

## PRACTICAL DESIGN AT WORK — PROGRAMMING/SCOPING



Washington State  
Department of Transportation

## Statewide Highway Safety Program

### Background

Highway safety investments are intended to reduce the frequency and severity of collisions. WSDOT monitors collision data continuously, looking for trends and patterns to help inform prioritization of safety needs. Current budget limitations and competing needs have caused transportation agencies across the nation, including WSDOT, to rethink how safety investments are prioritized, designed and programmed.

### Original plan

Safety improvements at WSDOT have historically been accomplished primarily as part of preservation projects. Typically whenever a section of roadway was resurfaced or repaired, WSDOT required that all elements of that section of road be brought up to standards. This “do everything” approach relied on an assumption that building to standards is the best way to maximize safety.

The traditional approach to a standards-based design meant that the return on investment would be very long term, and from a systems perspective not achievable, because funding for “all improvements” across the system would not realistically be available.

In light of this, WSDOT moved from preservation needs driving safety investments to safety needs driving safety investments. WSDOT uses a matrix-based approach which is a significantly different from the preservation approach still used by most states. We’ve been highly successful in targeting needs and increasing our return on safety investment.



Low-cost safety strategy: cable barrier



Low-cost safety strategy: rumblestrips



Low-cost safety strategy: left-turn pocket

## Practical design solution

With shrinking future-funding forecasts, WSDOT continues to think strategically and look for opportunities to innovate as it moves towards its goal of zero fatal and serious crashes. To meet the challenge, WSDOT uses analytical safety tools that have become available, and continues to modify its approach to address the factors that are specifically contributing to crash occurrence and outcomes. Successful implementation will increase cost-effectiveness and reduce potential tradeoffs when prioritizing safety investments.

Through collision analysis, WSDOT prioritized locations with higher than expected collision frequency or severity. As part of the analysis, the contributing factors of collisions – human behavior, vehicle type and roadway environment were identified. Prioritization was then focused on solutions that address the contributing factors. In other words, priorities were set based on what's actually happening or highly probable to happen on the roadway, rather than everything that could possibly happen.

Projects were then evaluated in terms of potential risk, considering the environmental, community impacts, right of way and modal options in identifying potential solutions. In this sense, both costs and tradeoffs are considered and optimized.

## Results

**On one corridor:**  
Invest \$17MIL  
instead of  
intermediate  
\$3MIL option



**System-wide:**  
\$14MIL not  
available to  
address high-  
priority needs

Statewide impact of investment choices.

**Safety:** By focusing on contributing factors, WSDOT developed cost-effective solutions to reduce the risk of collisions. These include cable median barrier and centerline rumble strips to reduce the risk of head-on collisions; shoulder rumble strips and guardrail to reduce the risk of run-off-the-road collisions; and creating left-turn pockets to reduce the risk of collisions at intersection locations.

**Community coordination:** Close community coordination is a key to success when proposing cost-effective solutions to reduce collisions. For example, a community might expect WSDOT to build an interchange to reduce intersection collisions at a location, when a less expensive roundabout will provide the same benefit for less money.

**Cost:** Practical design solutions result in targeted investments that are cost-effective and reduce the risk of collisions. Instead of spending money to bring a few locations “up to current” design standards, the cost savings that result from intermediate solutions to correct a specific, identified risk can be used to fund projects in other locations.

One example of how practical design was used to minimize cost while providing a benefit is a project in WSDOT's Olympic Region that was intended to flatten and modify roadway curves. The original project was estimated to cost \$14 million, but WSDOT avoided \$12 million in expenditures by focusing on lower-cost strategies. Instead of rebuilding this section of highway, WSDOT installed chevrons, signs, striping and turn-lane pockets to reduce the risk of collisions.