Best Practice in Practical Design: Synthesis

Prepared for Nancy Boyd, Director, Columbia River Crossing (CRC)
Washington State Department of Transportation

Prepared by
Kathy Lindquist, WSDOT Research Office
Michel Wendt, WSDOT Library

August 2013

Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Synthesis

This synthesis and literature review, requested by Nancy Boyd, Director, Columbia River Crossing (CRC), relates to the concept of Practical Design, most commonly described as a strategy to deliver focused benefits for a State's transportation system while working with the realities of a fiscally constrained funding environment. This synthesis includes practices of several state DOT's, publications describing potential legal issues, program guidelines, and design flexibility. Other states reviewed include: Missouri, Minnesota, Kentucky, Oregon, Utah, Pennsylvania, New Jersey, and Washington State.

Databases Searched

- TRID - A Transportation Research Database at the Transportation Research Board (TRB)
- Research in Progress (RiP) – A Database of Current Transportation Research at TRB
- Previous Synthesis Reports on WSDOT Research Website
- Google
- Wisconsin DOT Transportation Synthesis Reports
- Federal Transit Administration (FTA) website
- Federal Highway Administration (FHWA) website
- International Transportation and other Research Websites

Published Sources

New Complete Streets materials highlight best practices, assist practitioners
Center for Transportation Studies, University of Minnesota; CTS Catalyst; August 2013

A new study and guide to Complete Streets is nearing completion. Associate professor Carissa Schively Slotterback and research fellow Cindy Zerger examined projects for case studies from 11 locations across the nation, including efforts at the regional, community, corridor, and project level . . .

Key findings from this study resulted in the following recommendations:

•Policy (if one exists) is just the start. Institutional and cultural changes that facilitate implementation are also necessary.
•Be rationally opportunistic. Communities should know what they would most like to do but also be willing to take advantage of other opportunities that may arise.
•Engage advocates. They can be especially important in education and outreach efforts.
•Make the most of project champions. Whether they are elected officials, advocates, or staff, champions often push the hardest to get projects done.

The guidebook, *a Guide to Complete Streets Planning and Implementation*, is slated for completion in early fall of 2013. It will highlight policies, practices, designs, and community engagement strategies from 11 case studies and include suggestions for tailoring Complete Streets implementation to a particular context. These materials are designed to help practitioners in Minnesota apply best practices and lessons learned from other communities to their own projects.

Practical Design Highway Solutions
NCHRP Synthesis 443.0; TRB; 2013

Summary: Labeled as Practical Design, Practical Solutions, or Practical Improvements; this report describes the various cost-saving approaches states have adopted for roadway project development.

INVEST
FHWA; 2013

Summary: A tool for states and local agencies to use in integrating sustainability best practices into transportation projects and programs, including practical design principles as community involvement.

FHWA and Context Sensitive Solutions (CSS)
FHWA; CSS Website; 2013

The purpose of this FHWA website is to provide information about FHWA's involvement with CSS and is not intended to duplicate the contents of the FHWA sponsored context sensitive solutions website.

Practical Transportation: Better Solutions for Better Transportation Systems
By David C. O'Hagan, PE, State Roadway Design Engineer; PPP Slide Presentation; June 6, 2012

Summary: This report describe the programs of five States including Missouri, Kentucky, Idaho, Oregon, and Utah that currently have Practical Design guidelines.

Risking Success through Flexible Design
By Keith Harrison and Stephanie Roth; Public Roads, Vol. 73 - No. 4; Jan/Feb 2010

Summary: The customary approach to highway project development has been for engineers to gather information, make independent decisions, and then announce and justify their design plans to the public, known informally as the "decide, announce, defend," or "DAD," approach. The prevailing thinking was that highly trained engineers applying standard designs were producing projects that best served the needs of the traveling public. Projects were by and large being delivered on time and within budget, and project goals such as reducing crashes and congestion and maintaining the infrastructure also were being realized. News approaches are currently in use referred to as flexible or practical design.

Project Delivery –So How Do States Really Do It?
Mark C. Cacamis, P.E., CCM, VDOT; AASHTO Webinar: May 13, 2010
PPP Slide Presentation on Innovative Project Delivery


VDOT+Presentation
+May+2011+AASHT

Project Delivery—Past Accomplishments
Webinar part of NCHRP 20-73 (Accelerating Project Delivery); May 2010
Slide Presentation on topics including practical design.


Project+Delivery+O
verview+SCOM+PD+

Performance based analysis can support practical design-based project solutions
Kittleson & Associates; Streetwise; April 16, 2010

Summary: As communities across the country continue to grow, and federal funds to support our aging infrastructure continue to diminish, public agencies look for new ways to maximize investment dollars with minimal compromise. One key approach is the concept of Practical Design, which was pioneered by the Missouri and Pennsylvania DOTs.

Performance Based Analysis & Practical Design
By John M. Mason, PhD, PE, and Brian L. Ray, PE; Transportation Education Series; April 15, 2010

What is "practical design"?

- Standards and practical design
- Performance based tools
- Design variances and documentation
- Discussion

Using Practical Design and Context-Sensitive Solutions in Developing Surface Transportation Projects
Hearing of U.S. House of Representatives' Committee on Transportation and Infrastructure Subcommittee on Highways and Transit; House Hearing, 111th Congress; From the U.S. Government Printing Office; June 10, 2010

Summary: This panel explored what State DOTs are doing in combining practical design and context sensitive design. A number of States have adopted policies for context sensitive design or practical design solutions. States provided examples where projects were designed outside of the normal parameters of optimal engineering solutions, but were more appropriate for communities, fully met the needs of the community, cost less and were delivered with less controversy.

Practical Design
By Joseph Jones; Vol. 73 - No. 4 - Public Roads; Jan/Feb 2010

Summary: MoDOT emphasizes a new philosophy of doing everything well instead of a few things perfectly and developed the concept of practical design, which they describe as "building good projects everywhere--rather than perfect projects somewhere."

Flexible Design for 21st Century Challenges: Balancing Competing Objectives and Optimizing Return on Investments
White Paper and Meeting Summary; Minnesota DOT; February 2009

Summary: A forum for leaders in flexible design bringing together engineers, executives, and interdisciplinary perspectives including barriers, benefits, and the need for change.

Understanding Flexibility in Transportation Design — Washington
Authors, John Milton and Anna St. Martin; WA-RD 638.1, Washington DOT Research Report; April 2007

Summary: This document provides conceptual guidance for the application of context-sensitive designs in the project development process and provides a compilation of issues that must be evaluated in highway design.

How We Can Save Our Roads
America's highway infrastructure needs money, manpower — and a new vision
Parade Magazine, March 2009

Summary: Nationwide, the US transportation infrastructure has a backlog of critical repairs and reconstruction needs. The price tag is huge and new solutions, such as practical design, are discussed as a necessary component in how we design, build and finance our transportation system.

Practical Design Case Study
Prepared by the Organizational Results Division; MoDOT; 2007

Summary: This in-house study by the MoDOT Organizational Results Office in cooperation with the Central District, found that Practical Design has been a resounding success at MoDOT. Projects have been delivered to meet specific location needs while saving millions of dollars. In just its first two years, Practical Design saved Missouri taxpayers $400 million.

Practical Design at MoDOT
By Thomas Allen PE and Bob Brendel; Achieving Value; www.value-eng.; Winter 2006

Summary: This article describes how the Missouri DOT used Practical Design as value engineering to construct cost-effective transportation projects.

A Guide to Best Practices for Achieving Context Sensitive Solutions
National Cooperative Highway Research Program (NCHRP) Report 480; TRB; 2002

Summary: This guide describes how state DOT's and other transportation agencies can implement context sensitive solutions in developing transportation projects; particularly when highway projects are perceived as having clear and measurable adverse impacts on the communities through which they pass. It is crucial to involve the public early in the process, and keep them involved, to reach a consensus that is acceptable to everyone.

State DOT's Practical Design Programs

Missouri

Practical Design develops efficient solutions to solve today's transportation project needs
Practical Design: MoDOT Website; 2013

Innovation and creativity are necessary to accomplish this goal. This document was prepared to effectively begin implementing Practical Design. It is purposely written to allow flexibility for project specific locations.

Practical Design: The Right Solution at the Right Time in the Right Place
Joseph G. Jones, MoDOT; Slide Show, MoDOT; 2010

Summary: Slide presentation on the creation and use of practical design at the Missouri Department of Transportation.

Guidelines: ***Meeting Our Customer's Needs: Practical Design Guidelines***

FAQ's From MoDOT Practical Design Regional Meetings Jan. -Feb. 2005
MoDOT; March 18, 2005

Summary: MoDOT conducted regional meetings on Practical Design and provided a Question and Answer document.

Minnesota

Geometric Design & Layout Development
Formal Design Exceptions – Practice & Procedure for MnDOT; www.dot.state.mn.us ; 2012

Guidelines: ***MnDOT Policy and Practice: Design Standards & Design Exceptions***

Kentucky

Practical Solution Concepts for Planning and Designing Roadways in Kentucky
By Nikiforos Stamatiadis, Adam Kirk, Don Hartman, and Jerry Pigman, Kentucky Transportation Center, University of Kentucky; Kentucky Transportation Cabinet; October 2008

Summary: The Kentucky Transportation Cabinet initiative called "Practical Solutions" goal is to reduce highway cost expenditures. The initiative goes beyond the "Practical Design" approach in other states, like Missouri, by encompassing the entire project development process from planning through operations and maintenance. This change in design philosophy is driven by the desire to use scarce resources in an efficient and effective manner while maximizing the beneficial impacts to the system in its entirety.

Oregon

Oregon Technical Services Practical Design
Practical Design Website, Oregon.gov; 2013

Summary: Oregon's approach to Practical Design requires focus on the project's purpose and need and a clear process for approving and documenting the rationale for important decisions. It requires good use of engineering judgment to assess the severity of adverse consequences, evaluate design tradeoffs, and to mitigate risks to the extent practical.

Guidelines: ***ODOT Highway Design Manual: Appendix D: Practical Design***
ODOT; June 2010

New Jersey

Flexible Design of New Jersey's Main Streets
Reid Ewing and Michael King; Alan M. Voorhees Transportation Policy Center, Rutgers; New Jersey DOT; 2001

Pennsylvania & New Jersey

Smart Transportation Guidebook: Planning and Designing Highways and Streets that Support Sustainable and Livable Communities
New Jersey DOT and Pennsylvania DOT; March 2009

Summary: The Pennsylvania and New Jersey Departments of Transportation partnered in the development of the Smart Transportation Guidebook – a roadmap to a successful future, with the goal to integrate the planning and design of streets and highways to foster the development of sustainable and livable communities. The Guidebook is equally applicable to rural, suburban, and rural areas.

Utah

Practical Design
Practical Design supports UDOT's continuing emphasis on innovation, cost savings, and providing the public with the transportation system that meets their needs. The goal of Practical Design is to only build right sized projects that meet focused needs. This allows UDOT to spread limit resources more effectively throughout the transportation system.

Washington State

Washington State Department of Transportation Context Sensitive Design
WSDOT Context Sensitive Design Website; 2013

Guidelines:
Understanding Flexibility in Transportation Design – Summary Document
WSDOT; 2006

Understanding Flexibility in Transportation Design – Washington
WSDOT; 2005