Final Alternatives - N-13a: Joint SPU/King County Storage Upstream of the Fremont Siphon - In-Line Storage in Right of Way

Design Criteria

- SPU Storage Volume requirements: 1.931 MG (NPDES147 Basin), 0.93 MG (NPDES174 Basin), and 0.185 MG (NPDES060 Basin)
- King County Storage Volume Requirements: 4.18 MG (3rd Avenue West Regulator)
- Peak Flows: 15.0 MGD (NPDES147 Basin), 7.5 MGD (NPDES174 Basin), and 29.3 MGD (3rd Avenue West Regulator)
- Average dry weather flows will require continuous pumping to convey flows to the King County system

Description

Alternative N-13 consists of distributed or joint combined sewer overflow (CSO) storage upstream of the Fremont Siphon for SPU NPDES147 and NPDES174 Basins and the King County 3rd Avenue West Regulator. Based on the draft 2010 CSO Reduction Plan, a CSO control volume of 2.86 MG is required to reduce overflows at NPDES147 and NPDES174 Outfalls to an average of one untreated overflow per year. A total maximum storage volume of 7.226 MG is required to control all three outfalls. In-line storage for a portion of this volume could be provided with an in-line storage tunnel and effluent pump station. This would consist of a storage tunnel from the undeveloped commercial property at the intersection of North 40th Street and Stone Way North, located in the middle of NPDES147 Basin to the private commercial property located at North 34th Street and Stone Way North. A layout of the alternative is shown on the attached figure.

The main components of this alternative would include:

- 7.226 MG In-line storage tunnel, 22foot-diameter, 2,560 feet
- 14.45 MGD effluent pump station
- Two diversion structures
- Approximately 250 feet of force main
- Approximately 1,150 feet of gravity conveyance pipes

Storage Tunnel

The control volume for NPDES147 and NPDES174 Basins and the 3rd Avenue West Regulator could be stored in a 22foot-diameter, 2,560 feet long tunnel at a slope of 0.001 ft/ft.

The tunnel boring machine (TBM) would launch from private property at North 34th Street and Stone Way North and bore north towards the undeveloped commercial property at the intersection of North 40th Street and Stone Way North. Typical tunnel design standards require one to two and half times the tunnel diameter of soil/ground cover depending on the type of material being tunneled through. For this phase of alternative development, approximately 2.5 times is assumed. Further research and exploration of the geotechnical conditions may allow the tunnel to have less cover and will be determined during preferred alternative development.

The tunnel would be an in-line facility with flows from the upper part of NPDES147 Basin permanently routed to the tunnel. This would require that the effluent pump station be

designed for continuous operation. Flows from the lower portion of NPDES147 Basin would be directed to the tunnel during a storm event. Since the tunnel is deeper than the surrounding existing sewer facilities, all flows that enter the tunnel will need to be pumped to the King County North Interceptor.

Facilities Building

An above grade facilities building would be located on private property at North 34th Street and Stone Way North. These facilities would contain an odor control system, electrical controls, and a stand-by power generator for the tunnel and associated effluent pump station. The actual contents of the building will be determined during preferred alternative development.

Flow Diversion and Discharge

Diverting flows to the beginning of the storage tunnel would require reconfiguring the surrounding combined sewer. Four new structures would divert SPU flow from the upper portion of NPDES147 Basin to the inlet of the tunnel. These structures would be located along Bridge Way North at Woodland Park Avenue North, Midvale Avenue North, and Stone Way North, with one structure on undeveloped commercial property to pick up the sewer flows that bisect the property. Based on flow monitoring data from meters located at Stone Way North and North 40th Street and at NPDES147 Outfall, this gravity diversion would capture approximately 40 percent of the NPDES147 Basin flow.

Flow that enters NPDES147 Basin south of Bridge Way North would be collected by a diversion structure located just upstream of NPDES147 Outfall. From the diversion structure, approximately 250 feet of gravity pipe would carry flow to the downstream end of the storage tunnel located on private property at Stone Way North and North 34th Street.

Since the storage tunnel is located in NPDES147 Basin and is upstream of NPDES174 Outfall, flows from NPDES174 Basin would not be diverted to the storage tunnel. It is assumed that diverting and storing sufficient flow from NPDES147 Basin will allow NPDES174 Basin flows to enter the interceptor that would otherwise overflow to NPDES174 Outfall. This will be confirmed during modeling and the next phase of alternative development.

Construction Assumptions

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