

# 2009 AASHTO VALUE ENGINEERING AWARD APPLICATION

(required for each entry)

## Applicant Information

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**Project Name:** SR 530, Sauk River Bank Erosion CED

Award Application Category (check one):

- Pre-Construction Engineering (>\$75M)
- Pre-Construction Engineering (\$25M to\$75M)
- Pre-Construction Engineering (<\$25M)
- Construction (VECP/CRIPS)
- Improved Process
- Improved Performance

## Participating Parties (Contractors, Consultants, Agencies, etc.):

USFS, HW Lochner, Skagit River System Cooperative, Local Property Owners

## Briefly Describe Project/Process & Significant Value Engineering Changes (125 word limit):

The purpose of the project is to realign SR 530 away from the Sauk River as corrective action from to reduce risk to the roadway and reduce recurring maintenance costs.

Several goals and objectives were identified to balance environmental, community, and transportation values while meeting the purpose and need for the project.

- Ensure that SR 530 functions as a state highway
- Minimize effects to private property
- Minimize effects to the environment
- Consider design elements that are reasonably funded, less complex to build, and simpler to maintain
- Reduce emergency repairs and the environmental impact of emergency repairs

The basic functions of the project were determined to be "Protect Roadbed" and "Minimize Erosion".

Implementation of the VE Study recommendations resulted in total potential project cost increase of approximately \$2.1 million along with the advancement of the project schedule. The project received the WSDOT 2009 Excellence in Environmental Design Award based on the implantation of the VE Study recommendations.

## Contact Information:

Richard Jaffe, AASHTO Value Engineering Technical Committee  
New Jersey Department of Transportation, Telephone (609)530-5643

## Send Completed Award Application Package to both:

Mr. Richard Jaffe at [richard.jaffe@dot.state.nj.us](mailto:richard.jaffe@dot.state.nj.us) and Mr. Blane Long at [LongB@wsdot.wa.gov](mailto:LongB@wsdot.wa.gov)

**ALL ENTRIES MUST BE RECEIVED NO LATER THAN MARCH 31, 2009**

## Introduction

This project overview is submitted to the AASHTO Value Engineering Technical Committee as application for a 2009 Value Engineering Award for Pre-Construction Engineering in the project cost category of “Less than \$25 million”. The Washington State Department of Transportation’s (WSDOT) SR 530, Sauk River Bank Erosion CED is a superb example of the value engineering process at its best.

A Value Engineering (VE) team made up of subject matter experts, property owners, and stakeholders used the VE job plan to improve the value of this project through an analysis of its functions.

After the presentation of the VE recommendations, the Northwest Region of the WSDOT demonstrated vision and decisiveness in seizing the value engineering ideas generated by the assembled VE team. These recommendations forecasted significant cost, schedule, right of way, environmental, and operational impacts, which would come to pass if action was delayed.

## Project Issues

The SR 530, Sauk River Bank Erosion CED (chronic environmental deficiency) project is located approximately 8 miles south of the small town of Rockport, WA, along the banks of the Sauk River. This project was proposed as corrective action to reduce the risk to the roadway and to reduce recurring maintenance costs.

Since the early 1990s, the Sauk River has eroded its stream banks and the SR 530 highway shoulder. When this occurs, the WSDOT is forced to close the road. This is a significant problem for many drivers, businesses and residents because the highway is the primary road in and out of the area. It also serves as the primary route for trucks carrying timber products and tourists. SR 530 is also the designated flood evacuation route for the Suiattle Tribe.

The project team’s design proposed was to realign SR 530 away from the Sauk River at the location of the 2003/2007 flood events. The riprap that was placed to protect the highway after those events was to be removed after construction of the new alignment.

The original purpose of the VE Study was to bring the project within budget and to have property owners, the USFS, and other stakeholders work together towards a solution that would benefit all the parties involved. After validation of the project estimate by the VE team the estimated cost was \$9.26 M with a current year budget of \$6.9 M.

## Value Engineering Recommendations

The purpose of the project is to realign SR 530 away from the Sauk River as corrective action to reduce the risk to the roadway and reduce recurring maintenance costs.

A value engineering study was conducted July 23, 25-26, 2008 that brought together various stakeholders including property owners to help determine the best course of action for this project.

Several goals and objectives were identified by the VE team to balance environmental, community, and transportation values while meeting the purpose and need for the project.

- Ensure that SR 530 functions as a state highway
- Minimize effects to private property
- Minimize effects to the environment and comply with all permits
- Consider design elements that are reasonably funded, less complex to build, and simpler to maintain
- Reduce emergency repairs and the environmental impact of emergency repairs

The project at the time of the VE study was at 60% design and had an advertisement date of October 2010. After the functional analysis phase of the VE job plan was concluded it was determined that the basic functions of the project were “Protect Roadbed” and “Minimize Erosion”.

## ***Recommendation #1***

The first recommendation was to protect the right bank of the side channel of the Sauk River along SR 530. While this was outside of the project limits it was recognized by the VE team as vital to saving the roadway because the Sauk River was migrating back to its 1974 channel. The last few flood events were widening the side channel and starting to erode at the banks of the highway. It was agreed that the next flood event would quite possibly move the Sauk River to the location of the side channel.

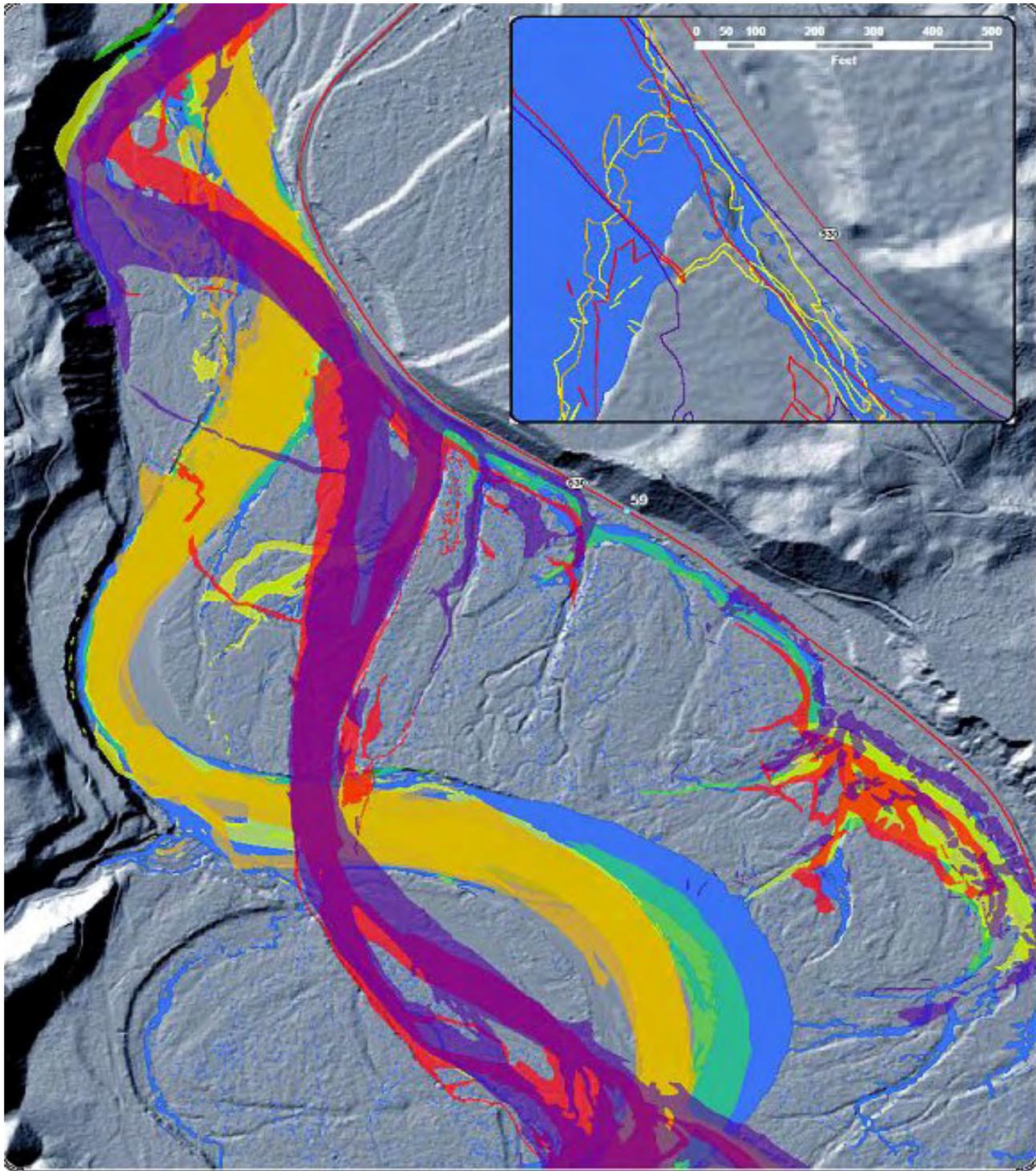
In November 2006, the project area was subjected to a large flood event (representing a 30-year recurrence interval) with a magnitude of 84,000 cubic feet per second (cfs). The storm event resulted in significant geomorphic changes to the mainstream channel that has affected the project site. Since this event the main-stem of the Sauk has migrated eastward approximately 228 feet which is approximately 60 percent of the average channel width.

As the main-stem meander has migrated to the east, the river channel has lengthened causing the river channel to become less efficient at conveying flow. The side channels however, are growing in size due to erosion and will become more and more efficient. Between 2006 and 2007, the width of the side channel adjacent to the highway increased an average 44 feet. Most of the channel width increase is the result of increased erosion of the right bank which supports the road prism for SR 530.

The side channel adjacent to the highway has become fully activated year round and continues to erode into the east bank. Since the 2007 winter season, there is evidence of trees sloughing into the channel as the east bank continues to erode. WSDOT hydrologists predict the side channel will erode into the roadway with the next significant storm event if measures to stabilize the slope are not in place. This could be as early as fall 2008. It is predicted the entire mainstream flow will occupy the side channel in the near future. This recommendation was approved by the WSDOT Northwest Region Executives.



**Side channel of the Sauk River after the December 2007 flood event**

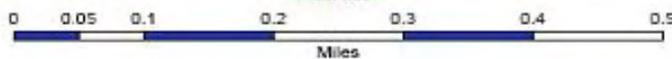


Courtesy of WSDOT  
State Highways  
GIS MP Markers  
Sauk River Features  
2005 LIDAR  
courtesy of PSLC

### SR 530 Sauk River Project Area Migration Analysis



Scale 1:8000  
Inset Scale 1:2000  
WSDOT  
Prod. 2007



- Legend**
- Mile Post Marker
  - State Route
  - 1964 Sauk River Approx. 6530 cfs
  - 1974 Sauk River Approx. 2180 cfs
  - 1998 Sauk River Approx. 2740 cfs
  - 2003 Sauk River Approx. 1120 cfs
  - 2006 Sauk River Approx. 8110 cfs
  - 2007 Sauk River
  - 2007\_Safety Network

The blue represents the location of the Sauk River after the December 2007 flood event. The purple and red represents where the river was in 1964 and 1974 respectively. The Sauk River is seeking out this old channel with each flood event.

## **Recommendation #2**

The second recommendation was to advance the dollars immediately to fund VE Recommendation #1 and to protect SR 530 from the advancement of the Sauk River side channel.

The side channel adjacent to the highway has become fully activated year round and continues to erode into the east bank. Since the winter season of 07/08, there is evidence of trees sloughing into the channel as the east bank continues to erode. WSDOT hydrologists predict the side channel will erode into the roadway with the next significant storm event if measures to stabilize the slope are not in place. The VE team predicted that this could be as early as fall 2008.

WSDOT Northwest Region Executives approved this recommendation quickly. In less than two months after the VE Study was concluded (August 2008) a project was awarded to protect SR 530 along the banks of the side channel of the Sauk River to Jansen Inc. for \$2.1 million. The project was completed in October 2008, well in advance of future flooding.



**Completed wall October 2008**

The photo above is of the combination steel & log crib wall that was constructed in less than 3 months after the VE Study was conducted. This wall is comprised of 112 steel pilings, 15,000 cubic yards of fish-friendly fill material, and 355 logs. The wall should help protect the road this fall and winter when the river level rises to flood stages. Without this work, it was very likely that the river would have washed away parts of SR 530 in the future.

Based on the implementation of the VE Study recommendations the project received the WSDOT 2009 Excellence in Environmental Design Award.

### ***Recommendation #3***

During the validation of the project teams estimate several items were identified that could be reduced to bring the project estimate within the original \$6.9 M current year budget. Even with this savings because of the money being allocated for recommendations #1 & #2 it would become necessary for additional funds to be allocated to construct the project as originally designed.

The WSDOT is currently requesting additional money from the Washington State Legislature to fully fund the remainder of this project. This recommendation was approved by the WSDOT Northwest Region Executives.



**Realignment of SR 530 away from the Sauk River**

### ***Recommendation #4***

During the VE Study multiple ideas were brought up about the Sauk River Valley and SR 530. After this discussion it was determined that a corridor study is needed. Requests to move the entire highway or considerable portions of it have now been posed by Treaty Tribes and Regulatory agencies, and are figuring prominently in discussions with these entities about permits for bank stabilization and other projects aimed at highway survival.

The common theme in these requests is that WSDOT take a broader look at whether other realignments can avoid larger numbers of both existing and potential trouble spots by getting out of the channel migration zone of the river. This recommendation was approved by the WSDOT Northwest Region Executives.

## Summary

### CRITERIA 1: Cost Savings as Compared to Original Design

- Total Dollar Amount Saved – This VE study added \$2.1 M to the original project, which was the cost of Recommendation #1, to protect the roadbed adjacent to the side channel. If this work wasn't completed the highway would have been lost during a future flood event.
- Reduced Life Cycle Cost or Impact on Future Maintenance – The managers and executives of the WSDOT heard the VE Team when they said there was a strong possibility of losing the highway during the next flood event, which most likely would come as soon as the fall of 2008, and the need to act now to prevent that from happening. The estimated cost to replace SR 530 at this location would have been well over \$4.0 M, an overall savings of \$1.9 M.

### CRITERIA 2: Project Improvements as Compared to Original Design

- Innovative Approach to Accomplish Purpose & Need – This VE Study is a prime example “value added”. Even though additional work was recommended by the VE team, it was understood by all parties that this work was not only necessary, but needed to be accelerated to save the highway from catastrophic failure during the next flood event on the Sauk River. The VE Teams willingness to step outside the “box”, or in this case the project limits, and do the right thing, most likely saved the taxpayers of Washington State millions of dollars in emergency funds to rebuild the roadway sometime in the future and saved the local economy millions of dollars in highway user delays.
- Technology or Materials New to Agency (to better accomplish functions) – The log crib walls and revetment used to protect the river bank and roadway have been used on other projects but this was a first on a WSDOT project.
- Environmental, ROW & Stakeholder Impacts – By accelerating the project the WSDOT saved the roadbed by using “fish friendly” barriers and reduced the possibility of future emergency repairs and the environmental impact of those emergency repairs. The project received the WSDOT 2009 Excellence in Environmental Design Award based on the implantation of the VE Study recommendations.
- Safety (Collision Costs) and Traffic Operations (Level Of Service) – No change over baseline
- Other Improvements or Efficiencies – Stakeholder acceptance

### CRITERIA 3: Constructability

- Reduction of Construction Schedule and/or Impacts to Users in Work Zone – No change over baseline

