The Road Less Traveled: Implementing Nontraditional BMPs for Transportation Projects
Today’s Discussion

- Pro’s and Con’s integrating non-traditional approaches
- Review 2 case studies
- Cost comparison with non-traditional options
Non-Traditional BMPs

- **Pro’s and Con’s of implementing**

<table>
<thead>
<tr>
<th>PRO</th>
<th>CON</th>
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<tbody>
<tr>
<td>Project can move forward</td>
<td>May need EPA approval</td>
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<tr>
<td>Might get higher level of treatment</td>
<td>Complex Construction</td>
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<tr>
<td>You get to think outside the box</td>
<td>Added schedule/budget implications</td>
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<tr>
<td>May have less R/W impact</td>
<td>May need additional R/W or agreements</td>
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Non-Traditional BMP Case Studies

- City of Green, Massillon Road
- Orange Township, E. Powell Road
City Vision
- Beautify the corridor
- Handle increased vehicle and pedestrian volume

Project
- Urban Principal Arterial
- Design Speed 40 mph
- ADT (2035) 41,390
- Corridor is very full and finding a location for BMPs was difficult
Available for BMP

- The median
- The pavement crown
  - reversed to sheet flow runoff to the median
- Curb cuts
  - allow water into the BMP
The Catch! (there is always one)

- 6% longitudinal slope
- Available median width of 20 feet
- With traditional at-grade level ponding the side slopes would be too steep even with short terrace lengths
- Even with new sloped bioretention, there would not be enough room for conveyance above the dike
- Guardrail would be required
  - Detracts from the City’s beautification vision
Massillon Road: The Fix

- What If …. process to vet alternatives

- Non-Traditional BMP
  - Hold side slope to maintain clear zone grading
  - Terrace the bioretention below grade
  - Use clean coarse aggregate over the cell
  - Use the void space in the aggregate to store the WQv
Massillon Road
Plan View

- BMP UNDER CHANNEL*
- CLAY DAM
- CURB
- CONCRETE WEIR WITH 6" PIPES THROUGH
- TIED CONCRETE BLOCK MAT
- GRASS/PLANTINGS
- 22' MEDIAN
Massillon Road
Profile View

CLAY DAM

CLEAN AGGREGATE OVER MEDIA

OBSERVATION WELL/CLEANOUT

DIKE

TERRACE BMP MEDIA

BMP MEDIA
- Pretreatment via forebay formed by modified Type 6 Curb
- Subsurface openings in curb allow WQv to pass through weir
- Higher flows pass over the weir wall
Making the City’s Vision a Reality

- **Pro’s:**
  - Have a viable BMP to move the project forward
  - Fits within the project boundary
  - Fits within the City’s Vision for the corridor

- **Con’s:**
  - Construction will be more complex
  - Maintenance will be more complex

- **Cost:**
  - Construction cost will be higher
  - Maintenance will be more expensive
Orange Township, E. Powell Road

- **County Needs**
  - Address increased vehicle and pedestrian traffic
  - Limit R/W takes

- **Project**
  - Urban Collector
  - Design Speed 45 mph
  - ADT (2035) 17,800
BMP Challenge

- Road transitions from open ditches to curb and gutter with sidewalks and allowance for shared use path
- A goal of the project was to minimize R/W even if it meant building retaining walls
- Finding a location for BMPs was difficult and expensive
Proposed Cross Section
## Alternatives Comparison

<table>
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<tr>
<th>Alternatives Comparison Table</th>
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<tbody>
<tr>
<td><strong>Traffic Flow Through Intersection</strong></td>
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<td><strong>Right-of-Way Impacts</strong></td>
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<tr>
<td><strong>Spill Design (Reduced Crashes)</strong></td>
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<td><strong>Public Maintenance Costs</strong></td>
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<td><strong>Maintenance of Traffic During Construction</strong></td>
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<tr>
<td><strong>Pedestrian Bike Accommodations</strong></td>
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<td><strong>Existing Facility Impacts</strong></td>
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### Evaluation Criteria

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<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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*Image of a bicycle and a pedestrian icon.*
Delaware County came up with the concept of using off-site treatment.

The County studied the area and found an older subdivision that had a flood control pond, but no post construction BMPs.
The pond is about 800` upstream of one of the project’s major storm sewer crossings.
The WQv needed for this section of the project was 0.23 Ac-Ft.
The WQv needed for the subdivision pond was 0.67 Ac-Ft.
By modifying the outlet structure, 0.68 Ac-Ft of storage was available.

This amounted to 103% of what was needed for the subdivision and 295% of what the project needed.
East Powell Road
The Design Elements

6" THICK CONCRETE WEIR WITH V-NOTCH CENTERED IN BASIN

GRATE 964.50

TOP OF WEIR 962.67

BOTTOM OF WEIR & 24" DIA. OPENING E 961.92

CONCRETE MASONRY
Making the County’s Vision a Reality

- **Pro’s**
  - No additional R/W within the project
  - Straight forward construction
  - Potentially a higher level of treatment

- **Con’s**
  - Need easement to inspect and maintain basin
  - Requires special approval

- **Cost**
  - Construction cost lower than many other alternative
  - Maintenance cost about normal
Cost Comparison

- **Subsurface Bioretention**
  - More expensive option than traditional bioretention
  - Construction and maintenance
  - 25% to 50% more expensive than at grade bioretention

- **Off-site Retention Basin Retrofit**
  - More cost effective than other alternatives
  - $10,000 Project
Final Takeaways – Non-traditional BMP’s

- OEPA approval may be needed
- Design schedule may be effected
- Construction can be more complex
- Cost can go either way
Thank you for listening!

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