

INFRASTRUCTURE CASE STUDY:

Tolt Water Treatment Facility



SUMMARY

PROJECT TYPE	YEAR	DEAL STRUCTURE
Water treatment	2001	Design-build-operate

TOTAL COST

\$101 million total cost (\$65 million for construction, \$36 million for operations)

FINANCING

Bond financing

FUNDING

Rates

PUBLIC BENEFIT

Higher-quality drinking water at a lower cost



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Background

Seattle Public Utilities (SPU), a municipally owned utility providing water, sewer, and solid waste services, contracted with American Water-CDM (a joint venture between American Water and Camp Dresser and McKee, Inc.) in May 1997 in a partnership to permit, design, build, and operate the Tolt Water Treatment Facility. The facility was completed in 2001 to treat 120 million gallons of water per day from the South Fork of the Tolt River.

Project Description

Nearly 100 percent of the city of Seattle’s drinking water supplies originate as surface water from the Cedar River watershed, responsible for 70 percent of supply, and the South Fork Tolt River watershed, which supplies the remaining 30 percent. Historically, both the Tolt and Cedar Rivers, with their sources in the foothills of the Cascade Mountains and with largely protected watersheds, provided Seattle with high-quality water needing minimal treatment. Yet more stringent federal regulations and a need for greater reliability and capacity necessitated a new treatment facility.

At the time the facility was being planned, the Environmental Protection Agency issued two regulations, the Disinfectant and Disinfection Byproduct Rule¹ and the Enhanced Surface Water Treatment Rule,² which, in part, govern water contaminants under the Safe Water Drinking Act. SPU was increasingly aware of the varying levels of natural organic material in Tolt water and recognized that they would not be able to meet these standards without filtration and treatment improvements. The pursuit of a public-private partnership was, in part, an attractive option because of the technical expertise and innovation the private sector could offer SPU in meeting these environmental standards.

Increased system reliability was also a top priority. Turbid water, or water made “cloudy” by suspended particles like sediment, occasionally caused plant shutdowns, often because of storms and their resulting runoff.³

Qualified companies submitted bids covering the design, construction, and operation of the facility for a minimum of 15 years and extending up to 25 years. This process used qualification-based selection to consider overall value, not just upfront costs; only 40 percent of the contractor selection criteria were based on price.⁴

Early in development of the new water treatment facility, SPU had planned to follow the traditional practice of building the system through a competitively bid contract process. The city anticipated that it would cost \$171 million, \$115 million in construction and \$56 million in operations and renewal over 25 years.⁵ But following new authority from Seattle’s City Council, SPU shifted to consideration of a design-build-operate (DBO) procurement. With the winning DBO bid projected to cost \$101 million, the city estimated savings of 40 percent or \$70 million over a conventional approach to DBO of a similar facility, as shown in Figure 1.

Figure 1. Tolt Treatment Facility Project Costs

	DBB Estimate	DBO Contract	Savings
Capital	\$115 M	\$65 M	\$50 M
Operations	\$56 M	\$36 M	\$20 M
Total	\$171 M	\$101 M	\$70 M

The winning design differed from the previously bid-build design in three primary ways: the overall facility was more compact, gravity and hydraulics powered the primary means of solid removal, and the filter media were less thick.⁷ Ultimately, the projected cost savings of the DBO project were driven by these features, the increased efficiency and aligned incentives that stem from having a single partner from design through operation, and an expedited timetable. SPU also avoided any increase in internal staff expertise that would have been required to operate the facility, which it did not have previous experience running. These potential costs savings also bolstered the case for a public-private partnership.

The Tolt treatment plant was completed in 30 months after executing the DBO contract.⁸ According to one source at the time, “It is the largest water-treatment plant in the United States to be developed using this type of contracting.”⁹ Operating at full capacity, the Tolt plant generates 120 million gallons of water daily, using ozone for disinfection and taste/odor control that, together with filtration, limit water contaminants before delivery to SPU’s northern and eastern service areas.¹⁰ Upon completion, Tolt was also the largest water-treatment facility on the West Coast utilizing ozone and direct filtration.¹¹

The initial 15-year operations and maintenance (O&M) contract for the Tolt facility expired in 2016. In a letter to American Water, one SPU official remarked that, over the course of that contract period, the private partner had brought “a proactive approach to maintain plant systems and components, trouble shooting, making repairs, and coordinating condition assessments to ensure the plant continues to operate well.” SPU further noted that their continued partnership “demonstrate[s] a high-value benefit to SPU’s customers.”¹² Owing to their performance and the tangible benefits of the public-private partnership, SPU recently extended American Water’s O&M contract an additional five years, to 2021.

Benefits and Criticisms

As predicted, the two primary benefits of the Tolt Water Treatment Facility were its cost savings over traditional procurement and improved water quality and systems reliability. According to the Natural Resources Defense Council, an environmental advocacy group, the new Tolt treatment facility and its state-of-the-art ozone treatment successfully reduced elevated levels of water contaminants—haloacetic acids, total trihalomethanes, and *Cryptosporidium*—to below national standards.¹³ In this case, these clear public benefits have limited the criticism or opposition that public-private partnerships can, at times, face.

While Seattle has more generally faced criticism for its relatively high cost of water for consumers, the Tolt facility is not a primary driver of increased rates but one in a number of recent upgrades to the system that have necessitated rate increases—including another treatment facility on the Cedar River, watershed restoration and conservation efforts, and required security upgrades after the September 11 attacks for uncovered reservoirs.¹⁴ In fact, the private partners in this case are paid primarily on a fixed-fee basis with only some adjustments based on the amount of water produced and variable expenses. The private partner does not have control over rates and bears the primary risk of increased operational costs, a benefit of this partnership to SPU.

Takeaways

While public-private partnerships in the transportation sector have received more attention, the Tolt Water Treatment Facility is an example of how the DBO model can be used to cost-effectively address municipal water treatment challenges. In fact, Seattle has since elected to pursue P3s for other water projects, including a DBO contract for a water treatment plant on the Cedar River. Not having ever operated a water filtration plant before, Seattle chose to leverage the technological innovation and expertise of the private sector while allocating risk to minimize overall project costs. SPU succeeded in raising the quality of its drinking water at a lower cost than if it had tackled the project alone. The success of the partnership is evidenced in SPU’s recent extension of the private partner’s contract.

Endnotes

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4. G. Culp, "Alternative project Delivery Methods for Water and Wastewater Projects: Do They Save Time and Money?" Leadership and Management in Engineering 11(3), July 2011. [http://ascelibrary.org/doi/full/10.1061/\(ASCE\)LM.1943-5630.0000133](http://ascelibrary.org/doi/full/10.1061/(ASCE)LM.1943-5630.0000133).
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12. American Water Works Company, Inc., Letter obtained from American Water. <http://amwater.com/>.
13. Natural Resources Defense Council, "What's on Tap? Grading drinking water in U.S. cities: Seattle," June 2003. <https://www.nrdc.org/sites/default/files/seattle.pdf>.
14. Lynn Thompson, "We're Conserving But Water Rates May Climb," The Seattle Times, September 12, 2011. <http://www.seattletimes.com/seattle-news/were-conserving-but-water-rates-may-climb/>. Gene Balk, "Rain-Soaked Seattle Has Nation's Highest Water Bills," The Seattle Times, April 30, 2015. <http://www.seattletimes.com/seattle-news/data/rain-soaked-seattle-has-nations-highest-water-bills/>.



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