

# CHAPTER 12.

## IMPLEMENTATION PLAN

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This chapter discusses the methodologies and assumptions used to develop a construction schedule and cost estimates for implementation of the Denny Way/Lake Union CSO Control Project. The schedule and costs encompass both the City of Seattle Phase 2 and the King County CSO Control Projects from planning through construction completion. Contract bid packaging and detailed construction scheduling will be developed following completion of preliminary design.

### 12.1 Project Schedule

A critical path method schedule analysis was performed to determine the logical phasing sequence and time required for major work tasks. The major work tasks have been defined by King County as follows:

- Planning
- Preliminary design
- Final design
- Construction permit acquisition and contract document preparation
- Construction

Figure 12-1 shows the overall project schedule for each task and project component.

#### 12.1.1 Planning

Since the project is funded in part by a USEPA Grant, a Facilities Plan and Environmental Assessment (EA) will need to be submitted and approved by Ecology and USEPA prior to construction. A preliminary draft USEPA Facilities Plan and draft NEPA EA were prepared and issued in May 1997 to meet this grant funding requirement. The May 1997 preliminary draft Facilities Plan evaluated various CSO control alternatives and defined the preferred alternative. In November 1997, the Facilities Plan was updated to reflect the final project configuration, including the tunnel, outfall, and pipeline alignments and the CSO control facility layouts. The May 1998 final facilities plan further updated the project configuration and Ecology comments on the draft plan were integrated. The planning work represents approximately a 30 percent level of design completion.

### **12.1.2 Preliminary Design**

King County commenced preliminary design at the beginning of second quarter 1997. The design contracts are:

- A. Mercer Street Tunnel, Elliott West outfall, and Elliott West CSO Control Facility design contract.
- B. South Lake Union CSO control facilities design contract (south Lake Union conveyance structures).
- C. Denny Way CSO control facilities contract (Denny area conveyance structures and effluent pipeline).

Preliminary design work on the project is scheduled for completion in 1997, and the preliminary design report will represent approximately a 30 percent level of design completion. Based upon the predesign work, a final Facilities Plan and NEPA EA was prepared by King County and released in November 1997. USEPA approval of the final plan is anticipated in mid-1998.

### **12.1.3 Final Design**

Final design of the project will commence during the summer of 1998, based on the approved Facilities Plan and EA work, and will continue until the mid-1999. It is possible that the final design will be phased, based on the final construction packaging and schedule. This activity will end with the 100 percent design submittals to King County.

The City of Seattle proposes to start final design of Phase 2 upon completion of the King County preliminary design phase. Completion of final design will be based on the final construction packaging and construction schedule of the King County facilities.

### **12.1.4 Construction Permit Acquisition and Contract Document Preparation**

King County will prepare some permit applications based on the 30 percent design submittals, and obtain all necessary permits for construction. The design submittals will then be revised to incorporate the final permit conditions upon receiving final permits.

### **12.1.5 Construction**

The construction phase begins with construction bid advertisement and ends with construction completion. The bidding period is immediately followed by the contract award period, which ends with the commencement of construction following delivery of the contractor's notice to proceed. It is assumed that the combined contract bidding and award period will take 6- to 9-months.

Construction durations will vary depending on the final contract packaging and scheduling. It is assumed that there will be a 6- to 9-month closeout period for final construction administration such as final payments and record drawing preparation.

The overall construction sequence for the project was based on construction production rates, site constraints, facility interface requirements, and construction durations for each facility. The analysis resulted in a logical overall construction sequence that will result in a Phase 3/4 substantial completion date of June 2003.

Figure 12-2 shows the construction sequence for all facility work packages and an overall project critical path schedule. King County and Metro experience on similar sewerage facility construction projects (such as those for the Fort Lawton tunnel, Redmond connection, West Point and Renton treatment plants, University regulator CSO, Interurban pump station and force main, and Lander separation projects) was used to estimate construction durations.

### 12.1.6 Basis for Schedule

The project schedule was based on the major assumptions, construction restrictions, and potential constraints described below.

**CSO Control Milestone Date.** The Denny Way/Lake Union CSO Control Project objective, as described in the *1995 CSO Update*, was to reduce the annual untreated discharges to one event per year at the Denny regulator station by the year 2006. The City of Seattle has substantially completed Phase 1 of the project. The project team attempted to phase the facility work package construction to allow earliest possible completion of the tunnel, pipelines, regulator, and pump station--thereby enabling the City of Seattle to use the tunnel storage to decrease City CSO discharges into Lake Union.

**Elliott West Site.** The site is confined and an on-site contractor staging area is limited due to the proximity of adjacent structures, railroad tracks, Myrtle Edwards Park, and Elliott Avenue West. It is assumed that the Mercer Street Tunnel staging and mining area will be at the Elliott West site. The construction sequence was evaluated to divide site work into logically sequenced work activities, making optimal use of the site and allowing efficient construction of both the Elliott West CSO Control Facility and the Mercer Street Tunnel.

**Traffic Restrictions.** Traffic control is an important consideration for both the cost estimate and schedule. Construction of the Mercer Street Tunnel and south Lake Union conveyance structures will affect local traffic. Traffic conditions will require that the predesign activities include a detailed analysis of constructability and plans to minimize traffic disruption.

Preliminary discussions with the City of Seattle Transportation Department indicate that the following construction restrictions may be imposed:

- *No open-trench construction--Westlake Avenue North, Broad Street, and Roy Street (8th Avenue to Westlake Avenue).*
- *Open trench construction during nonpeak traffic conditions--Elliott Avenue West and Roy Street (8th Avenue North to Dexter Avenue North).*

**Major Public Events.** There are numerous public events that take place annually in the project area, particularly near the Seattle Center and Myrtle Edwards Park. These events attract 100,000 to 500,000 spectators each year, and it is highly probable that construction activities will be restricted at those times. Major public events include:

- Folklife festival (Seattle Center), Memorial Day weekend, May.
- Fireworks display (Myrtle Edwards Park), 4th of July.
- Bite of Seattle (Seattle Center), third weekend in July.
- Seafair, first weekend in August.
- Bumbershoot festival (Seattle Center), Labor Day weekend, September.

It was assumed for the purposes of scheduling that no construction within Myrtle Edwards Park will occur during the 4th of July events and that no construction will occur near the Seattle Center during the other events listed above.

**Fisheries “Window.”** Work within the near shore or intertidal zone of Elliott Bay to construct the Denny outfall extension and the Elliott West outfall will be subject to conditions imposed by the Washington State Department of Fish and Wildlife. It is expected that limitations on construction to protect migrating fish from March 15 to June 15 will prevent construction within the intertidal zone.

**Myrtle Edwards Park.** Pipeline construction on the eastern edge of Myrtle Edwards Park within the railroad right-of-way. The pipeline construction is assumed to require an approximately 25-foot-wide construction easement, and construction will likely be limited to normal working hours. Alternative routes for park users will be required when existing trails are closed by construction.

## 12.2 Estimated Costs and Rate Impacts

Estimated costs and rate impacts are presented for two alternatives - the preferred alternative (Alternative 1) and the partial sewer separation and storage alternative (Alternative 2). Although subsequently eliminated, Alternative 2 is presented because it is being carried through the EIS process and this alternative serves as a good indicator of “worst case” project costs.

Each fiscal year, the King County budget process establishes the monetary requirements for the disposal of sewage. These requirements include administration, operating, maintenance repair/replacement, necessary capital reserves and the requirements of bond resolutions. For 1998 and 1999, the established sewer rate is \$19.10 per month per residential customer. This rate captures the impact from all King County wastewater capital projects including the Denny Way project and ongoing operating expenditures. The Denny Way/Lake Union CSO Control Project receives no money from the State Revolving Fund because these funds can not be used for CSO treatment. Therefore there are no impacts related to this fund to present.

Additionally, this project has been awarded a \$35.0 million infrastructure grant by the USEPA. King County and the City of Seattle share this grant, and \$28.5 million is reserved for Phase 3/4. The effect of this grant is described in the rate impact discussion below.

## 12.2.1 Preferred Alternative

Table 12-1 summarizes the most probable estimated order-of-magnitude project costs escalated up through the point of award of all of construction contracts (2001). Total estimated project cost including City of Seattle Phase 1 and Phase 2 work is \$164.3 million.

### Preferred Alternative User Rate Impacts

The total rate impact for the preferred alternative for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$0.95 - 1.14 of the total rate by project completion in the year 2004. The USEPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny Way project by \$0.07 in 2000 and \$0.27 by the year 2004.

Table 12-2 shows the anticipated rate impact on a year by year basis, both with and without the USEPA Infrastructure Grant. This table should not be construed as a user rate forecast; the figures shown only attempt to demonstrate the impact of the Denny Way/Lake Union CSO Control Project and the USEPA Infrastructure Grant on a year by year basis. The ultimate user rate is comprised of a number of factors, including initiatives such as the Regional Wastewater Services Plan and other projects that may occur many years from now.

Sources of funds for the wastewater capital improvement program include:

- Contribution from the operating fund:
  - Customer charges (sewer rate)
  - Investment income
  - Capacity charge
  - City of Seattle CSO charge

- Other miscellaneous revenue, including industrial surcharge fees, septic tank disposal fees, sale of by-products, and other fees
- Capital Fund Sources:
  - Proceeds from bond sales
  - Short-term borrowing
  - Other capital revenues (non-operating and capital revenues)

**Table 12-1 Estimated Project Costs**

**Alternative 1 - CSO Storage and Treatment (Preferred Alternative)**

**Capital costs in millions of dollars at time of expenditure**

	<b>Phase 1</b> (Seattle)	<b>Phase 2</b> (Seattle)	<b>Phase 3/4</b> (King County and Seattle)	<b>Total Project</b>
<b><i>Estimated Construction Cost</i></b>				
Construction Costs including Contingencies and Sales Tax	\$12.8	\$4.4	\$104.8	<b>\$122.0</b>
<b><i>Estimated Non-construction Costs</i></b>				
Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.7	37.4	<b>42.3</b>
<b><i>Most Probable Project Cost</i></b>	<b>16.0</b>	<b>6.1</b>	<b>142.2</b>	<b>\$164.3</b>
<b><u>Funding Sources</u></b>				
King County			94.4	<b>\$94.4</b>
Federal grant	5.2	1.3	28.5	<b>35.0</b>
City of Seattle cost share	10.8	4.8	19.3	<b>34.9</b>
<b><i>Estimated Annual O&amp;M Costs</i></b>	<b>\$100,000</b>	<b>\$20,000</b>	<b>\$501,000</b>	<b>\$621,000</b>

Note: The construction cost estimate for Phase 3/4 is based on fourth quarter 1997 dollars (ENR Seattle Construction Cost Index of 6640), escalated to time of construction. The range of accuracy for the Phases 3/4 construction cost estimate is +20% to -15%, thus giving a range of probable construction cost between \$89.1 and \$125.8 million.

**Table 12-2 Preferred Alternative - CSO Storage and Treatment - Component Rate Impact**

	1999	2000	2001	2002	2003	2004
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.18 - .22	\$0.43 - .52	\$0.67 - .80	\$0.88 - 1.06	\$0.95 - 1.14
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.11 - 15	\$0.26 - .35	\$0.41 - .54	\$0.61 - .79	\$ .68 - .87

Note: the range of rate impacts shows 1) the rate with the estimated Phase 3/4 construction cost as shown in Table 12-1 (\$104.8 million) and 2) the rate with the construction cost at the high end of the range of probable construction costs (\$125.8 million).

## 12.2.2 Partial Separation and Storage - Alternative 2

Table 12-3 shows the probable estimated order of magnitude project cost for Alternative 2, partial sewer separation and storage. This alternative was not considered further due to the excessive construction disruption and ultimate project cost. Total project cost including City of Seattle Phases 1 and 2 is \$309.3 million escalated up through the point of award of all construction contracts (2001).

**Table 12-3**

**Alternative 2 - Partial Separation and Storage**

**Capital costs in millions of dollars at time of expenditure**

	<b>Phase 1</b> (Seattle)	<b>Phase 2</b> (Seattle)	<b>Phase 3/4</b> (King County and Seattle)	<b>Total Project</b>
<b><i>Estimated Construction Cost</i></b>				
Construction Costs including Contingencies and Sales Tax	12.8	6.2	220.9	<b>\$239.9</b>
<b><i>Estimated Non-construction Costs</i></b>				
Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.8	64.4	<b>69.4</b>
<b><i>Most Probable Project Cost</i></b>	<b>16.0</b>	<b>8.0</b>	<b>285.3</b>	<b>\$309.3</b>
<b><u>Funding Sources</u></b>				
King County			213.1	213.1
Federal grant	5.2	1.3	28.5	35.0
City of Seattle cost share	10.8	6.7	43.7	61.2
<b><i>Estimated Annual O&amp;M Costs</i></b>	<b>\$100,000</b>	<b>\$20,000</b>	<b>\$1,300,000</b>	<b>\$1,400,000</b>

**Alternative 2 User Rate Impacts**

The total rate impact for Alternative 2 for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$2.07 of the total rate by project completion in the year 2004. The USEPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny Way project by \$0.27 by the year 2004.

Table 12-4 in shows the anticipated rate impact on a year by year basis, both with and without the USEPA infrastructure grant.

**Table 12-4**  
**Alternative 2 - Partial Separation and Storage - Component Rate Impact**

	1999	2000	2001	2002	2003	2004
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.41	\$0.96	\$1.48	\$1.96	\$2.07
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.34	\$0.79	\$1.22	\$1.69	\$1.80