

EXECUTIVE SUMMARY



Purpose of the Comprehensive Water System Plan

Tacoma Water's planning activities center on the need to meet increasing demands in an expanding service area, to address local, state, and federal government planning policies and regulations, to satisfy Washington State Department of Health (DOH) planning guidelines and to satisfactorily address customer expectations. The 2006 Tacoma Water Comprehensive Water System Plan (2006 Update) serves as a tool to assist Tacoma Water in making the best use of available resources in order to provide quality water services and protect the health of its customers. The 2006 Update complies with DOH regulations under Washington Administrative Code 246-290-100 which requires water purveyors to update water system plans every six years and, therefore, replaces the September 2000 Comprehensive Water System Plan as Tacoma Water's foundation for future decisions pertaining to the complete water system. The Green River Watershed Management Plan has also been updated and is included as Volume II.

Changes Since the last Water System Plan

Many changes have occurred which affect water system planning since Tacoma Water last prepared a water system plan. Such significant changes include:

- On October 21, 2005 water began flowing through Tacoma Water's 34-mile Second Supply Project Pipeline. A new regional partnership between Tacoma Water, the Lakehaven Utility District, the Covington Water District and the City of Kent was formed to share in the expense, and utilize the supply, associated with Tacoma Water's Green River Second Diversion Water Right.
- The Howard Hanson Dam Additional Storage Project received approval and installation of the cofferdam needed for construction of the fish trap and haul facilities is proceeding under U.S. Army Corps of Engineers direction.
- Tacoma Water began providing Satellite System Management Agency services to the City of Tacoma owned Tacoma Narrows Airport.
- Tacoma Water has acquired the following independent water systems: SE Tacoma Mutual, Hyada Mutual and Day Island.
- New wholesale water contracts have been reached, including with the Cascade Water Alliance.
- The requirement to conduct a vulnerability assessment was established when the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (HR3448) was passed.
- The 2003 Municipal Water Law (HB 1338) identified additional water system planning elements related to water rights, system capacity, service area consistency and conservation.
- The Environmental Protection Agency promulgated the Long Term 2 Enhanced Surface Water Treatment Rule that contained, among other things, new federal requirements for covering open finished water reservoirs.
- The Tacoma Water Habitat Conservation Plan was approved in 2001.
- Franchise agreements were reached with the City of Lakewood and the City of Fircrest to serve in portion of those cities.
- Tacoma Water developed its first 10-year Business Plan in 2003. Since that time, the Business Plan has been reevaluated and revised every other year as the first step in establishing the upcoming biennial budget and associated rate cases, and identifying projected needs for the subsequent four biennial budget periods.

Water Service Area and Water Use

Tacoma Water provides water service to residences, businesses and industries located in the cities of Tacoma, University Place and Ruston; in portions of the cities of Puyallup, Orting, Bonney Lake, Fircrest, Lakewood and Federal Way; and, in portions of Pierce and southern King county. Tacoma Water also provides wholesale water supplies to 14 independent water systems operating in Pierce and King counties and provides management services to the Tacoma Narrows Airport located on the Gig Harbor Peninsula. Tacoma Water is a participant in, and operator of, the Second Supply Project: A new regional water partnership between Tacoma Water, the Lakehaven Utility District, the City of Kent and the Covington Water District.

Taken together Tacoma Water provides retail water service to approximately 94,000 connections or an estimated population of 302,392. While single-family residential connections account for the majority (89 percent) of Tacoma Water's customer base, water use by the single-family customer class accounts for 34 percent of total water consumption. On the other hand, one industrial connection (the Simpson Tacoma Kraft Mill) accounts for 29 percent of total water consumption. The multi-family customer class makes up 5 percent of Tacoma Water's customer base and 11 percent of total consumption, with commercial connections accounting for 6 percent of the customer base and 15 percent of consumption.

The total average daily billed consumption for all Tacoma Water customers in 2005 was 51.1 million gallons. This is lower than the 1995 average daily billed consumption (59.35 million gallons) despite the passage of 10 years and an increase in customer connections of approximately 18 percent. Average day water use at the Simpson Pulp Mill in 1995 was 20 million gallons. By 2005, average day water use has been reduced to 14.9 million gallons at the Simpson Pulp Mill.

Tacoma Water's residential per capita (or per person) water use has consistently dropped since 1990. For example, in 1990 the residential per capita water use was 92 gallons per day, decreased to 90 gallons per day in 1995 and to 76 gallons per day in 2005. Year 2005 residential per capita water use is significantly lower than what occurred in year 2004 (83 gallons per day) due, in part, to the implementation of Stage One of the four-stage Tacoma Water, Water Shortage Response Plan, which began in March and ended in July.

Water Resources

Tacoma Water relies on the conjunctive use of surface and groundwater to meet customers' demands for water. The Green River, located in King County, is Tacoma Water's primary source of water. Tacoma Water's Green River First Diversion water right can supply up to 73 million gallons of water each day. The supply under this water right can be replaced with water from seven wells located along the North Fork of the Green River when water in the river is turbid (or cloudy). An agreement reached with the Muckleshoot Indian Tribe in 1995 requires Tacoma Water to guarantee minimum river flows. In the event the established flows are not met, Tacoma Water must reduce use of the First Diversion water right or, following the completion of the Howard Hanson Dam Additional Storage Project, use water stored at Howard Hanson Dam for streamflow support.

Tacoma Water's Green River Second Diversion water right can provide up to 65 million gallons of water each day. This diversion is subject to minimum streamflow standards, is a resource

shared with Tacoma Water and its Second Supply Project Partners and allows water to be stored in the spring for use in the summer. When completed, the Howard Hanson Additional Storage Project will allow the storage of up to 20,000 acre-feet behind Howard Hanson Dam. Such stored water can be used as needed by Tacoma Water and its Partners to support Tacoma Water's instream flow commitments. Tacoma Water's share of the Second Diversion water right equals 27 million gallons of water a day. Tacoma Water's share of stored water equals up to 8,333 acre-feet: 30 million gallons a day if used at a uniform rate over a 90-day period.

In addition to surface and groundwater sources in the Green River Watershed, Tacoma Water owns 24 wells located in and around the city. Tacoma Water's wells have a short-term combined pumping capacity of approximately 60 million gallons per day. These groundwater sources supply approximately 15 percent of total annual water requirements. In some cases, Tacoma Water wells have not yet been fully developed to utilize the individual water rights associated with the various sources of supply.

Future Water Demands and Water Supply

With the October 20, 2005 start up of the Second Supply Project Pipeline, Tacoma Water relies on four basic sources of supply. These include the First Diversion water right from the Green River, the Second Diversion water right from the Green River, the North Fork well system and the system of 25 groundwater sources located in and near the City. Each of Tacoma Water's four basic sources of supply have unique constraints and conditions associated with their use. Given the complexity of the supply system, Tacoma Water utilizes a resource model in order to determine the most efficient means of meeting demands. The most recent resource model was prepared in July 2007 and is titled Water Availability Study.

The water demands incorporated into the resource model include Tacoma Water's most current demands as prepared in December 2003 (Expected Growth and High Growth scenarios), new water demands associated with a new wholesale water contract reached with the Cascade Water Alliance and additional average day wholesale demands of 1.67 million gallons per day, across all years. Such wholesale demands were contracted for after the 2003 demand forecast was prepared.

The July 2007 Water Availability Study evaluates the amount of water available in years 2020, 2025 and 2030 given projected water demands and water supply constraints. The Water Availability Study concludes that year 2025 will be the most difficult time period to meet demands. By 2030, the Cascade Water Alliance term-limited supply will drop from 6 million gallons a day to 1 million gallons a day, making year 2030 demands less than year 2025. For the Expected Growth Demand scenario, all demands will be met through 2030. In 2025 and 2030 there is an additional 2.2 million gallons per day and 4.1 million gallons per day available supply, respectively. For the High Growth Demand scenario, the years 2025 and 2030 experience shortfalls, with the 2025 shortfall expected to be 2.5 million gallons per day.

Tacoma Water plans to develop additional groundwater resources, consistent with existing water rights, at the South Tacoma Aquifer and Tideflats Wellfields, to implement the Tacoma Water Conservation Program, to cooperate in regional projects including projects involving the use of reclaimed water as may be implemented by local sewer utilities, and to pursue the acquisition of existing water rights that may become available in order to maintain adequate resources to meet projected demands.

Water System Evaluation

Transmission System

Tacoma Water's primary transmission system conveys water from the Green River (or North Fork Wellfield) to the service area and consists of Pipeline Nos. 1, 2, 4 and the newly constructed Second Supply Project Pipeline (also known as Pipeline No. 5). The basic strategy of the transmission system is to make use of the gravity flow of water from the Green River or North Fork Wellfield to the service area for reliable and economical service. Tacoma Water's secondary transmission system consists of 140 miles of main ranging in diameter from 28 to 96-inches.

Tacoma Water implements a transmission main renewal and replacement program to estimate capital expenses required to keep the existing transmission main infrastructure operable into the future. Through this program, transmission main replacement or renewal projects involving the following infrastructure, and in the following locations, have been identified as necessary to complete: Pipeline No. 1 in the Puyallup River valley; Pipeline No. 2 near Canyon Road; Tideflats Trunk Main 1 in the vicinity of the Tacoma Dome; Pipeline No. 1 near Boise Creek; and, Pipeline No. 2 west of Woodland Avenue along 128th Street.

Distribution System

Tacoma Water's distribution system encompasses an area of approximately 150 square miles. The distribution system contains nearly 1,200 miles of pipe ranging in diameter from 2 to 24-inches. The distribution system is designed to provide adequate looping and available water pressure generally ranges from an average of 55 pounds per square inch (psi) in residential areas up to 100 psi in industrial zones. All of Tacoma Water's customers are served through metered connections, varying in size from 5/8 inch to 30-inches.

Hydraulic modeling of the transmission and distribution system completed for the 2006 Update identifies several areas that are experiencing low flows based on existing maximum day and peak hour demands. Specific deficient areas include: Fife Heights; Stadium District; East Tacoma; North End; and, South L Street. The deficiencies are currently being addressed either through main replacement projects currently underway or planned or will undergo further study to determine the best solution to improve water service.

Storage System

Tacoma Water has built a storage system consisting of the 210- million-gallon McMillin Reservoir plus 16 other reservoirs, standpipes and tanks that can store up to 78 million gallons of additional water.

The Tacoma Water system, as a whole, has excess storage capacity; however, some individual service zones do not currently have adequate storage for anticipated growth. More storage and/or pump capacity is planned for the Prairie Ridge and Sunrise Standpipe zones to stay ahead of future growth.

The McMillin Reservoir is the last remaining uncovered reservoir in the Tacoma Water system and currently has approximately 150 million gallons of excess storage. Adverse impacts on water quality and recent federal water quality regulations require that the McMillin basins be replaced with enclosed tanks. To reduce the cost of covering the reservoirs and to increase the turnover rate, the size of McMillin will be reduced. Current projections call for the first of three 30-35 million gallon tanks to be constructed in 2009, with a second to be constructed in 2015.

Once two basins are in service it is likely that the remaining uncovered basin will be removed from service. The final tank would be constructed as system needs dictate, but likely in the 2019-2020 timeframe.

Water Quality

Because of the high quality of Green River water, active watershed control and ongoing compliance with regulations, Tacoma Water is one of the very few water systems in the United States that is not currently required to filter its supply.

Green River treatment facilities consist of North Fork groundwater blending and chemical treatment with chlorination, fluoridation and pH adjustment. The groundwater blending occurs within the Headworks Control Building and chemical treatment occurs approximately 2,600 feet downstream of the Headworks Control Building at the newly constructed Green River Treatment Plant – Chemical Facilities. A new Ozone Treatment Facility will be in service in mid-2007 for taste and odor control treatment.

The Tacoma Water groundwater supply system is principally treated only with chlorine for disinfection. Each groundwater source is not treated at the wellhead, rather several sources are blended together and treatment is applied at multiple confluence points.

The Long Term 2 Enhanced Surface Water Treatment Rule requires Tacoma Water to have the facilities in place to remove or inactivate *Cryptosporidium* by 2012. Tacoma Water plans to conduct a pilot study to evaluate several treatment processes for *Cryptosporidium* beginning in 2009.

Presently, the water from the South Tacoma Wells is disinfected with chlorine, but is not optimized for corrosion control nor is it fluoridated. Installation of corrosion control and fluoridation facilities for the South Tacoma Wells and other groundwater sources are planned for the 2007/2008 biennium.

Operations and Maintenance

Tacoma Water's operations and maintenance (O&M) organization is staffed by well-qualified, technically trained personnel. Staff regularly participates in safety and training programs to keep abreast of the latest changes in the water industry and to ensure a smooth and safe operation of the water system.

Maintenance programs on the distribution system began to be superseded by new construction for growth starting in the late 1970s. Throughout the 1990s, Tacoma Water focused on re-establishing adequate maintenance programs for the distribution system. The Systematic Maintenance and Renewal Team (SMART) program, hydrant maintenance, meter maintenance, and systematic flushing are all a result of those efforts. These programs are very effective and are models that other water purveyors have looked at to improve maintenance on their own systems.

A written maintenance plan provides the framework for maintenance planning in the Supply Section. Good progress has been made in reducing the backlog in maintenance of right-of-ways, tanks and pipe painting, and reservoir cleaning. Some challenges remain, such as making improvements in electrical maintenance, making further use of SAP in maintenance planning and scheduling and developing a maintenance plan for distribution.

Taken together, Tacoma Water's O&M budget for the 2005/2006 biennium is \$78,484,477. This level of funding is expected to increase in the 2007/2008 biennium.

Green River Watershed Management Plan

The Green River Watershed Management Plan, included as Volume II, serves as documentation of the watershed control program implemented by Tacoma Water for the Green River Watershed. Washington Administrative Code 246-290-690 mandates that public water supply systems using unfiltered surface water develop and implement a DOH-approved watershed control program to avoid degradation of the physical, chemical, microbiological, and radiological quality of the source of the supply. As a public water supply utility with an unfiltered water source, Tacoma Water is required to update its watershed control program at least once every six years by providing documentation to the DOH. The Green River Watershed Management Plan characterizes the watershed hydrology, geography, and critical areas; details landowners and written agreements with landowners; identifies watershed characteristics and activities that may have an adverse effect on source water quality; summarizes monitoring and control of watershed activities; and discusses potential future improvements in watershed control.

Capital Improvement Program

The 2006 Update contains Tacoma Water's capital improvement program (CIP) developed to guide the growth of the Tacoma Water system through the year 2012 and beyond. Included in the CIP are:

- Water supply / conveyance projects
- Storage system projects
- Watershed and water treatment projects
- Distribution main upgrades and renewals

A CIP is to be updated every six years, consistent with water system plan update requirements. Through the development of a business plan, Tacoma Water evaluates and prioritizes system improvement needs on a more frequent, 2-year schedule.

Financial Evaluation

Revenue sources to finance the Tacoma Water capital improvement program include: policy-based rate revenue, System Development Charges, Water Quality Assurance Fund transfers, sale of surplus property and revenue bond proceeds. Tacoma Water has a sound financial base that can finance capital improvements. Bond ratings from both Moody's Investors Service and Standard and Poors indicate a high level of confidence in the utility's ability to repay related debt obligations.

Conclusion

Tacoma Water has a history of providing its customers with high quality drinking water in a cost-effective manner. The 2006 Update provides a roadmap for Tacoma Water to continue this level

of performance into the future. The 2006 Update will serve as a tool to assist Tacoma Water in making the best use of available resources in order to provide quality water services and protect the health of its customers.

The following table displays selected operating and financial data regarding Tacoma Water as of year-end 2005, 2004 and 2003.

SELECTED OPERATING AND FINANCIAL DATA

	2005	2004	2003
Average Customer Months Billed	94,003	93,906	92,740
Operating Revenue	\$43,050,593	\$39,844,915	\$38,006,361
Net Operating Expenses	\$38,830,548	\$37,005,934	\$33,422,026
Debt Service Coverage Ratio	2.68	2.26	2.94
Total Water Billed (Million Gallons)	18,648	20,353	20,141
Average Billed Daily Use (Million Gallons)	51.09	55.76	55.18
Maximum Daily Use (Million Gallons)	93.61	109.26	110.67

Source: Water Division, 2005, 2004 and 2003 Financial Reports
Net Operating Expenses excludes gross earnings tax and depreciation