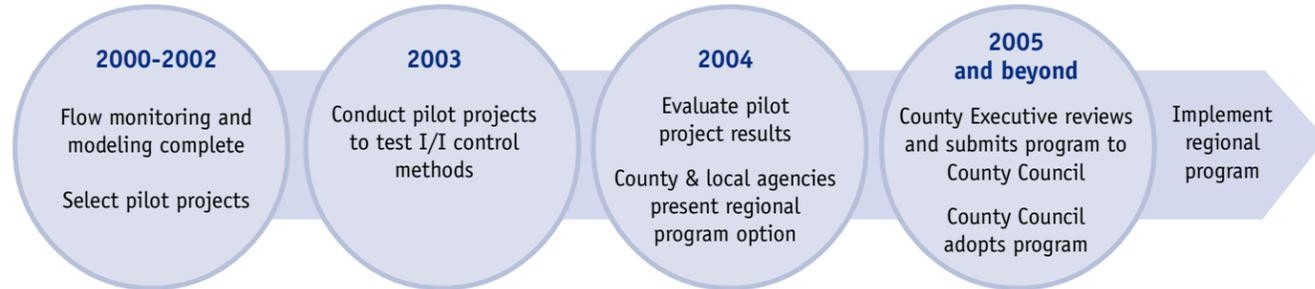


Regional Infiltration/Inflow Program Milestones



Local agency involvement is key

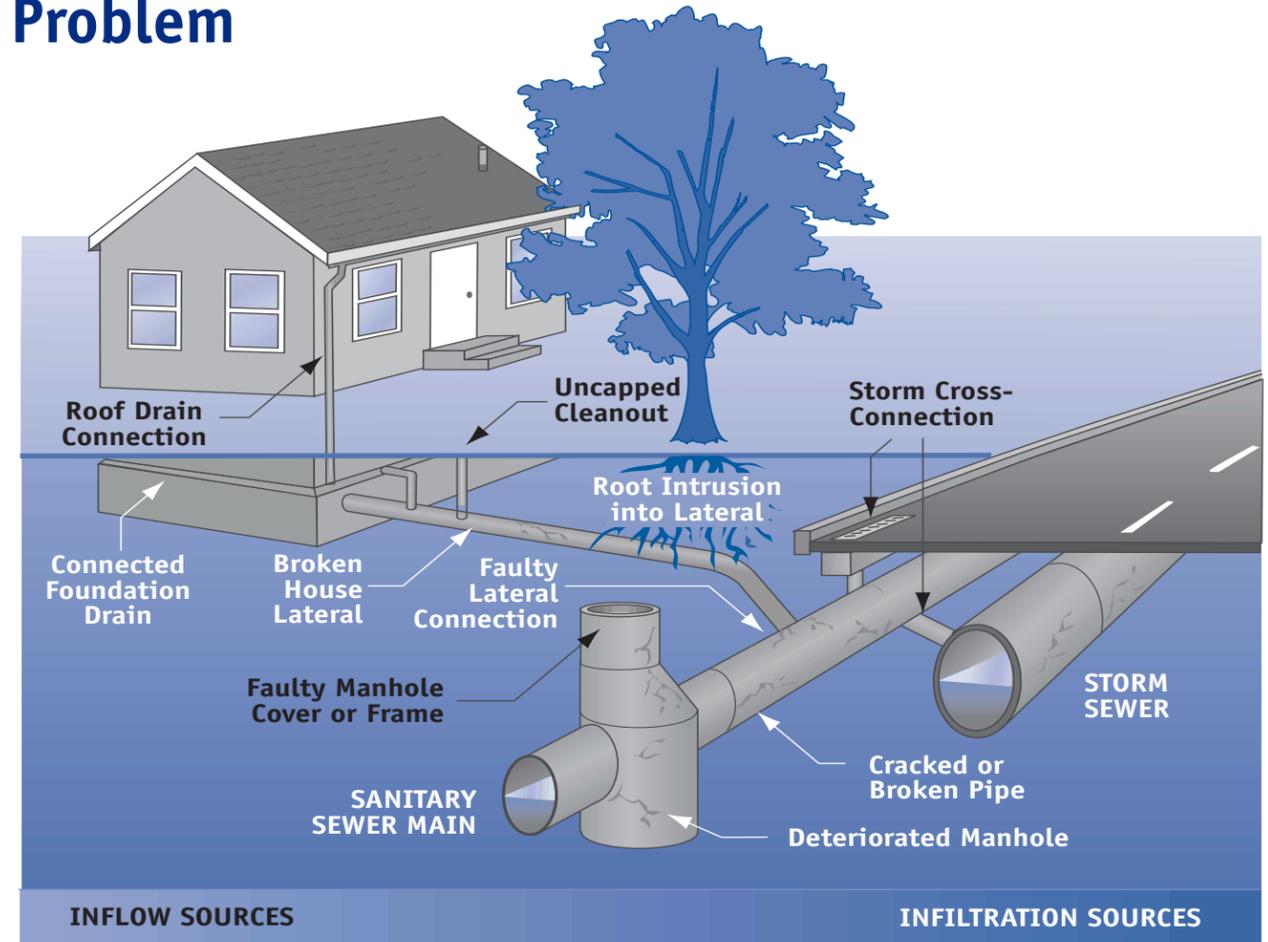
King County and local agencies are working together to develop the Regional I/I Control Program. They cooperatively developed the criteria for selecting pilot projects, and draft standards and policies for I/I control. They are also working together to decide how the regional program should be carried out and funded beyond 2005. The following is a list of our local agencies:

- | | |
|---------------------------------------|--|
| Alderwood Water & Wastewater District | Northeast Sammamish Sewer & Water District |
| City of Algona | Northshore Utility District |
| City of Auburn | City of Pacific |
| City of Bellevue | City of Redmond |
| City of Black Diamond | City of Renton |
| City of Bothell | Ronald Wastewater District |
| City of Brier | Sammamish Plateau Water & Sewer District |
| Cedar River Water & Sewer District | City of Seattle |
| Coal Creek Utility District | Skyway Water & Sewer District |
| Cross Valley Water District | Soos Creek Water & Sewer District |
| Highlands Sewer District | City of Tukwila |
| City of Issaquah | Val Vue Sewer District |
| City of Kent | Vashon Sewer District |
| City of Kirkland | Woodinville Water District |
| City of Lake Forest Park | Town of Woodway |
| Lakehaven Utility District | |
| City of Mercer Island | |

What can you do?

- Find out where your roof and foundation drains go and determine if they can be disconnected. Redirect the water away from the building and allow it to soak into the ground.
- Learn more about the pilot projects. Contact King County staff: Erica Herrin at 206-684-1138 or erica.herrin@metrokc.gov or Mary Lundt at 206-263-3184 or mary.lundt@metrokc.gov.
- Visit the King County Web site at <http://dnr.metrokc.gov/wtd/i-i>.
- Learn more about the program. Contact Dan Sturgill, King County I/I Program Manager, at 206-684-1242 or dan.sturgill@metrokc.gov or contact your local wastewater provider.

Clean Water in Sewer Pipes Adds Up to a Problem



Are we paying to treat rainwater like sewage?

Clean water that flows into sewer pipes from groundwater (infiltration) and stormwater (inflow) is called infiltration and inflow, or I/I. The King County Wastewater Treatment Division estimates that I/I makes up 75 percent of peak flows in the sewer system during winter storms.

Handling I/I is expensive because we have to treat this clean water like sewage. Extra water in sewer pipes can

also cause sewer overflows into waterways and can require new and larger facilities to convey and treat the water.

As shown in the drawing, **infiltration** (groundwater) enters sewer pipes and manholes through holes, breaks, joint or connection failures, and other openings. **Inflow** (stormwater) enters the wastewater system from roof drains, downspouts, cross-connections with storm drains, and through holes in manhole covers.



Smoke testing can show illicit downspout and storm drain connections, as well as leaky pipes.

What is being done to develop solutions?

In 2000, King County, in partnership with 32 cities and sewer/water agencies that collect sewage in the King County region, launched a multi-year program to develop a cost-effective approach to controlling I/I. The program is designed to:

- Define the scope of the I/I problem by flow monitoring and sewer system evaluations
- Test various techniques for controlling I/I through neighborhood pilot projects
- Estimate how much I/I can be removed cost-effectively
- Recommend a regional I/I control program that has local agency support.

Finding and fixing I/I How do you find I/I?

Several sewer system tests can be used to examine the condition of individual sewers and identify I/I sources. These tests are called sewer system evaluation surveys. Smoke testing involves pumping smoke through sewers from manholes in streets and observing where smoke exits. The exiting smoke can locate a broken pipe or where roof or foundation drains might be connected to the sewer system.

TV cameras have been developed that can be slid down sanitary sewer lines and record sewer conditions. TV inspection can identify breaks, root intrusion, leaking water and deteriorating conditions.

Wastewater flow and rainfall monitoring results from the winter of 2001-2002 confirmed that clean water enters the sewer pipes during winter rainy periods and goes to the treatment plants.

I/I can enter all parts of the sewer system on both private and public property (see table). Since I/I can come from both public and private property, the responsibility for controlling I/I rests with both public sewer agencies and private property owners.

How will neighborhood pilot projects help fix I/I?

During 2002-2003, King County and local agencies are conducting pilot projects throughout the service area (see map). A broad range of I/I control methods will be tested to reduce or eliminate I/I sources. Some projects will focus on the public sewers. Others will involve work on private property and will require the cooperation of private property owners. King County and the local agencies work closely with the pilot project communities to design and implement the projects.



Pilot Basin Locations
 ● Pilot Basin
 ■ King County Wastewater Service Area

How do we reduce or eliminate Infiltration/Inflow?



To reduce or eliminate I/I, sewer components can be replaced or rehabilitated. Rehabilitation methods are less invasive, because repairs can be made from inside the pipe or manhole, or only a small excavation is needed to expose the pipe. Examples of I/I control techniques are listed in the following table.



SEWER COMPONENT	HOW TO FIX I/I	I/I CONTROL METHODS
Pipelines (side sewers, laterals, mains) Side sewers and some laterals are on private property. Most mains are on public property.	Replace or repair sewer pipes.	Replacement <ul style="list-style-type: none"> • Dig and replace Rehabilitation <ul style="list-style-type: none"> • Pipe grouting – cement based grout is injected from the inside of a pipe to fill a hole or crack • Pipe relining - flexible liner is inserted into a pipe either by pulling it through an existing pipe or inverting it using water pressure – like a sock turned inside out • Pipe bursting – existing pipe is expanded with a bursting tool and a new pipe is pulled through • Spot repairs – problem pipe is exposed and replaced or a repair sleeve is attached
Manholes Location: Most are on public property.	Replace or repair existing manholes.	Replacement <ul style="list-style-type: none"> • Dig and replace Rehabilitation <ul style="list-style-type: none"> • Coat or grout exterior • Line interior • Install lid pans • Raise or replace lids and frames • Divert surface water from manhole
STORMWATER COMPONENT	HOW TO FIX I/I	I/I CONTROL METHODS
Building Connections Most are on private property.	Disconnect and reroute to separate stormwater system or remove and allow water to soak into the ground.	Stormwater system disconnection <ul style="list-style-type: none"> • Roof drains • Downspouts • Yard drains • Catch basins Groundwater control system disconnection <ul style="list-style-type: none"> • Foundation drains • Sump pumps