

WYDOT Precast Box Underpasses Raise Level of Safety for Motorists and Deer

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Nugget Canyon is part of the migration route for an estimated 14,000 mule deer. Until recently, approximately half of the crashes on U.S. Highway 30 passing through Nugget Canyon in southwest Wyoming involved deer. Thousands of deer-vehicle collisions have been recorded along this stretch of highway with confirmed animal deaths averaging 130 deer a year and some injuries to motorists.

In 2001, [Wyoming Department of Transportation \(WYDOT\)](#) built a wildlife underpass at the west end of the canyon along with deer-proof fencing to direct the herd to the crossing. It then funded a two-year study by the University of Wyoming's Cooperative Fish and Wildlife Research Unit and the Game and Fish Department to monitor how the deer used the underpass. On July 19, 2007 the Wyoming Transportation Commission awarded a \$3.9 million contract to Hout Fencing of Wyoming to build additional underpasses and erect 12 miles of deer-proof fence to direct deer to the new underpasses and prevent them from crossing the highway at other locations. Underpasses constructed with precast concrete boxes met all of the design criteria. Using precast concrete boxes cut the cost of building the underpasses by about 25 percent. Hout contracted with [Rinker Materials - Concrete Pipe Division](#) to provide precast concrete boxes to construct six underpasses, each 20 feet wide, 12 feet high and 47.33 feet long.

The portion of the structure beneath the roadway is entirely precast. This minimized the installation time and traffic disruptions. The box sections were a standard design that could be installed at every location, eliminating multiple designs. The sections were locally fabricated and WYDOT's contractors were familiar with the installation of these structures. Finally, the precast underpasses had the lowest initial and life cycle costs.



Photos:
Wyoming DOT

The underpasses provide a highway crossing safe for deer and motorists.



The underpasses were constructed two at a time working from west to east and sequenced with the installation of the fence. During construction of the first pair, traffic was detoured for 45 days. Each of the remaining pairs required 30 to 40-day detours. The grade for the underpasses was set to allow the bottom of the culverts to be covered with one foot of soil to provide a natural surface for the deer to walk on, while maintaining 11 feet of clearance. Once the grade was set, it took about a day to place the precast boxes. About 95 percent of the total construction time on each underpass was for the cast-in-place concrete work, which included parapets and wing walls.

During the first week after the monitoring system in the new underpasses was in operation, nearly 800 animals were recorded crossing through them. By Jan. 24, 2009 more than 3,050 deer had been documented. Since the project was completed, WYDOT maintenance forces have picked up only 17 big game animals killed by vehicles. The project demonstrated an effective precast concrete solution to ensure a safe and efficient transportation system. The 20-foot by 12-foot precast concrete boxes provide the connectivity needed for the mule deer migration, while greatly reducing the number of deer-vehicle collisions.

