



## **U.S. 20 Pioneer Mountain to Eddyville Project (US 20 PME: UPRR to Eddyville)**

### **Overview**

The U.S. 20 PME: UPRR to Eddyville Project is located on U.S. 20 (Corvallis-Newport Hwy), between milepost 14 (west end) and milepost 24 (east end). It creates 5.5 miles of new road, bypassing a 10 mile section of the original alignment of U.S. 20 built in 1917. The main section of the new highway is scheduled to open to traffic in mid-October 2016. Overnight closures will continue as work progresses on the west end curve tie-in through the end of October 2016.

The old highway in this location has narrow lanes with little to no safety shoulder, passing through rolling terrain with many sharp curves. This restricts the type of trucks able to safely use the highway. About 90 percent of the old highway section is marked "No Passing." Combined with growing traffic volumes, the physical characteristics of the old highway contribute to traffic congestion, slow travel speeds and serious safety problems. A portion of the route is designated as a state Highway Safety Corridor and will remain so until the crash rate lowers.

Construction began on the project in 2005 with an original contract authorization of \$140 million. In 2012, ODOT parted ways with the first contractor, a design-build contractor, with over half of the project completed. Given the challenges of the project, various options were considered which included walking away and leaving it unfinished. It was decided by the Oregon Transportation Commission (OTC) that the benefit to Oregon outweighed the time and expense involved to develop solutions and open a safe, maintainable roadway that could accommodate all vehicles. An additional \$142 million was requested in 2013 to complete the project, and that, combined with landslide mitigation, safety, and contingency funds brought the final approved budget to \$365 million.

Since resuming the project under ODOT design and construction oversight in 2012, PME has remained on time and under budget. The end result is a safer route that opens the area to further economic development.

The project:

- Eliminates severe, hairpin curves with a 5.5-mile stretch of new roadway
- Eliminates a railroad crossing
- Removes visual barriers for motorists by straightening the highway
- Eases congestion by replacing miles of no-passing zones with two wide lanes of travel, wide shoulders and passing lanes
- Provides an improved, more resilient lifeline route for coastal residents
- Provides a safer and more efficient route between the valley and the coast
- Eliminates the need for out-of-direction travel by freight haulers with long loads

**Purpose and Need**

This project was identified by the OTC as a project of statewide significance that has had substantial local and regional support. The need for the project was brought forward by a united coalition of government and community leaders who demanded improvements to the U.S. 20 corridor.

**Benefits**

**Safety** - This route is a vital transportation link shared by commercial, recreational, and passenger traffic connecting the mid-coast with the Willamette Valley. This section of highway was designated as a Safety Corridor in 1999 when the corridor had a crash rate 60% higher than similar state highways. From 1999 through 2014, the stretch of highway to be bypassed experienced 374 crashes with 16 fatalities and 271 people injured. That's an average of 24 crashes per year, with the exception in 2012, where crashes peaked at 62 crashes. Currently available data for 2015 indicates there have been no fatal crashes and seven injury related crashes.

The project makes major safety improvements by building wider travel lanes and paved safety shoulders, providing a separated railroad crossing, and providing greater passing opportunities. Ideally, this engineering project, along with partnerships within enforcement, education, and emergency service, will reduce serious injury crashes and encourage drivers within the safety corridor to drive safely. Once the crash rates are lowered, the safety corridor designation will be removed. ODOT will continue to monitor the safety in this corridor after it is no longer a safety corridor and continue to fund additional police enforcement when possible with available safety grant funding.

**Economics** - By opening the corridor to most interstate trucks, it provides a major employer in Toledo, Georgia Pacific, a more direct route to the Willamette Valley and the I-5 corridor. Currently more than 100 truck trips per day must travel out of direction north on U.S. 101 through Lincoln City and use the OR 18/22 corridor through Salem to access I-5. Additionally, opening the corridor to freight movement provides future opportunities for regional economic development.

**Transportation system efficiencies** – This project enhances regional connectivity by improving freight mobility on a major coastal feeder route. By providing more direct access for freight movement there are benefits to safety, congestion, and the environment. It will save time by removing 4.5 miles from the existing route, also saving fuel and reducing greenhouse gasses. It will complement the OR 18/22 route and provide alternate routes for both the trucking industry and tourist traffic. It also provides improved emergency access for the mid-coast region.

### **Project Challenges**

Like most of the Coast Range, the project's remote location is a combination of high, steep slopes, deep valleys and known and unknown landslide activity. Landslides are part of the geologic history of the Coast Range, and are both prevalent and active in the area. With as much 100 inches of rainfall per year common in the Coast Range, erosion control is a critical issue.

The heavy winter rains have provided challenges on this project. While the project length is described in years, in reality, there are only 120 days of earth moving in a construction year.

The alignment selected during the Environmental Impact Statement (EIS) process intentionally pulled the highway away from sensitive habitat surrounding the Yaquina River to reduce the impacts on water quality and fish and wildlife habitat.

Because the new road slices straight through the Coast Range rather than following the curves of the river, a lot of earth has been moved to create an even and consistent road grade. The tops of hills have been cut off. That material was used to fill the low-lying areas. These so-called "cuts and fills" represent a significant part of the project. There are 10 cuts and 15 fills.

### **Contracting Method**

In 2003, ODOT determined that this project should be delivered as a Design-Build project, an approach where the contractor provides the engineer to design the project and the construction contractor to build the project.

The decision was reached after evaluating the risks and benefits of the Design Build approach compared to delivering the project from within ODOT. It was decided that an ODOT-delivered project would challenge the capacity of agency resources and jeopardize other Statewide Transportation Improvement Program (STIP) work already scheduled.

In 2005, the Design Build contract was awarded to Yaquina River Constructors (Granite Construction). By May 2012, a series of issues forced ODOT and YRC to negotiate the end of the Design Build contract and ODOT took over design and management of the project.

### **Project History**

**2004**--The Final EIS identifies a new alignment that would make this highway section more than four miles shorter, open the route to most interstate trucks, provide greater passing opportunities, and be built to modern safety standards.

**2005**--Project is awarded and ground is broken.

**2006**--Construction began with the Design Builder clearing and grubbing the alignment. This led to two significant issues. First, at the end of the short work season, the project site had approximately 160 acres of unprotected hillsides exposed. 2006 winter rains caused erosion and sediment flowed into the creeks and streams. This resulted in DEQ fines of \$240,000 to the Design Builder and \$90,000 to ODOT.

The second issue was that as the project site was cleared and grubbed, the Design Builder encountered what it contended were ancient and unanticipated landslides along the new road alignment at several locations.

**2007**-- ODOT and the Design Builder agreed to suspend the project and work together to further investigate the landslides. The Design Builder developed a landslide mitigation plan. This effort was focused on four slide locations: Eddy 'C' Creek, Eddy 'B' Creek, Crystal Creek and Cougar Creek. The Design Builder's proposed bridges spanning these drainages were founded on these landslide areas.

The Design Builder's engineers (TY Lin for design management and bridge design, and URS for geotechnical design) proposed, as the only viable option, adding large buttresses and shear keys at the bottom of the slopes to hold the four slides in place. Buttresses and shear keys are geotechnical construction methods. In simple terms, a buttress is a large man-made berm or wedge of fill material placed at the toe of the slide. A buttress increases the resisting forces and is intended to resist the slide from moving towards the toe of the slope. A shear key is a trench excavated into the non-slide soil so that the new fill placed over the natural slope firmly keys into the existing stable soil.

The proposed buttresses and shear keys added more than 700,000 cubic yards of earthwork to the project and initially added \$46 million to the contract amount.

**2008** -- Construction resumed.

**February 2010** -- The Design Builder determined that columns at Eddy 'B' Bridge were out of plumb. Further investigation determined that the columns at the Cougar Creek Bridge were similarly out of plumb. Eventually, the Design Builder reported that the four landslide locations were still moving; the landslide mitigation constructed in 2008 and 2009 seasons — the buttresses and shear keys—had failed to successfully protect the constructed elements from the slide forces. Four bridges (railroad bridge, Yaquina River Bridge, Trapp Creek Bridge and the Little Elk Creek Bridge) that were constructed in the 2008 and 2009 seasons remain and are unaffected by the landslides.

**2011** -- No substantial construction was completed in the sections containing the four landslides and bridges since the continued movement was discovered in early 2010.

These final four bridges affected by the landslides were in the center of the project; they were (east to west) Eddy 'C' Bridge, Eddy 'B' Bridge, Crystal Creek Bridge, and Cougar Creek Bridge. The Eddy 'C' Bridge was completed; however its westerly abutment sat on a slope that was moving, causing distress to the bridge. The other three bridges had constructed foundations and columns only; however the integrity of these foundations were in question.

**2012** -- ODOT negotiates an agreement with YRC to end the Design Build contract and takes control of the design of the project, with six bridges constructed and 2.5 miles of the new alignment completed. \$201 million of budgeted funds had been spent. \$15 million was returned to ODOT.

**2012** -- ODOT designs and contracts for Phase 1 construction. Scarsella Brothers, Inc. completes the project on-time and on-budget. Phase 1 includes:

- 70 miles of horizontal drains into the hillsides, reducing pressure that causes slide activity
- Blanket drains moving water away from slopes by providing an outlet for subsurface water
- Testing of ground anchors to resist slides
- Installation of hundreds of ground monitoring sensors
- Demolition of one completed and three partially completed bridges
- Removed and made available to other projects more than 100 bridge beams--- \$2.3 million saved

**2013** -- In January 2013, the Oregon Transportation Commission approved an additional funding allotment of \$141 million to complete the project. It chose an observational approach to design and construction. This approach installed hundreds of ground and water monitoring instruments to verify the site conditions and solidify the assumptions and engineering properties to be used for the design. It allowed the engineers to design the project to the most probable site conditions and make adjustments to the design between phases based on the results obtained from the monitoring instruments. The data allows ODOT to pinpoint where and what type of slide mitigation construction is needed in future phases and prevents building features that aren't necessary. The new highway segment is expected to be open to traffic in 2016.

**2013** -- ODOT designs and contracts for Phase 2 & 2A construction (\$33 million). K & E Construction (Phase 2) and Wildish Construction (Phase 2A) complete the projects on-time and on-budget.

Phase 2 construction included:

- Another 29 miles of horizontal drains
- Placement of 3,216 feet of culvert to replace bridges at four locations
- Test fills to accurately estimate the effects of loading
- Production and placement of 600,000 tons of rock

Phase 2A construction included:

- Realignment of a sharp curve east of Eddyville to make it safer for motorists
- Construct two vehicle activated, traffic calming signs on the current U.S. 20
- Added two flashing beacon warning signs on the current U.S. 20
- Improved and upgrade warning signs along nine miles of current U.S. 20

**2014 – 2015** -- Phase 3 and 3A construction contracts (\$56 million) are awarded to Scarsella Brothers, Inc. (Phase 3) and Oakridge Sand & Gravel (Phase 3A).

Phase 3, in 2014 and 2015, included:

- Blasting and placement of 2.5 million cubic yards of earth and rock to form the final alignment of the unfinished segment
- Construction of approximately 12 miles of horizontal drains to remove subsurface water that causes landslide activity
- Construction of rock buttresses to mitigate landslide effects
- Construction of 415 *ground anchors* to mitigate landslide effects  
*Ground anchors are bundles of steel cables drilled and grouted into the ground, tensioned and held in place by either a steel plate or a large concrete block. They are able to withstand hundreds of tons of force and stop earth movement.*

Phase 3A construction contract was let in early 2015. Phase 3 included:

- Remove more than 130,000 cubic yards of earth from a site off Brush Trail Road to make way for a mitigation site to improve habitat for fish and other wildlife.

**2016-2017** -- Phase 4 construction contract (\$21.8 million) is awarded to K & E Construction.

Phase 4 construction includes:

- Establishing final grade and roadway base construction
- Paving, guardrail, signs and striping
- Construction of a large culvert under the highway to be used as a wildlife crossing

- Straightening of a sharp curve at the west end of the project, which involves the blasting and removal of 350,000 cy of dirt and rock (will continue in 2017)
- Construction of five buttresses for landslide mitigation
- Final drainage
- Landscaping
- Construction of approximately 2.5 miles of horizontal drains

The 5.5 mile main alignment opened on October 11, 2016.

Phase 5 riparian enhancement project is awarded to Scarsella Brothers, Inc. (\$2.7 million).

Phase 5 construction includes:

- Improve habitat for fish, birds, and other wildlife on or near the project site
- Construction of high water refuge for small fish during high water
- Habitat improvements for fish and wildlife in and around the Little Elk River, Trapp Creek, and Yaquina Meadows

#### **2017 – 2019**

- Environmental monitoring and supplemental environmental work will continue with the planting of trees and shrubs in winter 2017. Winter is a better time to plant to ensure that vegetation takes root. Some off-site mitigation work will be constructed in summer 2017 on Bull Creek and the Big Elk River. Some native plantings will be placed on site in 2018 after the Phase 4 seeding and trees are given a chance to establish themselves. There will be no impact to traffic from this work.
- The west end curve tie-in work of Phase 4 will continue in summer 2017. It will consist of straightening the curve by moving the roadway away from the river, final paving, and completing a fish passage culvert. This work is expected to be completed by August 2017. Only 20 minute closures are expected at this time.