A Sneak Peek at New Criteria for INDOT Bridge Waterway Design

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A Sneak Peek...

New Design Criteria

Based on OPENROADS

Only for bridge replacement projects
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New Design Criteria

... are not final!

Remaining steps:

• Final Hydraulics review
• Review by FHWA
• Publish in IDM
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Backwater...

ONE FOOT
A Sneak Peek…

**Backwater…**
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**Backwater…**

First assess the existing backwater

**Basic backwater criteria:**

<table>
<thead>
<tr>
<th>If the existing backwater is…</th>
<th>The allowable backwater will be…</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 3 feet</td>
<td>3 feet or less</td>
</tr>
<tr>
<td>Between 0.14 and 3 feet</td>
<td>Match or improve existing</td>
</tr>
<tr>
<td>Less than 0.14 feet</td>
<td>Up to 0.14 feet</td>
</tr>
</tbody>
</table>

This can be affected by other factors →
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**Backwater: Check velocity...**

Requires judgment

Evidence of instability?

*If the existing bridge is unstable, the average velocity in the proposed bridge waterway should be \( \leq 1.5 \times \) the downstream channel velocity.*
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Backwater: U/S structures...
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Backwater: U/S structures...

- Lowest adjacent land grade
- “Natural” water surface elevation
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**Backwater: U/S structures...**

- **Lowest adjacent land grade**
- **Existing backwater**
- **1’ below lowest adjacent land grade**
- **“Natural” water surface elevation**
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**Backwater: U/S structures…**

- Lowest adjacent land grade
- Proposed backwater (maybe…)
- 1' below lowest adjacent land grade
- “Natural” water surface elevation
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**Backwater: Waterway areas...**

Gross Waterway Area
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**Backwater: Waterway areas...**
A Sneak Peek…

**Backwater: Waterway areas…**

Request plans at:  http://www.in.gov/indot/2345.htm
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Other Criteria: Freeboard...

Current criteria:
Ideal is 2’ or...
maybe 1’ or...
maybe 3’

New criteria:
What do I want to achieve?
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**Other Criteria: Freeboard**

Goal: Meet the existing criteria

Three possibilities:

1. The existing low structures is above the goal
2. The existing low structure is in pressure flow
3. The existing low structure is above the 1% EP elevation, but no pressure flow
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Other Criteria: Freeboard...

Matching existing freeboard

0.81’

Debris issues?

Yes: Meet the current criteria
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Other Criteria: Freeboard...

Matching existing freeboard

Debris issues?

Yes: Meet the current Criteria

No: Can match the PROFILE

0.81'
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More Criteria:

**Spans:**
1.) Number of spans not increased
2.) Spans between piers not decreased
3.) Total out-to-out span not decreased

**Slopes:**
1.) Change from vertical to sloping abutments allowed, but
2.) Check 10% EP to make sure elevation not increased

**Road Overflow:**
1.) Include impacts of changes to guardrail / barrier rail
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New Design Criteria…

Coming to an IDM near you – It’s just a matter of time!