duwamish	13,688	1983
Southwest	2300 SW Webster St (W of the study area)	West Seattle and the Duwamish Industrial Area	28,531	2002

Source: City of Seattle, 2020.

Exhibit 3.13-8 Police Precinct, Sector, and Beat Boundaries



Source: City of Seattle, 2021; BERK, 2021.

Port of Seattle Police Department

The Port of Seattle Police Department was created in 1972 and provides the primary law enforcement service to Seattle-Tacoma International Airport and the Port's seaport properties (see **Exhibit 3.13-9**). Port of Seattle Police patrol more than 30 miles of waterfront property, piers, marinas, and cargo and cruise ship terminals and are the primary first responders for all reported crimes and incidents within its jurisdiction. The Department's Waterfront Office is located in the study area at Terminal 30 (2715 East Marginal Way South, Building A-5). The POSPD has been internationally accredited by the Commission on Accreditation for Law Enforcement Agencies since 2011 (Port of Seattle Police 2020).

Exhibit 3.13-9 Port of Seattle Properties Near the Study Area, 2020

Source: (Port of Seattle Police 2020).

The POSPD currently consists of 115 commissioned police officers—including 1 chief, 2 deputy chiefs, 6 commanders, 18 sergeants, and 88 police officers—and 38 non-commissioned personnel—including 911 communications specialists who receive and coordinate all calls for service for both the Port of Seattle Fire and Police Departments and the Burlington Northern Santa Fe Railroad Police. The Department also has several specialized units, including a Marine Patrol Unit, a Dive Team, and a Commercial Vehicle Enforcement Unit to support seaport activities (Port of Seattle Police 2020).

The Transportation Security Administration, as an agency of the federal Department of Homeland Security, oversees the security efforts for all Port properties. Currently, the U.S. Coast Guard maintains responsibility for shoreline security for the Port. TSA provides support to the Coast Guard in its maritime security efforts and focuses primarily on passenger security and intermodal connectivity to ports. In partnership with the Coast Guard, TSA administers the Transportation Worker Identification Credential program, which is required for workers who need access to secure areas of the nation's maritime facilities and vessels (TSA 2016).

Burlington Northern Santa Fe Railroad Police

The Burlington Northern Santa Fe (BNSF) Railroad Police provide police services along the BNSF railway within the study area. Systemwide, BNSF Police's jurisdiction is 32,500 miles long and 100 feet wide, crisscrossing hundreds of local and state jurisdictions along the way. BNSF Police analyze statistical data to discover crime trends, use K-9 units and proactive uniformed patrol to combat trespassing and cargo thefts, and actively participate with SPD and the Port of Seattle Police Department to investigate crimes committed on railroad property (BNSF Railway 2021).

Performance

Seattle Police Department

Trends in Calls for Service and Response Times

In 2020, SPD received approximately 343,100 calls for service citywide, 100,000-130,000 calls lower than each of the previous 4 years. Total calls were likely lower in 2020 due to the COVID-19 pandemic. In 2019, SPD received 461,328 calls for service—approximately 66% of these were dispatched calls and 34% were on-view incidents (events that officers logged during routine patrols). Total calls for service increased by 5% from 2016 through 2019. **Exhibit 3.13-10** shows the total number of dispatched calls and on-views in the city during this time period. In comparison, the total calls for service in beats serving the study area increased by 17% (see **Exhibit 3.13-11**).

Exhibit 3.13-10 Seattle Police Department Citywide Calls for Service, 2016–2020

Year	Community Generated	Officer Generated	Total
2016	311,380 (71%)	129,496 (29%)	440,877
2017	307,904 (68%)	144,471 (32%)	452,321
2018	317,380 (69%)	142,072 (31%)	459,462
2019	306,586 (66%)	154,551 (34%)	461,328
2020	245,580 (72%)	91,364 (27%)	343,100

Note: Total calls is slightly higher than the sum of community generated (dispatched) and officer generated (on-view) calls as some calls are logged as "Unknown" for how they were received.
Source: Seattle Police Department Calls for Service Dashboard (http://www.seattle.gov/police/information-and-data/calls-for-service-dashboard), 2021.

Exhibit 3.13-11 Seattle Police Department Calls for Service by Area, 2016 and 2019

Area	Total Calls 2016	Total Calls 2019	Percent Change
Citywide	440,877	461,328	5%
Study Area *Includes beats B1, B2, B3, Q1, Q2, Q3, W1, O1, O2, O3, F1, F3, and D3.*	106,343	124,494	17%
Ballard *In beats B1, B2, & B3*	27,874	30,060	8%
Interbay Dravus *Primarily in beats Q1 & Q2*	14,488	15,580	8%
Interbay Smith Cove *Primarily in beats Q1 & Q3*	16,154	15,695	-3%
SODO/Stadium *Primarily in beats W1, O1, & O2*	26,726	35,283	32%
Georgetown *Primarily in beats F1, F3, O2, & O3*	24,685	35,349	43%
Other Industrial Lands North of Salmon Bay *In beats B2 & B3*	17,442	19,288	11%
Other Industrial Lands in Eastlake *In beat D3*	8,460	8,469	0%

Note: Study area total includes beats B1, B2, B3, Q1, W1, O1, O2, O3, F1, and F3.
Source: Seattle Police Department Calls for Service Dashboard (http://www.seattle.gov/police/information-and-data/calls-for-service-dashboard), 2021.

SPD tracks average response time for priority one calls by precinct and sector. **Exhibit 3.13-12** shows statistics from 2016 through 2020 for sectors serving the study area. Citywide, SPD met its seven-minute response time target all five years. The median response time citywide stayed

relatively constant from 2016-2019 (decreased by 1%) but increased by 11% from 2019 to 2020 (increased 36 seconds from 5 minutes 42 seconds to 6 minutes 18 seconds). Median response times within the six sectors serving the study area varied from year to year and from sector to sector, but all sectors saw an increase in median response time from 2019 to 2020. Sectors W and F saw the greatest increase in response time (nearly a minute for both) from 2019 to 2020. This was likely in part because of the closure of the West Seattle High-Rise Bridge (the high bridge) to all vehicle traffic on March 23, 2020. The Spokane St Swing Bridge (the low bridge) remained open to emergency vehicles, transit, and heavy freight at all times of the day but was not built to handle the same volumes of traffic as the high bridge (Seattle Department of Transportation 2021). Sector B in Ballard also saw a 51 second increase in median response time from 2019 to 2020.

Exhibit 3.13-12 Median Response Times for Priority One Calls Citywide and in Sectors Serving the Study Area, 2016–2020

Year	Citywide	Sector B North Precinct	Sector Q West Precinct	Sector K West Precinct	Sector D West Precinct	Sector W South Precinct	Sector F South Precinct	Sector O Southwest Precinct
2016	5:44	7:49	6:35	4:05	5:12	8:02	6:27	5:28
2017	5:40	7:34	6:27	4:13	5:10	8:00	6:28	5:16
2018	5:45	8:24	6:40	4:06	5:09	7:06	6:20	5:01
2019	5:42	8:45	6:30	4:09	4:59	6:59	5:38	4:44
2020	6:18	9:36	6:37	4:16	5:06	7:58	6:37	5:08

Note: The Seattle Police Department utilizes the median value of this dataset because it is less impacted by extreme values.
Source: City of Seattle Open Data Portal, Call Data (https://data.seattle.gov/Public-Safety/Call-Data/33kz-ixgy/data), 2021; Seattle Police Department Calls for Service Dashboard (http://www.seattle.gov/police/information-and-data/calls-for-service-dashboard), 2021.

From 2016 to 2020, the Department has fallen short of meeting its seven-minute response time target for priority one calls in Sector B for all five years and for all but 2019 in Sector W.

Trends in calls for service and response time for sectors and beats serving each of the subareas are summarized below (see **Exhibit 3.13-8** above for the location of each subarea relative to police sectors and beats):

- **Ballard:** The Ballard Subarea is in Sector B in the North Precinct, and is primarily within the boundaries of beats B1 and B2. Calls for service increased by 8% in Sector B from 2016 to 2019 and the median response time increased by 23% from 2016 to 2020, with a 51 second increase in median response time from 2019 to 2020. The Department fell short of meeting its seven-minute response time target in Sector B from 2016 to 2020.
- **Interbay Dravus:** The Interbay Dravus Subarea is in Sector Q in the West Precinct, and is primarily within the boundaries of beats Q1 and Q2. Calls for service increased by 8% in these two beats from 2016 to 2019 with the greatest increases in Beat Q2 (15%). The median response time in Sector Q stayed nearly constant from 2016 to 2020 (increased by

1%). The Department met its seven-minute response time target in Sector Q from 2016 to 2020.

- **Interbay Smith Cove:** The Interbay Smith Cove Subarea is in Sector Q in the West Precinct and is primarily within the boundaries of beats Q1 and Q3. Calls for service decreased by 3% in these two beats from 2016 to 2019. The median response time in Sector Q stayed nearly constant from 2016 to 2020 (increased by 1%). The Department met its seven-minute response time target in Sector Q from 2016 to 2020.
- **SODO/Stadium:** The SODO/Stadium Subarea is in Sector O of the South Precinct and Sector W of the Southwest Precinct, and is primarily within the boundaries of beats W1, O1, and O2 (a small portion is also in sectors K and F). Calls for service increased by 32% in these three beats from 2016 to 2019 with the greatest increases in Beat O2 (66%). The average response time decreased by 6% in Sector O and by 1% in Sector W from 2016 to 2020. However, as noted above, median response time in Sector W increased by 59 seconds from 2019 to 2020, likely in part because of the closure of the West Seattle High-Rise Bridge to all vehicle traffic on March 23, 2020. The Department met its seven-minute response time target in Sector O and fell short of meeting its target in Sector W from 2016 to 2018 and in 2020 (the Department met its target in Sector W by 1 second).
- **Georgetown/South Park:** The Georgetown/South Park Subarea is in Sector O of the South Precinct and Sector F of the Southwest Precinct, and is primarily within the boundaries of beats F1, F3, O2, and O3 (a small portion is also in Sector S). Calls for service increased by 43% in these four beats from 2016 to 2019 with the greatest increases in beats O2 (66%) and O3 (62%). The average response time decreased by 6% in Sector O and increased by 3% in Sector F from 2016 to 2020. Median response time in Sector F increased by 59 seconds from 2019 to 2020, likely in part because of the closure of the West Seattle High-Rise Bridge to all vehicle traffic on March 23, 2020. The Department met its seven-minute response time target in sectors O and F from 2016 to 2020.
- **Other Industrial Zoned Lands:** Other industrial lands along the north side of Salmon Bay are within the boundaries of beats B2 and B3. Calls for service increased by 11% in these beats from 2016 to 2019 and the average response time increased in Sector B by 23% from 2016 to 2020, with a 51 second increase in median response time from 2019 to 2020. The Department fell short of meeting its seven-minute response time target in Sector B from 2016 to 2020.

  Other industrial lands in Eastlake are within the boundaries of Beat D3. Calls for service in this beat did not change from 2016 to 2019 but the average response time decreased in Sector D by 2% from 2016 to 2020. The Department met its seven-minute response time target in Sector D for from 2016 to 2020.

MCPP Priorities

The Seattle Public Safety Survey collects data at the micro-community level about perceptions of crime and public safety, police-community interactions, and knowledge and understanding of the MCPPs. The top five citywide public safety concerns identified in the 2020 survey (in order) were police capacity, property crime, homelessness, drugs and alcohol, and community and public safety capacity. The top five public safety concerns in each micro-community serving the study area are listed in **Exhibit 3.13-13**—police capacity, property crime, and homelessness were among the top three for all but the South Beacon Hill MCPP.

Exhibit 3.13-13 Top 5 Safety Concerns by MCPP in the Study Area in Ranked Order, 2020

MCPP	1st	2nd	3rd	4th	5th
Ballard South	Homelessness	Property Crime	Police Capacity	Drugs & Alcohol	Community & Public Safety Capacity
Chinatown/ Int'l District	Homelessness	Police Capacity	Property Crime	Drugs & Alcohol	Violent Crime
Commercial Duwamish	Police Capacity	Homelessness	Property Crime	Drugs & Alcohol	Traffic Safety
Commercial Harbor Island	Property Crime	Homelessness	Police Capacity	Traffic Safety	Drugs & Alcohol
Eastlake—West	Property Crime	Police Capacity	Homelessness	Community & Public Safety Capacity	Public Order Crime
Fremont	Police Capacity	Homelessness	Property Crime	Traffic Safety	Community & Public Safety Capacity
Georgetown	Homelessness	Property Crime	Police Capacity	Drugs & Alcohol	Community & Public Safety Capacity
Magnolia	Police Capacity	Property Crime	Homelessness	Drugs & Alcohol	Community & Public Safety Capacity
Pioneer Square	Homelessness	Police Capacity	Property Crime	Drugs & Alcohol	Violent Crime
Queen Anne	Property Crime	Police Capacity	Homelessness	Traffic Safety	Community & Public Safety Capacity
SLU/Cascade	Homelessness	Police Capacity	Property Crime	Drugs & Alcohol	Community & Public Safety Capacity
SODO	Homelessness	Property Crime	Police Capacity	Drugs & Alcohol	Public Order Crime
South Beacon Hill	Police Capacity	Property Crime	Community & Public Safety Capacity	Traffic Safety	Violent Crime
South Park	Property Crime	Police Capacity	Homelessness	Traffic Safety	Drugs & Alcohol
Wallingford	Homelessness	Property Crime	Police Capacity	Traffic Safety	Community & Public Safety Capacity

Source: Seattle Police Department Service Results Dashboard (https://www.seattle.gov/police/information-and-data/mcpp-about/survey-results-dashboard), 2021.

MCPP priorities for each subarea are summarized below:

- **Ballard:** The Ballard Subarea includes the Ballard South and Fremont MCPPs. The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included homelessness, property crime, police capacity, and community and public safety capacity. Respondents in Ballard South also included drugs and alcohol among their top five concerns while those in Fremont included traffic safety.
- **Interbay Dravus:** The Interbay Dravus Subarea includes the Magnolia and Queen Anne MCPPs. The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included police capacity, property crime, homelessness, and community and public safety capacity. Respondents in Magnolia also included drugs and alcohol among their top five concerns while those in Queen Anne included traffic safety.
- **Interbay Smith Cove:** The Interbay Smith Cove Subarea includes the Magnolia and Queen Anne MCPPs. The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included police capacity, property crime, homelessness, and community and public safety capacity. Respondents in Magnolia also included drugs and alcohol among their top five concerns while those in Queen Anne included traffic safety.
- **SODO/Stadium:** The SODO/Stadium Subarea includes the following MCPPs by precinct:
  - West Precinct: Pioneer Square and Chinatown/International District
  - South Precinct: SODO and Georgetown
  - Southwest Precinct: Commercial Duwamish and Commercial Harbor Island.

  The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included homelessness, police capacity, property crime, and drugs and alcohol. Other top five concerns varied by MCPP: respondents in the West Precinct included violent crime, respondents in the Southwest Precinct included traffic safety, respondents in Georgetown included community and public safety capacity, and respondents in SODO included public order crime among their top five concerns.
- **Georgetown/South Park:** The Georgetown/South Park Subarea includes the Georgetown and South Beacon Hill MCPPs in the South Precinct and the Commercial Duwamish and South Park MCPPs in the Southwest Precinct. The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included homelessness, property crime, police capacity, and community and public safety capacity. Drugs and alcohol were among the top five concerns in Ballard South while traffic safety was among the top five in Fremont.
- **Other Industrial Zoned Lands:** Other industrial lands along the north side of Salmon Bay are within the Fremont and Wallingford MCPPs, and other industrial lands in Eastlake are within the Eastlake—West and SLU/Cascade MCPPs. The top five public safety concerns in these MCPPs as identified in the 2020 Seattle Public Safety Survey included homelessness, property crime, police capacity, and community and public safety capacity. Respondents in the Fremont and Wallingford MCPPs also included traffic safety among their top five concerns while those in the Eastlake—West MCPP include public order crime and those in the SLU/Cascade MCPP included drugs and alcohol.

Port of Seattle Police Department

In 2020, the Port of Seattle Police Department's patrol team responded to 106,463 calls for service jurisdiction wide (airport and seaport properties), including 55,000 self-initiated contacts (area checks, subject contacts, traffic stops, and checkpoint alarm checks). This was about 15% more calls than in 2019 (106,463 vs. 92,186; see **Exhibit 3.13-14**).

Exhibit 3.13-14 Port of Seattle Police Department Patrol Team Calls for Service, 2019–2020

Year	Calls for Service	Self-initiated
2019	92,186	61,168
2020	106,463	55,000

Source: Port of Seattle Police Department Annual Report 2020.

Schools & Libraries

Data & Methods

The information about schools and libraries was collected from:

- Seattle Public Schools
- Seattle Public Libraries
- King County Assessor Parcel Records
- Seattle Comprehensive Plan
- Seattle Land Use Code

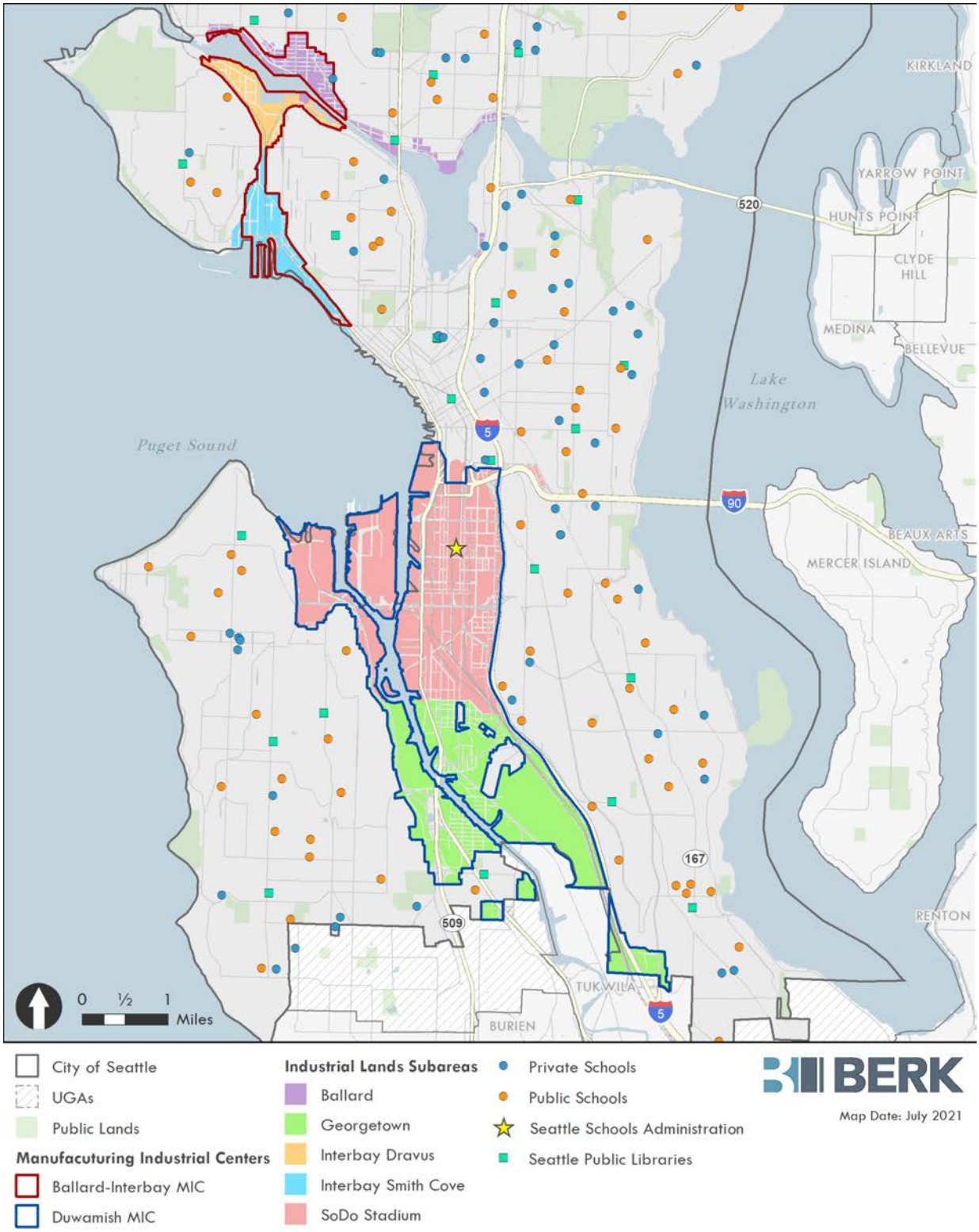
Services & Resources

The Seattle School District serves the city as a whole. It operates 106 schools and employs about 7,574 staff including about 6,173 educators that are school-based. There are about 25,528 Elementary, 12,025 Middle, and 14,828 high school students. The students are 46% white and 54% persons of color.[24]

The Seattle School District Administrative offices are in the SODO/Stadium Subarea. See **Exhibit 3.13-15**. There are no public schools in the study area. There is one private school in Ballard. In the Secondary Study Area there are schools in proximity to industrial zones identified in relation to the nearest subareas. For the few residences in the study area, they would attend a variety of schools based on the service areas in **Exhibit 3.13-16**. Schools are allowed in existing buildings in industrial zones except in the Greater Duwamish MIC.

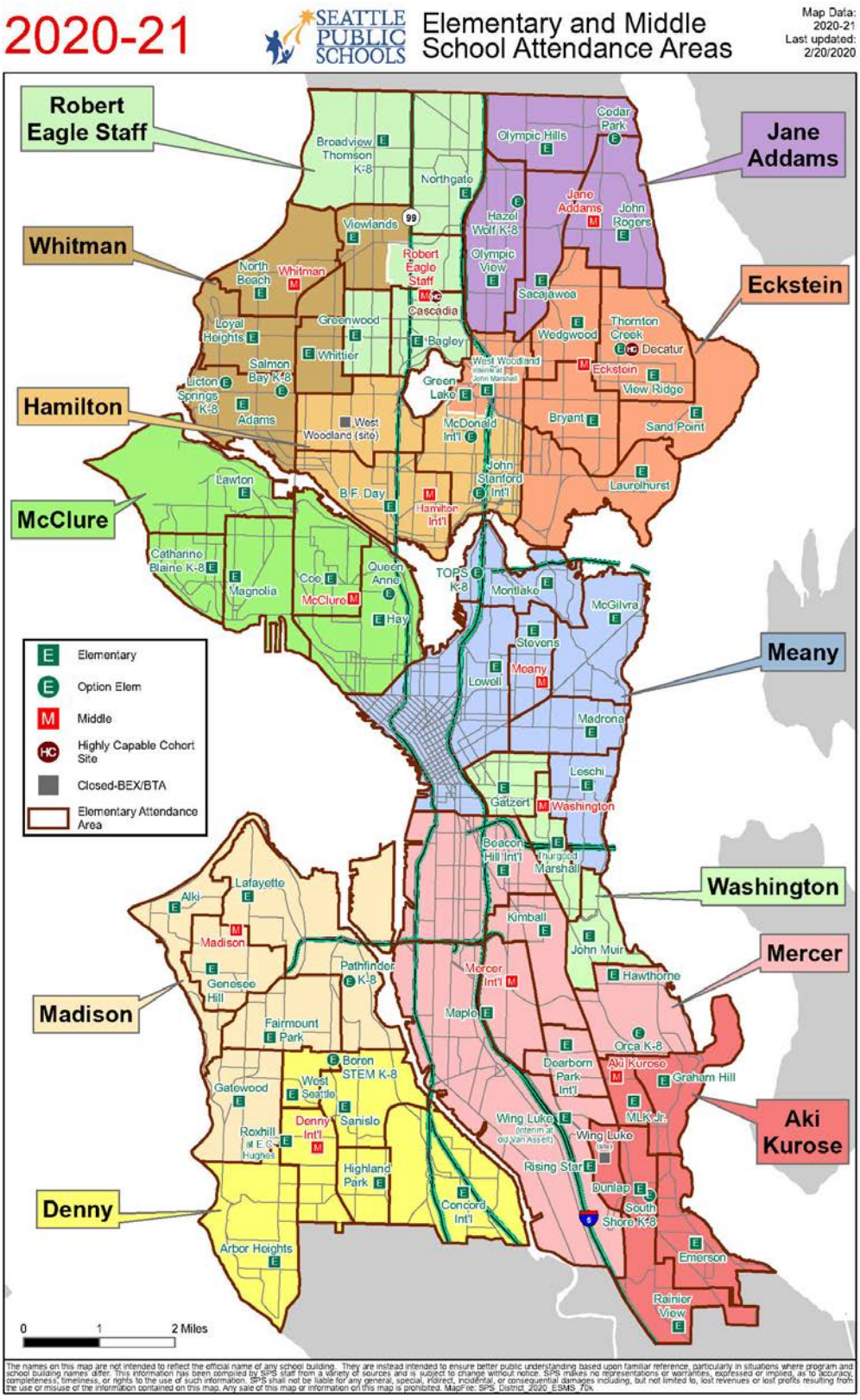
[24] Seattle Public Schools. 2020-21 Fast Facts & Figures Seattle Public Schools. https://www.seattleschools.org/UserFiles/Servers/Server_543/File/District/Departments/Communications/seattle-public-schools-quick_facts.pdf.

Exhibit 3.13-15 Schools and Libraries in or Near the Study Area



Source: King County GIS, 2021; CAI, 2021; BERK, 2021.

Exhibit 3.13-16 School Attendance Boundaries: Elementary and Middle Schools



Source: Seattle School District, 2020.

The Seattle Public Library system offers 27 locations. As of 2020, they provide access to 1.7 million print materials, 677,000 pieces of media, as well as 4.3 million e-books and 2.1 million streaming and downloadable medial. The system also offers 1,100 virtual classes, events, and activities including classes and to learn skills, find job resources and make social connections.[25] There are no libraries in the Primary Study Area, and several nearby in the Secondary Study area, described with the nearest subarea below. See **Exhibit 3.13-15**. The Seattle Industrial zones prohibit libraries.

Schools and libraries serving each subarea are summarized below:

- **Ballard:** The Ballard Subarea is served by BF Day Elementary and Adams Elementary Schools and Hamilton and Whitman Middle Schools based on service areas. There is one private school known as Modern Pilot, offering simulation-based flight training and curriculum, and located on Russel Avenue NW on property zoned IC-65 (M). It is operated in an industrial building on a 5,000 square foot property. The Assessor considers the property to be in an industrial use.
- **Interbay Dravus:** There are no mapped public or private schools in the Interbay Dravus Subarea. To the west is a public school, Lawton Elementary School, which is separated from the study area by topography and a strip of commercial and residential zones. The subarea is served by Lawton, Code, and Magnolia Elementary Schools and McClure Middle School. There are no libraries in the subarea.
- **Interbay Smith Cove:** There are no public or private schools or libraries in the subarea. The subarea is served by Magnolia, Code, and Hay Elementary Schools and McClure Middle School.
- **SODO/Stadium:** The John Stanford Center for Education Excellence and Seattle School District Administrative offices are in the SODO Stadium district on Lander Street on land zoned IG1 U/85. The building lies on about 6.9 acres and contains a 325,000 gross square foot building with two-thirds in office space and one third in storage/warehouse space. The district also owns a 4.3-acre parking lot to the north of the offices. There are no public or private schools or libraries in the subarea. The study area is served by Wing Luke Elementary and Mercer Middle School. The Puget Sound Community School, a private institution, lies on Dearborn Street in the International district and serves students between 11 and 18 years old (6-12 grades). North of the subarea lies the International District / Chinatown Library on Eighth Avenue S.
- **Georgetown/South Park:** There are no schools or libraries in the Georgetown/South Park Subarea. The MIC surrounds the Georgetown Urban Center/Village which contains the historic Concord International school and the South Park Library. The Georgetown/South Park Subarea is served by Concord International, Sanislo, and Wing Luke Elementary Schools and Mercer and Denny Middle Schools.
- **Other Industrial Zoned Lands:** In the Eastlake area abutting the IG1 U/45 zone on E Galer Street is a private school called the Fusion Academy offering one on one teacher/student

[25] The Seattle Public Library. 2021. 2020 Statistical and Financial Summaries. https://www.spl.org/about-us/library-impact/2020-impact-report/2020-statistics.

ratios for middle and high school students. The school is in an office building on a property zoned C1-75. In Eastlake, the industrial area is served by Montlake and Lowell Elementary Schools, and Meany Middle School. The scattered industrial areas along Salmon Bay and north Lake Union are served by BF Day, John Stanford International, and Laurelhurst Elementary Schools and Hamilton and Eckstein Middle Schools.

3.13.2 Impacts

Thresholds of significance utilized in this impact analysis include:

- Negatively affect the response times for police and/or fire and emergency medical services.
- Increase demand for special emergency services beyond current operational capabilities of service providers.
- Result in increases in students and lack of facilities unanticipated in district plans or that would reduce adopted levels of service.

Impacts Common to All Alternatives

Fire & Emergency Medical Services

Population Growth

Growth in worker and residential populations in the study area is expected to lead to an increased number of calls for emergency services. Growth is expected to occur incrementally under all alternatives, as individual development projects are constructed. The Seattle Fire Department would attempt to maintain response times consistent with or better than current performance levels as the population grows. Over time, additional staffing and equipment may be required in order to maintain performance levels.

As described under the Affected Environment, fire stations serving the study area were recently upgraded or replaced as part of the Fire Facilities and Emergency Response Levy and are not anticipated to need renovations in the near future. In addition, the Chief Seattle Fireboat at Station 3 Fisherman's Terminal was renovated as part of the levy and Station 5 (serving the downtown waterfront) is currently under construction concurrent with portions of the Seattle Waterfront project.

Any potential future fire facility, staffing, or equipment needs could be included as part of the City's annual Budget and Capital Improvement Program process.

Building Heights & Density

Existing ladder trucks at Stations 8, 10, 14, 17, and 18 and at other stations near the study area are equipped to provide services to buildings of the heights proposed under all alternatives.

Additionally, new buildings would be required to meet the Seattle Fire Code which requires sprinklers throughout. The City also applies standards for live/work units (like artists' lofts and caretakers' units) to ensure there are exits from sleeping rooms and fire-rated walls and doors between different uses. No impacts to fire services are anticipated due to increases in building height or density.

Hazardous Materials

Industrial uses often include hazardous materials or have the potential to produce hazardous waste. Hazardous materials are defined by the City of Seattle as "those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public, and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal, or transportation" (City of Seattle 2018).

Additional industrial development under all of the alternatives could increase the amount or prevalence of hazardous materials in the study area. All new development would be required to meet the Seattle Fire Code which includes provisions for hazardous materials (Part V, Chapter 50-67). Development proposals would be reviewed by the Seattle Department of Construction & Inspections as well as the SFD. Additional federal and state regulations also apply to development that includes hazardous materials or wastes—for example, the U.S. Environmental Protection Agency regulates hazardous waste in part 262 of title 40 of the Code of Federal Regulations, WSDOT regulates off-site transportation of hazardous materials, and the Washington State Department of Ecology requires additional permits and inspections for such facilities as underground storage tanks. No impacts to fire or EMS services are anticipated due to an increased amount of hazardous materials.

Construction

The Seattle Fire Department makes service calls related to inspection of construction projects and calls to respond to construction-related accidents. As such, increased construction activities associated with potential development under all alternatives could result in an increase in demand for fire services. Existing Fire Department staffing and equipment are anticipated to be sufficient to handle increased services needed for construction activities.

Transportation Network & Traffic Volumes

Use of the public right of ways is critical to SFD meeting their response goals as the Department is dependent upon the capability of the city's street network to handle traffic flows. No specific transportation projects or changes to emergency access routes are proposed under any of the alternatives, but changes to the street network over time has the potential to impact the mobility of fire response vehicles. Any street improvements must be consistent with the Seattle Fire Code Section 503 and Appendix D, which address fire apparatus access roads. Additionally, SFD reviews proposed street improvements on a project-by-project basis to identify potential negative impacts on response times. It is anticipated that these mitigation measures would

adequately address the potential impacts of future changes to the transportation network under any of the alternatives.

Traffic volumes are anticipated to increase under all of the alternatives. Travel times in the study area are expected to remain relatively consistent between 2019 and 2044 (see **Section 3.10 Transportation** and the impacts discussion under each alternative below). Regular planning by SFD is anticipated to address any needed changes to emergency access routes or any future facility, staffing, or equipment needs as a result of increased traffic volumes.

Ballard, Interbay Dravus, & Interbay Smith Cove

The Ballard Link Extension would construct three stations within the BINMIC: Ballard, Interbay (in the vicinity of Dravus Street), and Smith Cove. Transit capacity along the north-south corridor will dramatically increase compared to existing conditions making non-auto modes increasingly competitive.

SODO/Stadium & Georgetown/South Park

Terminal 5, the international marine cargo terminal operated by the Northwest Seaport Alliance (a partnership of the Ports of Seattle and Tacoma), is scheduled to open in early 2022. This opening will significantly increase the number of trucks that must use the West Seattle low bridge to reach the terminal. The opening of Terminal 5 and associated increase in truck traffic could negatively impact response times for emergency vehicles trying to access West Seattle. The City of Seattle is working closely with the Port of Seattle and Northwest Seaport Alliance to plan for more trucks on the low bridge and monitor the increase in workers traveling to the terminals for their shifts (Seattle Department of Transportation 2021, The Northwest Seaport Alliance 2021).

Police

Population Growth

Population growth in the study area may not necessarily result in increased crime and demand for police services. For example, total calls for service decreased by 3% in Beat Q3 from 2016 through 2019, while the population in the study area increased (PSRC 2020). While population growth and increases in urbanization can impact crime, many other factors are part of the equation including population characteristics, economic conditions, transportation conditions, climate, prevalent attitudes towards crime and crime reporting practices in the local population, and police department characteristics (Federal Bureau of Investigation 2013).

Since population and employment growth do not directly correlate to an increased demand for police services, none of the four growth alternatives would necessarily result in proportional increases in call volumes or incidence of major crimes. Therefore, no specific findings of adverse effects on response times or criminal investigations volumes are made. SPD will continue to analyze where best to focus its resources to respond to changes in demand for

police services regardless of which alternative is selected. Better site and building design such as with building placement, lighting, and visibility can reduce the potential for crime.

Building Heights & Density

No impacts to police services are anticipated due to increased building heights. Of the seven sectors serving the study area, Sector K consistently reported the fastest median response time for priority one calls from 2016-2020, ranging from 4 minutes 5 seconds to 4 minutes 16 seconds (see **Exhibit 3.13-11**). Sector K serves a portion of Downtown where there are many tall buildings. Conversely, other sectors serving the study area (such as Sectors B serving Ballard and Sector W) consistently reported the slowest median response time for priority one calls over the same time period.

Relative changes in population density by beat and sector may generate more workload in some areas of the city but are not anticipated to impact police service or response times under any of the alternatives. The Department's deployment model is adjusted for changes in workload. Increased city tax revenue generated by new businesses or households could help defray costs of increased police workload.

Construction

The Seattle Police Department responds to construction-related service calls such as construction site theft and vandalism. Potential construction activities under all the alternatives could result in an increase in demand for police services. Existing Departmental resources are anticipated to be sufficient to handle such an increase.

Transportation Network & Traffic Volumes

Future traffic volumes or changes to the transportation network in the study area could impact first responders' ability to respond rapidly to emergency calls. SPD's staffing model factors in response time to determine appropriate staffing levels in each precinct. The Department would likely adjust staffing levels to improve response times if future increased traffic volumes or changes to the street network negatively impact police services.

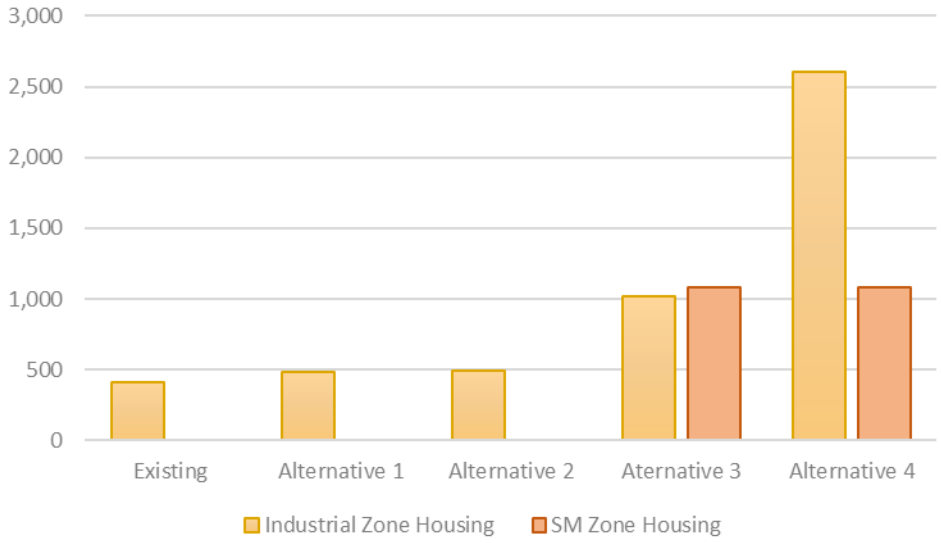
SODO/Stadium & Georgetown/South Park

As discussed under Fire & Emergency Medical Services, the opening of Terminal 5 in early 2022 and associated increase in truck traffic could negatively impact response times for emergency vehicles trying to access West Seattle. The City of Seattle is working closely with the Port of Seattle and Northwest Seaport Alliance to plan for more trucks on the low bridge and monitor the increase in workers traveling to the terminals for their shifts (Seattle Department of Transportation 2021).

Schools & Libraries

The demand for schools and libraries will be in proportion to the increase in housing under each alternative, which shows less growth in alternatives 1 and 2 and more under alternatives 3 and 4. See Exhibit 3.13-17.

Exhibit 3.13-17 Total Housing in Study Area by Alternative



Sources: City of Seattle, 2021; BERK, 2021.

Students are anticipated to be a similar share of the future population as today. Based on the State Office of Financial Management (OFM) population, and the Office of the Superintendent of Public Instruction (OSPI), the student enrollment for fall 2020 is about 7.1% of the total population. See **Exhibit 3.13-18**.

Exhibit 3.13-18 Student Generation Rate

	Number
Seattle School District Population (OFM 2020)	761,932
Enrollment OSPI 2020-2021	53,997
% of Pop	7.1%

Source: OFM, 2021; OSPI, 2021; BERK, 2021.

Based on the net change in dwellings and population, and assuming 7.1% of the population are students, the number of potential students is shown in **Exhibit 3.13-19**. Most housing units and associated population are anticipated under Alternative 4 and the least under Alternative 1. The students would have more effect on schools in Ballard, SODO/Stadium, and Georgetown/South Park.

Exhibit 3.13-19 Student Generation by Subarea based on Net Change in Population

Subarea	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Ballard	1	1	38	115
Interbay Dravus	1	1	11	25
Interbay Smith Cove	1	1	2	-
SODO/Stadium	4	5	29	144
Georgetown/South Park	3	3	9	35
Total: Ind Zone Housing (Caretaker/Artist)	11	12	89	319
With MIC Adjustments—Seattle Mixed-Use Zone Housing	—	—	157	157
Grand Total Students in Study Area	11	12	245	476

Source: BERK, 2021.

Equity & Environmental Justice Considerations

The City of Seattle developed a Racial and Social Equity Index that combines data on race, ethnicity, and socioeconomic and health disadvantages to identify neighborhoods with large proportions of priority populations as residents. Much of the SODO/Stadium Subarea as well as the South Park neighborhood were found to have among the highest disadvantages in the city.

The Action Alternatives—especially alternatives 3 and 4—would result in more land use growth compared to Alternative 1 No Action particularly in the SODO/Stadium and South Park neighborhoods. Additional growth would increase traffic volumes which may in turn increase the response time of emergency vehicles in areas with high proportions of priority populations. However, increased development in areas with histories of long-term underinvestment could bring improved infrastructure to those neighborhoods. Development standards in areas rezoned as Industry & Innovation and Urban Industrial would require frontage improvements such as sidewalks, pedestrian lighting, and street trees that would likely result in safer, more connected, and more accessible neighborhoods.

The increase in housing in areas rezoned Seattle Mixed under alternatives 3 and 4 is anticipated to generate students attending local schools in the Georgetown/South Park Subarea which has a higher proportion of disadvantaged households. The caretakers' quarters and makers' studios may also house families with students though less likely. Ensuring access to schools with safe travel routes would help all local students in these areas.

Impacts of Alternative 1 No Action

Alternative 1 No Action is expected to result in roughly 23,500 additional jobs in the study area compared to existing conditions. Residential development would be very minor—approximately

75 new dwellings over the study area. For both employment and residential uses, growth is expected to be highest in the SODO/Stadium and Georgetown/South Park subareas.

Fire & Emergency Medical Services & Police Services

No impacts other than those described under Impacts Common to All Alternatives are anticipated under Alternative 1 No Action. Regular planning by SFD and SPD are anticipated to address incremental increased demand for fire, emergency medical, and police services.

Traffic volume growth rates within the study area are expected to be relatively low under Alternative 1 No Action given that many facilities already operate with congestion during peak periods and new high-capacity transit options would be available, making non-auto modes increasingly competitive. Travel times in the study area are expected to remain relatively consistent between 2019 and 2044 (see **Section 3.10 Transportation**)

Any potential future facility, staffing, or equipment needs as a result of increased demand for services, traffic volumes, or changes to the transportation network could be included as part of the City's annual Budget and Capital Improvement Program process.

Schools & Libraries

Population growth is anticipated to be the lowest under Alternative 1 at 154, and would have low demand for school and library services.

Two thirds of the small population growth would be in the SODO/Stadium and Georgetown/South Park subareas. The population would generate about 11 students. See **Exhibit 3.13-19**.

There could be a small increase in demand at the Concord International school and the South Park Library. Other schools with minimal changes in students could be Sanislo and Wing Luke Elementary Schools and Mercer and Denny Middle Schools.

Impacts of Alternative 2

Alternative 2 would result in 10,900 jobs more than Alternative 1 No Action and residential growth would remain essentially flat (80 new housing units versus 75 under Alternative 1). As with Alternative 1 No Action, most of the new growth would be concentrated in the Greater Duwamish MIC.

Fire & Emergency Medical Services & Police Services

Alternative 2 applies a mix of Industry & Innovation and Urban Industrial Zone concepts in 10% of the current MIC areas, including an estimated ¼ mile from future light rail stations. These zones introduce nodes of high-density employment and multi-modal access near transit and create thoughtful integration between the edges of Seattle's MICs and adjacent neighborhoods. Compact

growth in these areas in proximity to SFD and SPD services could result in more efficient service delivery and greater ability to meet LOS objectives than under Alternative 1 No Action.

Traffic volumes under Alternative 2 would be slightly higher than Alternative 1 No Action but the magnitude of change would be relatively small in relation to the amount of background traffic in the city. Travel times in the study area are expected to remain relatively consistent on most corridors between 2019 and 2044, with travel time increases of up to 4% over Alternative 1 No Action. One corridor—eastbound W Dravus Street between 15th Avenue W and 20th Avenue W—would also fall from LOS E under Alternative 1 No Action to LOS F under Alternative 2 (see **Section 3.10 Transportation**).

No other impacts aside from those described under Impacts Common to All Alternatives are anticipated under Alternative 2. Regular planning by SFD and SPD are anticipated to address incremental increased demand for fire, emergency medical, and police services. Any potential future facility, staffing, or equipment needs as a result of increased demand for services, traffic volumes, or changes to the transportation network could be included as part of the City's annual Budget and Capital Improvement Program process.

Schools & Libraries

Impacts are very similar to Alternative 1 No Action. There are only 5 more dwellings than Alternative 1 (about 80 total new) and 10 more people (about 164 total new population). Student generation is about 12 instead of 11. See **Exhibit 3.13-19**. Similar small demand could occur with schools and the library serving the Georgetown/South Park Subarea.

Impacts of Alternative 3

Alternative 3 would result in 33,900 jobs more than Alternative 1 No Action. As with Alternative 1 No Action, most of the new employment growth would be concentrated in the Greater Duwamish MIC.

Alternative 3 also includes additional allowance for housing in the Urban Industrial Zone and new housing in focused areas removed from the MIC and placed in a mixed-use zone in Georgetown and South Park. Most of the additional 610 industry-supportive housing in industrial zones (535 more than Alternative 1 No Action) would be in the Ballard and SODO/Stadium subareas. An additional 784 dwelling units in mixed-use developments are estimated for the triangular area of Georgetown bounded by Airport Way, Corson Avenue S, and Carleton Avenue S, and 294 dwelling units are estimated for the two small areas of South Park that would be removed from the MIC near the Duwamish River. This would result in a total of 1,048 housing units over the study time horizon on land that is removed from industrial zoning under Alternative 3.

Fire & Emergency Medical Services

Alternative 3 applies a mix of Industry & Innovation, Urban Industrial, and Mixed-Use Commercial Zone concepts in 14% of the current MIC areas, covering more land area than under Alternative 2 and including an estimated ½ mile from future light rail stations. Similar to Alternative 2, these zones introduce nodes of high-density employment and multi-modal access near transit and create thoughtful integration between the edges of Seattle's MICs and adjacent neighborhoods. However, more industry-supportive housing would be allowed in the Urban Industrial Zone under Alternative 3 than Alternative 2; most of this housing would be in the Ballard and SODO/Stadium subareas. In addition, areas of land would be removed from the MICs in the Georgetown and South Park neighborhoods and placed in a mixed-use zone under Alternative 3. Compact growth in these areas—both inside and outside the MICs—in proximity to SFD and SPD services could result in more efficient service delivery and greater ability to meet LOS objectives under Alternative 3 than under Alternative 1 No Action or Alternative 2. New buildings would be required to meet the Seattle Fire Code, including standards for live/work units (like makers' studios and caretakers' units) to ensure there are exits from sleeping rooms and fire-rated walls and doors between different uses.

Traffic volumes under Alternative 3 would be higher than Alternative 1 No Action and Alternative 2—the PM peak vehicle miles traveled within the Greater Duwamish MIC would increase over Alternative 1 by roughly 2.3% and the PM peak VMT within the BINMIC would increase by roughly 4.3%. Travel times in the study area are expected to remain relatively consistent on most corridors between 2019 and 2044, with travel time increases of up to 1.5 minutes over Alternative 1. Two corridors—northbound 15th Avenue W from Magnolia Bridge to NW Leary Way and eastbound W Dravus Street between 15th Avenue W and 20th Avenue W—would also fall from LOS E under Alternative 1 No Action to LOS F under Alternative 3 (see **Section 3.10 Transportation**).

No other impacts aside from those described under Impacts Common to All Alternatives are anticipated under Alternative 3. Regular planning by SFD and SPD are anticipated to address incremental increased demand for fire, emergency medical, and police services. Any potential future facility, staffing, or equipment needs as a result of increased demand for services, traffic volumes, or changes to the transportation network could be included as part of the City's annual Budget and Capital Improvement Program process.

Schools & Libraries

The increase in caretakers' quarters/makers' studios of 610 dwellings would primarily be in the Ballard and SODO/Stadium subareas, generating most of the potential 89 students. This could increase demand for schools, particularly BF Day, Adams, Beacon Hill, and Wing Luke.

In addition, about 1,078 dwellings are planned in the Georgetown/South Park Subarea generating about 2,210 people and 157 students. This could affect demand at the South Park Library, and particularly schools like Wing Luke (capacity 351) and Concord (capacity 333) schools. This number of students would be about 45% of an elementary school capacity.

However, the plan is a 20-year plan and it is likely that not all housing would be developed at one time, and students would not start all at once and would be spread across grades.

Impacts of Alternative 4

Alternative 4 would result in 35,700 jobs more than Alternative 1 No Action. As with Alternative 1 No Action, most of the new employment growth would be concentrated in the Greater Duwamish MIC.

Alternative 4 also includes the greatest allowance for housing in the Urban Industrial Zone and new housing in focused areas removed from the MIC and placed in a mixed-use zone in Georgetown and South Park. Most of the additional 2,195 industry-supportive housing in industrial zones (2,120 more than Alternative 1 No Action) would be in the Ballard and SODO/Stadium subareas. New housing in the focused areas in Georgetown and South Park that are removed from industrial zoning is the same as under Alternative 3 (1,048 housing units over the study time horizon).

Fire & Emergency Medical Services

Under Alternative 4, the potential for more efficient service delivery and greater ability of SFD and SPD to meet LOS objectives is similar to that described under Alternative 3. Alternative 4 applies a mix of Industry & Innovation, Urban Industrial, and Mixed-Use Commercial Zone concepts in 13% of the current MIC areas, including an estimated ½ mile from future light rail stations. The same areas of land would be removed from the MICs in the Georgetown and South Park neighborhoods and placed in a mixed-use zone under Alternative 4 as under Alternative 3. However, Alternative 4 includes the most industry-supportive housing in the Urban Industrial Zone of the Action Alternatives; most of this housing would be in the Ballard and SODO/Stadium subareas. New buildings would be required to meet the Seattle Fire Code, including standards for live/work units (like makers' studios and caretakers' units) to ensure there are exits from sleeping rooms and fire-rated walls and doors between different uses.

Traffic volumes under Alternative 4 would be slightly higher than Alternative 3. Associated impacts on travel times and corridor LOS are similar to those described above for Alternative 3 (see **Section 3.10 Transportation**).

No other impacts aside from those described under Impacts Common to All Alternatives are anticipated under Alternative 4. Regular planning by SFD and SPD are anticipated to address incremental increased demand for fire, emergency medical, and police services. Any potential future facility, staffing, or equipment needs as a result of increased demand for services, traffic volumes, or changes to the transportation network could be included as part of the City's annual Budget and Capital Improvement Program process.

Schools & Libraries

Impacts under Alternative 4 are similar to Alternative 3 except that there would be more caretakers' quarters/makers' studios at up to 2,195, with most in the SODO/Stadium and Ballard subareas. Like Alternative 3, there would be 1,078 dwellings in the Georgetown/South Park Subarea.

All together there would be an increase in population of 6,710 including 476 students. Local libraries in Ballard and South Park would likely see an increase in demand for services. Schools serving Ballard, SODO/Stadium, and Georgetown/South Park could have increased demand at 33-45% of a typical elementary school capacity (~350).

3.13.3 Mitigation Measures

Incorporated Plan Features

Fire, Emergency Medical, & Police Services

- Compact growth in proximity to SFD and SPD services could result in more efficient service delivery and ability to meet LOS objectives.

Schools & Libraries

- None.

Regulations & Commitments

Fire & Emergency Medical Services

- Rules governing fire prevention in the State of Washington and the City of Seattle are addressed in the International Fire Code (IFC) with state adopted amendments in WAC Chapter 51-54A. In addition to the requirements detailed in the 2018 IFC, the City of Seattle has also adopted its own local amendments that can be found in Title 22 Subtitle VI Fire Code of the Seattle Municipal Code. All new development in the primary and secondary study areas is required to meet City of Seattle development regulations as well as the International Building Code and IFC. The Fire Code provides minimum fire and life safety standards for buildings, access roads processes, and fire protection equipment installations. Adequate fire flow to serve potential development is required under the Fire Code. Potential development would also be required to comply with code requirements for emergency access to structures.
- The Seattle Fire Department enforces and is subject to various City of Seattle regulations such as Title 22 Subtitle VI Fire Code, Title 10 Healthy and Safety, Title 11 Vehicles and Traffic, and Title 23 Land Use Code.

- The City sends plans for building construction from the Seattle Department of Construction & Inspections to the Fire Department for review of fire apparatus access and other fire code related issues.
- The City applies standards for live/work units like artists' lofts and caretakers' units to ensure there are exits from sleeping rooms and fire-rated walls and doors between different uses.

Police

- The Seattle Police Department enforces and is subject to various City of Seattle regulations such as Title 10 Healthy and Safety and Title 11 Vehicles and Traffic.
- Ongoing Seattle Police Department processes to evaluate where to best focus its resources are anticipated to help address future changes in demand for police services in the study area.
- Ongoing City of Seattle capital improvement planning and budgeting efforts are anticipated to address police facility needs, including potential needs for future improvements.

Schools & Libraries

- Ongoing Seattle School District capital facilities management planning is anticipated to be sufficient to address increases in student population. The Seattle School District prepares capital plans and projects are funded by levies.
- SDOT provides a Safe Routes to School program. In addition to education, there are walkway projects to make routes safer.

Other Potential Mitigation Measures

Fire & Emergency Medical Services

- Ongoing City operational and capital facilities planning efforts are anticipated to address incremental increases and other changes in demand for fire services.
- A portion of the tax revenue generated from potential redevelopment in the study area would accrue to the City of Seattle and could be used to help fund fire services.
- The City is considering an option to replace the Magnolia Bridge with a new bridge along Armory Way connecting to Thorndyke Avenue W at W Halladay Street. Replacing the bridge could improve emergency vehicle access to the study are and potentially lower response times.

Police

- A portion of the tax revenue generated from potential redevelopment in the study area would accrue to the City of Seattle and could be used to help fund police services.

- To reduce criminal activity and calls for service, site design principles can be employed such as orienting buildings towards the street, providing public connections between buildings, and providing adequate lighting and visibility.

Schools & Libraries

- The Seattle Public Library has a strategic plan and operations plan that guide the provisions of library services.
- The II and UI zones include potential changes to streetscape standards and could enhance walking routes to schools in areas with added housing.

3.13.4 Significant Unavoidable Adverse Impacts

All studied alternatives would increase the demand for public services with alternatives 2, 3, and 4 increasing jobs above No Action. The increase in industrial jobs could result in a greater need for fire and emergency services. Increased non-industrial jobs would require apparatus for taller structures in the case of fire or rescue.

All alternatives, particularly alternatives 3 and 4 would increase housing and increase demand for school and library services.

No significant unavoidable adverse impacts to fire and emergency medical services, police, or schools and libraries are anticipated with application of mitigation measures and regular capital planning.

Section 3.14

Utilities

This section documents the effected environment, impacts, mitigation measures, and significant unavoidable impacts of the public utilities that provide services to the study area. Utilities discussed in this section include the public wastewater system (including combined sewer), the stormwater drainage system, and the electrical system.

Impacts of the alternatives on utilities are considered significant if they:

- Are inconsistent with utility system planned growth and capital plans.
- Have the potential to require major new projects or initiatives for energy system upgrades to accommodate redevelopment.

Potable water is provided to the study area by Seattle Public Utilities (SPU). Seattle anticipated water service needs in its Final EIS for the Seattle Comprehensive Plan Update, May 5, 2016, hereby incorporated by reference. To plan for long-term needs and meet regulatory requirements, Seattle Public Utilities regularly updates its Water System Plan. The 2019 Water System Plan is the latest update. It describes near- and long-term plans for the regional water system. Through their water forecasting, asset management framework, and CIP, SPU employs a variety of strategies that allow them to anticipate and adjust to changing demands. Future developments would seek a water availability certificate (WAC) from SPU that confirms SPU water infrastructure exists to supply the parcel(s). (City of Seattle n.d.)The document identifies requirements, system improvements, and conditions necessary to provide water service to the parcel. With the Comprehensive Plan Final EIS, the current Water System Plan, and the WAC process, water services are addressed and not further considered in this EIS.

3.14.1 Affected Environment

Data & Methods

This section considers wastewater, stormwater, and power provider plans and studies. The section evaluates changes in population, dwelling units, and jobs and their effect on wastewater generation, the quantity of stormwater runoff, and electrical demand.

Service Providers

Seattle Public Utilities (SPU) manages the public wastewater and stormwater drainage in the City of Seattle. King County Wastewater Treatment Division (WTD) manages all the wastewater treatment plants and wet weather treatment facilities within the City of Seattle and surrounding King County. Together, SPU and WTD manage the combined sewer system. Seattle City Light (SCL) manages the electric power generation, transmission, and distribution services in the City of Seattle.

Wastewater & Combined Sewer

SPU Drainage and Wastewater Utility collects and conveys wastewater through a system of pipes, detention facilities, pump stations, outfalls, and treatment facilities. Most of the wastewater flows collected in the study area wastewater collection system are conveyed to King County for regional conveyance and treatment. The King County WTD operates the West Point Wastewater Treatment Plant (West Point) and Elliott West Wet Weather Treatment Facility (Elliott West), which serve the BINMIC and Greater Duwamish MICs and the subareas within. A small area in the southwest corner of the study area discharges to the Southwest Suburban Sewer District.

Exhibit 3.14-1 West Point Wastewater Treatment Plant Treatment Capacity

	Flow (mgd)
Dry Weather	90
Wet Weather	300[1]

[1] primary treatment and disinfection for flows between 300 to 440 mgd.
Source: Herrera, 2021.

As shown in **Exhibit 3.14-3**, the BINMIC has a combination of a partially separated and combined sewer system and the Greater Duwamish MIC has a combination of partially separated, combined sewer, and separated sewer systems. Both SPU and King County WTD operate combined sewer systems in the city. Combined sewer systems collect stormwater runoff and domestic wastewater in the same pipe and transport it to a wastewater treatment facility for treatment prior to discharge. In partially separated areas a portion of the runoff has been diverted in pipes to the separate drainage system. The primary objective of these separation projects was to reduce emergency overflows of untreated sewage into nearby waterbodies. **Exhibit 3.14-3** shows the partially separated areas in the study area. Areas of the system that were constructed as combined sewer but now function solely for wastewater conveyance have excess capacity because they were sized to convey stormwater, which no longer flows the system in these areas.

The installation of the combined sewer system is older; most pipes date back to the late 1800s and early 1900s. The partially separated system is more recent, with most pipes installed in the 1960s. The local collector pipes range from 8 to 12 inches in diameter and are primarily constructed of vitrified clay and concrete. As shown in **Exhibit 3.14-3**, wastewater lines primarily run north-south through the study area. During dry weather, the northern portion of the Elliott Bay Interceptor conveys wastewater from BINMIC to West Point via the Interbay Pump Station. Flow from the Greater Duwamish MIC is conveyed from either the West Duwamish Interceptor or the southern portion of Elliott Bay Interceptor via the Duwamish and Interbay Pump Stations to West Point.

During wet weather, combined wastewater and stormwater flows in combined sewer systems can exceed the system's capacity (Exhibit 3-53-1). In the neighborhoods adjacent to the BINMIC,

these wet weather flows from the combined sewer systems are diverted to a 14-foot diameter storage tunnel under Mercer Street. The Mercer Street Tunnel can store up to 7.2 million gallons until the Elliott Bay Interceptor has the capacity to transport the wastewater to West Point. Depending on the severity of the storm, stored flow in the tunnel is conveyed to West Point or the Elliott West Wet Weather Treatment Facility (Elliott West) for treatment prior to discharge. During the largest storms—on average, once a year—flows may exceed pumping capacity of Elliott West and are discharged untreated. This untreated flow is known as a "combined sewer overflow" (CSO). CSOs from regulated outfalls are allowed at times, when the system reaches capacity, and as permitted by agreements with the Washington Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA). SPU and King County WTD have made significant upgrades to the conveyance and detention capacity of the combined sewer system to limit these overflows. As the combined sewer system was designed to convey both wastewater and stormwater, during dry weather there is not a capacity issue for wastewater flow alone. More information about CSOs can be found in **Section 3.14.3 Mitigation Measures, Regulations & Commitments** (see King County & City of Seattle Guidelines, Regulations for Wastewater & Combined Sewer).

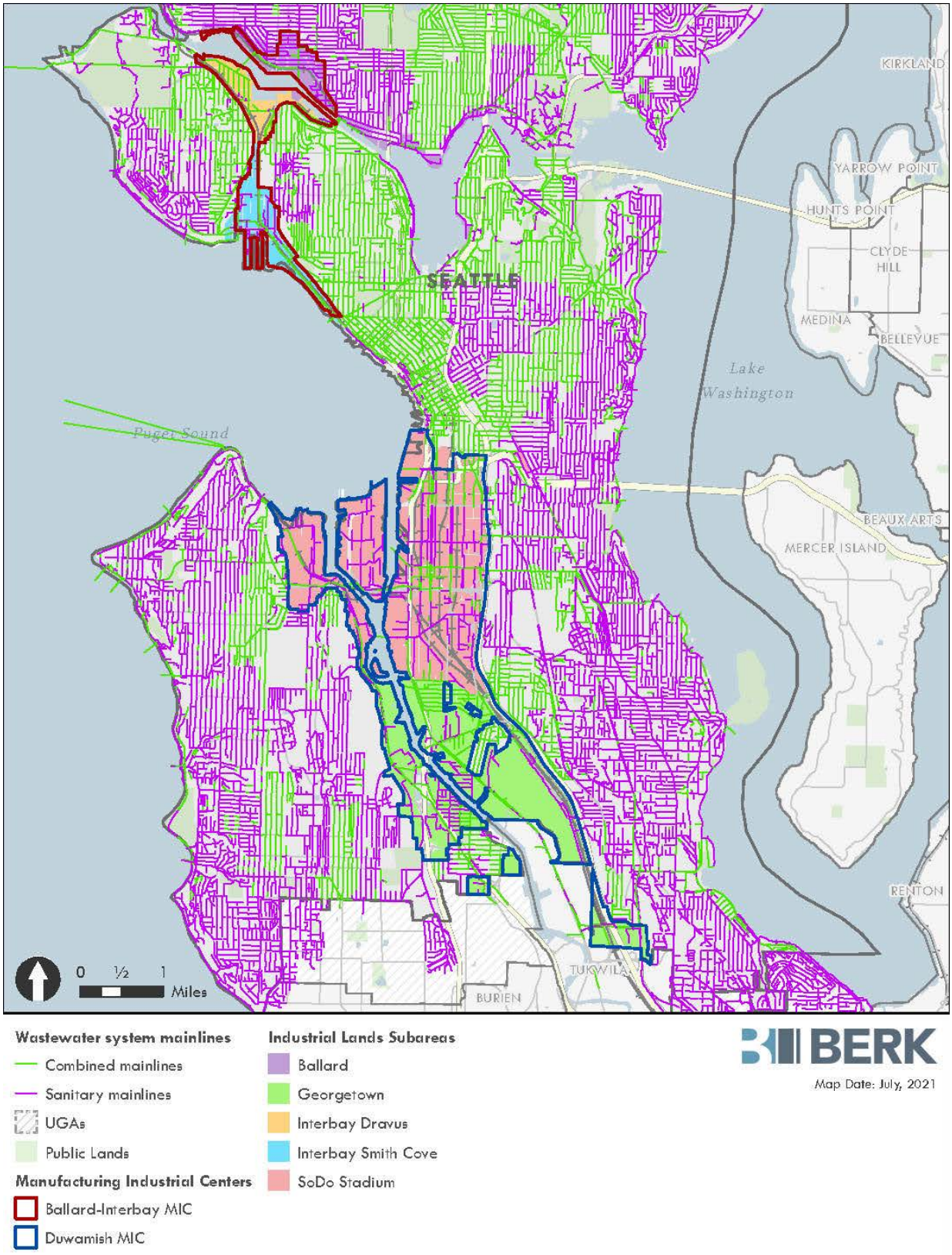
Exhibit 3.14-2 summarizes the length of the combined, sanitary, and total systems in each subarea.

Exhibit 3.14-2 Length of Wastewater Infrastructure

Subarea	Infrastructure Type	Total Pipe Length (ft)[1]
Ballard	Combined System	419
	Sanitary System	5,184
	Total System	5,604
Interbay Dravus	Combined System	4,492
	Sanitary System	310
	Total System	4,802
Interbay Smith Cove	Combined System	22,773
	Sanitary System	19,931
	Total System	42,705
SODO/Stadium	Combined System	21,719
	Sanitary System	46,897
	Total System	639,789
Georgetown/South Park	Combined System	15,291
	Sanitary System	18,733
	Total System	34,024

[1] Infrastructure within the City of Seattle Right of Way (ROW) were not included in the calculations.
Source: Herrera, 2021.

Exhibit 3.14-3 Wastewater and Combined Sewer System



Source: Herrera, 2021.

Stormwater

Stormwater runoff from impervious surfaces in the BINMIC and Greater Duwamish MICs is collected and conveyed from streets and properties, through the stormwater collection system. A portion of the system is managed by the Port of Seattle's Marine Stormwater Utility and much of the water is conveyed to receiving water bodies by the SPU storm drain system. This collection system includes the piping network, catch basins, and manholes that convey stormwater from the BINMIC and Greater Duwamish MICs to Elliott Bay (see **Exhibit 3.14-5**). Stormwater surrounding the MICs is collected and conveyed through SPU's combined and separated sewer systems. A small percentage of stormwater runoff from public rights-of-way is collected and conveyed in separate pipe networks within the partially separated portion of the surrounding neighborhoods (see **Exhibit 3.14-5**). The combined and partially separated systems are described in the wastewater discussion, above.

The stormwater drainage system within the partially separated areas includes a series of catch basins running along main drainage lines to take surface water runoff from roadways. In some areas, stormwater flows from these lines are conveyed back into the combined sewer system. In other areas, stormwater flows continue within the drainage system and discharge at outfalls to Elliott Bay. As with the wastewater system, SPU manages the storm drain system through asset-based management and operational standards.

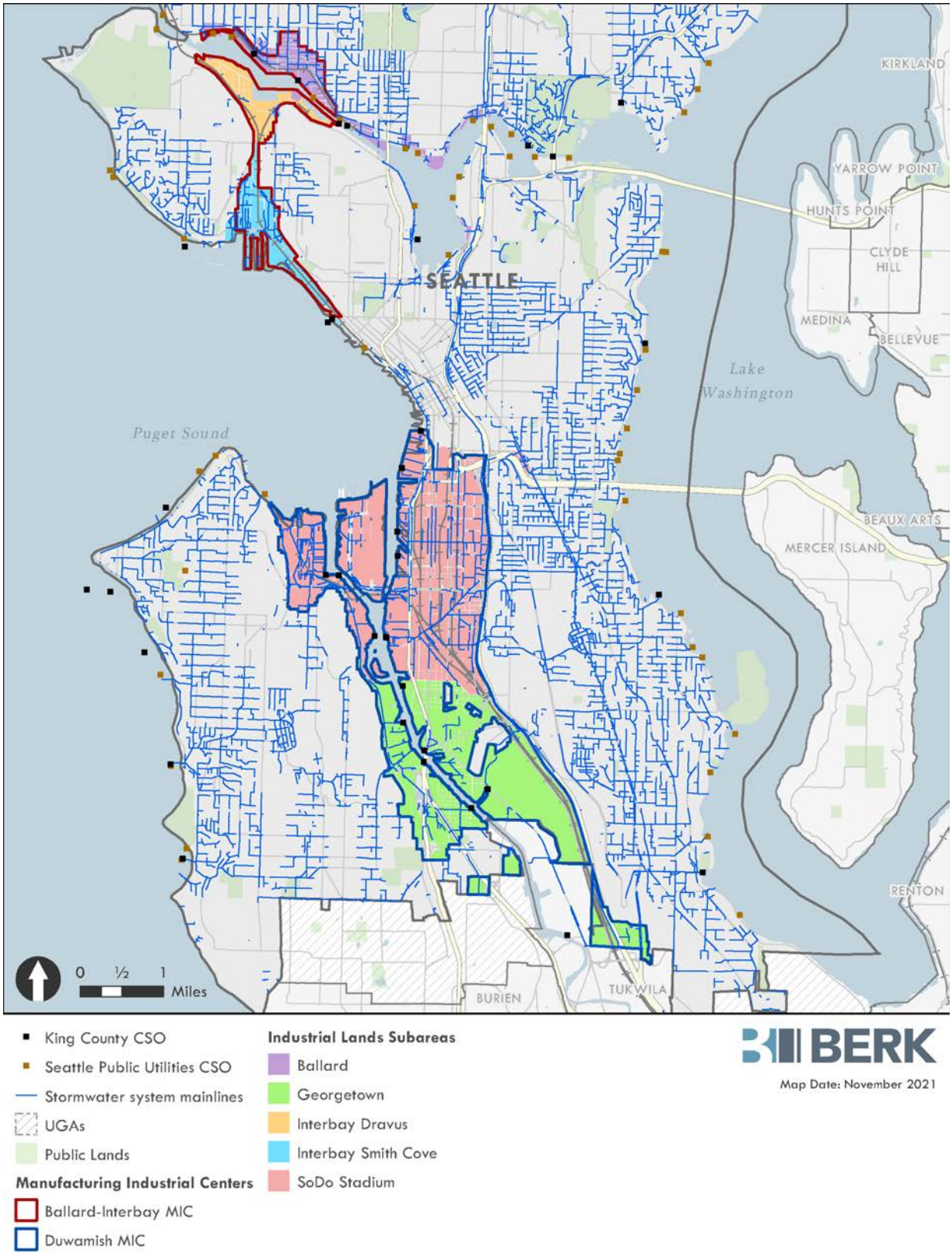
Exhibit 3.14-4 summarizes the length of stormwater infrastructure and number of adjacent CSO outfalls in each subarea.

Exhibit 3.14-4 Length of Stormwater Infrastructure and Adjacent CSO Outfalls in the Study Area by Subarea

Subarea	Total Pipe Length (ft)[1]	Adjacent CSO Outfalls[2]
Ballard	3,993	10
Interbay Dravus	183	0
Interbay Smith Cove	28,101	2
SODO/Stadium	90,661	11
Georgetown/South Park	22,371	6

[1] Infrastructure within the City of Seattle Right of Way (ROW) were not included in the calculations.
[2] King County and Seattle Public Utilities CSO outfalls within a 150-ft buffer of each subarea.
Source: Herrera, 2021.

Exhibit 3.14-5 Stormwater System in the Study Area



Source: Herrera, 2021.

Electrical Power

Seattle City Light (SCL), a municipal utility, supplies electrical power to customers in Seattle, including the BINMIC and Greater Duwamish MIC, and some portions of King County north and south of the city limits. Electric power infrastructure is shown in **Exhibit 3.14-7**. SCL's transmission system includes several high-voltage, 115.1-kilovolt (kV) and 230-kV transmission lines. These transmission lines run between electrical substations, which lower the voltage of the electricity before transferring it to the distribution lines. In the study area, the SCL system uses a combination of overhead and underground electrical transmission and distribution lines. The Broad Street Substation, located on 6th Avenue North between Broad Street and Thomas Street, is the electrical substation serving the BINMIC. The Massachusetts Substation, located on Utah Avenue S between Colorado Avenue S and S Massachusetts Street, is the electrical substation serving the Duwamish BIC.

SCL also has an ongoing program since 2007 to provide electrical service connections and related improvements within the Broad Street network areas. This program includes capacity additions work associated with service connections to customers. The program also replaces or installs network transformers, network protectors and specialty transformers, and performs other improvements. This program fluctuates with land use development (City of Seattle 2015b).

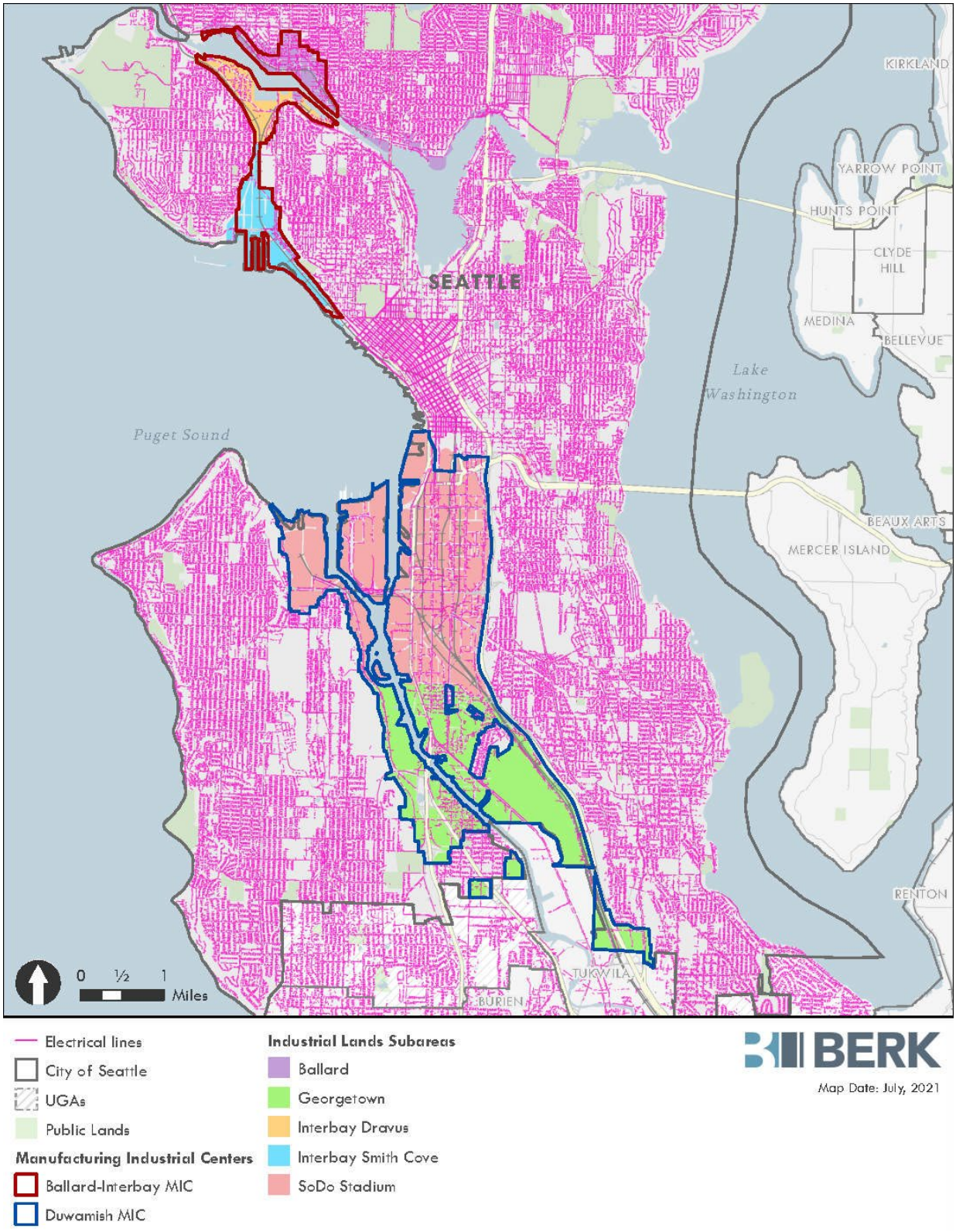
Exhibit 3.14-6 summarizes the approximate lengths of electrical lines in the subareas.

Exhibit 3.14-6 Electrical Transmission Lines by Subarea

Subarea	Total Line Length (ft) [1]
Ballard	52,298
Interbay Dravus	18,787
Interbay Smith Cove	7,677
SODO/Stadium	118,042
Georgetown/South Park	85,752

[1] Infrastructure within the City of Seattle Right of Way (ROW) were not included in the calculations
Source: Herrera, 2021.

Exhibit 3.14-7 Power Infrastructure in Study Area



Source: Herrera, 2021.

3.14.2 Impacts

Impacts Common to All Alternatives

While demand for utilities is expected to be similar for all alternatives, future development could result in adverse impacts to localized portions of the utility system. Seattle Public Utilities (SPU), King County WTD, and Seattle City Light (SCL) currently employ a variety of strategies to anticipate and adjust to changing demands. Both potential impacts and strategies employed by the utilities to respond to changing demand are discussed below.

Wastewater & Combined Sewer

Development under any of the alternatives could result in greater demands on the local wastewater collection system and on the downstream conveyance and treatment facilities. Increased wastewater flow is related to increased water consumption. Flow from the Primary Study Area to West Point (operated by King County WTD) represents only a small portion of the total West Point service area population (**Exhibit 3.14-8**), so increases in wastewater generation within the Primary Study Area under any of the alternatives are small compared to projected increases in flow already accounted for by King County WTD planning documents (King County 2014a). However, as some redevelopment of industrial areas is expected under all alternatives, impacts to the wastewater system should be evaluated for specific industries during future system planning efforts to assess whether historical loading rates and assumptions apply. Individual industries are required to get authorization from King County before discharging wastewater to the sewer system, which may involve on-site pretreatment. As noted in the Mitigation Measures section, development under the proposed alternatives is not expected to alter permitted use of King County facilities.

Exhibit 3.14-8 Current and Future Wastewater Service Population in the West Point Wastewater Treatment Facility Service Area Compared to Population in the Study Area.

Population Category		Residential[1] Households	Residential[1] Population	Commercial Employment Population	Industrial Employment Population	Total Population
2018 Population Served by West Point[2]		343,902	705,000	580,000	37,000	1,322,000
2044 Population Served by West Point[2]		404,878	830,000	815,000	40,200	1,685,200
Existing Conditions	2018 Population[3]	413	847	44,000	54,500	99,347
	Percent[4]	0.1%	0.1%	7.6%	147.3%	7.5%
Alternative 1 No Action	2044 Population[3]	488	1,000	55,600	66,400	123,000
	Percent[5]	0.1%	0.1%	6.8%	165.2%	7.3%
Alternative 2	2044 Population[3]	493	1,011	53,500	79,400	133,911
	Percent[5]	0.1%	0.1%	6.6%	197.5%	7.9%

Population Category		Residential[1]		Commercial Employment Population	Industrial Employment Population	Total Population
		Households	Population			
Alternative 3	2044 Population[3]	2,101	4,307	72,400	83,500	160,207
	Percent[5]	0.5%	0.5%	8.9%	207.7%	9.5%
Alternative 4	2044 Population[3]	3,686	7,556	74,400	83,300	165,256
	Percent[5]	0.9%	0.9%	9.1%	207.2%	9.8%

[1] Conversion between number of residential households and residential population assumes the 2020 citywide household size of 2.05 (CAI 2021; City of Seattle, 2021)
[2] Estimate of the total population served by the West Point Wastewater Treatment Plant in 2018 (Current Conditions) and 2044 (Future Conditions) (King County 2014a). These population assumptions represent the most recent publicly-available data. It is likely that King County is in the process of updating these projections to account for growth expected within the service area, including growth expected within the Primary Study Area as part of Alternative 1 No Action.
[3] Population served with the Primary Study Area
[4] Percent of the 2018 population served within the Primary Study Area when compared to the estimate of the total population served by the West Point Wastewater Treatment Plant in 2018 (King County 2014a).
[5] Percent of the 2044 population served within the Primary Study Area when compared to the estimate of the total population served by the West Point Wastewater Treatment Plant in 2044 (King County 2014a).
Source: Herrera, 2021.

Under all alternatives, increases in employment and/or residential populations in portions of the Primary Study Area are expected to result in greater wastewater generation, which could locally impact the wastewater collection system operated by SPU. Although there may be a greater overall need for wastewater system capacity with increased density, new development can reduce per-capita demand, as newer, low- or no-flow plumbing fixtures and equipment replaces older, less efficient, installations. This could help reduce overall impact. Consistent with SPU's guiding plans and asset management framework, SPU employs a variety of strategies to anticipate and adjust to changing demands.

While there would be increased demand on the wastewater system under any of the alternatives, existing programs, such as SPU's asset management framework and the capital improvement program (CIP), are in place to identify and implement projects to address system capacity issues and to incorporate improvements and repairs in association with major redevelopment and projects. As a result of these ongoing programs and current planning, increased demand for wastewater service under any of the alternatives is not considered a significant impact.

Because combined sewers receive both wastewater and stormwater runoff during wet weather, impacts to the combined system result from changes to both wastewater generation and stormwater runoff. Redevelopment governed by current Stormwater Code standards would help control peak rates of stormwater through the local combined sewer systems and reduce the risk of combined sewer overflows. This could potentially result in less usage of King County's CSO treatment facilities, such as West Point and Elliott West for the Ballard and Interbay subareas and the future Georgetown Wet Weather Station in the Georgetown/South Park and SODO/Stadium subareas. More information about the impact of the current Stormwater Code is discussed in greater detail in the Stormwater section below.

Stormwater

In general, increases in impervious area result in higher peak flows and total runoff, but because the majority of the Primary Study Area is impervious, redevelopment expected under all alternatives is not expected to significantly increase total impervious area. As described in **Section 3.14.3 Mitigation Measures**, the 2021 Stormwater Code requires on-site stormwater management to infiltrate, disperse, and retain stormwater runoff to the maximum extent feasible. Where the developed site's stormwater flow is expected to exceed the allowable flow levels, stormwater flow control is required. As a result of these requirements, given that some of the existing development predates modern stormwater requirements, it is expected that there would be a reduction in uncontrolled runoff in the Primary Study Area under all of the alternatives where new construction is anticipated.

The 2021 Stormwater Code also supports incentives for retrofitting existing development, such as opportunities for property owners to reduce their drainage rate if they install flow control and/or treatment facilities designed per the Code, which can include reducing impervious surfaces. Redevelopment that replaces existing impervious surface and provides flow control can reduce runoff rates even below current levels.

Under all scenarios, including Alternative 1 No Action, implementation of on-site stormwater management and continuation of retrofit incentives would continue to reduce adverse impacts on both the combined sewer system and the drainage system. No significant adverse location-specific impacts are identified in this review.

Electrical Power

Under all alternatives, including the No Action Alternative, future growth and development would increase demand for electrical energy. With the completion of the Denny Substation project in 2018 described in **Section 3.14.3 Mitigation Measures**, the existing Broad Street Substation and transmission infrastructure is expected to meet future needs through at least 2035.

Under any alternative, the local distribution system may need improvements or reconfiguration to meet future growth needs. Seattle City Light is actively planning to increase infrastructure along the central waterfront and in portions of both MIC areas to support conversion of cargo and cruise vessels to the use of shore power. Specific improvements would be addressed on a project-by-project basis. Currently, Seattle City Light is installing public electric vehicle charging stations in the Ballard and Georgetown/South Park subareas. No significant adverse impacts have been identified for any of the alternatives.

Equity & Environmental Justice Considerations

Under all alternatives, minor impacts to utility services could occur during construction of individual development projects. Construction could disturb existing utility lines; however, any disruptions would be temporary because the construction contractor would be required to

establish connections to prevent any disruptions prior to construction and be required to communicate the disruptions to the public in advance. These temporary disruptions could be disproportionately felt by low income and other underserved populations in the study area.

All alternatives are likely to lead to utility improvements in the study area. There is no indication that the improvements are likely to cause adverse impacts to low income and other underserved populations in the study area as long as the utility improvements avoid displacement of these populations. Utility improvements could potentially benefit low income and other underserved populations in the study area, such as in portions of the SODO/Stadium and Georgetown/South Park subareas.

Impacts of Alternative 1 No Action

Wastewater & Combined Sewer

Impacts resulting from Alternative 1 No Action would be the same as described in the discussion of **Impacts Common to All Alternatives**. Compared to the Action Alternatives, there is likely to be less redevelopment in the Primary Study Area and the least amount of increased wastewater service demand and the least reduction in the rate of stormwater runoff to the combined sewer system during wet weather.

Stormwater

Impacts resulting from Alternative 1 No Action would be the same as described in the discussion of **Impacts Common to All Alternatives**. Stormwater runoff in the Primary Study Area would continue to be collected and directed through the stormwater drainage system for discharge to existing outfalls. Potential impacts of future, specific development proposals would be addressed through implementation of the regulations and project-specific environmental review as appropriate. As sites redevelop, implementation of on-site stormwater management required under the 2021 Stormwater Code would continue to reduce adverse impacts that would otherwise occur under existing conditions. However, there would potentially be less redevelopment and less implementation of on-site stormwater management under Alternative 1 No Action, resulting in less reduction of peak flows and total runoff compared to other alternatives.

Electrical Power

Impacts resulting from Alternative 1 No Action would be the same as described in the discussion of **Impacts Common to All Alternatives**. Even without changes to current Comprehensive Plan policies, development standards, or zoning maps, the demand on the electrical system is likely to increase over time. However, compared to the Action Alternatives, there is likely to be less redevelopment pressure in the Primary Study Area resulting in the least change to electricity demand compared to the other alternatives.

Impacts of Alternative 2

Wastewater & Combined Sewer

There is likely to be a greater increase in wastewater service demand for this Alternative compared to Alternative 1 No Action due to the greater increase in industrial employment. Compared to alternatives 3 and 4, there is likely to be less redevelopment, resulting in less increases in wastewater generation and less reductions of the rate of stormwater runoff to the combined sewer system in the Primary Study Area.

Stormwater

Alternative 2 includes greater change and densification of industrial zones than Alternative 1 which could result in increased implementation of on-site stormwater management. Source control practices will need to be reevaluated by developers and City reviewers as land uses change to ensure that adequate treatment is occurring. Compared to alternatives 3 and 4, there is likely to be less redevelopment resulting in less reduction of the rate of stormwater runoff to the separated stormwater system.

Electrical Power

Assuming greater change and densification of industrial zones than Alternative 1, the demand on the electrical system is likely to be greater under Alternative 2 than Alternative 1, but less than alternatives 3 and 4.

Impacts of Alternative 3

Wastewater & Combined Sewer

There is likely to be a greater increase in wastewater service demand for Alternative 3 compared to alternatives 1 and 2 due to the greater increase in employment and housing, but due to greater redevelopment expected, the rate of stormwater runoff to the combined sewer system is likely to decrease due to the implementation of improved stormwater controls, and less wet weather flow in the combined system. Compared to Action Alternative 4, there is likely to be less increase in wastewater generation and less reduction of stormwater runoff in the Primary Study Area, which could reduce the frequency of CSO events. While increases in residential population are greater for this Alternative than for alternatives 1 and 2, particularly in the Ballard and SODO/Stadium subareas, the total residential population accounts for less than 1% of the expected residential population served by West Point in 2044 (Exhibit 3-58) and small when compared to the projected job increases in any given Subarea or the Study Area as a whole. Compared to Action Alternative 4, there is likely to be less increase in wastewater generation and less reduction of the rate of stormwater runoff to the combined sewer system.

Stormwater

Alternative 3 includes increased industrial and non-industrial redevelopment, which could result in increased implementation of on-site stormwater management compared to alternatives 1 and 2. This is likely to decrease the rate of discharge to the stormwater system relative to alternatives 1 and 2, but not as much as Alternative 4.

Electrical Power

Assuming greater change and densification of industrial zones than Alternative 1 and increased non-industrial land used compared to Alternative 2, the demand on the electrical system is likely to be greater for Alternative 3 than alternatives 1 and 2, but less than Alternative 4.

Impacts of Alternative 4

Wastewater & Combined Sewer

The greatest increase in wastewater service demand is expected for Alternative 4 due to the greater increase in employment and housing. Additionally, because the greatest redevelopment is expected under this alternative, the greatest improvements to stormwater flow rates to the combined sewer system are expected, resulting in the greatest reductions to wet weather flow in the combined system when compared to other alternatives. As with Alternative 3, though increases to the residential population are expected, particularly in the Ballard and SODO/Stadium subareas, the total residential employment population accounts for less than 1% of the expected residential population served by West Point in 2044 (Exhibit 3-58) and small when compared to the projected job increases in any given Subarea or the Study Area and a whole.

Stormwater

Alternative 4 includes the greatest expected redevelopment, which could result in the most implementation of on-site stormwater management compared to the other alternatives. As discussed above, this is likely to decrease the rate of discharge to the stormwater system.

Electrical Power

The demand on the electrical system is likely to be the greatest for Alternative 4 compared to other studied alternatives.

3.14.3 Mitigation Measures

Incorporated Plan Features

The Industrial and Maritime Strategy includes policy concepts relevant to Power and Air Quality/GHG:

- Introduce new or strengthened policies into chapters of the Comprehensive Plan that may include the Transportation, Environment, or Container Port elements encouraging transitions to clean fuels and decarbonization of industrial and maritime activities.
- Seattle Municipal Code (SMC 23.50.012) currently permits the use of currently zoned industrial areas for utility services by the King County Department of Natural Resources and Parks (DNRP). The proposed changes would not alter or prohibit currently permitted uses for these DNRP utility services.

Regulations & Commitments

Wastewater & Combined Sewer

SPU Drainage and Wastewater Utility and King County WTD are guided by several federal and state regulations as well as City of Seattle policies, programs, and plans. Regulations and guidance specific to wastewater are described below.

Federal Guidelines & Regulations

Federal guidelines for wastewater include the Clean Water Act (CWA). The 1977 CWA gave the EPA the authority to implement pollution control programs such as setting wastewater standards and regulating point discharges of pollutants. The EPA has the authority to delegate enforcement to the states, where state regulations are required to be at least as strict as federal regulations. The EPA has established minimum requirements for states to use in enacting regulations for wastewater reuse and reclamation. In the State of Washington, Ecology administers and enforces the CWA.

State of Washington Guidelines & Regulations

All wastewater treatment plants (WWTPs) in the State of Washington are regulated by Ecology. Ecology issues wastewater discharge permits, which regulate how WWTPs treat, control, and operate their facilities. WWTPs are required to control the quantity and quality of their discharges into surface or groundwater. These waters of the state include rivers, streams, bays, lakes, and aquifers. Chapter 173-221 of the Washington Administrative Code (WAC) defines WWTP discharge standards in further detail.

As discussed in previous sections, the BINMIC and Greater Duwamish MICs are served by the West Point WWTP. This facility is regulated under the National Pollutant Discharge Elimination

System (NPDES) permit No. WA0029181. The permit requires that the West Point facility must not exceed the following design criteria:

- **Maximum Month Design Flow (MMDF):** 215 mgd
- **BOD_5 Influent Loading for Maximum Month:** 201,000 lbs/day
- **Total Suspended Solids Influent Loading for Maximum Month:** 218,000 lbs/day

As part of the renewal process, King County submits a CSO Control Plan approximately every 5 years. Under WAC 173-245, the plan must update Ecology on program achievements, CSO control projects for the next NPDES permit phase, and plan amendments.

King County & City of Seattle Guidelines, Regulations, & Commitments

Regulations on the local level consist of King County Code, King County Public Rules, and SPU's Side Sewer Code. Title 28 of King County Code regulates the disposal of industrial waste into the sewer system. King County Public Rules PUT 8-13 - 8-16, 8-22, and 8-24 cover the following subjects:

- Local discharge limits
- Construction dewatering
- Discharge of contaminated groundwater to the sewer
- Discharge of cooling water to the sewer

SPU's Side Sewer Code regulates the design, construction, and permitting of privately-owned sewer pipe systems within private property and/or the right-of-way. To work on a side sewer project, SPU requires a Side Sewer Permit. This permit has fees dependent on the scope of work being performed.

Capital Improvement Programs

King County

Implementing capacity expansion projects at each of the County's regional treatment facilities would be initiated as required to meet population growth. Projects at West Point will have the greatest impact on the BINMIC and Greater Duwamish MIC, including near-term (by 2030) improvements to solids digestion.

City of Seattle

Guidance from SPU Drainage and Wastewater Utility includes SPU's *2015 Plan to Protect Seattle's Waterways* and the utilities' *2015–2010 Strategic Business Plan* (Seattle Public Utilities, 2015a) (Seattle Public Utilities, 2015b). The overriding goals of these plans is to construct and maintain facilities that:

- Reduce the frequency of flooding and sewer backups for customers
- Improve water quality and habitat in the environment
- Reduce sewage overflows and the impacts of stormwater pollution

Within SPU's asset management framework, SPU regularly inspects, repairs, and replaces pipe. As needed, new development may be required to make system improvements (Kelleher, 2016). SPU's Drainage and Wastewater CIP is the vehicle for identifying major projects and programs to rehabilitate, replace, improve, and expand system infrastructure (City of Seattle, 2015b). Projects are ranked based on a set of criteria to establish priority. This includes "level of service" criteria that address the provision of services to customers, including projects that address system capacity needs. Current Drainage and Wastewater CIP projects within the BINMIC include the Ballard Locks Improvements and the Ship Canal Water Quality Project (SCWQP). Flow from the Greater Duwamish MIC also impacts the SCWQP.

Within the CIP, SPU has an ongoing program, the Wastewater Capacity Improvement Program, to enhance sanitary sewer service to Seattle customers by addressing current and projected capacity limitations of the wastewater system through structural improvements. Such improvements may include infiltration and inflow (I/I) reduction, increased conveyance capacity, and individual customer measures to reduce the risk that customers would experience backups of sewage into their homes and businesses during storm events.

As part of another ongoing program in the CIP, the Shared Cost Project Program, SPU works take better advantage of opportunities to incorporate improvements and repairs to the drainage and wastewater systems with major redevelopment and projects undertaken by others (e.g., private developers, other city departments, regional and state agencies). Due to increased project costs ($5.4 million) in Waterfront CSO projects, the Shared Cost Projects budget was reduced by an overall $9.2 million in 2021.

Stormwater

SPU Drainage and Wastewater Utility and the Port of Seattle's Marine Stormwater Utility are guided by several federal and state regulations as well as City of Seattle policies, programs, and plans. Regulations and guidance specific to stormwater are described below.

Federal Guidelines & Regulations

Federal guidelines for stormwater include the Federal Endangered Species Act (ESA). The ESA is intended to protect threatened or endangered species from extinction. The ESA prohibits the "take" of all listed species, including a take that could result from the Port's stormwater facility operations or private development stormwater management activities that are permitted by the Port.

State of Washington Guidelines & Regulations

The State of Washington requirements for stormwater management for the City of Seattle are described in the Western Washington NPDES Phase I Municipal Stormwater Permit (Phase I Permit) (Ecology 2019). The 2019-2024 Phase I Permit, issued by Ecology on July 1, 2019, and effective on August 1, 2019, addresses a variety of issues associated with

stormwater runoff and requires the City to develop several distinct stormwater management program (SWMP) components:

- Municipal separate storm sewer system (MS4) permit mapping and documentation
- Public involvement and participation
- Controlling runoff from new development, redevelopment, and construction sites
- Stormwater planning
- Structural Stormwater Controls Program
- Source Control Program for Existing Development
- Illicit discharge detection and elimination (IDDE)
- Operations and Maintenance Program
- Education and Outreach Program
- Compliance with Total Maximum Daily Load (TMDL) requirements
- Monitoring and assessment
- Reporting requirements

The Port of Seattle is a secondary permittee under the Phase I Permit due to its ownership and operation of its stormwater system within the City of Seattle that drains to the Ship Canal, Shilshole Bay, Duwamish River, and Elliot Bay. The following requirements apply to the Port of Seattle:

- Education Program
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management for New Development and Redevelopment
- Operation and Maintenance Program
- Source Control in Existing Developed Areas
- Monitoring Program
- Compliance with TMDL requirements
- Monitoring and assessment
- Reporting requirements

Most of the Port's property is leased to commercial and industrial tenants. Approximately 70% of these properties are covered by an NPDES Industrial Stormwater General Permit, which includes additional requirements beyond those in the Phase I Permit. Maritime tenants play a crucial role in protecting water quality in Puget Sound. Any polluting activity has direct effects on the nearshore waters and Puget Sound. The Port is actively working with tenants to improve operations and manage stormwater runoff to protect the natural environment.

City of Seattle Guidelines & Regulations

As described in the Wastewater & Combined Sewer section above, SPU is guided by several federal regulations, City policies, and plans that address wastewater and stormwater drainage. SPU manages stormwater programs in the combined sewer area to improve water quality and habitat in the environment by reducing sewage overflows and the impacts of stormwater pollution. SPU also implements rules governing management of stormwater on private and public property through its current stormwater code (2021 Stormwater Code). The City's NPDES permit, issued in December 2005, requires implementation of stormwater pollution prevention programs in the combined sewer areas and is described in the section above (the permit was last modified issued on August 1, 2019).

Starting in 2009 and continuing with the 2021 Stormwater Code, Seattle has required on-site stormwater management (formerly green stormwater infrastructure) when feasible, as part of stormwater mitigation for all development and redevelopment projects. Examples of on-site stormwater management include permeable pavement, rainwater harvesting, rain gardens, infiltration facilities, bioretention facilities, and vegetated roofs. Individual projects are required to manage on-site stormwater runoff in accordance with City requirements to ensure that a development properly regulates its stormwater runoff.

It also should be noted that as described above, both SPU and King County WTD are required by agreements with Ecology and the EPA to reduce combined sewer overflows, of which stormwater is a component.

Capital Improvement Programs

King County

King County's 2018 CSO Control Program Update (King County 2018) presents a series of projects to control King County's remaining uncontrolled CSO locations in collaboration with SPU. The plan includes projects that would be built in the BINMIC and others that would be built in the Greater Duwamish MIC.

King County entered a consent decree with the U.S. Department of Justice and EPA (filed July 3, 2013) that ensures its CSO Control Plan (King County 2012a) is completed by 2030. King County had already committed to limiting CSOs to one per year at each outfall by 2030 through its adopted policies and a 2011 Agreement with Ecology.

City of Seattle

SPU is preparing a comprehensive strategy, The Plan to Protect Seattle's Waterways (Plan), to reduce CSOs and stormwater pollutants. The goals of the Plan are to protect public health and the environment while complying with federal and state regulations. The Plan is being developed under a Consent Decree agreement with EPA, Ecology, and the U.S. Department of Justice. The Consent Decree was entered in United States District Court for Western District of

Washington on July 3, 2013. The Plan will define projects to control a significant source of contamination and when implemented, the Plan will bring the City into compliance with the State and Federal requirements for CSO discharges. Specifically, the Plan will:

- Identify areas of Seattle where projects are needed to reduce combined sewer overflows.
- Evaluate alternatives for reducing combined sewer overflows in these areas.
- Identify additional areas where projects to control and treat polluted stormwater runoff will improve water quality.
- Recommend a schedule for designing and constructing projects.
- Estimate program costs and associated impacts on Seattle Public Utilities customer bills.
- Consider public and stakeholder input.

The Plan includes an Executive Summary (Volume 1), the Long-term Control Plan (Volume 2), the Integrated Plan (Volume 3), and the Environmental Impact Statement (Volume 4).

The Long-term Control Plan (LTCP) includes a ranking of the uncontrolled CSO basins with the largest negative impact on receiving water bodies and human health. The following basins are included within the BINMIC and Greater Duwamish MIC:

- Basins 174 and 147. Fremont/Wallingford
- Basins 107 and 111. East Waterway and Duwamish

SPU selected the Shared West Ship Canal Tunnel Option as the recommended LTCP option to provide the greatest benefit to receiving waterbodies and human health. The City would be the lead agency for construction and operation of the facility under the terms of a joint project agreement to be executed with King County. This project would impact the Freemont/Wallingford basins within the study area, which include portions of the Ballard Subarea.

The Integrated Plan identifies LTCP projects to be deferred until after 2025 so that the City can focus available resources on implementing the proposed stormwater projects. The Integrated Plan consists of implementing three stormwater projects by 2025 and deferring construction completion of six candidate LTCP projects until 2030. The three stormwater projects are as follows:

- Natural Drainage Systems (NDS) Partnering
- South Park Water Quality (WQ) Facility
- Street Sweeping Expansion Arterials

NDS Partnering would entail reconstructing City rights-of-way to manage flow and provide water quality treatment for urban runoff using primarily the green infrastructure practice of bioretention (i.e., engineered rain gardens). The South Park WQ Facility would provide active basic treatment for roughly 74 million gallons per year of stormwater runoff from a largely industrial area that discharges to the Lower Duwamish Waterway, thereby reducing the potential for recontamination of sediment remediation areas. This affects the SODO/Stadium and Georgetown/South Park subareas. The Street Sweeping Expansion Arterials would expand the area, frequency, and duration of the City's current arterial street sweeping efforts within the Primary Study Area.

Electrical Power

At the federal level, all electrical utilities are regulated by the 2020 National Electric Code (NEC). The State of Washington has adopted the 2020 NEC as of November 1, 2020 and can be found in WAC 296-46B. In addition to the NEC, the WAC also includes the International Energy Conservation Code, as provided in RCW 19.27A,020. This code has been adopted by the State Building Code Council in Chapter 51-11C and 51-11R WAC.

The City of Seattle adopts the 2020 NEC as part of their 2020 Seattle Electrical Code and the International Energy Conservation Code as part of their Seattle Energy Code. This code generally states that the State of Washington energy code shall be designed to construct increasingly energy efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by the year 2031, and to require new buildings to meet a certain level of energy efficiency.

Capital Improvement Programs

SCL has recently completed two projects which affect the Primary Study Area: the Denny Substation and the Broad Street improvements. The Denny Substation project was completed in 2018 in response to the high electrical load density caused by rapid redevelopment in the South Lake Union area over the past 15 years. In addition to serving the current and future needs of the South Lake Union area, the project frees up capacity at the Broad Street Substation, providing more system flexibility to accommodate current and future growth in the BINMIC.

SCL has an ongoing program since 2007 to provide electrical service connections and related improvements within the Broad Street network areas. This program includes capacity additions work associated with service connections to customers. The program also replaces or installs network transformers, network protectors and specialty transformers, and performs other improvements. This program fluctuates with land use development (City of Seattle, 2015b).

The Port of Seattle is increasing shore power available at terminals to reduce maritime emissions (Starcrest, 2018). Upcoming projects within the SODO/Stadium Subarea include planned shore power improvements in Terminal 15, Terminal 18, and possibly the electrification of Terminal 30 and the Coast Guard Station.

Other Potential Mitigation Measures

Wastewater & Combined Sewer

- **Water Conservation Measures:** Redevelopments may reduce per-capita water demand (and therefore, wastewater service demand) by using newer, low- or no-flow plumbing fixtures and equipment.

Stormwater

- No additional mitigation is proposed.

Electrical Power

- Future service system needs could be identified and evaluated through collaborative planning between Seattle's Office of Planning & Community Development and Seattle City Light.
- Installation of photovoltaic and other local generating technologies would reduce the demand on the public generating and distribution facilities.
- Construction and operation of LEED compliant (or similar ranking system) buildings would reduce the level of increase required in power systems.
- The use of passive systems, such as building design which utilizes layout and materials for transfer of heat rather than electrical systems, and modern power saving units would reduce the use of power in building heating and cooling. This could include, but is not limited to upgraded levels of insulation, reduced air infiltration, and selection of energy-efficient appliances.

3.14.4 Significant Unavoidable Adverse Impacts

Wastewater & Combined Sewer

No significant unavoidable adverse impacts on wastewater and combined sewer systems are anticipated. The levels of development proposed under all alternatives are expected to be managed through King County WTD and SPU's existing, ongoing processes for identifying CIP projects to address system capacity issues and reduce CSO frequency.

Stormwater

No significant unavoidable adverse impacts on the stormwater system are anticipated. New development allowed under any alternative would be required to meet City stormwater codes that would likely improve stormwater management (i.e., reduced flow rates and improved water quality) relative to existing conditions, and CIP projects identified in the Primary Study Area as part of SPU's asset management program would improve system capacity and performance.

Electrical Power

No significant unavoidable adverse impacts on the electrical system are anticipated. Recent SCL investments in the power system are anticipated to meet growth needs under all studied alternatives and development proposals the require specific improvements to the system would be addressed at a planning level through regular capital planning cycles as well as on a project-by-project basis.