CSO BEACH PROJECTS

Public Participation in the Decision Process

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

	PROJECT TEAM	PUBLIC
Planning	**Evaluate Approaches to CSO Control in Basins** • On-site treatment • Peak flow reduction • Storage • Convey/treat	*Learn more about the problem and control approaches*
Planning	**Identify and Evaluate a Broad Range of Alternatives for Each Basin** • Alternatives=approach+potential Site • All technically feasible alternatives considered	*Attend community meetings and provide input*
Planning	**Short list and Refine Alternatives for Each Basin** • Short list based on comprehensive criteria • Further develop/refine most favorable alternatives	*Attend community meetings and provide input*
Planning	**Decide on a Proposal for Each Basin** King County decides on proposals for environmental review	*Learn about proposals and opportunities to provide input*
Design	**SEPA (State Environmental Policy Act) Review** • Threshold determination issued • Public comment period	*Provide comments during public comment period*
Design	**Regulatory Review and Approval Period** • Agency comment and approval • Basis for design	*Agencies confirm public participation process*
Design	**Facility Design Phase** • Design level detail added • Project permit applications	*Public coordination continues. Public comment on some permits.*
Construction	**Construction** • Provide public updates and notification • Maintain 24-hour construction hotline	*Public access for construction questions and concerns*

WE ARE HERE

King County will decide on a proposal for CSO control in each of the four project basins: Barton, Murray, North Beach, and South Magnolia. The public will have opportunities to inform the county's decision process. Sign up for progress updates and meeting notices to stay informed and to provide input.

This diagram will help you keep track of the decision process and opportunities for participation.

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King County

Wastewater Treatment Division
Department of Natural Resources and Parks

North Beach Technical Workshop
June 26, 2010
Related Technical Documents

These documents are located in the CSO Beach Project Library
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Library/TechInfo.aspx

1. **Alternatives Development and Screening Process Overview, Feb. 19, 2010**

   Describes the process used in all four basins to develop, evaluate and screen potential CSO control alternatives.

2. **Technical Memorandum 207.1 CSO Beach Project GIS Analysis, Sept. 2008**

   Describes the methods and results of a geographic information system (GIS) analysis conducted by King County to identify sources and destinations for stormwater flow in Barton, Murray, Magnolia, and North Beach Basins. The data will be used as input for the design of combined sewer overflow (CSO) control projects in the basins. The data from this report was also used in the evaluation of the potential effectiveness of demand management options in each basin.

3. **Model Results Summary and Basis of Planning, June 2010**

   Describes the volume and peak flows in each of the four basins that was used for the basis of alternative development and storage volumes. It also includes the distribution of the peak flows within each of the individual sub-basins based on 2009 flow monitoring.

4. **Technical Review meetings (Oct. 21, 2009; Oct. 29, 2009), Control Approaches Schematics and Criteria Information Needs**

   These documents describe the design criteria used for developing CSO control approaches. These documents include schematics of typical CSO control facilities for storage, conveyance, and treatment.

5. **Summary of Discussion - Alternative Screening Workshop for North Beach Basin (February 11, 2010 and February 17, 2010)**

   These documents provide a summary of workshops held in December 2009 and January 2010. They summaries and describe the workshop process and capture the discussion themes that supported alternative evaluation and recommendations for further consideration of CSO control project alternatives in the North Beach Basin.

6. **Nine Alternatives, February 11, 2010**

   Drawings of the nine alternatives developed and evaluated by the project team. These alternatives were evaluated during the February 2010 Alternative Screening Workshops.

7. Alternatives Analysis, February, 2010

These matrix tables present the results of preliminary screening of the nine North Beach CSO controls alternatives against a range of evaluation factors.

8. Technical Memorandum 600.1 and 600.5

These technical memoranda document the analysis of CSO basins for the implementation of green stormwater infrastructure (GSI).

9. North Beach Inflow and Infiltration Alternative Analysis, May 18, 2010

This document summarizes the results of a preliminary analysis performed on disconnecting roof connections (inflow) and repairing side sewers/laterals (infiltration) in the North Beach Basin.

King County
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Wastewater Treatment Division

June 2010

Green Stormwater Infrastructure for Combined Sewer Overflow Control

The oldest parts of King County's sewer system were designed to carry stormwater from streets and roofs as well as wastewater from homes and businesses to the nearest water body. Today, that water is sent to a wastewater treatment plant. During heavy rains, however, the pipes can fill and overflow into waterways. These are called Combined Sewer Overflows or CSOs. King County's Wastewater Treatment Division plans to control all of its 38 combined sewer overflow (CSO) sites to an average of no more than one overflow per year by 2030, as required by regulatory agencies. Green Stormwater Infrastructure (GSI) is one method that could be used to reduce peak flows of stormwater and groundwater into the combined sewer system (also called "demand management").

What is Green Stormwater Infrastructure (GSI)?

The concept of green infrastructure originated in the conservation field. In this context, large forests, wetlands, greenbelts, and so forth—all part of the natural environment—are viewed as infrastructure because they support essential ecosystem functions. The term is increasingly being used to refer to engineered infrastructure at a smaller scale in relation to green stormwater management practices such as rain gardens and green roofs. These practices make use of soils and vegetation, in combination with other approaches such as rain barrels and permeable pavement, to infiltrate, evaporate, capture, and reuse stormwater.

In addition to helping reduce combined sewer overflows (CSOs) and the amount of untreated stormwater that finds its way to surface water, green stormwater management facilitates natural processes that recharge groundwater, preserve baseflow in streams, moderate impacts to water and air temperature, and protect hydrologic and hydraulic stability. Other names for green stormwater management include low impact development (LID), natural drainage, and water-sensitive design.

What are some GSI techniques?

Ecoroofs (green roofs) consist of shallow layers of growing medium, low-growing vegetation, subsurface drainage, and a waterproof membrane.

Roof disconnection removes water that flows from a roof through a downspout to a combined sewer and redirects it to some other location. It is not considered a GSI technique, but may be combined with "green" features such as rain gardens.

Street trees retain some rain in their canopies and take up a portion of the rain that infiltrates to the soil.

Bioretention involves dispersed small scale landscape features designed to attenuate and treat stormwater. These features are typically vegetation-filled areas, such as rain gardens and swales, with a drainage mechanism, often located in parking lots, median strips, or streets. Bioretention is an element of Seattle's Residential RainWise program on private property and natural drainage systems on neighborhood streets.

Permeable pavement allows rainfall to penetrate the pavement into a porous material that retains stormwater before it enters a combined sewer, limiting or removing the effects of the stormwater on the sewer system. Permeable pavement is not suited for high traffic areas.

What is required for GSI to work for CSO Control?

While GSI can provide benefits in stormwater control, neighborhood enhancements, water quality, and reduction in CSOs, there are several factors that must be considered for successful implementation of GSI for CSO control.

- Enough sources of stormwater- streets, roofs, and other impervious surfaces - that can be disconnected from the sewer system to limit CSOs and meet state standards for no more than one overflow per year on a long term average. If GSI alone cannot control the entire volume added traditional infrastructure may need to be constructed to insure compliance with regulations for CSO control.
- Land area available for GSI. Rain gardens, street trees, swales, and other GSI elements require sufficient space for installation. GSI features may be sited in existing planting strips, in parking lots, on private property, and in other existing space.
- Appropriate soils and topography. GSI benefits from flat areas where water can infiltrate into soils. Steep slopes and poorly draining soils are not recommended for GSI techniques.
- Supporting conveyance infrastructure for large storm events. In order to accommodate storms beyond design capacity, it may be necessary to direct excess flows into a stormwater or sewer system.
- Community support for GSI projects. Installing GSI, like other stormwater and sewer projects, has effects on the community during and after construction. Community understanding of GSI projects and support for their implementation is a critical success factor for this type of infrastructure.

Learn how King County evaluated GSI techniques as part of the Puget Sound Beaches CSO Control Projects.

Visit the project Web page at www.kingcounty.gov\CSOBeachProjects to view and download technical documents describing GSI evaluation for the project basins.

For more information on Seattle Public Utility's stormwater control programs
Residential RainWise
https://rainwise.seattle.gov/systems/water

Natural Drainage Projects
http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/GreenStormwaterInfrastructure/NaturalDrainageProjects/index.htm

Alternate Formats available upon request

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June 2010

Inflow and Infiltration Reduction to Control Combined Sewer Overflows

What is I/I, and what is King County doing about it?

The King County Regional Infiltration and Inflow (I/I) Control Program was created to identify cost-effective opportunities to reduce the amount of rain and groundwater that enter the portions of the County's wastewater conveyance system that are designed to carry only sewage .When rain or ground water enters the sewage system, it is called infiltration and inflow or I/I. Treating and conveying this excess water with sewage is expensive and can cause overflows if the system capacity is overwhelmed.

King County is testing the effectiveness of reducing I/I in a pilot project in Skyway in 2011-12. Two other proposed projects in Bellevue and Issaquah have been postponed. The Skyway project will test the County's ability to find numerous I/I sources as well as test the cost-effectiveness of I/I reduction on a scale large enough to potentially offset the need for larger conveyance or storage facilities. The results of the initial project will be used to develop recommendations to the King County Council regarding long-term I/I reduction and control, including applicable changes to policy or code.

What is required for I/I reduction to be a feasible approach for CSO control?

Sufficient sources of I/I that can be removed to meet target control volumes.

Flow monitoring and analysis is used to identify a target *control volume* for a specific CSO facility. This is the volume of wastewater and stormwater flow during a peak storm event that must be stored or removed from the conveyance system to prevent a CSO discharge.

Successful I/I reduction requires that many, often hundreds of individual leak points in sewer mains, manholes, and side sewers on private property must be found and fixed. To identify these leak points, extensive studies must be carried out on private property and in the local sewer system.

This approach has not yet been tested on a large scale in this region. King County is required to effectively reduce the number of combined sewer overflows in the system to no more than one event per year per location. The uncertainties of large scale I/I rehabilitation mean that it is risky to rely on this approach for meeting CSOs control requirements at this time.

Locations where I/I reduction is appropriate and cost-effective.

I/I projects are not recommended in critical areas such as slopes and shorelines, and those with historic flooding and drainage issues. In addition, sewer testing and repair requires access to sewer buried in streets that may also include underground utilities, and private property landscaping, driveways, and structures. Projects will require disruption to roadways, utilities and private property improvements that, if extensive enough, may limit the cost-effectiveness and feasibility of the project.

Availability of systems to manage water excluded from the sewer system.

Stormwater and groundwater that is excluded from entering the sewer system must be redirected to a stormwater conveyance or management system to prevent localized problems related to increased surface and ground water. Areas without developed stormwater systems, or without sufficient stormwater conveyance capacity are not good candidates for I/I reduction projects to control CSOs. Current water quality standards will require stormwater from streets to receive treatment before discharging to creeks, streams, lakes, and Puget Sound.

How can you help reduce I/I in your community?

Private property owners are responsible for maintaining the side sewer lines on their property. Regular inspection, followed by any needed maintenance and repair, can prevent both I/I and potential backups into homes.

People whose roof drains are connected to the sewer system can determine whether disconnecting this source of stormwater is feasible on their property. Property owners can also evaluate appropriate means of reducing stormwater runoff from their property, including installation of rain gardens, cisterns, or permeable pavement. These techniques may reduce I/I at locations away from the property, such as street catch basins. Seattle Public Utilities, through the Residential RainWise program, provides resources to participate in stormwater reduction programs.

Learn how King County evaluated I/I reduction for the North Beach basin as part of the Puget Sound Beaches CSO Control Projects.

Visit the project Web page at www.kingcounty.gov\CSOBeachProjects to view and download technical documents describing I/I analysis for the North Beach area.

For more information on Seattle Public Utility's stormwater control programs
Residential RainWise
https://rainwise.seattle.gov/systems/water

Natural Drainage Projects
http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/GreenStormwaterInfrastructure/NaturalDrainageProjects/index.htm

Alternate Formats available upon request

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Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Factors for Comparing Alternatives

LAND USE AND PERMITTING

City Of Seattle Comprehensive Plan
Seattle Municipal Code
Shoreline Master Program
Permitting Complexity
Property Acquisition Complexity

ENVIRONMENT

Cultural Resources
Fish and Wildlife
Wetlands, Streams, and Shoreline
Soils and Sediments
Water Quality

TECHNICAL

Technical Complexity
Compatibility with Existing WW System
Flexibility/Adaptive Management
Constructability/Implementation Schedule

O&M

Staffing
Training
Reliability
Maintenance
Safety

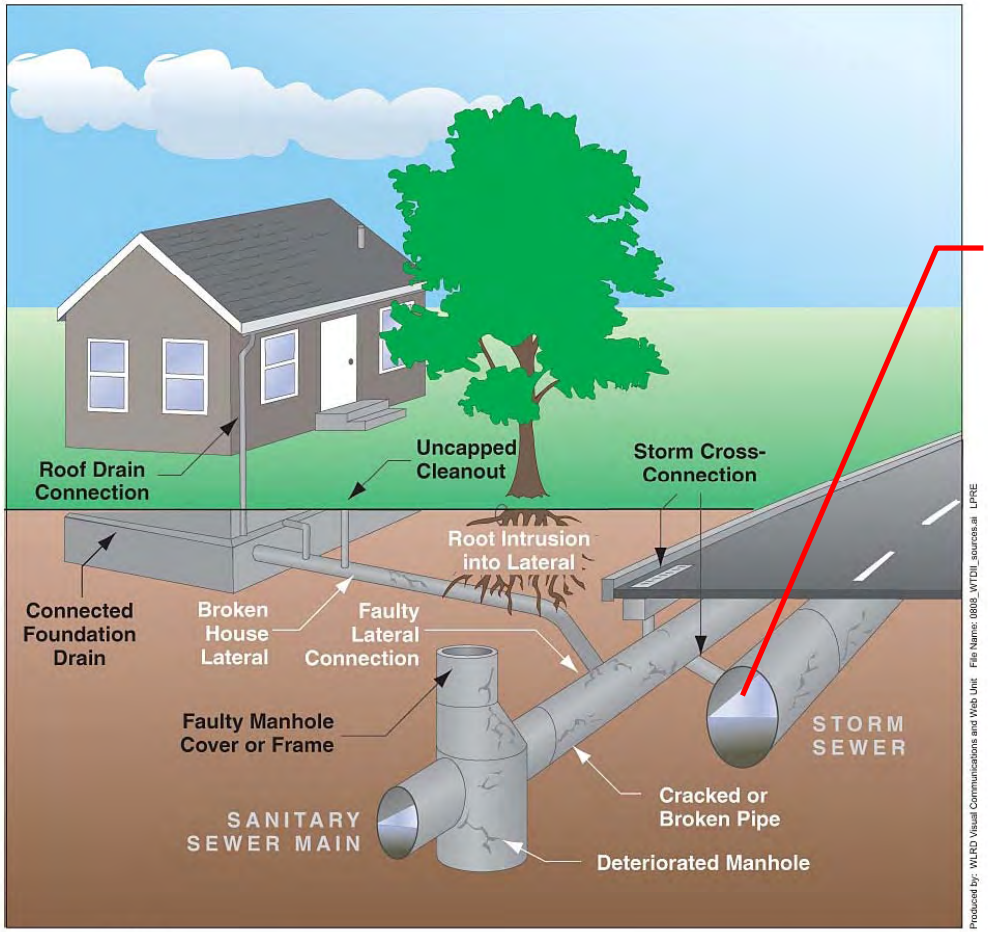
COST EFFECTIVENESS

Relative Project Costs
Relative Life-Cycle Costs
Relative Variability/Risk

COMMUNITY IMPACT

Location
Potential Community Impacts
Construction Impacts

North Beach Basin Flow Impacted by Both Inflow and Infiltration



Key:

- Inflow Source
- Infiltration Source

King County
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Wastewater Treatment Division
Regional I/I Control Program

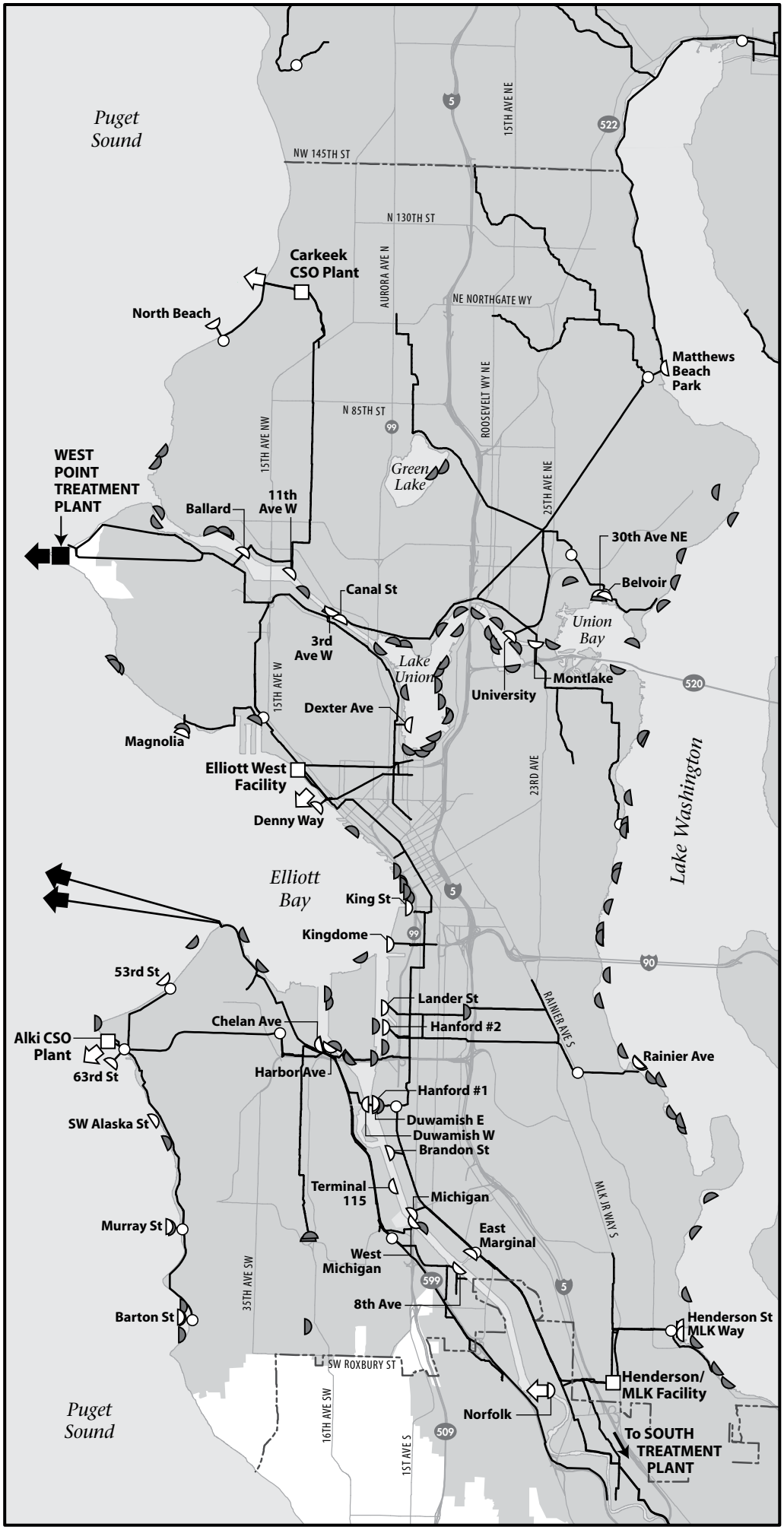
NOTE: Separate storm sewers do not exist in North Beach basin

What is the CSO Control Requirement?

- Set by State Ecology Regulations (WAC 173-245)
- No more than one untreated event per year on a 20 year average
- CSO control schedule to protect public health, environment, and aquatic life by 2030.
- Department of Ecology set deadlines for project milestones in the West Point NPDES permit.
  - CSOs must be controlled to the state regulation
  - Ecology & EPA can use various means of enforcement, including fines and court issued compliance orders
  - EPA is tracking King County's compliance schedule

CSO Control Projects

- King County has 38 CSOs
- Over half are controlled
- CSO Beach projects are a priority due to location near popular beaches.
- CSO Beach projects under construction 2013



Map 1b

Wastewater Service in Seattle: Current Conditions

- Wastewater Treatment Service Area
- King County Principal Sewer
- King County CSO
- City of Seattle CSO
- Wastewater Treatment Plant (Secondary Treatment)
- Wastewater Treatment Plant Outfall
- CSO Treatment Facility
- CSO Treatment Facility Outfall
- King County Pump Station
- Major Road
- Seattle City Limit

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November 2009

King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Map produced by King County DNRP Visual Communications and WTD GIS

Data source: King County Spatial Data Warehouse

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