WATER UTILITY

AFFECTED ENVIRONMENT

EXISTING WATER SYSTEM CONDITIONS

The Livable South Downtown study area is located in the South 326 pressure zone. Water services are provided by Seattle Public Utilities (SPU) to approximately 1,000 locations, of which roughly 70% are in Downtown zoned areas, 20% are in industrial zoned areas and 10% are in commercial zoned areas.

Sizes

The study area contains primarily 12-inch and larger diameter cast iron water mains. The major supply mains consist of 16-, 24-, and 30-inch mains that convey water in a north-south direction along the major avenues. The western study area vicinity is served by 12- and 24-inch mains in Alaskan Way and 1st Avenue S. respectively. In the Chinatown vicinity, there are 12-inch and 16-inch mains in 4th Avenue S. and 6th Avenue S., respectively, and 30-inch and 24-inch mains in Airport Way S.-to-7th Avenue S. and S. Dearborn Street respectively. The east-west pipe gridding consists mostly of 12-inch mains in the Pioneer Square and Chinatown vicinities, although there are a few scattered blocks with 8-inch mains. In the Little Saigon vicinity, 12th Avenue S. is served by a 24-inch main, with 8-inch mains present in most streets east of 12th Avenue S.

Age

The majority (63%) of the water mains in the study area were installed prior to 1920.

Water Pressure

Water pressure in this area is very good, ranging from 50-75 pounds per square inch (psi) in Little Saigon and higher hill areas of Japantown, to between 75-120 psi in the central portion of the study area, and between 120-129 psi in the western areas toward the waterfront.

Available Fire Flow

Nearly all of the hydrants in the study area supply at least 4,000 gallons per minute (gpm) at a residual pressure of 20 psi. Two locations provide fire flow below this level: S. Washington Street west of Maynard Avenue S. (near I-5), and S. Weller Street between 12th Avenue S. and Rainier Avenue South. Developers may need to install water main improvements at these locations if required for their structures. Actual fire flow requirements for new or improved structures are determined by the Seattle Fire Marshal's Office, based on the 2003 International Fire Code. Most Downtown structures rely on flow from several nearby hydrants to meet their fire flow requirements.

Reliability of Existing Water Mains

Since 2000, there have been about 25 water main leaks or breaks in this area. This is considered to be within a normal range of system performance (SPU, 2007). Seventeen of these leaks were joint-related leaks of which 15 occurred on pre-1920 cast iron mains where water pressures are about 125 psi. When these incidents occur, the main segments must be shut down to prevent further joint damage and isolate them for repairs. Spot repairs to water mains will continue to be occasionally needed in the study area due to local characteristics that include high water pressure, cast iron pipe, lead joints, soil and groundwater conditions, and rail and truck traffic vibrations.

Ongoing Planning Efforts, System Improvement Needs

Fill soils in the low-lying areas west of I-5 make watermains vulnerable to earthquake damage. In the worst-case, the entire pressure zone's service could be affected by earthquake damage in the study area. The installation of isolation valves is a potential improvement described by SPU engineers that would help reduce the extent of damage to water service (SPU, 2007). Conceptually, such valves should be located at the southern edge of the Downtown central business district just north of Yesler Way. This would enhance overall water main reliability in areas with good soils, though it would not solve post-earthquake needs in severely affected areas. Given its location and soil conditions, water supply likely could be maintained in Little Saigon after a seismic event, provided that service from an adjacent pressure zone is available.

Another possible system improvement would be to install additional local line valves with better spacing, which would reduce the size of shut-down areas when water main breaks or leaks occur. This would reduce disruptions and improve overall reliability of service. One drawback is cost—the larger diameter mains in the study area would necessitate costly commercial-level valving.

ENVIRONMENTAL IMPACTS

WATER SYSTEM IMPACTS WITH FUTURE GROWTH

All Alternatives

For EIS Alternatives 1, 2 and 3, the growth scenario evaluates approximately 6,000 dwelling units of additional residential growth, and approximately 24,600 jobs of additional employment growth by 2030. Employment growth would be expected to occur through development of new buildings but also through increased employment within existing buildings.

Projected growth would increase the overall demand for domestic water service and fire flow protection in the study area. At a programmatic level of review, no significant adverse impacts on water utilities are identified for any of the EIS alternatives (SPU, 2007). No specific system improvement needs related to the projected growth are identified. SPU staff indicate that the existing water system in the study area is well-prepared to provide service to future growth. From a system-wide perspective, the sizing of the system, and the available water pressure and fire flow volumes are generally adequate to provide service to future levels of growth under any of the EIS alternatives. This does not rule out the possibility that individual developments may be required to make localized improvements to meet fire flow or domestic service requirements. If improvements would benefit multiple parties, a developer's improvement costs are calculated in proportion to the scale of their development (SPU, 2007).

Under the No Action Alternative (Alt. 4), the expected amount of future growth would be less than predicted for the other alternatives, also with no significant adverse impacts on water utilities identified.

POSSIBLE SEISMIC DAMAGE CONTROL STRATEGIES

The EIS evaluates future growth within several portions of the study area that are at risk of seismic damage due to their soil characteristics. In order to reduce the worst-case risks of damage and water service interruptions, the installation of isolation valves between the study area and the Downtown office core, as suggested by SPU, has merit. This type of improvement would be a precautionary measure that could be pursued regardless of zoning for the study area. Also, see the Earth section in this chapter for additional discussion of seismic risks and potential damage.

POSSIBLE WATER-USE SUSTAINABILITY STRATEGIES

Despite the lack of identified significant adverse impacts on the water utility system, there would be opportunities in future development to encourage the use of alternative strategies that would reduce overall domestic water use and effluent flows to the sewer system. These strategies would have multiple kinds of environmental benefits.

Rainwater harvesting could provide supplemental water for toilet flushing, which comprises up to 20 percent of water demand in a typical building. ***On-site treatment of wastewater***, using proven technologies, could also contribute non-potable water for re-use without taking up too much space. Using both of these methods together could address all or most toilet flushing needs in a new building, which would generate year-round benefits by reducing "base flows." This would also reduce the volume of effluent flows into the sewer system, which helps reduce the potential for combined sewer overflows that are a significant environmental pollution concern in Seattle. Over the long-term, ***electronically-monitored "smart" valve systems*** may also be possible to employ in parts of Seattle's sewer system to help manage sewer flows better in real time and avoid overflows.

MITIGATION STRATEGIES

Due to a lack of identified significant adverse impacts, no mitigation strategies are proposed. However, please see the strategies listed above relating to seismic damage control and environmental sustainability.

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

None are identified.