

### Federal Highway Administration (FHWA) Research and Technology Agenda

## Meeting the Challenge: Federal Lands

Twenty-eight percent of land in the United States is under Federal stewardship, including national parks, forests, and wildlife refuges and Tribal and other Federal lands. Developing and maintaining the transportation networks within these areas pose unique challenges for transportation professionals. FHWA is helping Federal agencies and Tribal governments improve safety, streamline the environmental review process, and reduce congestion; all while protecting natural and cultural resources and meeting the needs of the many different communities served by these roads.

In partnership with diverse agencies, such as the National Park Service (NPS), the Army Corps of Engineers, and the U.S. Fish and Wildlife Service, FHWA is identifying new construction and maintenance techniques that are appropriate for environmentally sensitive and sparsely populated rural areas. Highways located on Federal lands often serve as test beds for innovations used by State and local highway agencies on their rural roads.

To speed the delivery of transportation improvements, the FHWA is cultivating streamlined project development and environmental review processes that integrate the activities of diverse agencies. The agencies may be from different levels of government and may have different points of view, based on wide-ranging missions such as construction, resource conservation, or finance, but they all work together to advance projects. This collaboration enhances the efficiency and quality of transportation projects on Federal lands.

# **Objective: 1: Enhance Federal Land Management Agency, Tribal, and public road systems to improve transportation access, movement, and traveler experience.**

er Center s: Grand mal Park
vderal gov
irces

Grand Canyon for future generations.

Point/Visitor Center Improvements • National Park Service: Parking Near the Visitor Center and Mather Point (Click the video link at the bottom of page.)

Replacement

### **Objective: 2: Improve Federal Land Management Agency, Tribal, and public road systems to enhance safety.**

Strategies	Showcase Activities	
<ul> <li>Provide technical assistance and project support services to stakeholders to make transportation facilities safer, including road safety audits, identifying high-crash locations, and reducing wildlife-vehicle interaction.</li> <li>Identify and deploy safety initiatives to improve safe transportation to and within Federal and Tribal lands. Work includes road safety audits, improving protections for work zones, and evaluating factors such as the crashworthiness of guardrails and the visibility of sign and pavement markings.</li> </ul>	• Developing the Haxton Way Pedestrian Path: Whatcom County, Bellingham, Washington	
Developing the Haxton Way Pedestrian Path: Whatcom County, Bellingham, Washington	Activity Contact	
The driving force behind the Haxton Way Pedestrian Path was the Lummi Nation's concern for the life and safety of pedestrians and bicyclists who use the existing roadway to reach community amenities. Haxton Way is a narrow, two-lane road with a fog line and a few inches of a paved shoulder. To improve safety and enhance the experience for nonmotorized travelers, an elevated, 8-foot-wide multiuse pathway was constructed on wetlands adjacent to Haxton Way. Solar-powered lighting along the newly constructed trail provides a low-intensity, environmentally friendly, cost-saving solution. Low-voltage, light-emitting diode lamps were mounted on each pole with a solar panel and battery pack. Each lamp utilizes motion, light, and proximity sensors to provide low-intensity (25 percent) lighting after sunset and full-intensity (100 percent) brightness as pathway users approach each post. Choosing a solar solution in this environmentally sensitive area also reduced the construction impact that is typically associated with conventional lighting. Since the completion of the project, no injuries, deaths, or crashes have been reported. Members of the Lummi Nation community have praised the project for providing a safe, well-lit way to travel along the road.	Amit Armstrong FHWA Office of Federal Lands Highway Tel: 360-619-7668 Email: amit.armstrong@dot.gov Additional Resources • <u>FHWA: Lummi Nation Haxton Way</u> <u>Pedestrian Path and</u> <u>Lighting Project</u> <u>(VIDEO)</u>	
Objective: 3: Streamline Federal Land Management Agency and Tribal processes to improve timeliness and effectiveness of program and project delivery.		
Strategies	Showcase Activities	
<ul> <li>Ensure the effectiveness of the Federal Lands Highway Program with condition and performance assessment initiatives.</li> <li>Promote and provide technical assistance on environmental streamlining to improve the effectiveness of transportation project delivery.</li> <li>Further link the transportation planning and National Environmental Policy Act (NEPA) processes to ensure efficient transportation project delivery and increase the quality of the National Environmental Policy Act processes.</li> <li>Engage partner agencies to develop long-range transportation plans based on transportation asset management priorities and performance-based principles.</li> <li>Provide quality education materials and sponsor training to accompany improved, enhanced, and</li> </ul>	<ul> <li>Promoting Roadside Revegetation: An Integrated Approach to Establishing Native Plants</li> <li>Using Construction Manager/General Contractor at the Point Bonita Lighthouse Bridge</li> </ul>	

• Provide quality education materials and sponsor training to accompany improved, enhanced, and streamlined project delivery programs, studies, recommendations, and guidance.

# Promoting Roadside Revegetation: An Integrated Approach to Establishing Native Plants

Integrating safe, efficient transportation with ecological health is a crucial issue that is receiving increased attention. Today, most road projects involve modifications to existing roads rather than new construction. Modifying roads or updating them section by section presents a tremendous opportunity to remedy the oversights of the past, mitigate environmental impacts, and improve conditions for healthy ecosystems. Through the Coordinated Technology Implementation Program, FHWA and the U.S. Forest Service developed a comprehensive Roadside Revegetation Technical Guide, which offers an integrated approach to facilitate the successful establishment of native plants along roadsides and other areas of disturbance associated with road modifications. The guide introduces readers to a comprehensive process of initiating, planning, implementing, and monitoring a roadside revegetation project with native plants. A Web site was developed to support the guide. The Web site contains four integrated and interlinked modules dedicated to explaining the art and science of roadside revegetation.

### **Activity Contact**

### Amit Armstrong

FHWA Office of Federal Lands Highway Tel: 360-619-7668 Email: amit.armstrong@dot.gov

### **Additional Resources**

Technical Guide

# Using Construction Manager/General Contractor at the Point Bonita Lighthouse Bridge Replacement

The Point Bonita Lighthouse Bridge is a 156-foot-long timber pedestrian suspension bridge located in the Golden Gate National Recreation Area in Marin County, California. Originally constructed in 1954, the bridge is a part of the Point Bonita Historic District, which is listed in the National Register of Historic Places. Lack of maintenance and the harsh coastal marine environment resulted in corrosion of the structure's timber and steel cables. Because of this deterioration, the bridge was closed to the public in 2010 and FHWA was asked to replace it. Project constraints included limited funding, a limited construction window because of environmental restrictions, a required 50-year design life for the new structure given the harsh marine climate, a long lead time to acquire specialized construction materials (timber, stainless steel), and difficult site access (that is, accessing the site requires navigating a trail and a tunnel). The project used Construction Manager/General Contractor contracting to help address the constraints and technical challenges for design and construction. This type of contracting involves engaging a construction manager during a project's design phase to provide input on design and constructability with an option to award the same contractor a construction contract at a later point. The Construction Manager/General Contractor method began in the design phase and fostered knowledge sharing and a partnership between FHWA, the contractor, an engineering firm, and the National Park Service. Because of this partnership, the construction was completed on time and under budget with a limited number of contract modifications. The National Park Service was extremely satisfied with the final product and the project team worked cooperatively. which fostered innovation and led to the overall success of the project.

needs.

# Roger W. Surdahl

**Activity Contact** 

FHWA Office of Federal Lands Highway Tel: 720-963-3768 Email: roger.surdahl@dot.gov

Objective: 4: Deploy new, emerging, underused, and innovative technologies to accelerate project delivery and improve sustainability of low-volume, low-speed roadways.

# StrategiesShowcase Activities• Deploy innovative and emerging technologies to accelerate project delivery, improve safety, and<br/>provide solutions to unique situations.• Producing Rockery<br/>Design and<br/>Construction<br/>Guidelines• Provide Federal Lands Highway projects as testbeds to field test research advanced by FHWA's<br/>Turner-Fairbank Highway Research Center.• Orducing Rockery<br/>Design and<br/>Construction<br/>Guidelines• Work with the Transportation Research Board Low-Volume Roads Committee and the<br/>American Association of State Highway and Transportation Officials to define research priorities<br/>for low-volume roads that address FHWA's Office of Federal Lands Highway stakeholders'• Mowcase Activities

<ul> <li>Collaborate with the Local Technical Assistance Program and Tribal Technical Assistance Program centers to provide training, technology transfer, and research opportunities that improve the abilities of stakeholders to deliver more effective and safer transportation projects.</li> <li>Document new and emerging technologies that support project delivery and share them with the transportation community by engaging partners and customers through appropriate forums.</li> </ul>	
Producing Rockery Design and Construction Guidelines	Activity Contact
Rockeries, or dry stack walls, are rough, natural, onsite rock structures that are stacked and interlocked without mortar, concrete, or steel. Rockeries retain and protect earth-cut or fill slopes. They provide examples of relatively low-cost, long- lasting, safe, and visually pleasing context-sensitive solutions. In the late 1930s, Civilian Conservation Corp workers built many impressive rockeries that are still functioning effectively today. Several of these historic or culturally important rockeries enhance the visitor experience on many forest highways and national park roads. Engineering reviews of functioning rockeries, those in need of maintenance, or failed rockeries offer key design and construction considerations to use in current building practices. Prior to 2006, no standards, specifications, or other accepted procedures existed to provide construction or design guidance for rockeries, but rockeries functioned well in many different types of environments, suggesting that excellent performance could be expected when certain conditions were met. A rational, tested design procedure was needed to provide designers and owners with confidence that rockery structures could be used as part of modern highway engineering. To meet this need, FHWA produced design and construction guidelines to define and evaluate the stability of rockeries given specific geometries (height, base width, and batter); rock properties and placements; and lateral pressures of backfill materials. These guidelines also include construction quality assurance steps, standard plan drawings, and construction specifications. To date, 22 rockeries were built following these guidelines, resulting in positive cost benefits averaging \$40 to \$50 per square foot compared with \$70 to \$100 per square foot for traditional soil nail walls. This value is obtained by using onsite materials and eliminating the need for the aesthetic treatments that cover the soil nail system.	Roger W. Surdahl FHWA Office of Federal Lands Highway Tel: 720-963-3768 Email: roger.surdahl@dot.gov Additional Resources • FHWA: Rockery Design and Construction Guidelines

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in this document.