I-71 Operational Improvements
October 28, 2015
Agenda

• Background
• Goals
• Improvement Alternatives
• Alternatives Testing Tool
• Conclusions
Background

• 2006 – began **Uptown Study**
  • Comprehensive look at transportation needs throughout Uptown Cincinnati
  • Recommended improved access near Martin Luther King Drive

• 2009 – began **Uptown Access Study**
  • Build upon Uptown Study
  • 2009 to 2010 – Initial Studies
  • 2010 to 2012 – Development of Alternatives
Background

- 2009 – began *Uptown Access Study (Continued)*
  - 2013 – Alternatives Engineering Report
  - 2013 – Interchange Justification Study
  - 2012 to 2014 – Detailed Design

- Recommended:
  - New Interchange at Martin Luther King Drive
  - Maintain existing access at Taft Road
  - Maintain existing access at McMillan Street
Background

• In 2013…
  • completed I-71 at Martin Luther King Drive Interchange Justification Study
    • 2 Segments of I-71 operate at LOS F in Design Year
  • Approved…But!
  • Must Study Ramp Meters to improve LOS in Design Year
Background

- In Summer 2013…
  - District 8 – Ramp Meter Feasibility Study
    - MLK Interchange Area – to Satisfy
    - Downtown Cincinnati to Lebanon – to Satisfy
  - Contracted
Goals

• will study 27 Miles of I-71
  • Downtown Cincinnati to SR 48
  • Primary Improvement Alternatives
    • Ramp Meters
    • Metered Traffic Queue Storage

Identify ramp metering improvements needed to ensure I-71 operates at LOS E, or better, in 2039
Improvement Alternatives

- Ramp Metering
- Ramp Metering with Queue Storage

**Initial Tests:**
Ramp Metering alone would not maintain LOS E, or better, in 2039

- Operational Improvements – i.e. Auxiliary Lanes
- Combination of all 3
Alternatives Testing Tool

No Tool Available to Test a Combination of these 3 Strategies

• basis for the ARCADIS developed Alternatives Testing Tool

• 3 Types of Data in the Tool

• LOS Results Confirmed in

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Alternatives Testing Tool Process

1. **Input Design Year Data**
   - Segment Speed Limit
   - # Lanes
   - Segment Length
   - DHV

2. **Outputs**
   - Capacity
   - Operating Speed
   - Density
   - LOS

3. **Check LOS**
   - Worse than F?

4. **Meter Traffic**
   - No Additional Ramp Queue Storage

5. **Check LOS**
   - Worse than F?

6. **Propose Additional Queue Storage**

7. **Check LOS**
   - Worse than F?

8. **Auxiliary Lane**
   - Meter Less Traffic

9. **Check Queue Length**
   - Check LOS

10. **Potentially Remove Proposed Additional Queue Storage**
Alternatives Testing Tool

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<th>Posted Speed Limit</th>
<th>Existing # Lanes</th>
<th>Length</th>
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We Need To Test Improvement Strategies
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Test Ramp Meters, Then Test With Queue Storage

Ramp Meters & Queue Storage not Enough
## Alternatives Testing Tool

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**Test Auxiliary Lane**

**Auxiliary Lane with Ramp Meters & Queue Storage**

**But do we need to meter so much traffic?**
### Alternatives Testing Tool

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- Test Auxiliary Lane without Ramp Meters & Queue Storage
- We Still Need some Ramp Metering & Queue Storage
Alternatives Testing Tool

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Test Auxiliary Lane with less Metered Traffic  
Success!

But...Did We Need Queue Storage?
## Alternatives Testing Tool

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<th>Volume Served (veh/h)</th>
<th>Volume Queued</th>
<th>Queue Length</th>
<th>Cycle Length</th>
<th>Storage Available</th>
<th>Ramp Widened?</th>
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Queue Length Exceeds Existing Storage

We Need Additional Queue Storage
Design Year Analysis

- AM No-Build – MLK Interchange Constructed
Design Year Analysis

- PM No-Build – MLK Interchange Constructed
Design Year Analysis

- AM Build – MLK Interchange Constructed
Design Year Analysis

- PM Build – MLK Interchange Constructed
Design Year Analysis – Northbound

- AM Travel Time

- PM Travel Time
Design Year Analysis - Southbound

• AM Travel Time

• PM Travel Time
Conclusions

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<th>Year</th>
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5 Miles Southbound
3 Miles Southbound
Conclusions

AM Peak Hour

• Northbound
  • Travel Time – 50% < No-Build
  • Throughput – 10% > No-Build

• Southbound
  • Travel Time – 60% < No-Build
  • Throughput – 15% > No-Build

PM Peak Hour

• Northbound
  • Travel Time – 60% < No-Build
  • Throughput – 30% > No-Build

• Southbound
  • Travel Time – 65% < No-Build
  • Throughput – 5% > No-Build
Questions/Discussion
Thank you!

**BRIANNE HETZEL, PE**  
The Ohio Department of Transportation Project Manager  
[Contact Information]

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**CRAIG HEBEBRAND, PE**  
ARCADIS Project Manager  
[Contact Information]