

Reducing Construction Impacts

A key advantage of trenchless methods of pipeline installation, including HDD, is that construction impacts are limited to the vicinity of the entry and exit points. The Partnership has taken steps to anticipate and address potential impacts at these locations.

Staging Areas: The areas around the entry and exit points will be fenced to assure security, and screened from neighbors' views.

Street cleaning and debris: The project contractors will be required to maintain a safe and clean work environment and comply with erosion control ordinances that mandate keeping streets and sidewalks free of sediment, dirt and debris.

Work hours: Standard work hours in West Linn will be 7:00 a.m. to 7:00 p.m. on weekdays, and 9:00 a.m. to 5:00 p.m. Saturdays. Work hours in Gladstone will be 7:00 a.m. to 6:00 p.m. on weekdays, and 9:00 a.m. to 6:00 p.m. on Saturdays for HDD. No work is anticipated on Sundays or holidays. During pipe pullback, work hours will be 24 hours per day for a few days. This work will be permitted separately to secure local approval and nearby neighbors will be relocated if they like.

Traffic and parking: A Traffic Control Plan will designate truck routes, detours, temporary parking, signs and safety measures for pedestrians and cyclists. Access will be maintained for residents and emergency vehicles at all times.

Noise control: A Noise Mitigation Plan establishes measures to be taken at the work site, including equipment selection, installation of sound barriers, and timing of noise generating activity during construction.

Learn More

A 3D animation of the HDD construction method can be viewed on YouTube <http://www.youtube.com/watch?v=ufYMGHa0d18>.

For questions about project costs, savings and rate impacts contact:



Joel Komarek, P.E.
Project Director
City of Lake Oswego
jkomarek@ci.oswego.or.us
503-697-6588



Dennis Koellermeier
Project Director
City of Tigard
dennis@tigard-or.gov
503-718-2596



lotigardwater.org • 503-697-6502
lotwater@ci.oswego.or.us • @lotwater

For more information about the Lake Oswego Tigard Water Partnership visit lotigardwater.org or contact:



Katy Fulton
Citizen Information Specialist
City of Lake Oswego
kfulton@ci.oswego.or.us
503-697-6502



Horizontal Directional Drilling

Lake Oswego Tigard Water Partnership

The cities of Lake Oswego and Tigard have formed a partnership to share drinking water resources. The Partnership is expanding Lake Oswego's existing drinking water infrastructure to serve both communities. The new water system upgrades and expands these aging facilities to serve both communities. Lake Oswego has a cost-sharing partner for the needed upgrades and joint operations. For the first time, Tigard will own its own water supply.

Construction is underway for Lake Oswego's and Tigard's new water system. There is progress on new facilities in Gladstone, West Linn, Lake Oswego and Tigard. High quality drinking water is scheduled to be delivered to homes and businesses in 2016.

New Construction

The project includes construction of new drinking water pipelines. One pipeline will carry untreated water from the Clackamas River source, under the Willamette River, to the water treatment plant in West Linn. Another pipeline will convey treated, drinking water from the treatment facility to reservoirs in Lake Oswego where it will be distributed to customers in both communities. These major pipelines will be earthquake resilient. The pipeline that crosses under the Willamette River will be constructed using a horizontal directional drilling (HDD) method that will keep most construction activity below ground.



The Lake Oswego Tigard Water Partnership will use horizontal directional drilling (HDD) to construct a new pipeline beneath the Willamette River.

What is HDD?

Horizontal directional drilling is a steerable, trenchless method for installing pipes. The pipe is pulled through a hole drilled underground, eliminating the need for open ditches that cause traffic disruptions and minimizing environmental impacts. This method is used for crossing rivers, busy intersections, congested urban settings, and sensitive environmental areas such as wetlands.

Directional drilling is not new. The technology was developed in the United States in the early 1970s. HDD is now being used on a global scale for a variety of jobs and soil conditions, for pipeline lengths up to 2 miles and pipeline diameters up to 56 inches.

Recent innovations include improved steering, with highly accurate guidance systems that improve reliability and reduce risk to projects.

Where Directional Drilling Will be Used

The Partnership will use HDD to install the pipeline that supplies untreated water from the Clackamas River intake in Gladstone to the water treatment facility in West Linn. A new 36-inch diameter pipe, which will cross under the Willamette River, is designed to carry up to 38 million gallons per day. This replaces a smaller pipe that is nearly 50 years old.

The accompanying map shows the HDD route and the staging areas at the entry and exit sites on either side of the river, in Meldrum Bar Park in Gladstone and in Mary S. Young Park in West Linn.

The Partnership is using a variety of pipeline construction methods at other locations: including open trench, pipe ramming and microtunneling. (See *What to Expect During Construction* brochure at lotigardwater.org)



HDD Advantages

- ✓ Minimizes construction impacts on surrounding area, people and their activities
- ✓ Safer for the environment
- ✓ No removal of trees or vegetation along the bore route

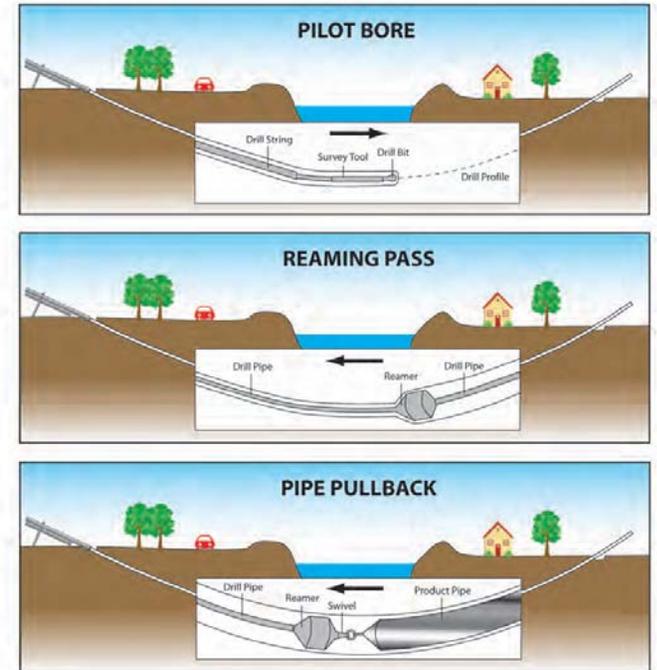
How HDD Works

The five steps of horizontal directional drilling:

1. **Excavate entry and exit holes, and prepare staging areas.** The entry and exit points are the only visible work sites for HDD construction. Drilling equipment is operated and materials stockpiled at these locations.
2. **Drill a pilot hole.** The rotary drill head is aided by drilling fluid or “mud”: usually a mixture of water with bentonite clay, a non-toxic product. The fluid is pumped continuously to cool the cutting head, remove cuttings, and lubricate passage of the pipe. The drill head also collects survey data along the way to ensure the pipeline drilling stays on course.
3. **Reaming.** The pilot hole is enlarged using multiple passes of the drill head, called reaming. As a rule of thumb, the final diameter of the hole must be about 12 inches larger than the pipe size to ease pipeline installation.

4. **Install the pipe.** Once the bore hole is fully enlarged, the water pipe will be pulled into the hole in long, continuous sections. Welded steel pipe with polyurethane lining and coating will be used for the Willamette River crossing. This pipeline will be highly resistant to seismic events and has an estimated design life of 75 years.

5. **Inspection.** Pipeline sections are inspected as they are installed. Before the finished pipeline is placed in service, it will be carefully inspected using remote controlled television cameras that travel its entire length. As a final check, the pipeline will be pressure tested to ensure there are no leaks.



Schedule

The anticipated schedule for Willamette River HDD pipeline construction is from June 2014 to November 2014.