



To: Autumn Salamack, City of Shoreline
From: Christy Shelton and Maddie Siebert
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Subject: **Analysis of Greenhouse Gas Emissions Associated with Tree Removal and New Development in Shoreline and King County**

The purpose of this project is to provide summary information regarding carbon benefits and trade-offs associated with the removal of mature trees, planting of new trees, and increased high-density development and access to light rail in the City of Shoreline (the City). In 2024, Sound Transit’s Lynnwood Link Extension (LLE) will open, providing 8.5 miles of new light rail from Northgate in north Seattle, to Shoreline, to Lynnwood in Snohomish County. The new extension includes stations along Interstate 5 in Lynnwood, Mountlake Terrace, and two stations in eastern Shoreline: Shoreline South/148th Station and Shoreline North/185th Station.¹ The new light rail service will provide regional connections from Shoreline and Lynnwood to downtown Seattle, Bellevue, Redmond, Sea-Tac airport, and Federal Way.

In the coming years, Shoreline is expected to grow, adding its share of new residents and jobs as the region develops. According to the Puget Sound Regional Council’s (PSRC) VISION 2050, the population of the central Puget Sound region will reach 5.8 million people by mid-century. PSRC’s Regional Growth Strategy assumes that 65% of that population growth and 75% of job growth will locate in regional growth centers and near high-capacity transit.² The Shoreline station areas, served by high-capacity light rail transit, are planned to receive a portion of this population and job growth. Indeed, the City envisions adding about 30,000 new households around the two stations in the coming decades as these areas are built out to their planned mixed-use residential (MUR) zoning.³

This analysis is intended to compare the greenhouse gas (GHG) impacts of population growth and commuting in two locations within Shoreline as well as a more distant King County example suburb, along with the tree removals and plantings associated with Lynnwood Link Extension. To conduct this analysis, the consultant reviewed information from the City and external sources, including planned and actual data related to tree removals and plantings, land use zoning and development, housing size and age, travel and commuting patterns, energy use and types, and projected population growth.

¹ Sound Transit, “Lynnwood Link Extension,” www.soundtransit.org/system-expansion/lynnwood-link-extension.

² Puget Sound Regional Council, “VISION 2050,” www.psrc.org/vision.

³ City of Shoreline, *145th Street Station Subarea Plan*, October 2016, p. 5-7, “Existing and Forecasted Population, Households, and Employment and Build-Out Timeframes.” Population: 8,321 (2014); 32,367 (build-out, 55–87 years, 2071–2103). Housing units: 3,467 (2014); 13,486 (build-out). City of Shoreline, *185th Street Station Subarea Plan*, March 2015, p. 5-11, “Forecasted Population, Households, and Employment and Build-Out Timeframes.” Population: 7,944 (2014); 56,529 (build-out, 80–125 years, 2095–2140). Households: 3,310 (2014); 23,554 (build-out).

Summary of Key Findings

This section summarizes overall key findings regarding estimated greenhouse gas (GHG) emissions. The remainder of this memo describes these estimates in more detail, along with methods and assumptions.

- Light rail construction in Shoreline will result in the **removal of nearly 1,200 mature trees**. These tree removals represent a one-time loss of 15,600 metric tons of carbon dioxide (CO₂) sequestration.
- **Sound Transit is planting 7,435 new trees** in Ronald Bog Park and elsewhere in Shoreline. These new trees are estimated to take 28 years to sequester an equivalent amount of CO₂ as the trees removed.
- **Changes in housing and commute patterns** associated with transit-oriented development (TOD) around the light rail stations are expected to provide GHG emissions benefits, compared to lower-density development in western Shoreline or suburban growth in King County’s eastern urban fringe. Plans for the two station areas call for adding 1,800 new households in 2030, over the 2014 baseline.
- **Energy use emissions from natural gas and electricity** are estimated at approximately 1.6 metric tonsCO₂ equivalent (mtCO₂e) per household annually for a two-bedroom unit in Shoreline’s new TOD, 5.2 mtCO₂e for existing development in western Shoreline, and 13 mtCO₂e for a more distant eastern King County suburb in Puget Sound Energy’s electricity service area.
- In comparison with Shoreline TOD, a typical **existing Shoreline home produces more than 3 times the GHG emissions from energy use** due to its larger size and lower efficiency. A typical **East King County home produces 8 times the GHG emissions** due to its size and higher-emissions electricity source. The energy-efficiency benefits of TOD are estimated to outweigh the GHG impacts of tree removal in the first 2–4 years of light rail service and continue to accrue over the century-long life of the project.
- **Commute trips on light rail from Shoreline TOD generate no emissions** with Sound Transit’s carbon-free electricity. Vehicle emissions from commuting are estimated annually at 2.9 mtCO₂e per driver from western Shoreline, and 5.5 mtCO₂e per driver from eastern King County. By 2035, Lynnwood Link is projected to reduce more than 270,000 vehicle miles daily, saving 111 mtCO₂e daily based on current fuel economy, which would compensate for the one-time loss of trees in less than a year.
- **Adding 30,000 new households in efficient buildings near light rail in Shoreline will produce far fewer net GHG emissions** than those households would generate with existing land use, energy, and commuting patterns in western Shoreline or other suburbs—yielding net benefits that greatly outweigh the 15,600 mtCO₂ from trees cut to make way for that development.

Table 1 summarizes current estimated annual emissions per household from energy use and commuting by driving or light rail for existing western Shoreline, Shoreline TOD, and an eastern King County suburb.

Table 1. Current Estimated Annual Emissions Per Household from Energy Use and Commuting, by Location

Scenario	Housing Size (SF)	Natural Gas (mtCO ₂ e)	Electricity (mtCO ₂ e)	Commuting (mtCO ₂ e)	Energy + Commute (mtCO ₂ e)
Existing Shoreline	2,200	4.98	0.24	(drive) 2.93	8.16
Shoreline TOD	1,000	1.52	0.08	(light rail) 0.00	1.60
East King County	2,800	4.76	8.39	(drive) 5.53	18.68

Methodology & Assumptions

To assess the impact of Sound Transit’s Lynnwood Link Extension on Shoreline’s carbon footprint, the City commissioned Cascadia Consulting Group to estimate greenhouse gas (GHG) emissions associated with housing, energy use, and commuting for the following three assumed development scenarios:

- **Existing Shoreline** – Shoreline West, King County Assessor’s Area 001, Richmond Beach neighborhood, mostly single-family homes, low-density, 4 to 6 dwelling units per acre, typical house size is 2,200 square feet (SF), many built in mid-20th century, driving distance to downtown Seattle is 14.2 miles.
- **Shoreline TOD** – Shoreline South/148th Station and Shoreline North/185th Station areas, Mixed-Use Residential zoning (MUR-70’), typical future unit sizes in multifamily housing are expected to range from 400-500 SF for studios, 700 SF for one-bedroom, and 900-1,000 SF for two-bedroom units; the higher estimate of 1,000 SF was assumed for this analysis. New construction is required to meet Built Green 4-Star standards or other green building certifications. Travel to downtown Seattle is 9.3 miles, accessible by light rail.
- **East King County Suburb** – Relatively new development (since 2000), mostly single-family homes in a planned community near I-90, typical house size is 2,800 square feet, driving distance to downtown Seattle is 26.8 miles.

Population Growth

According to its subarea plans, the City envisions adding about 30,000 new households around the two Shoreline stations in the coming decades as these areas are built to their planned mixed-use residential (MUR) zoning.⁴ When built out, the 145th Street area is expected to grow from 3,467 housing units in 2014 to 13,486 units between the years 2071 (at 1.5% annual growth) and 2103 (at 2.5%). The 185th Street area is planned to grow from 3,310 households to 23,554 when built out between 2095 and 2140. Assuming steady annual growth at the low range (1.5%), the combined station areas are expected to add nearly 1,100 new households from the 2014 baseline when the Lynnwood Link Extension opens in 2024 and nearly 2,500 by 2035.

Home Energy Use Emissions

Emissions from home energy use are estimated based on electricity and natural gas use. Electricity in Shoreline is provided by Seattle City Light, while natural gas is provided by Puget Sound Energy (PSE). Both electricity and natural gas for the eastern King County suburb example is provided by PSE, which provides electricity throughout the county except for Seattle, Shoreline, and few adjacent areas. For natural gas and electricity, residential customers are assumed to be mostly single-family homes, with a small number of 2-, 3-, and 4-unit structures. Energy use for multifamily housing of 5 units or more is

⁴ City of Shoreline, *145th Street Station Subarea Plan*, October 2016, p. 5-7, “Existing and Forecasted Population, Households, and Employment and Build-Out Timeframes.” City of Shoreline, *185th Street Station Subarea Plan*, March 2015, p. 5-11, “Forecasted Population, Households, and Employment and Build-Out Timeframes.”

assumed to be reported in the commercial figures. For Shoreline TOD, the energy use per square foot was assumed to be 33% more efficient than existing Shoreline home to reflect that new construction in the MUR zone is required to meet Built Green 4-Star standards.⁵ For the more distant suburb example, a 25% reduction was assumed, which aligns with the 3-Star Built Green level, to reflect higher energy standards in newer construction since 2000. Actual energy efficiency is likely to be greater in newer homes due to improvements in the state energy code since much of Shoreline's housing was built. Shared walls in townhomes and multifamily buildings also enhance energy efficiency.

Natural Gas

The City provided 2019 Residential natural gas usage from Puget Sound Energy (PSE) totaling 9,345,098 therms, for 11,681 customers. The residential figure was used to estimate an average natural gas usage per square foot (SF) of housing for Shoreline, including an adjustment to reflect that not all housing uses natural gas (though all housing is assumed to use electricity). This energy intensity per SF was used to estimate usage for other housing units based on floor area, though natural gas may be less common in new multifamily housing.

Electricity

The City provided 2019 Residential electricity usage from Seattle City Light totaling 214,256,993 kilowatt-hours (kWh), for 16,983 customers. This figure was used to estimate an average electricity usage per square foot of housing for Shoreline, though electricity use per SF may be lower in homes that use natural gas for heating, hot water, and cooking. This estimate is applied across all three scenarios based on square footage.

Emission factors were applied for Seattle City Light for the two Shoreline locations and for Puget Sound Energy for the eastern King County suburb. We recognize that electric utility emission factors are expected to decrease over time. PSE (like other Washington utilities) will be required to remove coal from its generation mix in 2025, which will significantly reduce its emission factors. Washington's Clean Energy Transformation Act (CETA) requires that all fossil fuels, including natural gas, be removed from the utility mix by 2045, so additional decreases are anticipated by that time. The analysis uses currently available emission factors, published in 2020 (covering 2018 for SCL and 2019 for PSE), but a refined version could incorporate these anticipated emission reductions and/or grid-average emission factors for the region.

⁵ Leah Missik, Talia Haller, and Aaron Adelstein, *Built Green Homes Are Even More Efficient Than You—And We—Thought*, www.builtgreen.net/docs/librariesprovider2/resources/built-green-post-occupancy-white-paper.pdf. Actual energy efficiency improvements are expected to be greater because this study compared new single-family homes and townhouses constructed in 2014, rather than comparing with older, less efficient existing houses.

Transportation Emissions from Commuting

Puget Sound Regional Council estimates that Shoreline households will generate 764,000 daily vehicle miles traveled in 2025.⁶ Detailed comparisons by geographic location with and without light rail were not available, and transportation modeling was not conducted for this analysis. Accordingly, a simple comparison of different commutes was completed based on mileages and modes of travel. GHG emissions from commuting were calculated based on assumed travel distances to downtown Seattle as shown in Table 5, though we recognize that Shoreline residents commute to a variety of locations around King and Snohomish counties and beyond. Sound Transit projects combined daily boardings of 12,600 at the two Shoreline stations in 2035.

The analysis uses the national average fuel economy of 21.4 miles per gallon. Corporate Average Fuel Economy (CAFE) standards were rolled back in 2020, though average fuel economy is still expected to improve over time, including as more all-electric vehicles enter the regional fleet. A refined analysis could incorporate these anticipated increases in fuel economy over time as well as local data on vehicle speed, fleet age, and vehicle types. The comparison assumed round-trip commuting of 2 trips per day, 5 days per week, and 50 weeks per year, for a total of 500 annual one-way trips per commuter. Other trips beyond commuting to and from work were not included in this simplified comparison.

Tree Removals & Plantings

The carbon impacts of tree removals and tree plantings were estimated using the U.S. Forest Service's Center for Urban Forest Research (CUFR) Tree Carbon Calculator.⁷ The calculator estimates carbon dioxide sequestration by year and in total for various tree species, including big-leaf maple (*Acer macrophyllum*) and Douglas-fir (*Pseudotsuga menziesii*). These species were used as proxies for the evergreen and deciduous trees removed and planted by Sound Transit. The analysis assumed that the cut trees were mature and that the evergreen/deciduous mix matched that of the replacement tree plantings in Ronald Bog Park, with 59% evergreen (represented by Douglas-fir) and 41% deciduous (represented by big-leaf maple).

According to the Tree Carbon Calculator, Douglas-firs in the Pacific Northwest reach their peak annual CO₂ sequestration of 310 kilograms per tree per year at age 67 and reach their cumulative lifetime sequestration of 13.9 metric tons at age 72. Big-leaf maples are estimated to reach their peak annual carbon sequestration of 189 kilograms per tree per year at age 62 and reach their cumulative lifetime sequestration of 11.8 metric tons at age 84. The calculator is used to estimate lost carbon sequestration from tree removals as well as new sequestration from tree plantings and growth over time. The sequestered CO₂ was assumed to be released upon tree removal, though it is likely that at least a portion of these emissions would remain sequestered for years in the form of lumber or would be released slowly over time from decomposing wood chips and tree mulch.

⁶ Puget Sound Regional Council, Vehicle Miles Traveled model data provided to the City of Shoreline, April 14, 2020.

⁷ U.S. Forest Service, "CUFR Tree Carbon Calculator," www.fs.usda.gov/ccrc/tool/cufr-tree-carbon-calculator-ctcc.

Analysis & Results

The following sections describe the calculations and results for emissions impacts of building energy use (natural gas and electricity), commuting, and tree removals and plantings across the three scenarios.

Home Energy Use Emissions

Electricity

Homes and businesses in Shoreline obtain electricity from Seattle City Light (SCL), Seattle’s publicly owned electric utility, which bills itself as the nation’s first electric utility to achieve zero net greenhouse gas emissions.⁸ SCL primarily provides electricity to the City of Seattle, and the north end of its service territory includes the cities of Shoreline and Lake Forest Park. This arrangement means that Shoreline’s electricity has the very low GHG emissions factors of SCL,⁹ which are much lower than electricity service elsewhere in King County. Puget Sound Energy provides electricity to King County outside of the SCL service territory and provides natural gas in the City of Shoreline and elsewhere.¹⁰ Electricity from PSE results in much higher CO₂e emissions in their service area compared to Shoreline’s electricity from SCL.

Table 2 summarizes estimated annual emissions from electricity for each scenario. Electricity is reported in kilowatt-hours, which are converted to megawatt-hours for GHG calculations. An existing Shoreline household has approximately 3 times the GHG emissions from electricity use as Shoreline TOD. Because PSE has much higher emissions than SCL, an East King County household generates more than 100 times the GHG emissions from electricity, compared to TOD.

Table 2. Current Estimated Annual Emissions Per Household from Electricity, by Location (2019)

Scenario	Housing Size (SF)	Kilowatt-hours	Metric Tons CO ₂ e
Existing Shoreline	2,200	16,086	0.24
Shoreline TOD	1,000	4,899	0.08
East King County	2,800	15,354	8.39

⁸ Seattle City Light, “Carbon Neutral,” www.seattle.gov/light/enviro/carbonneutral.htm.

⁹ The Climate Registry, “2018 Emission Rates: Seattle City Light,” www.theclimateregistry.org/our-members/cris-public-reports. SCL’s most recent emissions factor (2018) was 32.05 pounds of CO₂ per megawatt-hour.

¹⁰ Puget Sound Energy, *2019 Greenhouse Inventory*, June 2020, Tables 8 and 9, www.pse.com/pages/greenhouse-gas-policy. PSE’s 2019 emissions factor was 1,200 pounds of CO₂ equivalent per megawatt-hour.

Natural Gas

Puget Sound Energy provides natural gas in the City of Shoreline and elsewhere, for home heating, hot water, and cooking. Natural gas is reported in therms, which are converted to British thermal units (BTUs) for GHG calculations.¹¹ Table 3 summarizes estimated annual emissions from natural gas for each scenario. Households in both existing Shoreline and East King County generate more than 3 times the GHG emissions from natural gas as Shoreline TOD, mostly due to their larger size.

Table 2. Current Estimated Annual Emissions Per Household from Natural Gas, by Location (2019)

Scenario	Housing Size (SF)	Therms	Metric Tons CO ₂ e
Existing Shoreline	2,200	938	4.98
Shoreline TOD	1,000	286	1.52
East King County	2,800	895	4.76

Combined Home Energy Use from Electricity & Natural Gas

Table 4 shows the combined total building energy use from natural gas and electricity for each scenario. Again, an existing Shoreline household generates more than 3 times the GHG emissions from home energy use as Shoreline TOD. An East King County household generates more than 8 times the GHG emissions due to PSE's higher-emissions fuel mix, compared to TOD.

Table 4. Current Estimated Annual Emissions Per Household from Building Energy Use, by Location (2019)

Scenario	Housing Size (square feet)	Million BTUs (natural gas)	Megawatt-hours (electricity)	Metric Tons CO ₂ e
Existing Shoreline	2,200	93.79	16.09	5.23
Shoreline TOD	1,000	28.56	4.90	1.60
East King County	2,800	89.53	15.35	13.15

Transportation Emissions from Commuting

Table 5 shows current estimated annual emissions from commuting trips made by driving a personal vehicle or riding light rail. These figures reflect one commuter per household (a likely underestimate) and commute trips only. This analysis compares commutes made by driving alone versus riding light rail, though people near light rail will continue to drive for some commuting and other trips. On average nationally, about 30% of annual vehicle miles traveled are associated with trips to and from work.¹²

¹¹ BTUs are British thermal units, a measure of the energy content in fuel; one therm is 100,000 BTUs.

¹² 2017 National Household Travel Survey, *Transportation Energy Data Book: Edition 38.2*, nhts.ornl.gov.

Commuting miles were used to estimate GHG emissions from driving based on the national average fuel economy of 21.4 miles per gallon (mpg) from the U.S. Environmental Protection Agency and gasoline emission factors from The Climate Registry. As noted in the *Methodology & Assumptions* section above, fuel economy is expected to increase over time. For each scenario, we compared driving and a transit option. The transit option for Existing Shoreline assumes driving to the North Shoreline light rail station, parking, and taking light rail to Seattle. The transit option for East King County assumes driving to the North Bend Park & Ride and taking transit to downtown (bus emissions are not calculated).

In 2020, Sound Transit’s Link light rail started running on 100 percent carbon-free electricity.¹³ Sound Transit estimates combined daily boardings of 12,600 riders at the two Shoreline stations in 2035. If these trips were taken by car instead of light rail, they could generate nearly 97 metric tons of CO₂e emissions daily (though it is expected that commuters would use a mix of travel modes, including driving alone, carpooling, biking, and buses). By 2035, ridership on Lynnwood Link is estimated to help reduce travel on roads in the region by more than 270,000 to 290,000 vehicle miles daily, and riders would save up to 25,000 hours in daily travel time.¹⁴ At current fuel economy of 21.4 mpg, those reductions in vehicle miles equate to 111 to 120 metric tons of CO₂e daily. Annually, these savings are more than double the one-time loss of trees removed to build the project, as described in the next section.

Table 5. Estimated Annual Emissions per Commuter from Driving, by Location and Mode (2019)*

Scenario	Mode	Drive Distance (one-way mi)	Annual Driving (miles)	Fuel (gallons)	Total (mtCO ₂ e)
Existing Shoreline	Drive only	14.2	7,100	332	2.93
Existing Shoreline	Drive + transit	3.0	1,500	70	0.62
Shoreline TOD	Drive only	9.3	4,650	217	1.92
Shoreline TOD	Walk/bike + transit	0	0	0	0
East King County	Drive only	26.8	13,400	626	5.53
East King County	Drive + transit	6.3	3,150	147	1.30

**This analysis compares the estimated emissions from driving a personal vehicle, from home to downtown Seattle (for all “Drive only” modes), Shoreline North light rail station (for Existing Shoreline “Drive + transit” mode), or North Bend Park & Ride (for East King County “Drive + transit” mode). Sound Transit’s light rail runs on carbon-free electricity;¹³ transit bus emissions for the East King County example are not included in this estimate.*

¹³ Sound Transit, “Sound Transit Light Rail Trains Are Now Running on Clean Energy,” 12/1/2020, www.soundtransit.org/get-to-know-us/news-events/news-releases/sound-transit-light-rail-trains-are-now-running-clean. Carbon-free light rail is expected to continue, in line with the agency goal of carbon-free electricity by 2030 and carbon-free energy by 2050.

¹⁴ Sound Transit, *Lynnwood Link Extension: Final Environmental Impact Statement*, p. S-23, www.soundtransit.org/sites/default/files/documents/pdf/projects/north_hct/lynnwoodeis/frontmatter_summary.pdf.

Tree Removals & Plantings

The City and Sound Transit reported the removal of up to 1,193 trees in Shoreline to make way for the Lynnwood Link Extension. As in other Sound Transit projects, trees removed are assumed to become the property of the contractor and may be used for lumber, mulch, compost, and wood by-products.¹⁵ These trees were assumed to be a mix of mature Douglas-firs and big-leaf maples.

The 1,193 tree removals represent an estimated 15,600 metric tons of previously sequestered CO₂, as shown in Table 6, including a loss of 310 metric tons of in peak annual sequestration capacity. The 3,315 trees planted in Ronald Bog Park are estimated to sequester 43,000 mtCO₂ at maturity. In addition to Ronald Bog Park, Sound Transit is planting an additional 4,120 trees elsewhere in Shoreline, particularly along the freeway. These trees are expected to sequester an estimated 54,000 mtCO₂ at maturity. In addition to trees, Sound Transit's plantings of shrubs and other vegetation contribute some additional sequestration benefits that are not included in the calculation.

When they reach maturity by 2100, the 7,435 new trees at Ronald Bog Park and elsewhere in Shoreline are expected to sequester a lifetime total of 97,000 mtCO₂—a net increase of 81,000 mtCO₂ when accounting for both tree removals and plantings. By the time the trees reach age 19, their annual sequestration of 326 metric tons will exceed the peak annual sequestration of the trees that were removed (310 metric tons). The new trees are expected to sequester carbon equivalent to the total of the mature tree removals (15,600 metric tons CO₂) at an age of 28 years. These figures assume a start year of zero; if the trees are assumed to be 5–7 years old at the time of planting, the sequestration is more rapid as they approach their peak period for growth and carbon sequestration. These figures do not include tree plantings by the City of Shoreline, King Conservation District, Mountains to Sound Greenway Trust, or elsewhere in Lynnwood Link, including Seattle, Mountlake Terrace, and Lynnwood.

Table 6. Estimated Changes over Time in Total CO₂ Sequestration from Sound Transit's Tree Removals and Plantings in the City of Shoreline (metric tons)

Changes in Trees & CO ₂	Tree Counts	10 years (mtCO ₂)	20 years (mtCO ₂)	30 years (mtCO ₂)	40 years (mtCO ₂)	50 years (mtCO ₂)	Mature (mtCO ₂)
Tree Removals	-1,193	-15,559	-15,559	-15,559	-15,559	-15,559	-15,559
New Trees	7,435	1,633	7,364	17,535	31,610	48,602	97,005
<i>New – Ronald Bog</i>	3,315	728	3,283	7,818	14,094	21,670	43,251
<i>New – Elsewhere</i>	4,120	905	4,081	9,717	17,516	26,932	53,754
Net Trees & mtCO₂	+6,242	-13,926	-8,195	+1,976	+16,051	+33,043	+81,446

¹⁵ Sound Transit, "Tree and Vegetation Removal Underway," 6/18/2020, www.soundtransit.org/get-to-know-us/news-events/project-updates/tree-vegetation-removal-underway.

Potential Co-Benefits

In addition to the greenhouse gas impacts summarized above, mixed-use transit-oriented development around Shoreline's new light rail stations is expected to bring additional co-benefits to the community, relative to less compact development that is more dependent on driving. These co-benefits include:

- **Cleaner air.** In addition to reducing GHG emissions, less driving lowers other air pollution, such as smog and particulate matter. Cleaner air reduces asthma and other health conditions. Cleaner air also improves visibility and ecosystem health.
- **Healthy active lifestyles.** Transit-oriented development supports walking, biking, and other active transportation, which improves health, wellbeing, and safety. Reducing driving can lower associated stress and road rage, while light rail improves transit speed, reliability, and rider satisfaction.
- **Cleaner water.** Replacing some car trips with carbon-free light rail helps keep toxic runoff from oil leaks, antifreeze and other fluids, tire wear, and brake wear out of Echo Lake, Boeing Creek, and Puget Sound. Clean waterways benefit people, salmon, orcas, and other aquatic life and ecosystems.
- **Resource efficiency and cost savings.** TODs can foster affordable housing, cost savings from reduced car use and ownership, and energy savings in housing and transportation. Compact development supports efficiency in costs of community services and infrastructure, including utilities and parking.
- **Vibrant local community and economy.** Well-designed mixed-use developments around transit hubs have a dynamic mix of shops, restaurants, homes, jobs, parks, entertainment, and other attractions. Residents, workers, and visitors value the connectivity and livability of these neighborhoods.