

Shady Cove Protects Pristine Rogue River Through Trenchless Technology



A sub-river crossing using horizontal directional drilling proved to be the most cost-effective and environmentally-friendly construction alternative.

The City of Shady Cove, Oregon, is situated along the banks of the beautiful Rogue River in the Pacific Northwest, one of the most treasured and popular recreational rivers in America. To prevent overflows into the river during severe wet weather flows, Shady Cove hired Carollo to provide planning, preliminary design, final design, and construction management services for a project to increase the capacity of its largest raw sewage lift station.

Choosing the Right Alternative

Part of the project involved upgrading the lift station force main that conveys flow to Shady Cove's

gravity interceptor. Potential alignments for the upsized force main included the existing 6,500-foot alignment or a sub-river crossing beneath the Rogue River very near the lift station. Following an evaluation of the costs and benefits of each alternative, the team chose a sub-river crossing using horizontal drilling technology.

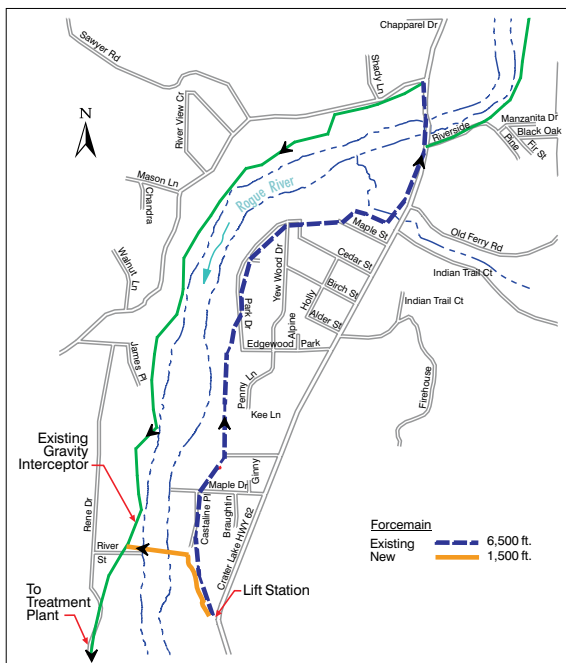
The new 1,500-foot sub-river force main is five times shorter and has less elevation rise than the original force main, reducing pumping energy and operating costs. Additional benefits included less construction disturbance and odor generating potential, and lower capital costs.

A Challenging River Crossing

Horizontal directional drilling beneath the Rogue River was by far the most challenging aspect of the project. The river banks and subsurface soils consist of coarse alluvium, sand, gravel, and cobble materials that are typical for this setting but disadvantageous to directional drilling techniques. This required a thorough and detailed geotechnical evaluation and directional drilling feasibility assessment to help mitigate potential construction problems.

Careful planning resulted in several measures to streamline construction, minimize environmental impacts, and address public sensitivity regarding drilling on private property, including:

- ▼ Setting entry and exit bore pits back away from river shoreline to protect the sensitive habitat.
- ▼ Constant monitoring of drilling fluid pressure and flow rates.
- ▼ Using washover casings to minimize the risk of drilling fluid escape.



Force main alignment.

Highlights

- ▼ Horizontal directional drilling of 624-foot length of 8-inch-diameter, high-density, polyethylene DR 9 pipeline.
- ▼ 1,500-foot force main installed under the Rogue River at depths up to 32 feet.
- ▼ Four-day installation time.
- ▼ Sewage pump station with VFDs.
- ▼ Designed, bid, and constructed on tight schedule.

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Carefully planned to minimize environmental and community impacts, the project involved setting entry and exit bore pits back away from the river shoreline.

- ▼ Installing a casing through the alluvial cobbles to prevent caving of entry and exit pits.
- ▼ Gradual steering corrections to prevent borehole caving.
- ▼ Back-reaming of the bore prior to pipe pullback.

Pump Station Improvements

The project also provided for increased pumping capacity with variable frequency drives (VFDs) to handle low summer flows as well as peak winter flows. The design included a programmable logic controller (PLC) to control the pumps, wet well levels, and the daily force main flushing cycles. The PLC also transmits run, fail, and level status to the operator's remote computer for monitoring.

Each of these measures contributed to the project's successful outcome, which met Shady Cove's needs for increased capacity while preserving a valuable natural resource.



One measure of the project's success was the preservation of the sensitive Rogue River environment.