

DSN031-CON-1 (KC) or MEBI-Han-Rain-BV-KC-CONV/STOR

Alternative DSN031-CON-1 (KC) controls King County's Hanford@Rainier and Bayview North CSOs by installing new conveyance pipe from the Bayview North Overflow Structure to the Bayview Tunnel¹ and building a storage tank near the Hanford@Rainier Overflow Structure. This alternative is an independent alternative and only controls King County CSOs.

Design Criteria

- Hanford@Rainier
 - King County Storage Volume Requirement: 0.343 MG
 - King County CSO Peak Flow Rate for Sizing Conveyance to Storage: 9.6 MGD
 - Storage tank is required to drain within 12 hours of event.
- Bayview North
 - King County CSO Peak Flow Rate for Sizing Conveyance to Bayview Tunnel: 55.5 MGD

Description

Alternative DSN031-CON-1 (KC) consists of a conveyance pipe and storage tank to control King County Hanford@Rainier and Bayview North CSOs. A CSO control volume of approximately 0.343 MG at Hanford@Rainier and conveyance from Bayview North Overflow Structure to the Bayview Tunnel are required to reduce overflows at the Hanford #1 CSO Outfall to an average of one untreated discharge per year. Storage could be provided with an offline storage tank located within or adjacent to the approximate boundary shown in Figure G.4-3. See Section 6.1 Planning-Level Sizing Assumptions for criteria and assumptions used in establishing the approximate boundary.

The main components of this alternative would include:

- Hanford@Rainier
 - 0.343-MG offline storage tank with pumps to empty the storage tank.
 - Facilities building(s) to house electrical/control/odor control equipment and a standby generator.
 - Modifications to the Hanford@Rainier Overflow Structure.
 - Up to approximately 660 ft of 8-inch-diameter force main, depending on the location selected for the offline storage tank within or adjacent to the approximate boundary shown in Figure G.4-3.
 - Up to approximately 1,320 ft of 27-inch-diameter influent gravity sewer, depending on the location selected for the offline storage tank within or adjacent to the approximate boundary shown in Figure G.4-3.
- Bayview North

¹ Hydraulic modeling determined that the tunnel is currently not fully utilized and has available capacity.

- Conveyance from Bayview North Overflow Structure to Bayview Tunnel
 - Approximately 50 ft of dual 30-inch-diameter conveyance pipes (100 ft total) as shown in Figure G.4-3.
 - Approximately 510 ft of 48-inch-diameter conveyance pipe as shown in Figure G.4-3. Approximately 380 ft of the 48-inch-diameter conveyance pipe is within a 72-inch-diameter casing installed by microtunnelling due to the excavation depths.
- Modifications to the existing Bayview North Overflow Structure.
- Connection to the Bayview Tunnel.

Storage Tank

The CSO control volume for King County could be stored in a buried, rectangular structure, approximately 100 feet long and 40 feet wide with a sidewater depth of approximately 20 feet.

Flows would enter the storage tank during a wet-weather event. The tank may be configured with multiple chambers, so that only those chambers required to store the volume of the wet-weather event would be used. Storage of flows would start in the first chamber and as that chamber fills and reaches capacity, flows would be transferred into subsequent chambers until either the wet-weather event ends or the capacity of the storage tank is reached. Each chamber would contain equipment for flushing and self-cleaning, and only chambers used in a wet-weather event would require flushing. Control of odors and sediment in the storage chambers may require regularly-scheduled cleaning between events.

Facilities Building(s)

Facilities building(s) would be located above or below ground level and would contain an odor control system, electrical controls, and a standby generator. The actual contents of the building(s) will be determined during preferred alternative development. The representative footprint shown in Figure G.4-3 for this alternative locates the facilities buildings adjacent to the storage tank for conservative purposes; however, the facilities buildings could be located above the storage tank to minimize space requirements.

Flow Diversion and Discharge

One regulator station will be required to divert King County flows (Hanford@Rainier CSOs) from the Hanford@Rainier Overflow Structure to the storage tank. For this planning phase, it is assumed that the diversion would occur just upstream of the Hanford@Rainier Overflow Structure. Evaluation of whether flows can be diverted further upstream of the overflow structure will be completed during preferred alternative development. Diverted King County flow would discharge to the location of the storage tank via a 27-inch-diameter influent gravity sewer. The length of the influent gravity sewer will vary depending on the selected location of the offline storage tank, which will be evaluated during preferred alternative development. The influent gravity sewer can be up to 1,320 feet long based on the criteria and assumptions listed in Section 6.1.

After a wet-weather event, the chambers inside the storage tank would drain to a common sump. Submersible pump(s) would transfer stored sewage from the sump back into the King County Hanford Trunk through an 8-inch-diameter force main that is up to approximately 660 feet in

length. The length of the force main will vary depending on the selected location of the offline storage tank, which will be evaluated during preferred alternative development.

Conveyance Upgrade

One regulator station will be required to divert King County flows (Bayview North CSOs) from the Bayview North Overflow Structure to the Bayview Tunnel. For this planning phase, it is assumed that the diversion would occur just upstream of the Bayview North Overflow Structure. Evaluation of whether flows can be diverted further upstream of the overflow structure will be completed during preferred alternative development. Diverted King County flow would discharge to the Bayview Tunnel via approximately 560 ft of conveyance pipe. Hydraulic modeling determined that the tunnel is currently not fully utilized and has available capacity. This conveyance upgrade increases flows to the Hanford and Lander Street Regulator Stations. Additional modeling will be required to determine the impact of the increased flows to the downstream regulator stations and proposed CSO control facilities. For this planning stage, it is assumed that the increased flows from the Bayview North Overflow Structure would minimally impact the size of the proposed CSO control facilities for the Hanford and Lander Street Regulator Stations.

A drop structure will be required at the upstream end of the conveyance pipe, immediately adjacent to the Bayview North Overflow Structure. This drop structure is required to lower the invert elevation of the conveyance pipe, so that: (1) the water surface elevation at full flow in the sewer is lower than the existing overflow weir elevation in the overflow structure, and (2) the pipe can cross under the existing 96-inch-diameter storm drain, which is located approximately 35 feet west of the Bayview North Overflow Structure. This drop structure will allow the capacity of the new conveyance pipe to be fully utilized as well as allow the conveyance pipe to cross under the existing storm drain.

In addition to the drop structure, approximately 50 ft of dual 30-inch-diameter pipes (100 ft total in length) are required to cross under the existing storm drain. Smaller diameter pipes are required to provide adequate clearance between the new pipes and existing storm drain. The dual 30-inch-diameter pipes would convey flows to approximately 510 ft of 48-inch-diameter pipe, which connects to the Bayview Tunnel. Approximately 380 ft of the 48-inch-diameter conveyance pipe is within a 72-inch-diameter casing installed by microtunneling due to excavation depths.

King County has identified an abandoned 48-inch-diameter private sewer located underneath Bartell Drugs, located on the northwest corner of the South Bayview Street and Rainier Avenue South intersection. It appears that this pipe was previously the trunk line between the Bayview North Overflow Structure and the Bayview Tunnel but was abandoned when the 96-inch-diameter storm drain was installed in Rainier Avenue South. It may be possible to use this existing 48-inch-diameter private sewer to convey flows from the Bayview North Overflow Structure to the Bayview Tunnel instead of installing the new conveyance pipe. Further evaluation of the pipe condition and ownership disposition is required before a decision can be made regarding the use of this existing pipe.

Construction Assumptions

King County's Tabula cost estimating program was used to develop a Class 5 estimate for this alternative. The attached documentation lists the construction assumptions used.