Slide Correction
Case Study: SR 105 in Huntington County

Presented by:
John Langmaid, INDOT
Jennifer Goins, P.E., HNTB
Outline

- Project Location & Background
- Design Topics
- Construction Topics
- Cost
- Successes & Lessons Learned
- Accolades
- Q&A
Project Location:
Huntington County, IN
Project Location:

SR 105
Project Scope

- Resurface: 3.23 mi
- Slide Correction: 0.18 mi
UNT to Silver Creek

Silver Creek
Cumulative Rainfall Map for June 2015
From weather.gov
Huntington Reservoir – on an average day
View of
Slide
June 2015
Pavement Step Down
June 2015
Height of Embankment

Skewed Cross Section at Existing Pipe

30’

38’
Outfall of Existing Pipe

June 2015
Outfall of Existing Pipe

June 2015
Downstream of Pipe
June 2015
Inlet of Existing Pipe

May 2015
Inlet of Existing Pipe

June 2015
Preventing A Future Slide

Picture looking South – Crack along EOPs
<table>
<thead>
<tr>
<th>Month</th>
<th>Event or Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2015</td>
<td>Slide occurs. Road closed.</td>
</tr>
<tr>
<td>November 2016</td>
<td>Environmental Approval</td>
</tr>
<tr>
<td>January 2016</td>
<td>Project Letting</td>
</tr>
<tr>
<td>March 31, 2016</td>
<td>Tree clearing complete</td>
</tr>
<tr>
<td>August 2016</td>
<td>Road open when school starts.</td>
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</table>
### Alternative Comparison

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Cost Estimate of Select Items</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3:1 fill slopes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Retaining walls halfway down and then 3:1 fill slopes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Retaining walls with no bench</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bridge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Retaining walls with 15’ bench</td>
<td></td>
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</tr>
</tbody>
</table>
Option 1 – 3:1 Fill Slopes

Alternative Comparison

Wide Footprint

Long Pipe
Ex 127’
Prop 218’
Option 1 – 3:1 Fill Slopes

Alternative Comparison
Option 2 – Retaining walls halfway down & then 3:1 slopes

Alternative Comparison

- Narrower Footprint
- Shorter Pipe
Option 2 – Retaining walls halfway down & then 3:1 slopes

Retaining Walls

15’ Bench

Alternative Comparison
Option 3 – Retaining walls with no bench

Alternative Comparison

Shortest Pipe

Narrowest Footprint
Option 3 – Retaining walls with no bench

Alternative Comparison

Build Retaining Walls on Existing Embankment

NOT FEASIBLE
Option 4 – Bridge

Alternative Comparison

No Pipe

Narrowest Footprint
Option 5 – Retaining walls with 15’ bench

Alternative Comparison

Excavate for Straps
# Alternative Comparison

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Cost Estimate of Select Items</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3:1 fill slopes</td>
<td>$229k</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Retaining walls halfway down and then 3:1 fill slopes</td>
<td>$380k</td>
<td></td>
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<tr>
<td>3</td>
<td>Retaining walls with no bench</td>
<td>$183k</td>
<td>Dismissed as not feasible</td>
</tr>
<tr>
<td>4</td>
<td>Bridge</td>
<td>$800k</td>
<td></td>
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<tr>
<td>5</td>
<td>Retaining walls with 15’ bench</td>
<td>$347k</td>
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</table>

**Selected**: 3:1 fill slopes
## Categorical Exclusion Level Thresholds

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<thead>
<tr>
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<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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<tbody>
<tr>
<td>Relocations</td>
<td>None</td>
<td>≤ 2</td>
<td>&gt; 2</td>
<td>&gt; 10</td>
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<tr>
<td>Right-of-Way</td>
<td>&lt; 0.5 acre</td>
<td>&lt; 10 acres</td>
<td>≥ 10 acres</td>
<td>≥ 10 acres</td>
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<tr>
<td>Length of Added</td>
<td>None</td>
<td>None</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Through Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent Traffic</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pattern Alteration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Alignment</td>
<td>None</td>
<td>None</td>
<td>&lt; 1 mile</td>
<td>≥ 1 mile</td>
</tr>
<tr>
<td>Wetlands</td>
<td>≤ 0.1 acre</td>
<td>&lt; 1 acre</td>
<td>≥ 1 acre</td>
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<tr>
<td>Stream Impacts*</td>
<td>≤ 300 linear feet of stream</td>
<td>&gt; 300 linear feet impacts, no</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td></td>
<td>impacts, no work beyond 75 feet</td>
<td>work beyond 75 feet from</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>from pavement</td>
<td>pavement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 4(f)</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Any impacts</td>
</tr>
<tr>
<td>Section 6(f)</td>
<td>None</td>
<td>None</td>
<td>Any impacts</td>
<td>Any impacts</td>
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<tr>
<td>Section 106*</td>
<td>“No Historic Properties Affected”</td>
<td>“No Adverse Effect” or “Adverse</td>
<td>N/A</td>
<td>If ACHP involved or Historic Bridge</td>
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<tr>
<td></td>
<td>or falls within guidelines of</td>
<td>Effect”</td>
<td></td>
<td>Involvement</td>
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<tr>
<td></td>
<td>Minor Projects PA</td>
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<tr>
<td>Noise Analysis Required</td>
<td>No</td>
<td>No</td>
<td>Yes&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Yes&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Threatened/Endangered Species</td>
<td>“Not likely to Adversely Affect”, or Falls within Guidelines of USFWS 9/8/93 Programmatic Response</td>
<td>N/A</td>
<td>N/A</td>
<td>“Likely to Adversely Affect”&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sole Source Aquifer Groundwater Assessment</td>
<td>Detailed Assessment Not Required</td>
<td>Detailed Assessment Not Required</td>
<td>Detailed Assessment Not Required</td>
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<td>Approval Level</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>ESM&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>FHWA</td>
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</table>
Section 106
Endangered Species:

Bats

Indiana Bat & Northern Long-eared Range

No tree clearing between April 1 to September 30 due to bat roosting season.
Design Criteria

- Resurface Partial 3R
- Slide Correction 3R
SR 105 Stats

- AADT (2016): 660 VPD
- AADT (2036): 850 VPD
- Trucks: 10.63% A.A.D.T.
- Design Speed: 55 mph
- Rural
- Major Collector
Two Design Exceptions Approved

1. Maximum Grade
   - Required: 7.5% Max (per IDM 55-3B)
   - Proposed: 9.1% (retain existing)

2. Vertical Stopping Sight Distance
   - Required: 495’
   - Proposed: 296’ (retain existing)
Design Exceptions

9.1% Grade

Slide Area
Steep Ditches in the Slide Area

Ditch Geometry
Steep Ditches in the Slide Area

40% GRADE

Ditch Geometry
Preventing A Future Slide

Picture looking South – Crack along EOPs
Preventing A Future Slide
Preventing A Future Slide

Cross Section looking North Longitudinal Cracks along Both EOP
Proposed R/W

3 Parcels
SR 105 Customer Survey

Parcel Number: ______________________

Date: _____________________________

KTM Interviewers: ____________________________________________________________

Property Owner Information / Tenant Information Secondary Contact?
Name: ______________________________ Name: ______________________________

Address: ___________________________ Address: _____________________________

___________________________________________________________________________

Home phone: _________________________ Home phone: _________________________

Cell phone: __________________________ Cell phone: ___________________________

Email: ______________________________ Email: _______________________________

Preferred Method: ____________________ Preferred Method: ____________________

1. What time of day do you prefer we contact you? Or not contact you?

2. How do you access your property?
<table>
<thead>
<tr>
<th>S</th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>T</th>
<th>F</th>
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<tr>
<td>Nov 15</td>
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<td>17</td>
<td>18</td>
<td>19</td>
<td>CE Approval</td>
<td>20</td>
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<tr>
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<td></td>
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<td>Appraisals Complete</td>
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<td>28</td>
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<tr>
<td>29</td>
<td>30</td>
<td>Dec 1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>Review</td>
<td>Appraisals Complete</td>
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<td>Desk Reviews Complete</td>
<td>Buying Begins</td>
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<td>12</td>
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<td></td>
<td>RoEs Signed / R/W Certified</td>
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</tbody>
</table>
Slide Area
Construction Photos
Construction Access
Begin Clearing
March 8, 2016
Excavation of Slide Area
Drying On-site Borrow with Lime = Major Reduction in Downtime
Expect the unexpected…

Dealing with shelf of trapped water
Road Open
July 24, 2016
Plans Vs. Google Map
Aerial of Completed Project
Financials

- Original SPMS Budget $2,741,250
- Engineer’s Estimate $1,785,000
- Low Bid – E&B Paving, Inc. $1,191,339.07
- Final Close-Out Cost $1,165,420.48
Lessons Learned

- Emergency Project Designation
- Challenge with permits
• Property Owner Meetings
• Kickoff meeting with R/W Appraiser, Review Appraiser, & Buyer
• Right of entries
• Addition of lime to help dry soil
• Change Orders
  • One on resurface project
  • Zero on slide project
• Partnership & Cooperation of the Entire Agency
Design Accolades

- INDOT Ft. Wayne District
- INDOT Geotechnical Services
- INDOT Hydraulics
- INDOT Environmental Services
- INDOT Cultural Resources
- INDOT R/W
- HNTB Design, Environmental, Survey, R/W Engineering
- Weintraut & Associates – Section 106
- Atlas Appraisals - Appraisals
- Will L. Stump & Associates – APA & Appraisal Reviews
- CPS Acquisitions – Buying
Construction Accolades

- INDOT Contracts
- E&B Paving, Inc., Prime Contractor
- Fox Contractors Corp., Earthwork Contractor
- Curtis Reimer, Project Supervisor
- Brad Taylor, Area Engineer
Thank you / Questions

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