

WASTEWATER TREATMENT DIVISION CAPITAL IMPROVEMENT PROGRAM

Introduction to Program, Goals, and Highlights

The Wastewater Treatment Division's (WTD) Capital Improvement Program (CIP) budget request for 2009 is \$168 million. The total 2009-2014 proposed budget plan is approximately \$685 million.

The mission of the Wastewater Treatment Division is to protect public health and enhance the environment by treating and reclaiming water, recycling solids and generating energy. Since 1958, when King County citizens voted to build a regional wastewater system to clean the polluted waters of Lake Washington and Puget Sound, the county has helped to dramatically improve water quality, while creating resources from wastewater.

In accordance with WTD's mission, the objectives of the wastewater capital program are:

- Ensure continued operation and reliability of existing wastewater conveyance and treatment assets;
- Enhance regional water quality in compliance with federal, state, and local regulations;
- Provide sufficient wastewater conveyance and treatment capacity to meet the long-term needs of people and businesses in the WTD service area; and
- Facilitate creating resources from wastewater.

Obtaining these objectives is the basis for the projects included in the 2009 CIP budget request.

The spending authority for most capital projects is appropriated at the fund level. The projects included in the 6 minor asset management categories are appropriated at the category level. This allows WTD the flexibility to transfer funds among projects within the appropriation category, subject to reporting requirements, and to react to special circumstances as they occur. In each case, only one year of budget authority is appropriated. Additionally, the full term of multi-year construction contracts is appropriated in the first year of the contract. Inclusion of the full contract value in one year can give rise to fluctuations in appropriation requests over time. For example, a large multi-year contract will increase the appropriation in the first year relative to the subsequent years.

Wastewater Treatment Division 2009 Appropriation Request

	Requested Appropriation
WTD Capital Projects	\$159,508,951
Minor Asset Management Categories	
Structure and Site Improvements	1,521,695
Mechanical Equipment	873,949
Odor and Corrosion	686,275
Pipeline Replacement	1,745,406
Process Replacement / Improvement	1,745,407
Electrical, Instrumentation and Control	1,519,937
Total	\$167,601,619

Financial Resources and Policy Overview

In June 2008, the Metropolitan King County Council adopted a monthly wholesale sewer rate of \$31.90 for 2009, with the intent of maintaining the same rate through 2010. A capacity charge of \$47.64 will also be in effect in 2009. Revenues generated by the wholesale sewer rate and capacity charge are sufficient to fund the accompanying appropriation request while fully complying with WTD's financial policies.

This year there were several challenges to developing a balanced capital financial plan in pursuit of the mission objectives of the wastewater capital program. The speed in which economic conditions changed required substantial re-analysis of WTD's assumptions and project decisions. The combination of a capital program at historically high levels of expenditure in support of the construction of the Brightwater Treatment System, a worsening economic outlook and a volatile municipal bond market greatly influenced the capital program decisions used to prepare this budget request. As a result of these factors and a critical needs and risk assessment of the wastewater capital program performed by staff, some projects have been delayed or reduced in scope as described in the project categories.

The WTD CIP is funded primarily through proceeds from revenue bond sales, short-term borrowing, capacity charge revenues, and transfers from the operating fund. The operating fund derives the majority of its revenue from monthly charges to sewer customers that are collected by WTD's component agencies. Transfers from the operating fund to the capital program are the result of the financial policy requirement of maintaining a debt service coverage ratio greater than one (a minimum of no less than 1.15 of all debt service payments). This means the monthly sewer rate is set such that operating revenues will exceed debt service and operating expenses by an amount equal to at least 15 percent of the total debt service expense. This buffer reduces risk to bond holders and at the end of the year provides WTD the funds to reduce the amount of borrowing necessary to finance the capital program.

The capacity charge is based on the methodology the Metropolitan King County Council adopted in October 2001 in Ordinance 14129. This methodology provides an equitable basis for allocating the costs

of the wastewater treatment system to the customers that use it. Specifically, it enacts the Regional Wastewater Services Plan (RWSP) policy of growth paying for growth by ensuring new customers pay their equitable share of the cost of building new capacity in the system.

Capital Project Budget Estimates

The King County Wastewater Treatment Division uses a consistent and systematic approach across the Division to develop initial project budgets and update existing budgets. The following section provides an overview of the project budgeting process, including assumptions for project contingency and inflation.

The initial project budget is almost always derived from a planning-level budget estimate. These estimates are prepared early in the life of the project, and provide the expected capital construction or implementation costs. These estimates are based on:

- the project scope as it is known at that time
- industry standard pricing and contingencies
- historical project comparisons
- in-house and/or consultant experience
- benchmarking, estimating programs, and in-house construction cost models.

The capital implementation cost estimate is used to derive additional project costs, including planning, engineering, construction, right-of-way/land acquisition costs, staff labor and overhead costs. Using historical information and management input, the parameters and standards used in allocating these additional costs vary according to such things as: (1) the size and complexity of a project, (2) whether engineering is performed by county staff or consultants, and (3) whether construction management is performed by county staff or consultants.

The result is an overall project budget including details on schedule, construction costs, engineering costs, staff costs, overhead costs, and right-of-way/land acquisition costs. This budgeting model produces detailed cash flow information by year and project phase in addition to detailed staffing information by phase and cost center or year and cost center. WTD will continue to improve the model over time.

Program Contingency

Program contingency provides an element of flexibility in reacting to changing circumstances across the entire CIP program. For the WTD, CIP program contingency is defined as 7.5 percent of the appropriation-year cash flow or \$10 million, which ever is less. Program contingency is identified as a single project (423545).

Project Contingency Assumptions

Project contingency is added to a project to explicitly reflect the uncertainty about the future and as a buffer against the risk of under-funding a project. In WTD, CIP project contingency is calculated using standards recommended by the Association for Advancement of Cost Engineering (AACE). The typical WTD CIP project goes through five phases; with each successive phase representing more complete and

detailed project information. The five phases are planning, predesign, design, construction, and closeout.

In calculating project contingency, a percentage of total project cost is specified according to the current phase of the project. The following table shows the percentage associated with the current phase of the project.

Project Phase	Percent contingency
Planning	30
Predesign	20
Design	15
Construction	10
Close out	0

The contingency is based on total project cost and entered in the close-out phase of the project. As the project moves through the phases, the contingency amount will decrease reflecting the improvements in project definition and expected accuracy of the data.

Inflation Assumptions

Inflation is an increase in the level of prices over time that results in a decrease in the purchasing power of a dollar. The WTD CIP contains many multi-year projects in which price changes over time affect the cost of materials and services.

There are many sources of inflation in construction projects and prices do not always change at the same rate. For example, the cost of construction materials and commodities have increased at a greater rate and shown more volatility during the 2004-06 period than general inflation, reflecting a strong local construction market and national and international economic conditions. Then in 2007, commodity prices on average declined during the year. However, in late 2007 and the first half of 2008, commodity prices began to increase again.

WTD assumes general prices increase at 3 percent per year during the 2009-2014 budget periods. This does not reflect a projection of any single inflation index but reflects a reasonable aggregate rate of increase for the next 6 years, based on the historical activity of both construction and non-construction price indices. Indices tracked include the Consumer Price Index, Implicit Price Deflator, the ENR Construction Cost Index, and the Turner Building Cost Index.

It should be noted that while a standard increase of 3 percent per year is being used in estimating costs for its wastewater projects, the activity in project components such as materials, labor, equipment, supplies, and contractor markups and especially petroleum-based products may require an increase in inflation assumptions in subsequent budgets.

Project Prioritization

In 2003, King County's Wastewater Treatment Division initiated a new process to prioritize its capital projects for funding. This process combined WTD's former approach with the approaches used by other large West Coast wastewater utilities. In summary, the new process evaluates each capital project against

specific criteria that reflect WTD's mission and goals. Each project receives a score based on this evaluation, and the result was a numeric ranking of projects from 1 to N. This ranking, combined with the project cost estimates and other information, helps WTD managers identify which projects to propose for funding in the budget. The process assumes that each proposed capital project is part of an approved comprehensive plan or has a sound business case, as demonstrated in a detailed project review form.

The prioritization system groups capital projects in three project categories, each with a set of criteria based on the division's mission statement.

1. **Major Capital (MC)** - projects that provide new capacity to the wastewater systems are either through additional area or increased size to the current system. Five categories of criteria are used to score Major Capital projects in this category: (1) regional capacity needs, (2) public health, safety, and property, (3) regulatory or contractual requirements, (4) natural resources protection, and (5) cost savings.
2. **Asset Management (AM)** - projects that rehabilitate or improve existing facilities, upgrade technologies, and improve processes or systems. Asset management projects typically do not increase capacity. Five categories are used to score Asset Management projects: (1) service disruption and impacts from asset failure, (2) employee safety, (3) regulatory or contractual requirements (4) remaining equipment life/asset damage, and (5) cost savings.
3. **Planning** - projects that are more diverse in nature, such as planning work, studies, central administrative functions, and projects supporting the Water and Land Resources Division. Six categories are used to score Planning projects: (1) regional service needs, (2) public health protection, (3) regulatory compliance (4) contractual requirements or mandates, (5) natural resources and property protection, and (6) cost savings.

The result of the ranking process is three lists of ranked projects, one for each category of projects. Each category has its own budget allocation, so only like projects compete against each other for available funding.

WTD CIP Asset Management Business Plan

WTD is implementing a formal Asset Management Program that seeks to lower the life-cycle cost of providing service without lowering safety, reliability, or level of service. As WTD faces increasing expenses due to equipment in need of replacement and additional rate increases are necessary to pay for equipment replacement, those rate increases will be less than the increases that would be needed by trying to continue operating worn out equipment or allowing wastewater to spill into the environment.

Objective: Proactively manage the assets of the Wastewater Treatment Division in order to improve the cost-effectiveness of asset ownership. Effectiveness improvement is defined in terms of lower life-cycle cost without loss of reliability. The primary benefit is anticipated to be the lowering of the long-term cost of ownership of all WTD assets.

Strategy: Implement a formal Asset Management Program which includes these components:

- Define required level of service;
- Improve the knowledge of the current state of all assets;
- Identify critical assets;

- Evaluate and implement optimum maintenance strategy for these assets based upon their current condition assessments and risk analysis;
- Develop and implement an “Optimum Renewal Decision Making” process based upon most economical and best risk-based business practices;
- Develop long range asset replacement plans and funding forecasts; and
- Monitor progress and program improvements via a feedback loop and analysis.

The Business Plan also expands the Productivity Initiative to capital projects. All capital projects will have an independent estimate of costs performed when the project reach the 30% or 60% design milestone. If WTD completes the project for less than that amount, a portion of the difference will be placed in the WTD Incentive Fund and distributed according to the policies and procedures that apply.

Six year Common Comparison

The six year common comparison between the 2008 adopted and 2009 proposed CIP budgets shows a net budget decrease of \$209 million or 23.5% from \$889 million in the 2008 Adopted Budget to \$680 million in the 2009 Executive Proposed Budget Request.

The net appropriation decrease is due to several factors in the wastewater capital program with the largest being the completion of several large projects. The single largest contribution to decreasing need for appropriation during the six year period is the completion of construction for the Brightwater treatment plant, conveyance system and reclaimed water pipeline in 2011. Other factors include the completion of the pump station at Hidden Lake and the Bellevue Forcemain, the delay in the assessment and replacement of raw sewage pumps at South Plant, and the disappropriation of unused appropriation in the completed Henderson/Martin Luther King CSO project. The last contribution is from the reduction of placeholder appropriation in the future capital improvement master plan project reflecting the improved definition of future asset projects.

Growth Management and Comprehensive Plan

Both King County and Washington State require sewer comprehensive plans for all entities that provide sewage collection and treatment. These plans must include specific information such as a capital facilities inventory, and must undergo a formal public review process. The Washington State Growth Management Act (GMA) requires King County to forecast the amount of wastewater infrastructure necessary to serve growth within the urban growth boundary, and to have this infrastructure available when growth occurs.

The Metropolitan King County Council adopted the Regional Wastewater Services Plan (RWSP), a supplement to the King County Comprehensive Water and Pollution Abatement Plan, in November 1999. The RWSP is the policy basis for the capital improvements necessary to provide wastewater services to this region for the next 30 years.

The RWSP utilizes the same assumptions with regard to future population and employment levels in the Puget Sound region as does the Growth Management Act and the King County Comprehensive Plan. When originally presented to the Council for adoption, the RWSP included an up-to-date inventory of existing facilities, a level of service definition, and an identification of needs to support the regional vision adopted under the Growth Management Act and the King County Comprehensive Plan. An annual report on the status of the RWSP is submitted to the Regional Water Quality Committee of the King

County Council each year for review. Additionally, approximately every three years a comprehensive update of the RWSP costs, projections and assumptions is undertaken and presented to the King County Council.

Project Categories

Capital projects carried out by the Wastewater Treatment Division are grouped according to the major functions they serve in the wastewater system. There are thirteen functional categories. The spending authority for the first twelve of these categories is pooled at the fund level. For the thirteenth category, Minor Asset Management, the spending authority is defined at the level of the sub category.

1. South Treatment Plant
2. West Point Treatment Plant
3. Brightwater Treatment Plant
4. Local treatment facilities
5. Conveyance pipes and storage
6. Conveyance pump stations
7. Combined Sewer Overflow (CSO) control
8. Infiltration and inflow (I/I) control
9. Biosolids recycling
10. Water reuse
11. Environmental laboratory
12. Central functions
13. Minor asset management

2009 Significant Project Highlights

Significant Projects Wastewater Treatment Capital Improvement Plan	2009 Executive Proposed Budget	Continuation of Existing Project
Brightwater Treatment Plant	\$44,205,598	X
Brightwater Conveyance	\$26,464,127	X
Ballard Siphon Repair	\$16,825,515	X
North Creek Pipeline	\$7,649,725	X
Ravenna Creek Separation	\$5,000,000	X
West Point Treatment Plant Disinfection	\$4,847,439	X

Brightwater Treatment Plant: \$44,205,598

The Brightwater Wastewater Treatment Plant will serve south Snohomish County and north King County. Brightwater will provide treatment capacity for average wet weather flows of 36 million gallons per day (mgd) of wastewater in 2010 with the capacity to increase to 54-mgd in 2040. The total projected cost of this project is \$875,313,701 in the six-year capital plan.

Brightwater Conveyance: \$26,464,127

The 12.6 mile-long system of large diameter tunnels will carry wastewater to and from the Brightwater treatment plant located at the Route 9 site. These facilities will serve south Snohomish County and north King County. Separate pipes within the tunnels will convey untreated wastewater to the treatment plant,

treated wastewater to the outfall in Puget Sound and reclaimed water to end users through the reclaimed water “back bone” system. The total projected cost of this project is \$926,916,517 in the six-year capital plan.

Ballard Siphon Repair: \$16,825,515

The Ballard Siphon project is designed to meet capacity requirements through 2106. Ninety percent of this tunnel is beneath the Lake Washington Ship Canal. The project cost has increased due to a modified tunneling construction technique, increases to labor and materials costs, and corrections to earlier estimates. The total projected cost of this project is \$40,526,594 in the six-year capital plan.

North Creek Pipeline: \$7,649,725

The North Creek pipeline in Snohomish County is under capacity and requires upgrading. King County has an agreement with Alderwood Water and Wastewater District to upgrade the gravity pipeline facility. The gravity line will vary in diameter from 21-inches to 48-inches. The total projected cost of this project is \$44,977,602 in the six year capital plan.

Ravenna Creek Separation: \$5,000,000

This new project will design and implement the necessary improvements at the Ravenna Creek drop structure and associated conveyance system to prevent overflow discharge events from occurring.

West Point Treatment Plant Disinfection: \$4,847,439

This new project designs and constructs a disinfection system that will replace the existing chlorine system at the West Point Treatment Plant. An alternate disinfection system such as one that uses liquid sodium hypochlorite is preferable, since it is a more stable and a safer product than chlorine.

**2007 WTD Capital Program Closed Projects
(Project # Project Title Council District)**

A20010 South Treatment Plant - Asset Mgmt

423509 Chemical Storage Facility Upgrade 05

423567 Structural Repairs to Earthquake Damaged Facilities 05

A20030 South Treatment Plant - Odor Control

423498 Ferric Chloride System 05

A20410 Conveyance Pipelines and Storage - Asset Mgmt

423363 Auburn Facilities Assessment 09

A20530 Conveyance Pump Station - Odor Control

423469 Swayolocken Discharge Odor Upgrade 06

423581 Pepcon Replacement Study 06

A21100 Central Functions

423311 WTD Financial System Replacement Project All

**2008 WTD CIP Scheduled Project Completion
(Project # Project Title Council District)**

A20020 South Treatment Plant - New Facilities & Improvement

423585 South Plant Odor Improvements 05

A20410 Conveyance Pipelines and Storage - Asset Mgmt

423616 Conveyance Pipeline Easement Reconciliation All

A20420 Conveyance Pipelines and Storage - New Facilities & Improvements

423121 Madsen Creek Erosion & Sewer Stabilization 09

423494 Fairwood Interceptor (Formerly Madsen Creek) 09

A20510 Conveyance Pump Station - Asset Mgmt

423563 East Offsite Control Systems & West Offsite Facilities Electrical Replacement All

A20520 Conveyance Pump Station - New Facilities & Improvements

423365 Hidden Lake PS/Boeing Creek Trunk 01

423406 Juanita Bay PS - Modifications 06

A20540 Conveyance Pump Station - Power Mgmt

423506 Emergency Generator Program All

A20820 Biosolids - New Facilities & Improvements

423604 West Side Biosolids Storage 03

A20920 Water Reuse - New Facilities

423600 Brightwater Reclaimed Water Pipeline 03

A21100 Central Functions

423458 HCP/ Programmatic Biological Assessment (PBA) All

**2009 WTD CIP Scheduled Project Construction Completion
(Project # Project Title Council District)**

A20010 South Treatment Plant - Asset Mgmt

423487 East Division Secondary Tank Coating 05

423573 SP STP Convert Disinfection From Chlorine To Sodium 05

423603 South Plant Daft Tank Restoration 05

A20020 South Treatment Plant - New Facilities & Improvement

423591 Space Planning Year 2 Phase 2 05

A20040 South Treatment Plant - Power Mgmt

423234 EDRP - POWER EQUIPMENT REPLACEMENT 05

A20110 West Treatment Plant - Asset Mgmt

423561 WPTP Digester Compressor System Modification 04

423566 West Point OGADS VSA-2 Media & Retention-Screen
Replacement 04

423594 West Division PLC Replacement Project All

423613 WPTP Heating and Cooling Loop Improvements 04

A20120 West Treatment Plant - New Facilities & Improvements

423579 Space Planning Year 1 Phase 1 04

A20320 Local Treatment Facilities - New Facilities &

423557 Carnation Treatment Plant 03

423611 Chinook Wetlands Enhancement 03

A20430 Conveyance Pipelines and Storage - Odor Control

423468 ESI Chemical Injection 06

A20510 Conveyance Pump Station - Asset Mgmt

423564 Barton - Murray - 53rd Avenue - 63rd Avenue - VFDS - MCCS -
Alki Pump Stations Electrical Upgrades 08

A20520 Conveyance Pump Station - New Facilities &

423549 53rd Street Pump Station Upgrade 08

A20530 Conveyance Pump Station - Odor Control

423580 King Street Regulator Odor Control 05

423590 Murray Avenue Pump Station Odor Control System Upgrade 08

423605 Phoenix Odor Control System Replacements for Lake City

Regulator & York Force Main Discharge 02,03

423617 Sweyolocken Phoenix Odor Scrubber Replacement 06

A20620 Combined Sewer Overflow - New Facilities &

423489 Carkeek Overflow Reduction 04

A21100 Central Functions

2009-022 Water Quality Data Store All

2009-023 Asset Management System All

2009-024 Process Network Security All