

Regional Wastewater Services Plan

2004 Update

Executive Summary

Wastewater
Treatment
Division

April 2004



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RAY HELLER



King County

Department of
Natural Resources and Parks

Wastewater Treatment Division

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RWSP 2004 Update—Executive Summary

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Executive Summary

In November 1999, the Metropolitan King County Council adopted the Regional Wastewater Services Plan (RWSP) as an amendment to the King County Comprehensive Water Pollution Abatement Plan. The RWSP serves as the policy basis for providing wastewater management services to the central Puget Sound region through 2030 and beyond.

This document is a summary of the first update to the RWSP. The update report presents a snapshot in time taken between RWSP adoption and the end of 2003. It evaluates the planning assumptions used in 1999 and the effectiveness of RWSP policies. The update serves as a basis for any recommended policy changes.

Wastewater Management in 1999

When the RWSP was adopted in 1999, 31 local wastewater agencies sent their flows to the County's wastewater system for conveyance and treatment. The boundaries of the County's wastewater service area were defined primarily by the boundaries of the service areas of these local agencies. Two regional wastewater treatment plants—the West Point plant in Seattle and the South plant in Renton—provided secondary treatment of these flows and discharged the treated effluent through outfalls into Puget Sound. The treatment plants consistently met effluent quality regulations—and won awards for excellent operation. A portion of the effluent was treated to advanced levels and used onsite for plant processes and landscape irrigation. Byproducts of the treatment process—biosolids and digester gas—were recycled for fertilizer and power generation, respectively.

Overflows of untreated wastewater from separated sanitary sewers occurred rarely, usually as the result of extreme weather conditions combined with power outages or mechanical failures. While most conveyance systems were intended to carry wastewater, they also carried varying amounts of groundwater and stormwater to the treatment plants as the result of “inflow and infiltration” (I/I). I/I entered the system through leaky pipes, home roof drains, and foundation connections in both County and local agency sanitary sewer systems. In 1999, not much was known about specific locations and volumes of I/I, but it was believed that this water used a significant amount of system capacity that could otherwise be used to convey and treat wastewater.

Stormwater also entered the system through combined sewers in the City of Seattle. These sewers were designed to collect both wastewater and stormwater from roof and street drains and convey these flows to the West Point plant. During large storms when the capacity of the West Point plant was exceeded, combined sewer overflows (CSOs) would occur through some of the 38 County outfalls and over 100 City outfalls that extend into Puget Sound, the Duwamish River, and other water bodies in Seattle.

In the early 1990s, King County began an intensive wastewater planning effort to provide needed capacity for the rapidly growing region for the next 30 years and beyond. Population forecasts indicated that an additional 1.1 million people would live or work in the service area by 2030 and that population growth in the area would reach saturation (“buildout”) by 2050. Most of this growth was expected to occur outside the City of Seattle, primarily in the north and south portions

of the service area. To calculate the wastewater flows that these new residents, businesses, and industries would generate, it was assumed that the boundaries of the service area would remain essentially the same, that there would be no increase in water conservation, and that all those on septic systems in the area would connect to sewers by 2020. Given these forecasts and assumptions, an estimated 56 million gallons per day (mgd) of additional wastewater system capacity would be needed by 2030.

The wastewater planning effort culminated on November 29, 1999, with the King County Council's adoption of the RWSP in Ordinance 13680. A major component of the RWSP is a new regional treatment system (Brightwater) to be constructed in the north end of the service area by 2010. An Operational Master Plan (OMP) was prepared in 2000 that specifies how the RWSP will be implemented and defines performance measures for gauging progress. The service area and planned improvements under the OMP are shown in Figure 1.

RWSP Policy Implementation Highlights

RWSP policies were designed to guide the County in its continued provision of high quality wastewater services while responding to changing conditions and increasing demands. The cornerstone for all policies is the mission to protect human health and the environment. The policies guide implementation of this mission through emphasis on meeting commitments, promoting environmental stewardship, recognizing the value of wastewater in the regional water resource system, and using public funds wisely. To date, the RWSP policies have proven to be sound and are being implemented as intended. Minor adjustments in some schedules will be made in the update to the Operational Master Plan. No changes in policies are recommended.

Wastewater Services and Planning

Planning for services and facilities is based on a long-term assessment of wastewater system needs. The County collaborates with other jurisdictions in this planning, looking for opportunities to achieve environmental benefits and save costs for regional customers. In this planning, buildout population is considered when sizing facilities.

Ordinance 13680, the ordinance to adopt the RWSP, calls for three types of planning reports to be prepared:

- **Semi-Annual Reviews.** The County Executive submits semi-annual written reports to the Regional Water Quality Committee (RWQC)¹ and the Council on siting, permitting, design, and construction of new treatment and conveyance facilities.
- **Annual Plan Reviews.** These annual "Water Quality Reports" document the results of the County's wastewater management and water quality monitoring programs in maintaining the quality of the waters in the County. Every third year, this report is submitted with the RWSP update to inform any recommendations for changes in policies or programs.

¹ RWQC is a committee to the King County Council composed of members from the Suburban Cities Association, City of Seattle, Metropolitan Water Pollution Abatement Advisory Committee, and the King County Council.

Regional Wastewater Services Plan 2000 – 2030

Recommended Improvements

Treatment Plant Projects

- 1 Construct 36 mgd North Treatment Plant (2010)
- 2 Increase South Treatment Plant capacity to 135 mgd (2029)

Outfall Projects

- 1 Construct North Treatment Plant Outfall (2010)

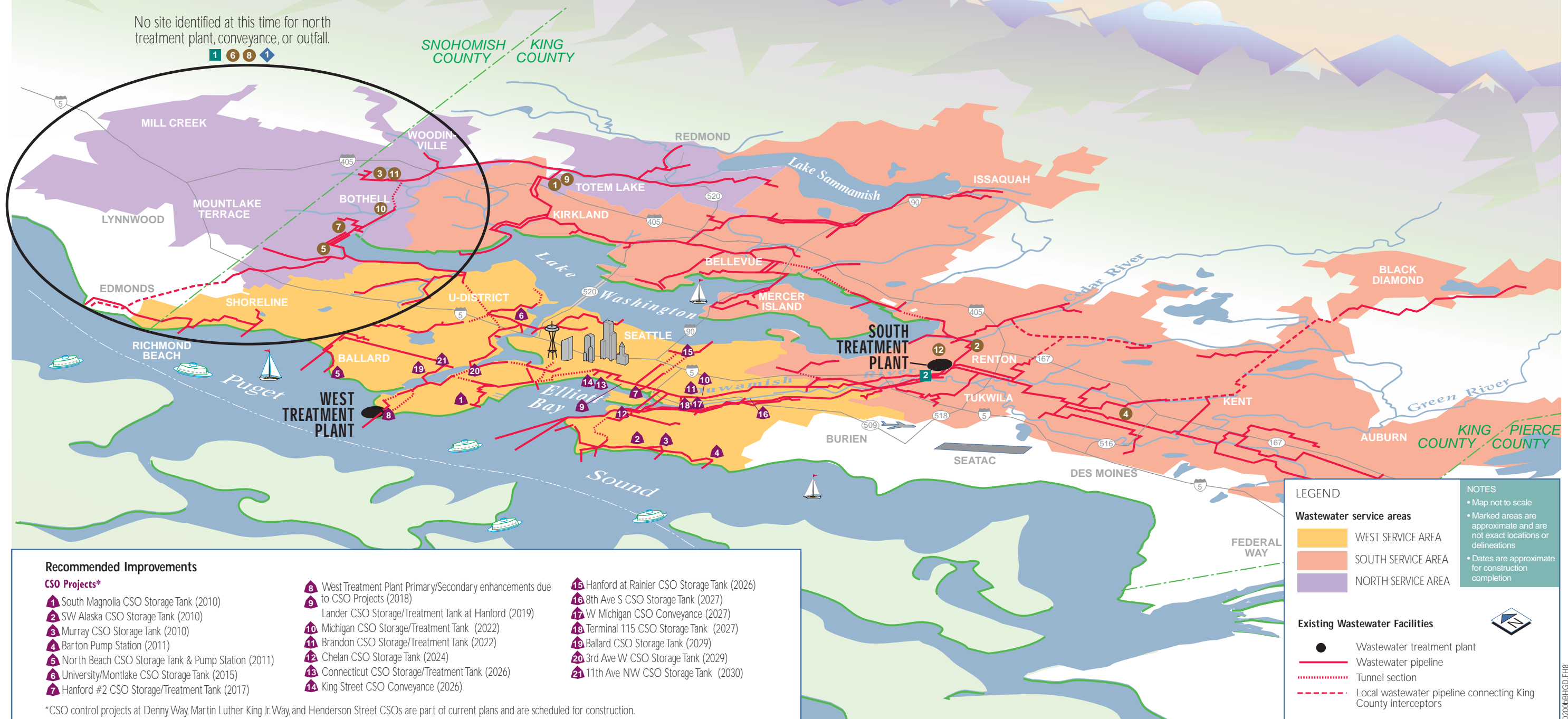
Conveyance Projects*

- 1 Increase York Pump Station (2000)
- 2 Parallel Eastside Interceptor Section 1 (2001)
- 3 Construct 6 MG Storage (2002)
- 4 Parallel Auburn Interceptor Sections 1, 2, and 3 (2004)
- 5 Construct North Lake Interceptor and pump station (2006)
- 6 Construct tunnel from North Treatment Plant to Outfall (2010)

- 7 Construct new Kenmore Pump Station to pump flow to North Treatment Plant (2010)
- 8 Construct forcemain from Kenmore Pump Station to North Treatment Plant (2010)
- 9 Modify York Pump Station to pump 35 mgd to North Creek Pump Station (2016)
- 10 Construct forcemain to Convey North Creek Flow to Kenmore Pump Station (2016)
- 11 Upgrade North Creek Pump Station (2016)
- 12 Construct 3-5 MG effluent storage at South Treatment Plant (2030)

* There are other smaller conveyance improvements throughout the system. 2000-2040

No site identified at this time for north treatment plant, conveyance, or outfall.



Recommended Improvements

CSO Projects*

- | | | |
|--|--|---|
| 1 South Magnolia CSO Storage Tank (2010) | 8 West Treatment Plant Primary/Secondary enhancements due to CSO Projects (2018) | 15 Hanford at Rainier CSO Storage Tank (2026) |
| 2 SW Alaska CSO Storage Tank (2010) | 9 Lander CSO Storage/Treatment Tank at Hanford (2019) | 16 8th Ave S CSO Storage Tank (2027) |
| 3 Murray CSO Storage Tank (2010) | 10 Michigan CSO Storage/Treatment Tank (2022) | 17 W Michigan CSO Conveyance (2027) |
| 4 Barton Pump Station (2011) | 11 Brandon CSO Storage/Treatment Tank (2022) | 18 Terminal 115 CSO Storage Tank (2027) |
| 5 North Beach CSO Storage Tank & Pump Station (2011) | 12 Chelan CSO Storage Tank (2024) | 19 Ballard CSO Storage Tank (2029) |
| 6 University/Montlake CSO Storage Tank (2015) | 13 Connecticut CSO Storage/Treatment Tank (2026) | 20 3rd Ave W CSO Storage Tank (2029) |
| 7 Hanford #2 CSO Storage/Treatment Tank (2017) | 14 King Street CSO Conveyance (2026) | 21 11th Ave NW CSO Storage Tank (2030) |

*CSO control projects at Denny Way, Martin Luther King Jr. Way, and Henderson Street CSOs are part of current plans and are scheduled for construction.

LEGEND

Wastewater service areas

- WEST SERVICE AREA
- SOUTH SERVICE AREA
- NORTH SERVICE AREA

Existing Wastewater Facilities

- Wastewater treatment plant
- Wastewater pipeline
- Tunnel section
- Local wastewater pipeline connecting King County interceptors

NOTES

- Map not to scale
- Marked areas are approximate and are not exact locations or delineations
- Dates are approximate for construction completion



Figure 1
Regional Wastewater Services Plan as Adopted in 1999

802008HGD.FH8

- **Three-Year RWSP Update.** The purpose of the RWSP update reports is to comprehensively review RWSP implementation, to update planning assumptions (including population and flow projections), and to review the effectiveness of policies. The Executive and Council may recommend changes to RWSP policies based on new regulations, emergent technologies, or other relevant factors identified in the update reports.

The first three-year update report was due on March 1, 2003. Because so many important elements of the RWSP would change with selection of a site for Brightwater, the publication date was moved to April 2004. This delay allowed for incorporation of Brightwater facilities and to respond to a request by the RWQC for a structured review of the status of RWSP elements.

For purposes of the update report, population and flow projections were updated to verify whether the location, timing, and sizing of new RWSP facilities were still valid. The updated projections indicate that population throughout the service area will increase at about the same rate over the course of the planning period as was predicted for the RWSP. However, the south service area will grow faster than predicted.

Meeting the wastewater needs of the growing community requires not only building new capacity but also finding ways to use existing resources and facilities more efficiently. To that end, asset management functions from several groups in the Wastewater Treatment Division were combined into a new asset management program. The program analyzes increasing system demands and aging infrastructure to provide information to decision-makers on how to cost-effectively maintain and improve existing infrastructure. Results of the analyses will be completed in stages over the next three to five years and will be incorporated into future updates to the asset management plan, which was developed since adoption of the RWSP.

Treatment Improvements

The RWSP calls for a number of treatment improvements. In addition to the Brightwater Treatment Plant, improvements include expanding the South plant in 2029 and maintaining the potential for expansion at the West Point plant to accommodate future flows from CSO control projects and to adapt to any new regulations. The RWSP also calls for all plants to treat wastewater to secondary levels and to meet or exceed discharge regulations.

Following adoption of the RWSP, the County began a four-year, three-phase process to site the Brightwater plant and its associated conveyance pipelines and outfall. The siting process culminated in the County Executive's selection on December 1, 2003, of the Route 9–195th Street System. This system includes a treatment plant at the “Route 9 site” in unincorporated Snohomish County, north of the City of Woodinville. It also includes an influent pipeline from Kenmore to the plant site and an effluent pipeline from the plant site to Point Wells, primarily along NE 195th and NE 205th Streets in King County. Both pipelines will be placed in underground tunnels. A marine outfall will extend from Point Wells into Puget Sound. A public involvement and outreach program kept interested parties informed and involved throughout the siting process. Public meetings in potentially affected communities were well attended and over 5,000 comments were received on the Draft Environmental Impact Statement (EIS).

The updated flow projections indicate that the South plant will reach its rated design capacity by 2007. The County is exploring whether this plant, with an updated rating and a few adjustments, could provide enough treatment capacity to manage flows until they can be sent to Brightwater in 2010.

The communities of Vashon and Carnation were added to the service area since preparation of the RWSP. In 1999, the County contracted with Vashon to manage its wastewater treatment plant. Upgrades to the plant will be completed in 2005. In 2002, the County contracted with Carnation to design and manage its new wastewater treatment plant. Construction will be completed in 2006.

Finally, the King County Council adopted new odor control policies on July 14, 2003, in Ordinance 14712. These policies were based on a review of available technologies and are being applied to existing plants and to Brightwater.

Conveyance System Improvements

The current conveyance system is serving customers well. The RWSP includes a number of conveyance system improvements to ensure that additional capacity is online in time to serve future growth. The County's conveyance planning approach has undergone substantial reorganization since 1999 to address problems identified during large storms in 1996–1997 and to integrate conveyance planning with I/I control, water reuse, and local agency plans. Conveyance improvements are now grouped into 10 planning areas that correspond to natural drainage basins. Plans have been altered for some RWSP conveyance projects, as the result of both basin planning and Brightwater site selection. In many cases, the more detailed information developed during basin planning and site selection has resulted in more complex alternatives than specified in the RWSP. Conveyance projects will be further refined to incorporate I/I findings and identify cost savings. All projects will meet RWSP policy objectives.

In adopting the RWSP, the Council set high standards for the timing and sizing of conveyance projects. These policies direct that conveyance be designed and timed to be online to meet a 20-year design standard. The County is currently investigating the effects of using the 20-year standard to establish the size of facilities, but changing the timing of selected conveyance projects so that they come online when capacity to contain a 5-year storm is exceeded. This implementation strategy could offer the potential to save money by delaying construction while still meeting the policy objective. Under such a strategy, the County would make decisions about when to build conveyance facilities on a project-by-project basis, taking into account site-specific public health and environmental risks and the timing of other improvements being made by local agencies. Additional information on both the risks and benefits of this potential change is being developed and will be shared with the Executive and Council by the end of 2004.

Inflow and Infiltration Control

In recognition of the fact that most technologies for I/I control are relatively new and unproven, a systematic investigation is being conducted that will form the basis for I/I control decisions. Flow monitoring, 10 pilot projects, and draft standards, procedures, and policies have been completed. By December 2004, pilot project results and the final standards, procedures, and policies will be

included in a report to be submitted by the County Executive to Council. By December 2005, target I/I levels for local systems, along with long-term measures to meet the targets, will be recommended. And by June 2006, recommendations will be made regarding a possible I/I surcharge on agencies not meeting adopted target levels.

County-planned conveyance projects will be re-evaluated for I/I control cost saving opportunities. This approach will ensure that the County pursues only the projects that are expected to be the most cost-effective. Because of the time required to construct I/I control measures and assess their effectiveness, I/I control is targeted for application to projects that provide capacity after 2010.

Working on I/I has required close collaboration with the local agencies served by the County wastewater system. A benefit of this collaboration has been a strengthening of relationships, a better understanding of local and County needs, and a solid foundation for future collaborative projects that could enhance resource management and save costs for agencies and their customers.

Combined Sewer Overflow Control

The Denny Way/Lake Union and the Henderson/Martin Luther King/Norfolk CSO control projects, which were under way before the RWSP, will be completed in 2005.² These projects, as with most CSO control projects, will capture the overflows and divert them either to a storage tank or to a CSO treatment facility. Storage tanks hold the flow until the storm has passed and there is room in the pipelines to transfer the flow to the West Point plant for treatment, often to full secondary levels. CSO treatment facilities settle solids and provide disinfection for discharge in the vicinity of the current outfall. Many projects employ elements of both treatment and storage.

The RWSP defines 22 more projects to bring the remaining uncontrolled County CSOs into control by 2030. It calls for updates to the CSO control plan every five years in conjunction with renewal of the National Pollutant Discharge Elimination System (NPDES) permit for the West Point plant. The 2000 CSO plan update identified environmental and human health concerns related to historically contaminated sediments at CSO discharge locations and identified some emerging technologies to be considered during predesign of future CSO control projects. No changes to the CSO control plan were recommended under the 2000 update, primarily because the NPDES permit renewal application for West Point was due to the Washington State Department of Ecology only six months after adoption of the RWSP.

As part of the 2005 update, the County Executive is evaluating the benefits of CSO control projects along with other pollution control projects developed by the County and other agencies.³ No new CSO projects (other than the two projects that were under way in 1999) will begin, unless approved by the Council, prior to this CSO program review.

In developing a CSO control program, the County assumed that all City of Seattle CSOs were controlled. Since adoption of the RWSP, the City discovered that some of its CSOs were not

² CSO sites that meet the Washington State standard of “an average of no more than one untreated discharge per year per outfall” (WAC 173-245) are referred to as “controlled.” CSO sites that do not meet this standard are referred to as “uncontrolled.”

³ The CSO program review and plan update will be completed in 2005 as scheduled in the RWSP. The update will be submitted to the Washington State Department of Ecology (Ecology) in 2008. This later schedule results from Ecology’s delay in renewing the West Point NPDES permit.

controlled. In 2001, the City developed a plan to control these remaining CSOs by storing and then transferring these flows to the County conveyance system for transport and treatment at the West Point plant. The City has committed to building its storage facilities large enough to hold these new flows until room is available in the County system so that no increase in County overflows occurs.

The County is working with the City to coordinate CSO control and sediment remediation projects in order to avoid duplication and to save costs. The City has proposed that the County accelerate some County CSO control projects to coordinate with the City's CSO control plan and with the SR 99-Alaskan Way Viaduct and Seawall Replacement Project.

The sediment management plan (SMP), called for in the RWSP, was completed in 1999. A sediment management program was formed to implement the plan. The program addresses sediment quality issues near CSO and treatment plant outfalls, evaluates and addresses emerging sediment quality issues, and incorporates sediment quality considerations into comprehensive planning.

Since preparation of the SMP, the Harbor Island Superfund site was extended across the East Waterway of the Duwamish River to include the Port of Seattle's dredging project near the County's Lander and Hanford CSOs. In addition, the Lower Duwamish Waterway was listed as a federal Superfund site. In an effort to clean up contaminated sediments in a timely manner, a Memorandum of Agreement was signed by King County, City of Seattle, Port of Seattle, and Boeing (together known as the Lower Duwamish Waterway Group) to jointly complete the initial remedial investigation and feasibility study for the Lower Duwamish Waterway. This group also entered into an Administrative Order of Consent with the Environmental Protection Agency and the Washington State Department of Ecology. Cleanup has been completed or is under way at sites on the Lower Duwamish Waterway where sufficient information is available to move forward. These sites include the Norfolk and Diagonal/Duwamish CSO sites.

Biosolids Recycling

RWSP policies emphasize that the existing biosolids program is working well and should continue its recycling and resource recovery orientation. The policies recognize that byproducts of wastewater treatment are resources that can benefit communities inside and outside the service area, while also recognizing the challenges to biosolids recycling.

In meeting the intent of the policies, the biosolids program is sensitive to shifting markets and ready to respond to change. King County has developed relationships with a variety of customers, particularly farmers, whose demand for biosolids exceeds the current supply. The County continues to explore new production technologies. Through participation in national organizations such as the National Biosolids Partnership and local organizations such as the Northwest Biosolids Management Association and the Clean Water Coalition, the County is partnering to promote public understanding of the risks and benefits of biosolids and to assure the public of the safety of Class B biosolids. This participation enables the County to stay aware of trends in biosolids management.

Water Reuse

Under the RWSP, King County is building flexibility into existing and new facilities for the production and use of reclaimed water. This flexibility will allow the County to respond to an increasing need for reclaimed water and to achieve goals such as meeting water quality standards, benefiting species listed under the Endangered Species Act, and furthering the water reuse program.

A five-year water reuse work plan was transmitted to the King County Council on schedule in December 2000. Initial County efforts focused on convening forums with stakeholders in the region. These forums brought to light a number of opinions on the need for new water supplies. The County's water reuse program is focused on coordination with regional water supply planning and incremental increases in production of reclaimed water so that it can be available when the need arrives for new nonpotable water supplies.

The water reuse work plan calls for the siting and construction of a demonstration water reclamation plant. The County worked with an advisory task force to develop criteria for reviewing proposals. The process culminated in selection of the Sammamish Valley Reclaimed Water Production Facility. In a November 2003 proviso, the Council directed that a report be submitted by April 15, 2004, that includes an accounting of life-to-date expenditures and a revised scope and budget for the demonstration satellite reclaimed water production facility. If approved by Council, the facility could begin operating as early as 2007 and could provide up to 0.5 mgd of reclaimed water to King County soccer fields in the Sammamish Valley.

When Brightwater begins operating in 2010, it will produce 5 mgd of reclaimed water for onsite nonpotable uses. Land will be reserved on the Brightwater site for expansion of reclaimed water production. Use of membrane bioreactors at the plant will provide the opportunity to produce a continuous supply of high quality effluent that could be delivered to customers in the Sammamish Valley and other areas served by Brightwater. Any decision by King County to distribute reclaimed water beyond the Brightwater plant boundaries will be preceded by additional engineering analyses and appropriate environmental review.

Water Quality Protection

The County regularly checks the quality of treatment plant effluent to ensure that regulations are being met and that discharges do not contribute to pollution of our waters. This testing extends to the waters in areas near County outfalls and to other water bodies in King County. The County works collaboratively with regional watershed partners to identify solutions to water quality problems and to ensure that the problems are resolved.

Special water quality studies undertaken by the County are providing sound scientific data in support of joint efforts to keep County waters clean. These studies also support County wastewater programs, capital projects, and decisions for future activities. In this way, projects can be scoped to meet needs cost-effectively, thus using public funds wisely.

Environmental Mitigation

In adopting the RWSP, the King County Council highlighted the importance of a community-focused environmental mitigation process for construction projects. Projects are framed through early discussions with host or affected communities to ensure that the projects cause minimal impact and that mitigation for unavoidable impacts meets community needs.

Extensive public involvement programs were carried out for siting Brightwater. Community leaders from affected communities and their constituents contributed at every stage of the four-year siting process, from helping to form criteria for screening potential sites, to providing comments on the Draft EIS, to participating in conversations on how best to mitigate impacts. Similar processes, scaled to the complexity and potential impacts of the project, are being conducted for all other projects.

Public Involvement

RWSP policies recognize the importance of a well-informed and actively involved community and of being a good neighbor to those who live near the County's facilities. The County strives to help the community understand wastewater management needs and possible options for meeting these needs. Public involvement is stressed through general public involvement policies and through specific policies for programs such as I/I control, water conservation and reuse, and facility siting.

The public involvement program for Brightwater siting won the 2003 Project of the Year Core Values award from the International Association for Public Participation. This award acknowledges the way public participation core values were incorporated throughout the siting process. These core values include making a promise that the public's contribution will influence the decision and then communicating to participants how their input affected the decision.

Habitat Conservation Plan

A Habitat Conservation Plan is being developed as a framework for managing wastewater within the requirements of the Endangered Species Act and for streamlining the permitting process for future projects. Phase 1 of the Habitat Conservation Plan will be completed in 2004, and Phase 2 in 2006.

Financing the RWSP

New financial policies were developed and approved on October 1, 2001, by King County Ordinance 14129. These RWSP policies are structured to translate the 1998 Robinswood Agreement principles into financial practices. The policies address financial forecasting and budgeting practices to ensure adequate reserves, reasonable overhead, and appropriate use of assets. Policies covering debt financing and borrowing are designed to spread capital costs over time, resulting in more stable rates for customers. Revenue is collected through multi-year rates

and through capacity charges that result in growth paying for growth.⁴ Strategies to implement these policies will change over time to meet circumstances and adapt to changing needs. To date, the policies have provided the framework, and the flexibility, to meet the County's financial goals.

RWSP Costs

Table 1 shows the original and updated cost estimates for projects adopted in the RWSP. The original estimates are shown in 1998 dollars and then converted to 2003 dollars for comparison with the updated estimates. The updated estimates reflect greater specificity as RWSP projects have moved from planning through predesign, design, and construction. These estimates also include new projects, such as upgrading the Vashon treatment plant and constructing a Carnation plant.

The site selected for Brightwater is larger than assumed in the RWSP. The additional land provides room for future onsite reclaimed water production and power generation. Also, because the site is farther inland than assumed, longer pipelines are required to convey wastewater to and from the plant. Finally, Brightwater will employ a higher level of odor control to conform to the new Council-adopted odor control policies.

As a consequence of basin planning, the approach for a number of non-Brightwater conveyance projects was modified and several new projects were added. The original RWSP cost estimates assumed the installation of parallel conveyance lines as a means of increasing capacity. The detailed basin-by-basin analysis indicated that installation of parallel conveyance lines would not work for the actual conditions evaluated and that more complex solutions would be needed. Basin planning, therefore, involves a managed solution that uses a variety of approaches, including integrating County and local-agency projects, consolidating projects in the same vicinity, diverting flows, and storing flows.

Cost control remains a high priority. King County continues to pursue cost containment strategies for the Brightwater program. To lower overall program costs, the County conducts annual reviews of program priorities, optimizes existing facilities through the asset management program, develops revenue-producing resources, and analyzes rate-stabilizing financing strategies.

⁴ As called for in the RWSP, in June 2000 the County successfully obtained changes to legislation that had limited capacity charges. These capacity charges can now be set by the County using methodologies defined in the new policies.

Table 1
Original and Updated RWSP Cost Estimates for the Capital Program
(1999 through 2030)

RWSP Element	Original RWSP Estimate (1998\$ x 1M)	Original RWSP Estimate (2003\$ x 1M)	Updated Estimate (2003\$ x 1M)	Cost Change (2003\$ x 1M)
Total RWSP	\$1,585	\$1,832	\$2,601	\$769
Wastewater Services				
Asset management costs per year (not included above in total)	\$30/year	\$35/year	\$49/year	\$14/year
Brightwater Treatment and Conveyance	\$ 788	\$ 913	\$1,350	\$ 437
Brightwater Plant	\$ 363	\$ 421	\$ 548 ^a	— ^b
Brightwater Conveyance	\$ 398	\$ 461	\$ 802 ^a	— ^b
Total Land and Right-of-Way	\$ 27	\$ 31	—	— ^b
Total Treatment (Non-Brightwater)	\$ 94	\$ 109	\$ 132	\$ 23
Odor Control at South Plant ^c	\$ 10	\$ 12	\$ 4	\$ (8)
South Plant Expansion	\$ 84	\$ 97	\$ 97	\$ 0
West Point Odor Control	—	—	\$ 3	\$ 3
Vashon Upgrade	—	—	\$ 16	\$ 16
Carnation Plant	—	—	\$ 12	\$ 12
Total Conveyance (Non-Brightwater)^d	\$ 285	\$ 326	\$ 638	\$ 312
RWSP Specific Projects	\$ 120	\$ 135	—	—
Minor Trunk Improvements	\$ 165	\$ 191	—	—
Total Current Forecast	—	—	\$ 638	—
Inflow/Infiltration (I/I)	\$ 34	\$ 39	\$ 40	\$ 1
Combined Sewer Overflows (CSO)	\$ 360	\$ 417	\$ 398	\$ (19)
CSO Control	\$ 360	\$ 417	\$ 366	\$ (51)
Sediment Management Plan ^e	—	—	\$ 32	\$ 32
Water Reuse	\$ 24	\$ 28	\$ 18	\$ (10)
Technology Demonstration	—	—	\$ 1	—
Future Water Reuse Demonstration Projects	—	—	\$ 3	—
	—	—	\$ 14	—
Water Quality Protection^f	—	—	\$ 15	\$ 15
Habitat Conservation Plan	—	—	\$ 10	\$ 10

Notes:

All costs as of December 31, 2003.

Projects shown under each element are not exhaustive, but are listed to illustrate changes.

a. Current costs for Brightwater treatment and conveyance include land acquisition.

b. Cost change for Brightwater is not broken down by treatment and conveyance because land acquisition costs were presented separately for the original estimate but were folded into costs for the current estimate.

c. Medium- and low-priority improvements, if needed, will add another \$13 million to odor control costs at South plant.

d. In the original RWSP estimate, I/I costs were included under conveyance. These I/I costs are listed separately here to allow for comparison with the updated estimate.

e. Includes costs associated with Superfund.

f. Includes costs for the Freshwater Program, which now includes the Green-Duwamish Water Quality Assessment (to be completed in 2006) and the Sammamish-Washington Analysis and Modeling Program (to be completed in 2005).