PRACTICAL DESIGN

Presented by:

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Neil Sharp, Stanley Consultants
David Thompson, Avenue Consultants
Practical Design Guide

Inside UDOT –
Project Development –
Central Preconstruction –
Practical Design

OR

Search: *Practical Design*
What is Practical Design?

Strategy to maximize the delivery of focused improvements for the State’s transportation system.

Focus on value to meet our needs with limited resources.
Why Practical Design?

- Focus on Value
- Provide Needs
- Obligation to the Public
Why Practical Design?

“We Already Do This.”
UDOT’s Mission

Final Four (Needs)

- Take care of what we have
- Make the system work better
- Improve safety
- Increase capacity
Practical Design Vision

Point of Diminishing Returns (Value)
Practical Design Vision

“Building good not great projects will result in a great system.”
## Practical Design In Action

### University of Kentucky Study

<table>
<thead>
<tr>
<th>Design Option</th>
<th>Cross Section</th>
<th>Crashes per Year per Mile</th>
<th>Speed (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>2 Lanes, 10 ft L, 2 ft S</td>
<td>5.4</td>
<td>41.4</td>
</tr>
</tbody>
</table>

The table above shows the comparison of different design options for crashes per year per mile and speed. The University of Kentucky Study highlights the importance of practical design in reducing accidents and improving safety on the roads.
Keys for Practical Design Success

1. Objective Statement
2. Practical Design Goals
3. Collaboration
4. Professional Judgment
Practical Design KEY 1:
Project Objective Statement

✓ Foundation for ALL improvements
✓ Clear
  ✓ Easy for the Public to understand
  ✓ Comprehensive and specific
  ✓ Factual and numerical
  ✓ Expected positive outcome, not a solution
  ✓ Address UDOT’s Final Four
✓ Do Not expect more than the stated objective.
Project Objective Statement Examples

1. Reduce crashes by 50% at the intersection of X and Y.

2. Add right turn lane at the intersection of X and Y.

3. Add traffic calming measures to street X between Y and Z.

4. Reduce traveling speed on street X between Y and Z from 45 mph to 35 mph.
Practical Design Key 2:
Practical Design Goals

Optimize the transportation system.

Meet the Objective Statement

Maximize Value
Practical Design Key 3: Collaboration

Multi-disciplinary teams

- Involve everyone
- Allow disciplines to remove themselves
- Add specific knowledge needed
- Assemble a team adequate for the complexity of the project

Project Communication Plan

- Complexity Project = Complexity Plan
- Who engages the public and agencies.
- How all input information will be gathered and disseminated.

Encourage Open Discussion
Practical Design Key 4: Professional Judgment

1. Understand:
   - Objective Statement
   - Problem vs. Symptoms
   - Context
2. Consider:
   - Full set of alternatives
3. Eliminate:
   - Does not meet Objective Statement
   - Beyond Objective Statement
4. Evaluate:
   - Value
   - Life Cycle Costs
5. Exceptions, Deviations, and Waivers
Standards and Objective Statement

Old Practice
• Design standards dictate the desired level of improvement.
• Exceptions, deviations, and waivers are used when resources do not allow for the design standard to be built.
• The design starts with the standard and strips down to meet budget.

Practical Design Practice
• The project objective statement states the desired level of improvement.
• Exceptions, deviations, and waivers are used for the following reasons:
  1. The design standard exceeds the objective statement
  2. A lower cost solution, that does not compromise safety, is identified
• The design starts with the existing conditions and builds up to meet the objective statement.
Roles and Responsibilities

Project Sponsor
Identify the need and funding.

Project Definition Team
Develop and document the project Objective Statement.

Project Team
Concept and Design
Develop improvements to meet the Objective Statement.
Evaluate improvement values, including life cycle costs.

Operations Group
Give clear understanding of maintenance costs and operational needs.
Assist project team develop solutions to meet objective statement.
Roles and Responsibilities

Who is responsible to make sure the project meets the objective statement and adds the most value?
Examples

Planning Perspective
How the planning process works.

System Perspective
Identify the issues and selecting appropriate solutions

Project Perspective
Region 2 – 4015 West 5400 South
The Goal

 Appropriately allocate limited resources to maximize system wide improvements.
How do we do more with less?
How do we do more with less?

- start at the planning / concept phase
- create a problem-solving mind-set
- be willing to “think AND ACT outside the box”
"Never, ever, think outside the box."
"Your proposal is innovative. Unfortunately, we won’t be able to use it because we’ve never tried something like that before."
How do we do more with less?

*innovation* is not a novelty… but an appropriately applied and technically sound creative approach to identify and develop *cost effective* and *big-benefit* solutions
Bluff Street EA
Bluff Street EA
Bluff Street EA
Bangerter Highway

7 CFIs
Key Elements to a Practical Design Approach

- Collaboration
- Brainstorming – encourage ALL ideas
- Effective Screening & Evaluation Methods
- Effective Communication
Project Perspective – 4015 W. 5400 S.

Project Objective Statement – Increase capacity at stated intersection.
Initial concept – Dual lefts
Final design – ThrU Turn Intersection (TTI)
Project Perspective – 4015 W. 5400 S.

Practical Design Elements

1. Safety – To improve safety at the school, added an additional bulb on 5400 South.

2. Design Up – Determined existing cross section was sufficient, designed 11’ lanes, 3’ shoulders

3. Reduced Cost – Eliminated existing raised median at the elementary school to reduce project limits.
Success Indicators

Institutionalized Practical Design

• All projects have a clear objective statement.

• Every objective statement is clear.

• Project teams focus on improving the system as a whole, not just within their project limits.

• Project teams focus on meeting the objective statement.
Exceptions, Deviations, and Waivers

**Purpose:**
- Flexibility
- Documentation
- Tracking

**Keys:**
- Do Not Discourage.
- Provide more than enough information for approval.
- Include cost savings from maintenance, schedule, risk, etc.
Tools

- Value Engineering
- Context Sensitive Solutions
- Project Definition Document
- Project Status Report
- Objective Statement Development Guide
- Scoping Phase – Suggested Questions Checklist
Project Definition Document

• To document project objective statement and constraints
• Documents planning process
• Completed by the Project Definition Team
• Use to gain support from the Project Sponsor, Project Team, and Advisory Team Members.
• Key Info Included:
  - Objective Statement
  - Constraint Matrix (Scope/Schedule/Budget)
  - Project Team Members & Advisory Team Members
Project Definition Document

<table>
<thead>
<tr>
<th>Project Definition Document</th>
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<tbody>
<tr>
<td><strong>Description</strong></td>
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<tr>
<td><strong>Location</strong></td>
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<tr>
<td><strong>PIN</strong></td>
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<tr>
<td><strong>Project Objective Statement</strong></td>
</tr>
<tr>
<td><strong>Proposed Project Defined Benefits</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Constraint Matrix</strong></td>
</tr>
<tr>
<td><strong>Develop Preliminary Scope</strong></td>
</tr>
<tr>
<td><strong>Sponsor’s Expected Delivery Dates</strong></td>
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<tr>
<td><strong>Develop Preliminary Budget Estimate</strong></td>
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<thead>
<tr>
<th>Direct Project Team</th>
<th>Role</th>
<th>Name</th>
<th>Email</th>
<th>Phone 1</th>
<th>Phone 2</th>
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<tr>
<th>Advisory Project Team</th>
<th>Role</th>
<th>Name</th>
<th>Email</th>
<th>Phone 1</th>
<th>Phone 2</th>
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(1) Only applicable if "PM" is a member of the "Direct Project Team".
Project Status Report (COGNOS)

- To document decisions, commitments, and limitations
- Follows design, construction, and maintenance
- ePM
- Information input by any team member
- Update information often
- Information includes:
  - ✓ Project Goals
  - ✓ Limitations/Risks
  - ✓ Stakeholders
  - ✓ Coordinating Agencies
  - ✓ Project Costs
  - ✓ Project Commitments
  - ✓ Project Decisions
### Project Status Report (COGNOS)

<table>
<thead>
<tr>
<th>Project Name: I-15 Montalfet 16 Bridge Project</th>
<th>UDOT Project Manager: COGSINO, TROY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role</td>
<td>UDOT Construction Manager:</td>
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<tr>
<td>Project Number: 2011-021 (M)</td>
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<tr>
<td>Delivery Method: Design-Bid-Build</td>
<td>Consultant Project Manager:</td>
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<tr>
<td>M.C. Category: Structures Preservation/Maintenance</td>
<td>Organization: Organization</td>
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<tr>
<td>Project Phase: Construction Engineering</td>
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<tr>
<td>Project Sponsor: Utah DEPT. of TRANSPORTATION</td>
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<tr>
<td>Site Pool: NA</td>
<td>Consultant Resident Engineer</td>
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</tbody>
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#### Design Type
- Sill Bridge
  - Existing structure

#### Design Details
- Span 1 to 16
  - Existing structure
  - Reduction of 16 ft bridge
  - No new construction

#### Key Documents
- Preliminary Report
- Construction Drawings
- Plan Set

#### Construction Schedule
- Project Schedule
- Worked Across Lane Closure

#### Project Costs
- Cost Estimate
  - $0
- Expenditures
  - $0

#### Construction Type
- Cost Elements
  - Construction
  - Environmental
  - Preliminary Engineering
  - Construction Engineering
  - Miscellaneous

#### Project Summary
- Total
  - $0
- Project Status
  - Complete

#### Major Decisions
- 1. Design
- 2. Construction
- 3. Implementation
- 4. Maintenance

#### Minor Decisions
- 1. Design
- 2. Construction
- 3. Implementation
- 4. Maintenance

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**Nov. 16, 2011**

**UDOT Conference 2011 - Practical Design**
Objective Statement Development Guide

• Assist Project Definition Team develop the Objective Statement
• Located in the Practical Design Guide
• 5 Step Process
  1. Identify the current conditions.
  2. Determine the existing deficiencies. (Final Four deficiency)
  3. Identify the deficiencies to be improved.
  4. Determine the project objective.
  5. Clearly and specifically describe the objective statement of the project.
Scoping Phase – Suggested Questions Checklist

• Assist Project Team develop the project scope
• Located in the Practical Design Guide
• Questions focus on the following:
  1. Safety
  2. Corridor Context
  3. Optimize the System
  4. Public Support
  5. Efficient Cost
QUESTIONS AND COMMENTS