



Project Element: Construction

Fall 2013

King County is completing design for replacing the Fremont Siphon, a wastewater conveyance system that extends from Fremont to Queen Anne in a concrete tunnel located under the Lake Washington Ship Canal. King County will install two new pipelines in a new crossing under the ship canal just west of the existing siphon pipelines using trenchless technology.

Trenchless technologies are used for deep underground pipeline installations to avoid open trench excavation at the surface and limit surface impacts. Trenchless methods are commonly used for example, to install utility or conveyance pipelines under a busy roadway, or to avoid a sensitive environmental area such as a wetland, stream, or waterway.

King County will use the trenchless technology called microtunneling to install the two new siphon pipelines. Microtunneling is a remote-controlled pipe construction method in which pipe is pushed through the ground by hydraulic jacks, with a machine in front of the pipe that removes soil as the pipe moves forward. The excavated soil is mixed with a fluid and the resulting mixture is pumped up to the ground surface where the soil and fluid are separated and reused or recycled. A shaft will be constructed in Fremont where the microtunneling equipment and pipe will be launched from.



Pipe sections are fed through the launch shaft



A slurry separation plant is used to process excavated soils from the microtunnel

Once the microtunneling machine reaches Queen Anne, it will be removed through a retrieval shaft. Pipes will be installed in the shafts and then connected to existing piping to complete the siphon.

Utility relocations

In order to build the launch and retrieval shafts and complete the siphon replacement, several utilities in the Fremont and Queen Anne project areas will need to be relocated. Utilities potentially affected include power, water, gas and sewer lines. In addition, the City of Seattle's combined sewer overflow (CSO) outfall alignment in Fremont will need to be reconfigured. King County will install a new pipe connecting to the existing outfall, maintaining the current discharge point and capacity of the existing outfall. The City's outfall will function continuously during construction and tie-in of the new line.

Work activities in Fremont

The majority of construction activities will occur at the project area in Fremont near Northwest Canal Street and 2nd Avenue Northwest. These activities include:

- Excavate a shaft to launch the microtunnel machine
- Operate a soil separation facility to process excavated material
- Connect the new siphon to existing sewer
- Relocate utilities
- Replace and reconfigure the City's CSO outfall
- Build new access and odor control structures
- Restore affected areas

New structures in Fremont

Odor control for both the existing and new system is part of the project in response to community concerns and field investigations which evaluated odor from King County's existing sewer system. The odor control structure is anticipated to include both above- and below-ground elements.

Lift slabs and manholes will be constructed on the project site to provide access for inspections and maintenance.



A retrieval shaft is excavated for a similar King County project in Ballard



A lift slab and access hatch at Alki Beach

Work activities in Queen Anne

Construction activities in Queen Anne will occur on and near King County's property at West Ewing Street. These activities include:

- Excavate microtunnel retrieval pit and remove machine after drilling
- Connect new siphon to existing sewer adjacent to Seattle Pacific University
- Relocate utilities
- Restore affected areas

New structures in Queen Anne

Concrete slabs and manholes will be constructed to provide access for inspections and maintenance to new siphon and connections to existing pipeline.

For more information

Visit www.kingcounty.gov and search "Fremont Siphon"

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