

BULLETIN

News from *SubTerra, Inc.*®

State Route 169 Undercrossing for Quarry Operation Black Diamond, Washington

A sand and gravel quarry, operated by Cadman, Inc., is located immediately west of State Route (SR) 169 near the town of Black Diamond, Washington. Cadman, Inc., recently expanded reserve operations from the existing site to the northeast, on the opposite side of SR 169.

This expansion required being able to move sand and gravel across SR 169 from the new area to the existing site. Preliminary plans called for a conveyor belt system, several thousand feet in length that would pass under SR 169. **SubTerra, Inc.** was asked to assist in design of a suitable highway undercrossing.

SubTerra evaluated alternative options for the proposed highway under-crossing through the following:

1. A review of existing data to verify current easements and determine if they would be sufficient for construction of a subsurface crossing.
2. An evaluation of existing topographic data in conjunction with legal easements to determine optimum alignment of the conveyor crossing.
3. A visual site reconnaissance to identify potential obstacles that could increase construction time or costs.
4. Construction of five subsurface exploration pits on either side of SR 169, using a track-mounted excavator, to determine subsurface soil and ground water conditions.
5. Cross-sections to document site conditions and likely construction details.



Based on the preceding, **SubTerra** studied relative feasibility of cut-and-cover vs. tunneling construction options. Both were evaluated for a 100-ft. long alignment perpendicular to SR 169, at a location where the highway was about 15 ft. above the natural grade. The cut-and-cover method proved the superior alternative in terms of safety, cost, and scheduling.

Further analysis focused on minimizing closure of SR 169. Mid Mountain Construction obtained a 12-hour road closure permit from the State Dept of Transportation. The nighttime construction project proceeded from west to east and involved open excavation, sub-grade preparation, pipe installation and back-filling. Highway re-pavement immediately followed installation and backfilling of the last section of pipe, and SR 169 successfully reopened.