3.9 Utilities

This chapter considers the potential impacts to utility services that may result from implementation of the four alternative land use scenarios described in Chapter 2 of this Draft EIS. Utilities discussed in this chapter include the public water system, sanitary sewer system, stormwater drainage and electrical power.

Seattle Public Utilities (SPU) manages the public water system, sanitary sewer system, combined sewer system and drainage system in the City of Seattle. Seattle City Light (SCL) manages the electric power generation, transmission and distribution services in the City of Seattle.

3.9.1 Affected Environment

Seattle Public Utilities—Water, Drainage and Sewer

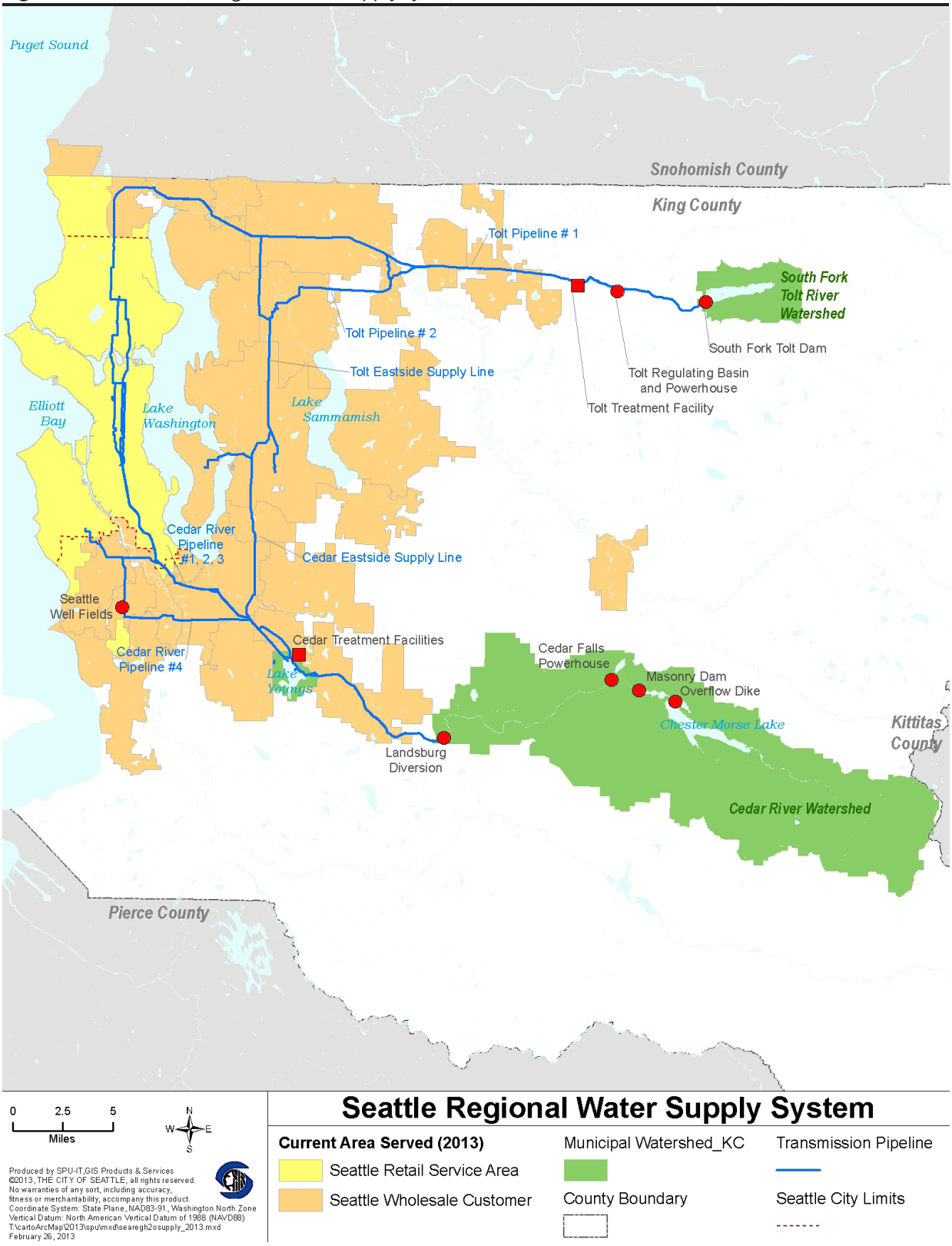
SPU tracks a number of performance metrics to determine if its utilities (water, drainage and sewer) are meeting established service levels. SPU monitors water system performance using real-time monitoring, regular water quality sampling and testing, field inspections and customer calls. All problems and crew responses are tracked in SPU's work order management system (Maximo).

Water System

SPU provides municipal water service, including water for fire suppression, to Seattle customers from its two surface sources: the Cedar River watershed and the South Fork of the Tolt Reservoir. The Cedar River system supplies 60–70 percent of the water SPU delivers and the South Fork Tolt provides 30–40 percent. A small amount of groundwater is obtained from the SPU's Seattle Well Fields located south of the City.

SPU's water system consists of transmission and distribution pipelines, treatment and storage facilities throughout Seattle and several other cities. Figure 3.9–1 on the following page shows SPU's regional supply system. SPU delivers water to Seattle retail and wholesale customers through 1,880-miles of transmission and distribution pipes. SPU maintains, improves and repairs this network as needed.

Figure 3.9–1 Seattle regional water supply system



Sewer and Drainage

SPU drainage infrastructure includes combined, fully separated and partially separated sewer systems, each serving approximately one-third of the City of Seattle. Figure 3.9–2 provides the generalized location of these systems within the city.

Combined Sewer System

King County Wastewater Treatment Division (KC) and SPU own and operate combined sewer systems that serve about one-third of the city. Each combined sewer system is a piped network carrying both sanitary wastewater and stormwater runoff to a King County wastewater treatment plant (WWTP).

King County Wastewater Treatment Division currently operates three secondary WWTP (West Point WWTP, South WWTP and Brightwater WWTP) and four combined sewer overflow (CSO) treatment facilities (Alki, Carkeek, Elliott West and Henderson/Norfolk). These facilities discharge treated wastewater to Elliott Bay, Puget Sound and the Lower Duwamish Waterway. KC and SPU manage the CSO systems based on the size of the drainage basin served by each overflow outfall. SPU manages basins smaller than 1,000 acres (86 basins) and KC Metro manages basins larger than 1,000 acres (38). When storm flows exceed the capacity of the system, the combined system, by design, discharges wastewater directly into Lake Union, Portage Bay, Lake Washington, Puget Sound, Thornton Creek, Longfellow Creek and Piper's Creek (SPU 2014).

The older parts of Seattle's wastewater system use a single set of pipes to carry both sewage and rain running off streets and buildings. Most of the time, this polluted water goes to a wastewater treatment plant. But in heavy rains, the pipes can overflow into rivers, lakes, or Puget Sound. Overflow points called **"combined sewer overflows"** or CSOs are built into the system. CSOs prevent sewer backups into homes and streets.

The water released by CSOs is 10 percent sewage and 90 percent stormwater. CSOs may be harmful to people and animals living in the water because they carry chemicals and disease-causing germs.

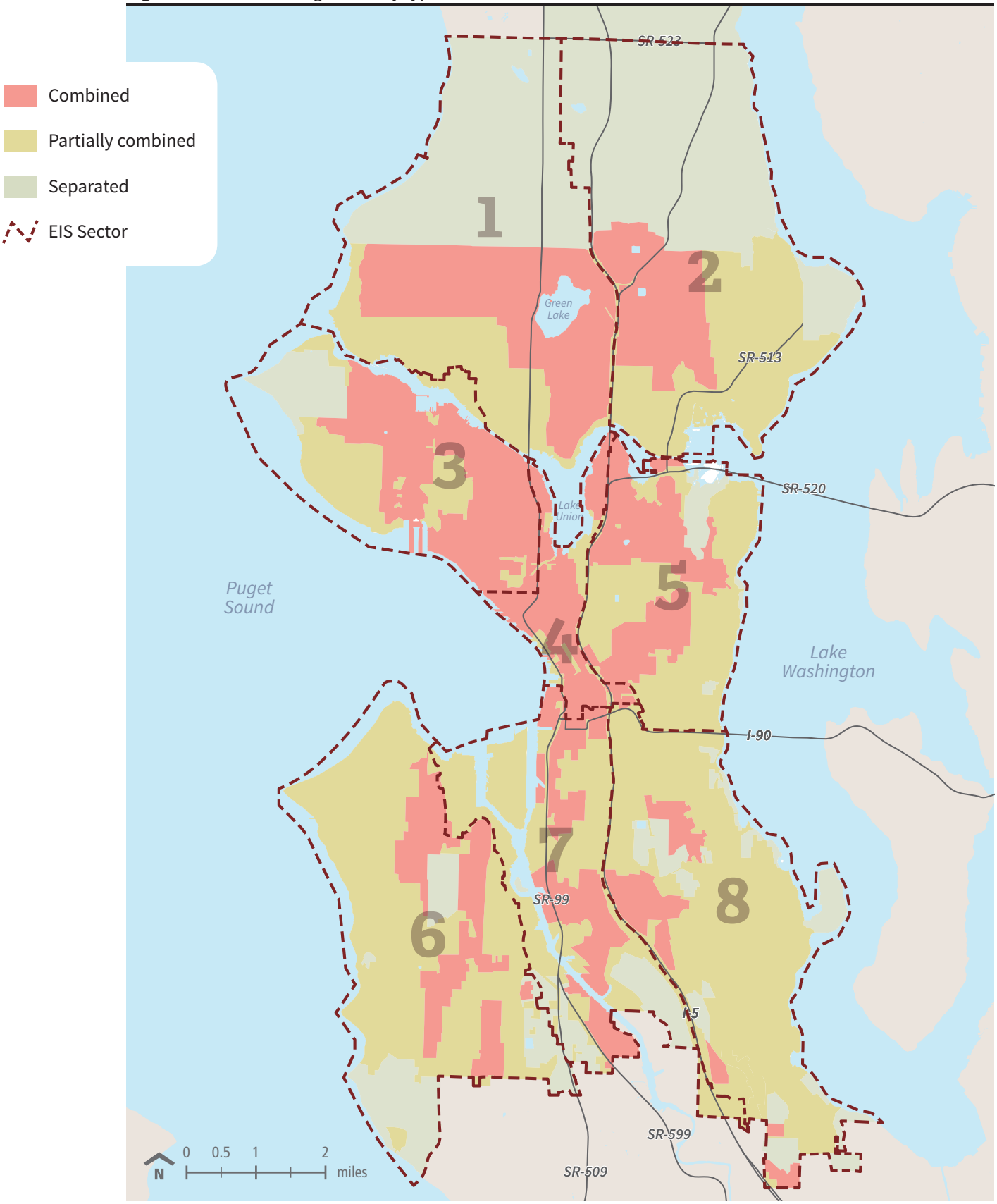
Figure 3.9–3 details the combined pipe system, pump stations and KC Metro wastewater system.

Some portions of the drainage system have been identified as capacity constrained. In these areas development is required to limit the peak discharges of stormwater. Any area that discharges to an informal ditch and culvert system is considered capacity constrained. Capacity constrained areas are shown in Figure 3.9–4.

Separated Systems (Sewer and Drainage)

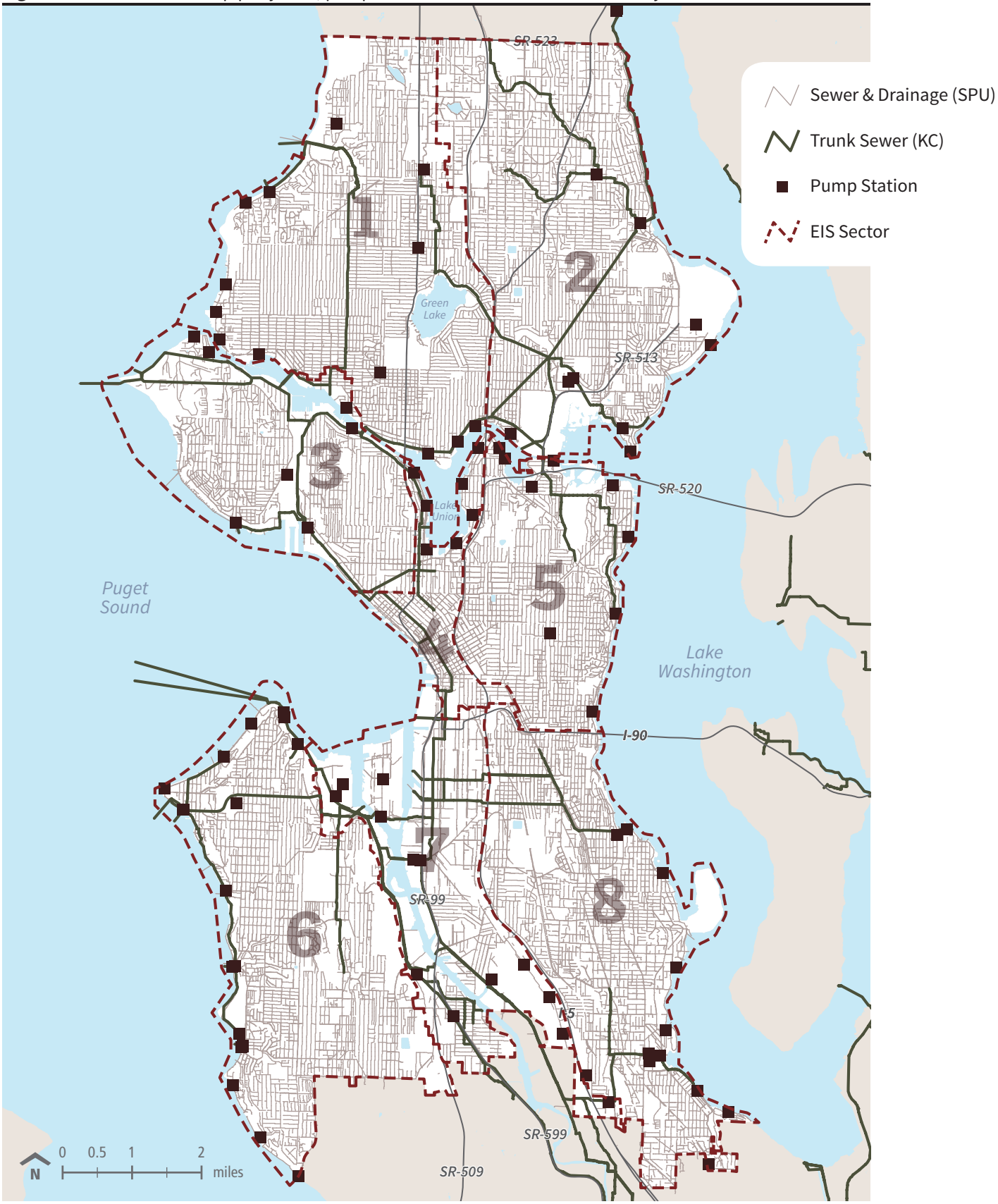
Beginning in the 1950s, additions to the sewer system were designed with separate networks of pipes for sewage and stormwater. In these areas, runoff is collected and conveyed in a drainage system and sewage is conveyed in a separate sanitary sewer system (shown in Figure 3.9–2).

Figure 3.9–2 Drainage areas by type



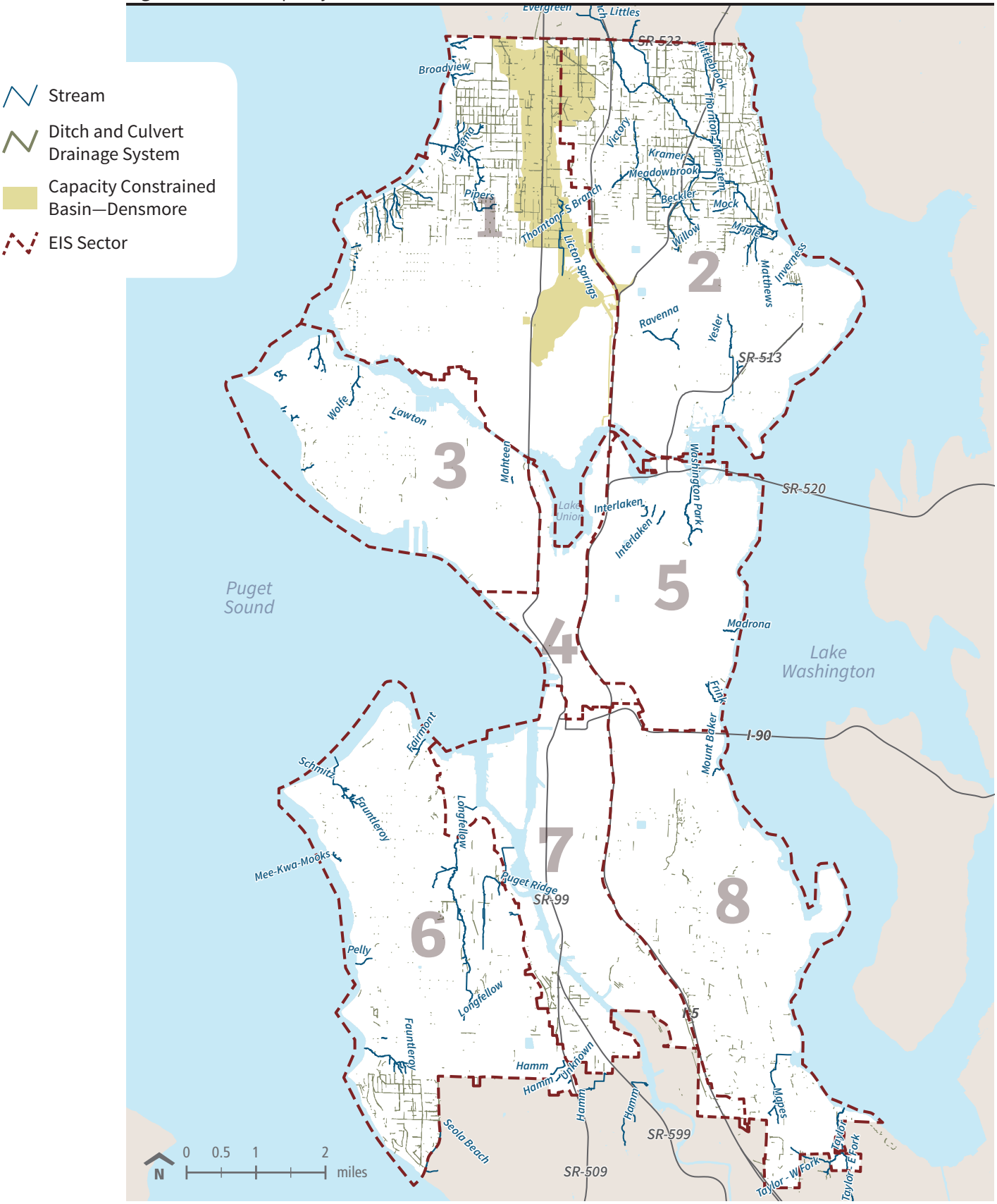
Source: City of Seattle, 2002.

Figure 3.9–3 Combined pipe system, pump stations and KC Metro wastewater system



Source: City of Seattle, 2002.

Figure 3.9–4 Capacity constrained areas



Source: City of Seattle, 2002.

Some portions of the drainage system are piped while others are an informal system of ditches and culverts, most of which drain to creeks or large receiving waters. For example, the area north of 85th Street (annexed by the City in 1954) is served primarily by ditch-and-culvert drainage systems (SPU 2014). Figure 3.9–5 shows the percentage of streets that do not have formal drainage systems by sector.

Partially Separated System

During the 1960s, portions of the combined sewer system were retrofitted with storm drain separators that diverted street runoff into the drainage system. The primary objective of these separation projects was to reduce emergency overflows of untreated sewage. Runoff from rooftops and properties outside the road rights-of-way was not diverted and is still conveyed to wastewater treatment plants (SPU 2014). Figure 3.9–2 shows the partially separated areas in the city.

Seattle City Light—Electric Power

In 1905 the Cedar Falls power plant began supplying electricity to Seattle's streetlights. The City's charter was amended in 1910 to create a Light and Power Department that eventually became known as Seattle City Light.

The heart of the SCL's water storage and generating facilities are four dams supplying hydroelectric power to the area: Ross, Diablo, Gorge and Boundary dams (SCL 2013).

Figure 3.9–6 shows the zones of substations that serve Seattle.

3.9.2 Impacts

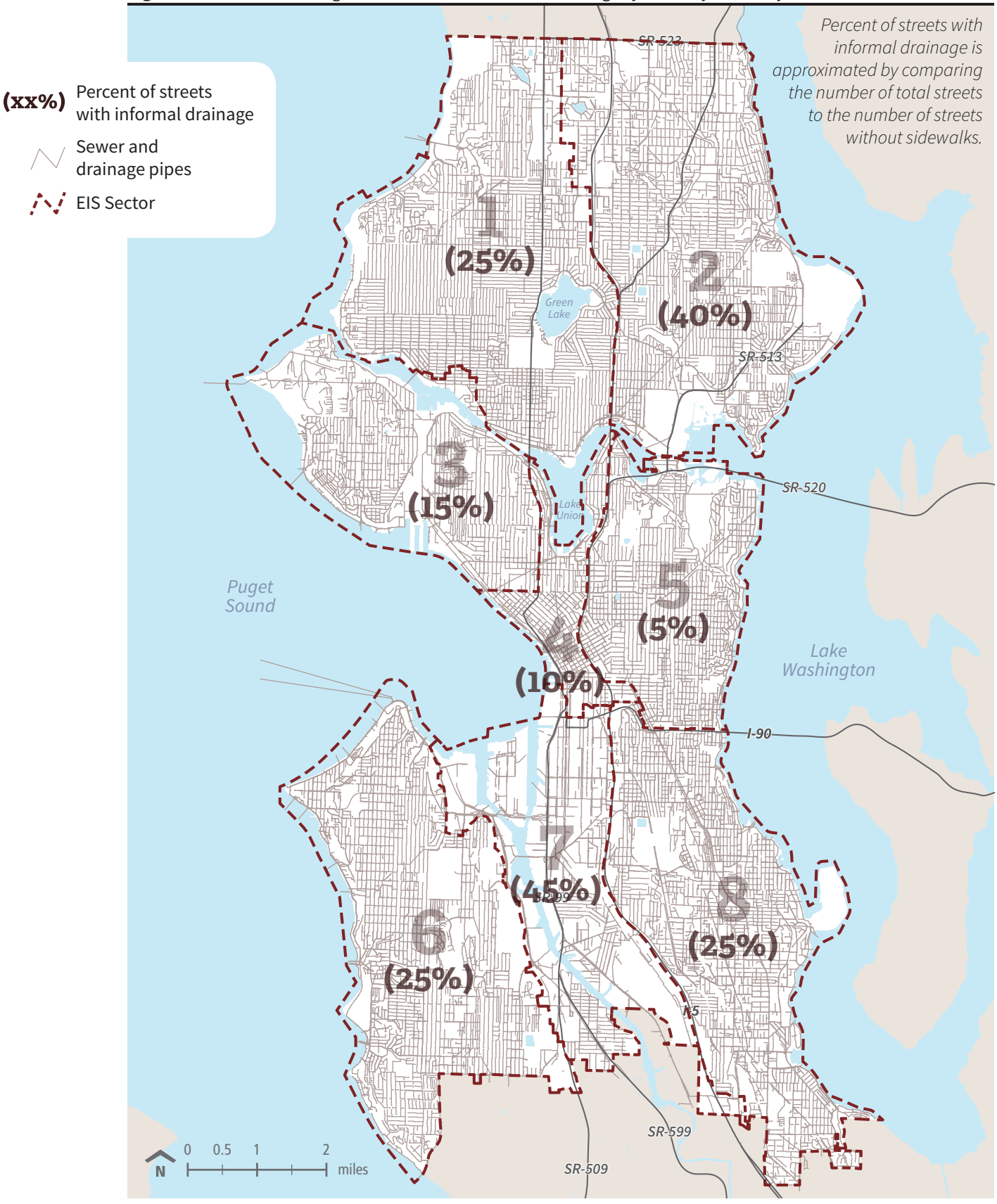
Impacts Common to all Alternatives

There are no significant variations in adverse impacts between the alternatives. The city-wide demand for utilities would be similar for all of the alternatives including Alternative 1 (No Action). Impacts to utility services that could be expected to result from any of the alternatives are described below.

SPU—WATER

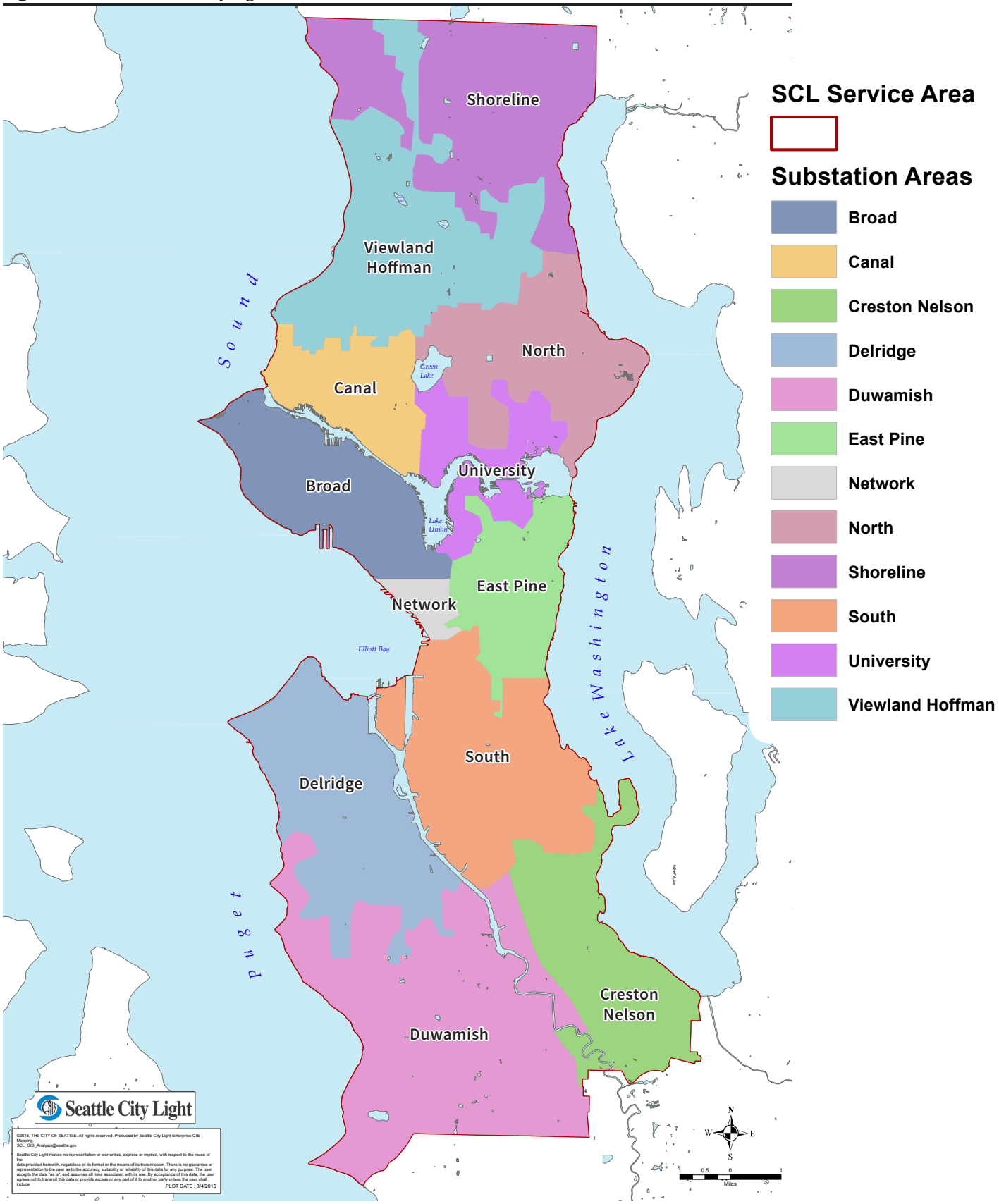
SPU uses Puget Sound Regional Council and Washington Office of Financial Management growth forecasts to develop long-range (at least 20 years) water demand forecasts and determine if new supplies or additional system capacity are needed. These water demand forecasts, supply analyses, water rights evaluations and capacity analyses are updated with each water system plan update, but may be updated more frequently if new information results in a significant change. The sensitivity of these forecasts to various factors, including updated

Figure 3.9–5 Percentage of streets without formal drainage systems by EIS analysis sector



Source: City of Seattle, 2002.

Figure 3.9–6 Seattle City Light substation service areas



Source: City of Seattle, 2015.

growth projections, is also examined. It should be noted that currently total water system usage is declining and the water system has excess capacity.

New developments and redevelopments must meet the current fire code and any new services are connected to adjacent water mains. Water supply requirements for fire flow can be much greater than the average daily usage for single buildings. Under all scenarios, including the No Action Alternative, future development would result in greater demands on localized areas of the water supply and distribution system. There is no significant variation in impacts between the alternatives.

SPU—SEWER AND DRAINAGE

Separated Sewers

Under all scenarios, including Alternative 1 (No Action), development could result in greater demands on the local sewer collection system, the downstream conveyance and the treatment facilities. Increased sewer flow is related to increased water consumption. There would be a greater overall need for sewage capacity with increased density, but no significant adverse location-specific impacting conditions are identified in this review.

Separated Drainage

Under all scenarios, including Alternative 1 (No Action), future development would result in increased flow and/or improvements to the drainage system. Increases in peak flow and total runoff caused by conversion of vegetated land area to impervious surfaces would create increased demand on drainage system capacity, but no significant adverse location-specific impacting conditions are identified in this review.

Combined Sewers and Partially Combined Sewers

In areas of combined sewers, impacts from water consumption and runoff would be cumulative. The potential variation in area-specific impacts between alternatives would therefore be comparable to what is predicted for the separated sewers and drainage described above.

SCL—ELECTRIC POWER

Under all scenarios, including the No Action Alternative, future growth and development would increase demand for electrical energy. For 50 years, electricity consumption grew well above Gross Domestic Product (GDP) growth (12 percent in 1950). Now it is growing at less than GDP, and Seattle City Light projects less than 0.5 percent annual growth. Despite recent population and economic growth, Seattle City Light's load is fairly stable since its service territory is well established and it has administered an aggressive energy conservation program for nearly 40 years. Tightened building codes, especially in Seattle are changing energy use. Some developers are going well beyond these codes—such as the Stone34

Building in Fremont, which is designed to reduce water and energy use by more than 75 percent compared to other similar buildings, and the Bullitt Center, a Living Building Challenge certified building which is required to be self-sufficient for energy and water for at least 12 continuous months and to meet rigorous standards for green materials and for the quality of its indoor environment.

At the same time, there are new efficiency standards for appliances as well as new technologies and software to better manage energy usage at home and office. Basic appliances, like televisions, are now 60 percent more efficient than just 3 years ago.

Impacts of the Alternatives

Although citywide demand for utility service would be similar for all of the alternatives, future development in concentrated areas could potentially result in cumulative impacts to localized portions of the utility system. However, both SPU and 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 in this section.

Alternative 1: Continue Current Trends (No Action)

Impacts resulting from Alternative 1 would be the same as described in the discussion of Impacts Common to All Alternatives.

Alternative 2: Guide Growth to Urban Centers

Alternative 2 would plan for focused growth in the City's six designated urban centers, with the greatest amount of growth focused in the Downtown, South Lake Union, Capitol Hill and Northgate urban centers. A concentration of growth in the urban centers would increase demand for utilities in these areas, with comparatively less demand for utility service in the hub and residential urban villages and outside of the urban villages. However, because the utilities are already planning for relatively high density and intensity development in the urban centers, Alternative 2 is not expected to result in any new impacts beyond those described under Impacts Common to All Alternatives.

Alternative 3: Guide Growth to Urban Villages near Light Rail

Alternative 3 would possibly create a new urban village around the NE 130th Street transit station and would amend the boundaries of other urban villages within a 10-minute walkshed of existing or planned light rail stations. The expansion and new urban village areas are currently primarily developed with single family residential uses.

Water. Increased development intensity in the new and expanded urban village areas would increase overall water demand, including fire flow demand. All new development would be required to meet the current fire code. However, SPU does not anticipate that developer required water improvements would differ from those described under Impacts Common to All Alternatives.

Drainage. The possible NE 130th Street/Interstate 5 urban village is located in an area where some streets have informal drainage. With future more intensive development, storm drains might need to be extended. A portion of this new urban village area is located in the Densmore drainage basin, which has more stringent requirements for mitigating runoff from redevelopment.

Sanitary Sewer. Impacts would be as described under Impacts Common to All Alternatives.

Electrical Power. Impacts would be as described under Impacts Common to All Alternatives.

Alternative 4: Guide Growth to Urban Villages near Transit

In addition to the residential urban village expansions described in Alternative 3, Alternative 4 would include additional expansions in the following urban villages: Ballard, Fremont, West Seattle Junction and Crown Hill. The potential for adverse impacts would be similar to those described for Alternative 3 above.

Existing Management Strategies

As noted above, both SPU and SCL currently employ a variety of mitigation strategies that allow them to anticipate and adjust to changing demands. Collectively, these measures will serve to minimize and mitigate the impacts of growth and development. A summary of existing practices employed by each utility are described below:

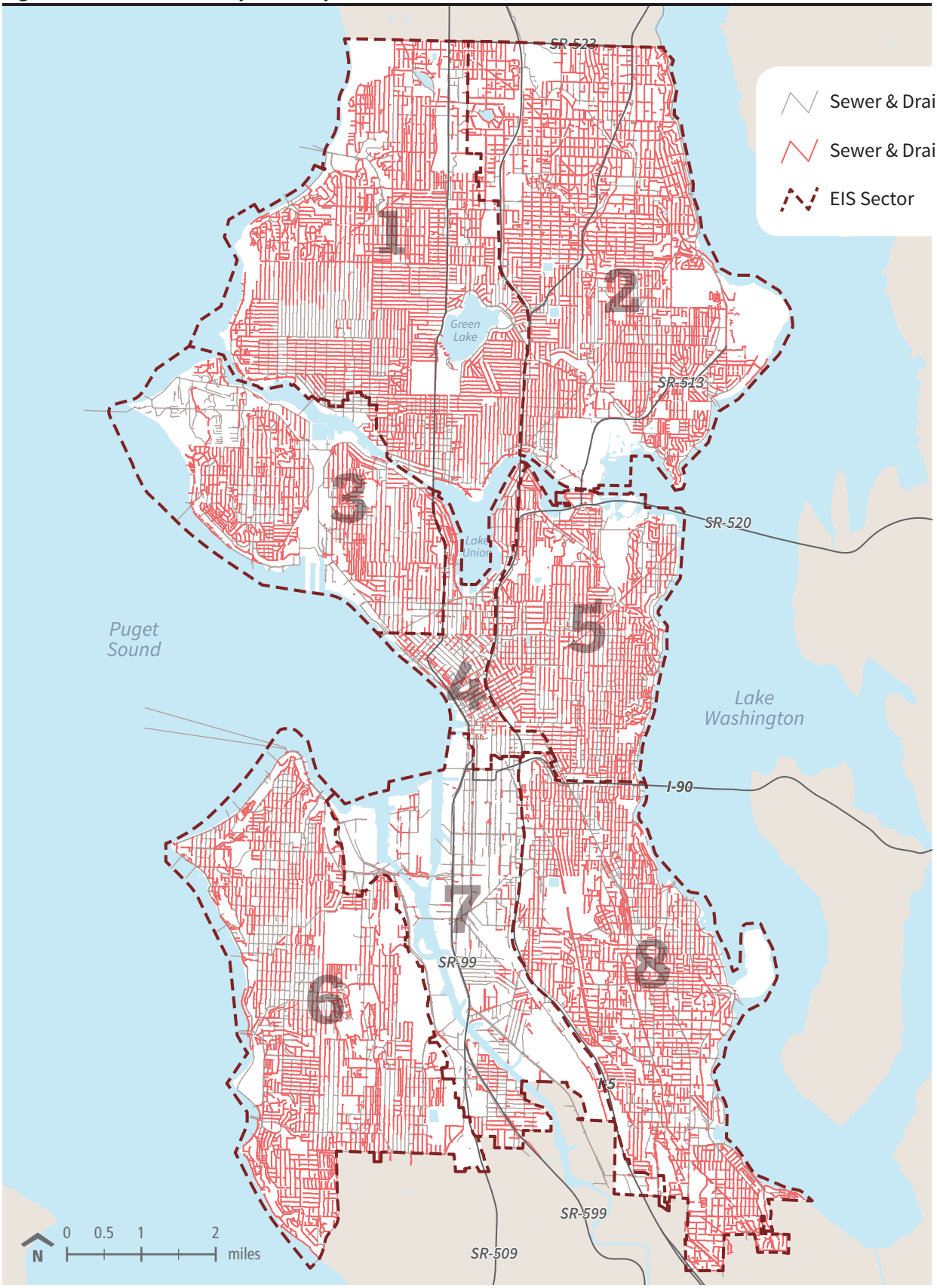
SPU—WATER

Water Availability Certificates and Conservation. SPU uses a hydraulic network model to evaluate capacity and make a determination of water availability. If there is a gap between what the existing system can provide and what a development needs, the developer is required to upgrade the existing system to meet demand (SPU 2012). New development and redevelopment is required by the plumbing code to include efficient plumbing fixtures. This requirement will reduce the overall impact to water demand resulting from the proposed alternatives.

SPU—SEWER AND DRAINAGE

Developer Sewer Improvements. In areas that are not designated as capacity constrained, developers are required to demonstrate that the downstream system has sufficient capacity for additional flow. Some parts of the City are served by sewers that are less than 12-inch

Figure 3.9–7 Areas of city served by sewers less than 12-inch diameter



Source: City of Seattle, 2002.

diameter, see Figure 3.9–7. These areas are likely at or near their capacity and downstream pipes from new development would have to be upgraded to a minimum 12-inch diameter. Redevelopments may also reduce per-capita sewer demand, as newer, low- or no-flow plumbing fixtures and equipment replaces older, less efficient, installations. These practices will help reduce the overall impact to the wastewater system.

Capital Projects. SPU also identifies candidate capital projects which the City implements independent of private development. SPU uses a hydrologic/hydraulic model and an asset management system to plan for development and address capacity constraints. A list of priority areas were identified in the 2006 Wastewater System Master Plan for Capital Improvement Projects. This list is updated and refined as additional data is available. Under the SPU Asset Management system, projects must be justified through a business case process that establishes that a problem or opportunity is timely and important, and that the proposed solution is superior to alternatives based on a triple bottom line analysis (economic, environmental and social) of life cycle costs and benefits.

Seattle Stormwater Code. Current stormwater regulations require new development and redevelopment to mitigate new impervious surfaces and pollution generating surfaces with flow control and/or water quality treatment. City of Seattle stormwater regulations protect people, property and the environment from damage caused by stormwater runoff. The stormwater codes satisfy the City's obligation to comply with Washington State Municipal Stormwater Permit—National Pollutant Discharge Elimination System (NPDES) Permit, issued by the Washington State Department of Ecology.

Also called natural drainage, **Green Stormwater Infrastructure (GSI)** *uses plants, trees and soils to manage stormwater. It slows down, reduces and treats polluted runoff before it can harm waterways.*

The stormwater regulations address how stormwater from development needs to be controlled and treated using on-site stormwater management including green stormwater infrastructure (GSI) and other measures. The code also identifies erosion control requirements for construction and grading activities. The erosion control, flow control and treatment requirements help to maintain or improve the conditions of the downstream system and discharge location and reduce the overall impact of development. New development that complies with these regulations, standards and practices will help reduce the overall impact to the drainage system. Redevelopment that replaces existing impervious surface and provides flow control can reduce runoff rates even below current levels.

As with the sewer system, developers are required to demonstrate that the downstream system has sufficient capacity for changes in stormwater runoff. In areas of informal drainage the developer may be required to extend the drainage main, refer to Figure 3.9–4.

SCL—ELECTRIC POWER

Advanced Meter Infrastructure. In 2016, Seattle City Light will complete deployment of Advanced Meter Infrastructure to replace the existing manually read analog meters. Currently, customers receive a bill from City Light that shows their consumption for the previous sixty days with no context as to when the energy was used or what it was used by. Advanced Metering will give customers the option of seeing their energy use in near-real time. Not

only can this help control energy use, it may be able to help customers identify problems with their electrical system, such as a malfunctioning electric water heater, that would only show up when they received an unusually high bill.

Energy Benchmarking. The Energy Benchmarking and Reporting Program adopted in 2010 and administered by the City's Office of Sustainability & Environment, requires owners of non-residential and multifamily buildings (20,000 square feet or larger) to track energy performance and annually report to the City of Seattle. This allows building owners to understand and better manage their building's energy usage.

Seattle Energy Code. Seattle's commercial and residential energy codes are some of the most advanced in the country. They set a baseline for energy efficiency in new construction and substantial alterations. Additionally, more buildings are exceeding energy code standards such as the Bullitt Center, the Stone34 Building and Amazon's planned data-center waste heat recovery system for the new South Lake Union campus.

Capital Project and Resource Planning. Seattle City Light's Six-Year Strategic Business Plan (updated every two years) and state-mandated Integrated Resource Plan (updated every two years) provides the utility the capacity to establish a roadmap for insuring adequate retail revenue, and necessary physical infrastructure and energy resources to meet the City's demand due to projected economic or population growth (SCL 2014).

3.9.3 Mitigation Strategies

The discussion above has identified comparative differences in the potential for adverse impacts related to increased demand for utility service under each alternative. However, none of these identified impacts are identified as significant adverse impacts. The continued application of the City's existing practices, including those described above, would help to avoid and minimize the potential for significant adverse impacts to utility service discussed in this section.

3.9.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to services provided by Seattle Public Utilities or Seattle City Light are anticipated.

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