

Fremont Siphon replacement

## **Completed Spring 2017**

#### Project update

#### June 2017

Thank you to all the folks who came out on Sunday, June 18 to see the site and celebrate the completion of the Fremont Siphon Replacement Project. The project was completed on time and under budget. King County deeply appreciates the community's patience and understanding during this important project.

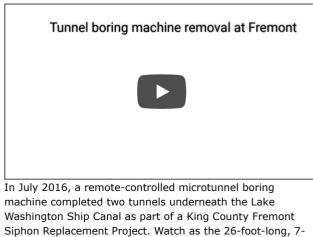
Thanks again for your time and consideration throughout the project.



#### Public Art at King County wastewater treat...



See how public art at KCWTD facilities connects community to our system and the environment.

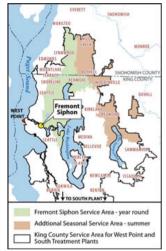


foot-wide machine is hoisted from its exit pit in Fremont.

Planning Design Construction Operations

# 24-hour emergency and odor reporting:

Contact West Point Treatment Plant at 206-263-3801.



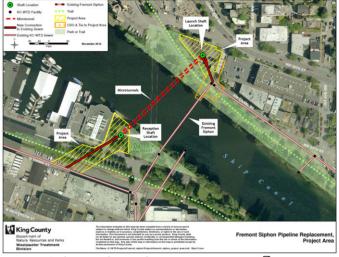
Fremont Siphon service area



Building the Fremont Siphon Tunnel, 1913. Photo provided by <u>Seattle Municipal Archives</u>

# **Project description**

King County replaced the Fremont Siphon, a major sewer pipe running under the Ship Canal between Fremont and Queen Anne. The new siphon is located west of the existing siphon to reduce project risks and impacts to the community. Construction began in early 2015 and continued until spring 2017. The old siphon was decommissioned.



Fremont Siphon pipeline replacement, project area

### Learn more about the project

#### Why do we need this project?

The Fremont Siphon has provided safe, reliable sewer service to north Seattle and other cities in north King County for decades. Sewage and stormwater from more than 100 square miles of pass through the Fremont Siphon every year to be cleaned and safely discharged at the <u>county's</u> <u>treatment plant</u> in Magnolia. During storms, the pipe carries up to 220 million gallons per day, making it one of the most heavily used pipes in the regional sewer system.

The existing siphon is nearly 100 years old and has reached the end of its of service life. The new pipes will ensure north Seattle and northern King County continue to enjoy safe, reliable sewer service for decades.

#### Project design

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# Fremont facility site design – historic building with Pacific Northwest coastal plant palette

As part of the project, King County built a new odor control facility at the Fremont site. Community members, neighbors, and park users joined the King County project team at a <u>January 2013 design workshop and March</u> <u>26 open house</u> to develop a design for this facility that fits with the community.

At the workshop, community members developed these common themes for the design:

- Extend the park feel to the site
- Fit with the historic nature of buildings in Fremont or develop a simple, modern feel
- Balance opening the view to the Ship Canal with screening the facility
- Minimize lighting onsite and minimize the pavement and fencing footprint



The front of the building at Northwest 36th Street and Leary Way Northwest will have a window to view into the facility.

From the Burke-Gilman Trail, the facility will eventually be screened by trees and vegetation.



Thank you for contributing to the site design.

King County's project team used the community's input to develop a building style that evokes historic Fremont structures and a plant palette featuring Pacific Northwest coastal plants.

View more information on the  $\underline{design\ process}$   $[\!\!\!]$  .

Other elements developed with community input include:

The building wall incorporated as part of the fence to create a simple appearance from Northwest 36th Street A window shaped and sized like the underground pipeline with view ports into the facility Lighting directed upward on the north wall of the building to provide some lighting on Northwest 36th Street but avoid glare Permeable pavement and grass pavement on the facility site for stormwater management A rain garden adjacent to the park to capture and infiltrate stormwater Landscaped area outside of the facility fence and new 6 benches on Northwest 36th Street Vegetation that, when mature, will screen the facility from the park while allowing views to the Ship Canal from Northwest 36th Street Predominantly native plant palette with drought tolerant 8 plants that support local wildlife A single driveway on Northwest 36th Street to reduce visible pavement and traffic on 2nd Avenue Northwest and Canal Street

> A mow strip along the south side of the property to reduce visual obstruction of a fence on the property line





Northwest features a landscaped area and new benches.

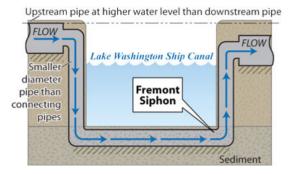


The rain garden in the lower left corner will feature plants commonly found on the Pacific coast.

#### What is a siphon and how does it work?

The Fremont Siphon is an *inverted siphon*. Inverted siphons use gravity to push liquids downhill. In this case, sewage and stormwater from north Seattle and elsewhere is pushed through the Fremont Siphon by having sewage and stormwater enter the pipe in Fremont Canal Park at a higher elevation than where it exits the pipe in Queen Anne.

To help keep the sewage and stormwater moving, inverted siphons in the sewer system are a smaller diameter pipe than those connecting to it on either side. The smaller diameter speeds up the passage of sewage and stormwater pass through the pipe to keep solids moving and avoid clogs.



#### Location of construction activities

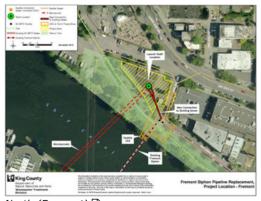
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In early design phase, project teams conducted surveys and field investigations to refine plans for facility location, configuration, and construction. On the Fremont Siphon project, this work was carried out in 2011 and early 2012.

In the planning phase, the project team proposed to focus trenchless construction staging on King County's property in Queen Anne. During early design, the team determined that constructability, technical and access considerations required trenchless construction staging to be located on the Fremont side. The Queen Anne site will be used for the microtunnel retrieval pit and staging for work to connect the new siphon to the existing sewer.

On the Fremont side, the possible locations of the new siphon facilities were limited to the Fremont Canal Park or the property located at 2nd Avenue Northwest and Northwest 36th Street due to hydraulic constraints. After reviewing the full range of community considerations and project requirements, King County Wastewater Treatment Division is moving forward with the project team's proposal to site major construction activities and permanent structures on private property in Fremont. This recommendation followed careful consideration, including evaluation of a range of factors by a multidisciplinary team and management review. King County completed environmental review of the recommended proposal (refer to <u>library page</u>) under the State Environmental Policy Act (SEPA) in Summer 2012.

Some work occurred in Fremont Canal Park to reconfigure the City of Seattle's CSO outfall. Limited and temporary detours of the Burke-Gilman and Ship Canal trails were required for work in Fremont and Queen Anne, respectively.



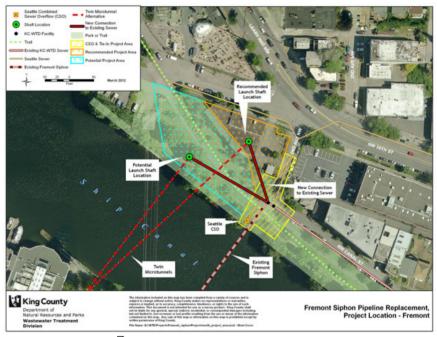
<u>North (Fremont)</u> 🖪



<u>South (Queen Anne)</u> 🖪

#### Fremont project area

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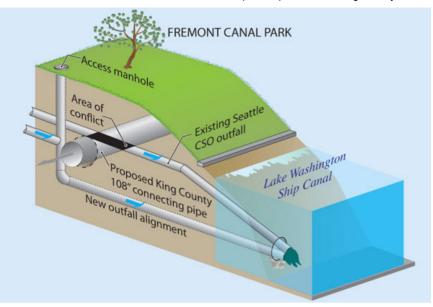
Fremont project area

# **New structures in Fremont**

New above-ground and at-grade structures are needed for this project. During the planning phase, the community expressed concerns about odor from King County's existing sewer system in Fremont. After monitoring and analysis, the project includes odor control for the existing and new system. A new odor control facility includes an above-ground structure.

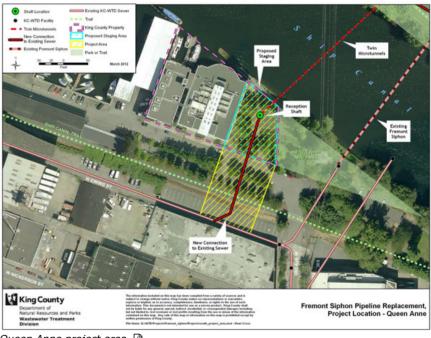
Operations and maintenance crews will also need access to the new siphon pipelines. Concrete slabs and manholes at the surface are needed to provide access for inspections and maintenance.

# **Replacement and reconfiguration of the City of Seattle's CSO outfall**



King County worked closely with the City of Seattle on replacement and reconfiguration of one of the city's CSO outfalls. This outfall extended under the Fremont Canal Park to the Ship Canal and was in direct conflict with the proposed location of the new siphon. The possible locations for the siphon were limited due to hydraulic constraints. To eliminate pipeline conflicts, King County installed a new outfall adjacent to the existing outfall. The discharge point and capacity of the new outfall remained the same. The outfall installation required excavation in Fremont Canal Park and work in the Ship Canal, outside of the navigational channel. Learn more about the <u>City</u> of Seattle's CSO system and CSO reduction program C<sup>\*</sup>.

#### Queen Anne project area



Queen Anne project area

# New structures in Queen Anne

Operations and maintenance crews will need access to the new siphon pipelines. Concrete slabs and manholes at the surface are needed to provide access for inspections and maintenance to the new siphon and its connections to the existing pipeline. To limit impacts, King County located most new structures on the King County owned property, however, there may also be new manholes in the street right-of-way.

#### Constructing the new siphon lines

King County replacef the existing Fremont Siphon with a new crossing under the Lake Washington Ship Canal. Two *microtunnels* were constructed west of the existing siphon and connected to the North Interceptor conveyance pipelines on the north and south sides of the canal. The new siphon pipes were designed to operate with the same capacity as the existing system. A new odor control facility was built on the Fremont side of the Ship Canal. The county retained the existing space in the Fremont Tunnel for Wastewater Treatment Division uses.

King County constructed a microtunneling receiving pit on the county's property adjacent to the King County Environmental Laboratory at 322 West Ewing Street. A launch pit was constructed on the Fremont side of the Ship Canal.

Connections of the new siphon to the existing North Interceptor conveyance pipes required work in the streets in both Fremont and Queen Anne. Both the Burke Gilman Trail and the Ship Canal Trail were affected during construction.

#### How microtunneling works

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. This method allows installation of pipes without having to excavate an open trench in difficult locations like Ship Canal.

Two excavated shafts were needed to launch the microtunnel machine at the beginning, and to retrieve it when tunneling was complete. The highest level of construction activity was at the launch pit, where pipe sections were added and soils were conveyed from the tunnel for processing. Truck traffic was heavier at this location than at the retrieval pit.

#### Site restoration and mitigation

King County Wastewater Treatment Division knows that communities are concerned about how their streets, trails, and parks will be restored after a construction project is completed. The Fremont Siphon Replacement Project was carried out in densely populated urban neighborhoods in Fremont and Queen Anne where parking, park space, and trail access are highly valued. As the project team conducted public outreach, we heard the community's concerns about restoration.

The project team has completed assessments of existing site conditions, including property surveys, soil and groundwater conditions, roads and trails, existing utilities, and tree surveys within the project areas in both Queen Anne and Fremont.

# **Restoring green spaces**

Project staff worked closely with agencies and jurisdictions on restoration conditions for the affected project areas (see map below). A tree survey was completed in the project areas and a certified arborist evaluated the trees for health and potential for transplantation.

Twenty-five trees in Fremont and 21 trees in Queen Anne were removed for this project. Trees were replaced during site restoration and the team selected replacement tree species taking into consideration stormwater management functions, habitat, and aesthetics.

# **Environmental mitigation**

As part of the project, King County improved vegetation along the Ship Canal in Queen Anne to mitigate the in-water work to replace the City's CSO outfall. The project removed invasive ivy and replaced it with native vegetation that provides ground cover and overhangs the waterway (see "mitigation area" in map). The project team selected native vegetation that benefits local wildlife and provides erosion control.

## Stormwater management

King County followed city requirements to mitigate impervious surfaces on site. Requirements were met by landscaping features that included bioretention swales, rain gardens, trees, or other measures.

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Restoration and mitigation areas



Fremont Canal Park



Burke-Gilman Trail



A rain garden in Ballard



Native vegetation (salal)

## **Community meetings and events**

#### June 18, 2017 - Community celebration and ribbon cutting

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Saturday, June 18, 2017 11:00 a.m. – 3:00 p.m. Fremont Siphon Odor Control Facility 215 Northwest 36th Street, Seattle

#### Community celebration and ribbon cutting

The facility ribbon cutting ceremony begins at 11:30 a.m.

During the Fremont Fair, bring your friends and family by the north project site to:

- Take a tour of the building and rain gardens
- See and learn about project art
- Speak with project staff

Public Art at King County wastewater treatment facilities

<u>View postcard</u>  $\square$  and <u>news release</u>.

#### February 22, 2016 - Fremont Neighborhood Council briefing

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Monday, February 22, 2016

#### Fremont Neighborhood Council briefing

Handouts/presentations and additional information

- Presentation
- <u>Summary</u>

#### February 16, 2016 - Meet SWIZY the new microtunneling machine

Tuesday, February 16, 2016 11:30 a.m.-1:30 p.m. Fremont Canal Park 2nd Avenue Northwest and Northwest Canal Street, Seattle

King County's Fremont Siphon Replacement Project team invites you to meet SWIZY the new microtunneling machine about to begin work installing the new Fremont siphons under the Ship Canal.

- See the machine up close
- Learn how it works
- Ask the project team questions
- Help decorate SWIZY before it goes to work

Handouts/presentations and additional information

- Event postcard
- Fact sheet: meet SWIZY the microtunnelling machine

March 4, 2015 - Briefing at Seattle Pa	<u>acific University</u>
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Wednesday, March 4, 2015 Seattle Pacific University

#### Briefing at Seattle Pacific University

Handouts/presentations and additional information

<u>Presentation</u>

#### March 2, 2015 - Community meeting

Monday, March 2, 2015 6–8:00 p.m. Fremont Library 731 North 35th Street, Seattle

**Community meeting.** Join King County's project team and contractor at the public meeting for the Fremont Siphon Replacement Project.

Handouts/presentations and additional information

- Meeting postcard
- Attend <u>online open house</u>
- <u>Presentation</u>
- <u>Meeting summary</u>

#### June 21 & 22, 2014 - Fremont Fair

#### 2014 Fremont Fair

Saturday and Sunday June 21–22, 2014

Visit our booth at the Fremont Fair June 21 and 22! Talk to staff about the Fremont Siphon Replacement Project and learn how you can help protect water quality by being "stewards of the sewers."

#### <u> June 11, 2014 - Briefing</u>

June 11, 2014 Seattle Pacific University Standing Advisory Committee

#### Briefings for community groups and organizations

King County's project team provided an update on the project.

Seattle Pacific University Standing Advisory Committee presentation 
 ☐ , June 11, 2014

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#### November 26, 2013 - Briefing

November 26, 2013 - North Seattle Industrial Association

#### Briefings for community groups and organizations

King County's project team provided presentations similar to the November 20 community meeting to community groups and organizations, and project neighbors.

• North Seattle Industrial Association briefing summary, November 26, 2013

#### November 25, 2013 - Briefing

November 25, 2013 - Fremont Neighborhood Council

#### Briefings for community groups and organizations

King County's project team provided presentations similar to the November 20 community meeting to community groups and organizations, and project neighbors.

• Fremont Neighborhood Council briefing summary, November 25, 2013

#### November 20, 2013 - Community meeting

Wednesday, November 20, 2013 6–7:30 p.m. Presentation at 6 p.m. Fremont Abbey Arts Center 4272 Fremont Ave North Seattle, WA 98103

**Community meeting.** You are invited to a presentation and discussion with the project team on November 20 to:

- Learn about the project final design, including construction areas, activities and traffic impacts in Fremont and Queen Anne
- Learn about what to expect during construction
- View the final design for the Fremont site and new odor control building
- View the public art design concept for the Fremont site and meet the artist

Handouts/presentations and additional information

- Meeting postcard
- <u>Agenda</u>
- <u>Comment form</u>
- News release
- Presentation
- Public art presentation
- <u>Seattle Public Utilities presentation</u>
- Meeting summary

#### June 22-23, 2013 - Fremont Fair

#### 2013 Fremont Fair

Saturday and Sunday June 22–23, 2013

Visit us at the Fremont Fair June 22 and 23! Get a virtual sewer pipe tour and learn how King County inspects over 350 miles of pipes with sewer camera robots and our closed circuit television (CCTV) sewer inspection truck. Talk to staff about the Fremont Siphon Replacement Project and learn how you can help protect water quality by being "stewards of the sewers."

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#### March 26, 2013 - Open house

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Tuesday, March 26, 2013 5:30–7:30 p.m. Fremont Public Library 731 North 35th Street, Seattle, WA 98103

**Open house.** You are invited to an open house to review design options for the facility site in Fremont.

Handouts/presentations and additional information

- <u>Meeting postcard</u>
- News release
- <u>Revised Fremont site plan</u>
- <u>Community input and how King County responded</u>
- <u>Site views</u>
- Design option: modern and northwest coastal
- Design option: historic and northwest forest
- <u>4Culture update on public art</u>
- <u>Comment form</u>
- Meeting (open house) summary

#### March 21, 2013 - Booth at "Cheers to Chambers" event

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Thursday, March 21, 2013 4:30–6:30 p.m. Emmanuel Bible Church, 503 North 50th Street, Seattle

Visit our booth at the Fremont Chamber of Commerce's "Cheers to Chambers" event on Thursday, March 21! Learn more about the project and talk with project staff.

#### January 12, 2013 - Design workshop

Saturday, January 12, 2013 10 a.m.-2 p.m. B.F. Day Elementary 3921 Linden Ave. North Seattle, WA 98103

You are invited to a design workshop to work with the project team and your neighbors to develop a landscape and architecture vision for the Fremont Siphon facility site.

At this workshop you can:

- Learn how the site will be used, and site constraints
- Discuss community values and vision for the site

- · Provide your input on flexible elements of design
- Learn about the public art process
- Hear about next steps

#### Handouts/presentations and additional information

- Meeting postcard
- <u>Agenda</u>
- Project newsletter, Winter 2013
- Presentation
- 4Culture presentation on public art
- <u>Summary</u>
- Current Fremont site plan
- Flexible design elements:
  - <u>Lighting</u>
  - Fencing and northwest corner
  - Vegetation and views
  - Building and odor control stacks
- Comment form

#### November 13, 2012 - Community meeting

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Tuesday, November 13, 2012 5:30 p.m. open house, 6 p.m. presentation Fremont Abbey Arts Center 4272 Fremont Ave. N. Seattle, WA 98103

King County's project team invites you to a community meeting to hear an update on the Fremont Siphon Replacement Project. At this meeting you will hear updates on:

- Update on project activities and facility design
- Restoration plans for affected street and park areas
- Next steps in project design
- Opportunities to participate

Handouts/presentations and additional information

- <u>Meeting postcard</u>
- News release
- <u>Agenda</u>
- Presentation
- <u>Summary</u> (updated January 2013)
- <u>Project area</u>

#### June 16-17, 2012 - Fremont Fair

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2012 Fremont Fair Saturday and Sunday June 16–17, 2012

Visit King County's sewer inspection truck at the Fremont Fair!



#### May-June 2012 - Briefings for community groups and organizations

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May 3, 2012 – King County Environmental Laboratory May 7, 2012 – Seattle Pacific University staff May 29, 2012 – Seattle Pacific University Standing Advisory Committee June 4, 2012 – Lake Union District Council June 25, 2012 – Fremont Neighborhood Council

#### Briefings for community groups and organizations.

King County's project team provided presentations similar to the May 15 community meeting to community groups, organizations, and project neighbors.

- Fremont Neighborhood Council briefing summary, June 25, 2012
- Lake Union District Council briefing summary, June 4, 2012
- <u>Seattle Pacific University Major Institution Master Plan, Standing Advisory Committee,</u> <u>briefing summary</u>, May 29, 2012
- King County Environmental Labs, briefing summary, May 3, 2012

#### April 18-19, 2012 - Briefings for community groups and organizations

April 18, 2012 – Seattle Public Utilities April 19, 2012 – Seattle Parks and Recreation April 19, 2012 – Seattle Department of Transportation

#### Briefings for agencies

The project team previewed the presentation prepared for the May 15 community meeting to agency stakeholders.

#### May 15, 2012 - Community meeting

Tuesday, May 15, 2012 6 p.m. open house 6:30 p.m. presentation Fremont Public Library, 731 N. 35th Street, Seattle

#### Project community meeting

Handouts/presentations and additional information

- Meeting postcard
- Project newsletter, Spring 2012
- <u>Agenda</u>
- Presentation
- <u>Summary</u>
- Project timeline
- Project area
- <u>Project overview</u>
- Odor control
- <u>City of Seattle's CSO outfall replacement</u>
- <u>Restoration</u>

#### June 18-19, 2011 - Fremont Fair

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2011 Fremont Fair Saturday and Sunday June 18–19, 2011

Visit King County's sewer inspection truck at the Fremont Fair!

- Swing by to tour the CCTV truck and learn how to be a steward of the sewers!
- Talk to us about King County's Fremont Siphon Project, which will replace a 100-year old wastewater conveyance line under the Lake Washington Ship Canal.

#### Nov 30, 2010 - Community meeting

#### **Community meeting**

Tuesday, November 30, 2010 6–7:30 p.m. Fremont Library 731 N. 35th St., Seattle

Project community meeting: presenting Fremont Siphon Project proposals.

Handouts/presentations and additional information

- News release: public invited to hear plans to upgrade the Fremont Siphon
- Agenda
- Presentation (6MB)
- Meeting summary
- · Maps of alternatives
  - Fremont Siphon pipeline replacement, microtunnel crossings (Alternate 1)
  - Fremont Siphon pipeline replacement, large tunnel crossing (Alternate 3)
  - Rehabilitation in place, with no bypass (Alternate 7)
  - Fremont Siphon pipeline replacement in existing tunnel (Alternate 10)

## **Project library**

### Project updates

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- Postcard: Community celebration and ribbon cutting, June 18, 2017
- Major construction activities complete project art on the way! May 25, 2017
- Ship Canal Trail closed Jan. 19 and 20 for repaving, January 18, 2017
- Week of January 9: Paving and restoration on W. Ewing St., January 6, 2017
- Week of Dec. 19: Burke-Gilman trail detour, paving on 2nd Ave N.W. and N.W. Canal St, December 15, 2016
- <u>W. Ewing St. and Ship Canal Trail closed occasionally during week of Oct. 24</u>, October 20, 2016
- West Ewing Alley closed for shoring removal on October 10, October 6, 2016
- Night work at Fremont site on October 5 expect crews and lights onsite, October 3, 2016
- <u>Crews finish Queen Anne connection structure West Ewing Alley reopens week of Oct. 3</u>, September 30, 2016
- Project update, August 22, 2016
- Project update, August 11, 2016
- No alley access from 2nd Avenue Northwest beginning Monday, April 11, April 7, 2016
- West Ewing Alley closed between 3rd Avenue West and 6th Avenue West until fall, March 16, 2016
- <u>Corner of 2nd Avenue Northwest and Northwest Canal Street closes March 14 through the</u> <u>fall</u>, March 10, 2016
- Corner of 2nd Avenue Northwest and Northwest Canal Street close, February 29, 2016
- <u>Meet SWIZY the Fremont Siphon Replacement Project's microtunneling machine!</u>, February 9, 2016
- <u>2nd Avenue Northwest closed as crews continue work on city of Seattle CSO pipe</u>, October 22, 2015
- <u>Burke-Gilman Trail detour shifts south</u>, October 15, 2015
- <u>2nd Avenue Northwest reopens as pipe work continues in Fremont Canal Park</u>, September 9, 2015
- West Ewing Alley and Ship Canal Trail close the week of July 20 as pipe installation begins, July 17, 2015
- Burke-Gilman Trail detour begins week of July 6, July 1, 2015
- Tunnel shaft construction starts at the Queen Anne site, June 25, 2015
- <u>Queen Anne site project update</u>, May 11, 2015
- Fremont site project update, May 11, 2015
- Project update, April 6, 2015
- <u>Project newsletter: construction starts to replace one of the region's busiest sewer pipes</u>, Spring 2015
- Praxair building demolition starts week of March 16, 2015, March 13, 2015
- Public meeting: Mar. 2, 2015, 6–8 p.m. View postcard.
- Public meeting: Nov. 20, 2013, 6-7:30 p.m., presentation at 6 p.m. View postcard.
- Project newsletter: King County finalizing design for the new Fremont Siphon, Spring 2013
- <u>Project newsletter: King County invites community to design workshop for Fremont Siphon</u>, Winter 2013
- <u>Project map</u>, updated November 2012
- <u>Public meeting</u>: Nov. 13, 2012, 6 p.m. open house, 6:30 p.m. presentation.
- <u>Utility investigations in your neighborhood beginning September 13, 2012</u>
- Project newsletter: King County begins designing the new Fremont Siphon, Spring 2012

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- <u>Project newsletter: King County recommends replacement of the Fremont Siphon</u>, Summer 2011
- Sewer system maintenance in your neighborhood the week of July 18, July 18, 2011
- Fremont Siphon Project public outreach summary, Spring 2011
- Project map (Alternative 1), April 2011
- <u>Public meeting</u>: Nov. 30, 2010, 6–7:30 p.m.
  Presenting Fremont Siphon Project proposals. View <u>meeting materials on the project</u> <u>meeting calendar page</u>.
- Project newsletter: King County proposes projects to update the Fremont Siphon, Fall 2010
- Project update: soil sample drilling in your neighborhood, Summer 2010

#### Fact sheets

- Meet SWIZY the microtunnelling machine, February 2015
- Project overview, updated October 2013
- Construction overview, updated October 2013
- Odor control, updated October 2013
- City of Seattle's CSO outfall replacement, updated October 2013
- Restoration, updated November 2013
- Working with communities, October 2013

#### **Environmental documents**

• DNS and environmental checklist (3.1MB) issued August 2, 2012



Last Updated November 1, 2019