Bull Run TREATMENT PROJECTS | Filtration

Technical Memorandum

Subject:	Potential Discharges to Johnson Creek
PWB Project #s:	W02229
Stantec Project #:	2002006066
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Stantec | in association with carollo and other firms

Exhibit A.57

Introduction

The Filtration Facility being developed as part of the Bull Run Treatment Project will be located in eastern Multnomah County, near the headwaters of Johnson Creek. The treatment process is designed to be "zero liquid discharge" (ZLD) – all waste streams are treated so that concentrated solids are trucked off site, and liquid streams are recycled to the head of the plant. Two overflow/recycle basins are provided so that plant overflows or water drained from basins during maintenance operations is captured and returned to the head of the plant. Therefore, the only discharge to Johnson Creek will be stormwater from the site, which will not exceed pre-development flows of stormwater from the site.

The overall stormwater management plan consists of facilities designed to collect, detain, and treat stormwater at the proposed project site, in accordance with applicable codes and regulations. A *Stormwater Drainage Report* has been prepared documenting details of the design storm and the proposed stormwater collection, conveyance and storage facilities.

The design has also considered potential impacts to Johnson Creek due to:

- Accidents and emergency operations
- Structural failure of basins or storage tanks

As described below, Portland Water Bureau and the design team have made significant efforts to avoid or mitigate any potential risks to Johnson Creek water quality and habitat.

Accidents and Emergency Operations

The design of the Filtration Facility includes measures to prevent any potential impacts on Johnson Creek from operation and maintenance activities at the Filtration Facility.

- All chemical handling and storage facilities include secondary containment, with provisions to safely remove spilled chemicals by pumping them into a truck for off-site disposal. Secondary containment areas are designed to hold, at a minimum, the full volume of the largest storage tank within the area plus additional volume for fire sprinklers.
- Chemical loading bays include collection and monitoring features allowing any chemicals spilled during delivery to be contained so they can be removed and disposed off-site.
- The drinking water treatment process has been designed as a closed system, with all waste streams recycled – there are no flows from the treatment process discharged to the environment. Solids removed from the water by sedimentation and filtration are dewatered to produce a dry, solid cake that is trucked off-site.

Equipment failure or other adverse events could cause overflows of untreated, partially treated, or fully treated drinking water to two large overflow basins with a combined capacity of 13.5 million gallons. This capacity is sufficient to contain over two hours of the maximum potential inflow (135 MGD) to the Filtration Facility, allowing sufficient time to detect and correct the cause of the overflow under all scenarios identified as reasonably possible by design and operations staff. The largest potential overflow volume would occur if the Water Bureau was unable to fully close a valve at the Bull Run Headworks. In this case, untreated water would be diverted to the overflow basins at the head of the plant, prior to any chemical addition.

Structural Failure

Structural failure of water-retaining basins or chemical storage tanks pose potential environmental risks, which have been mitigated by the design of the Filtration Facility. To provide reliable and resilient water service to Bureau customers, all structures will exceed current seismic codes, and be designed for immediate occupation following a seismic event. While minor leaks at joints are probable following a major seismic event, the robust design will minimize the risk of catastrophic failure of basins or tanks. Furthermore, all basins on the main process are buried, so even significant leaks would not release water directly into the environment — in particular, the finished water storage facilities, which contain chlorinated water, are completely below-grade. Soil composition on the site is primarily low-permeability clay, so transport of water leaking from basins to Johnson Creek would be very limited even following a major seismic event.

Chemical storage tank specifications require designs and anchorage that consider anticipated seismic forces, reducing the risk of chemical release. If a tank does leak, all chemical storage facilities have secondary containment areas as described above.

Conclusion

The Filtration Facility has been designed to prevent off-site discharges, including discharges that reach Johnson Creek. These design features include a ZLD treatment process, large overflow/recycle basins to address accidents and emergency operations, and a highly seismic-resistant design. The resulting Filtration Facility design, along with the stormwater management system described in the *Stormwater Drainage Report*, therefore maintains the current stormwater quality and quantity leaving the project site and will protect Johnson Creek's water quality and habitat.