For Discussion and Consideration

- Introduction to Ramp Metering
- Benefits and Issues
- Feasibility Study for Charlotte Metro Area
- Cost Sharing Proposal
**Introduction**

**What is a Ramp Meter?**
- Monitors the flow of traffic on the freeway and on-ramp
- Manages the flow onto the freeway by briefly stopping vehicles on the on-ramp

**Benefits of Ramp Metering**
- Reduce Congestion
- Reduce Crashes
- Low Cost Operational Strategy

**How do Ramp Meters do this?**
- Reduce the flow rate of vehicles onto the freeway
- Reduces the platoon size entering the freeway to make merging easier

**Where Does Ramp Metering Work?**
- At locations where freeway congestion is primarily caused by traffic merging from ramps.
Ramp Metering Video

• KC Scout (KDOT and MoDot)

http://youtu.be/TQOrP8tA4BY
## Reported Benefits of Ramp Meters

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Location and Result</th>
</tr>
</thead>
</table>
| Travel time             | **Atlanta** – 10% decrease in peak period  
                          | **Houston** – 22% decrease in peak period  
                          | **Arlington** – 10% decrease in peak period |
| Travel speed            | **Milwaukee** – 35% increase in peak period  
                          | **Portland** – 155% increase in peak period  
                          | **Detroit** – 8% increase  
                          | **Los Angeles** – 15 mph increase |
| Crash rate              | **Phoenix** – 16% decrease during metered hours  
                          | **Milwaukee** – 15% decrease in peak period  |
| Crash frequency         | **Portland** – 43% decrease  
                          | **Sacramento** – 50% decrease  
                          | **Los Angeles** – 20% decrease  |
| Driver hours saved      | **Sacramento** – 50% decrease  
                          | **Los Angeles** – 8,470 hours per day  |
| Vehicle volume          | **Milwaukee** – 22% increase in peak period  
                          | **Sacramento** – 5% increase in peak period  
                          | **Detroit** – 14% increase in volume  
                          | **Los Angeles** – increase of 900 vehicles per day |
| Gallons of fuel saved   | **Portland** – 700 gallons per weekday  |
| Emissions reduction     | **Minneapolis** – reduction of 1,160 tons annually  |
| Benefit-Cost ratio      | **Atlanta** – about 4:1 in year 1, about 20:1 after 5 years  |
Possible Issues with Ramp Metering

**Concerns**
1. Traffic backups on cross streets
2. Route diversion
3. Impact on travel time

**Solutions**
1. Design and System software selection
2. Signal timing
3. Siting and design
Overview of Feasibility Study

- Cabarrus, Gaston, Iredell, and Mecklenburg Counties
- Approximately 245 on-ramps on I-77, I-277, I-85 & I-485
- Screening analysis to determine the optimum sites for ramp metering
- More detailed analysis of as many as 50 of those locations
Scope of Work

- Perform detailed analysis of both the freeways and arterials
- Estimate delay reduction and financial benefits due to the installation of ramp metering
- Develop an implementation plan (with costs) that ranks potential ramp metering projects by county
From Triangle Ramp Metering FS:

- National Research Report
- Legal and Legislative Review
- Typical Design Criteria
- Marketing and Outreach Plan
Steering Committee

- NCDOT TPB, TM&S
- MPO Representatives
- Local Jurisdictions
Proposed Cost Breakdown

- Total Estimated Cost = $700,000
- TPB funding (75%) = $525,000
- Prorated CRTPO Funds = $152,857
## Proposed Cost Breakdown

#### Charlotte Metro Ramp Metering Feasibility Study

### Proposed Local Match Summary

<table>
<thead>
<tr>
<th>County</th>
<th>Route</th>
<th>Exits</th>
<th>On-Ramps</th>
<th>Percent</th>
<th>Pro Rata Share</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meck</td>
<td>I-77</td>
<td>25</td>
<td>54</td>
<td>78%</td>
<td>$136,429</td>
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<tr>
<td>Meck</td>
<td>I-85</td>
<td>13</td>
<td>39</td>
<td>7%</td>
<td>$11,429</td>
<td>All</td>
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<tr>
<td>Meck</td>
<td>I-277</td>
<td>10</td>
<td>20</td>
<td>6%</td>
<td>$10,714</td>
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<tr>
<td>Meck</td>
<td>I-485</td>
<td>32</td>
<td>78</td>
<td>9%</td>
<td>$16,429</td>
<td>All</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td>191</td>
<td>87%</td>
<td>$152,857</td>
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<td></td>
</tr>
<tr>
<td>Iredell</td>
<td>I-77</td>
<td>10</td>
<td>23</td>
<td>9%</td>
<td>$16,429</td>
<td>South of I-40 to Meck County Line</td>
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<tr>
<td><strong>CRTPO Subtotal</strong></td>
<td></td>
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<td>87%</td>
<td>$152,857</td>
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<tr>
<td>Gaston</td>
<td>I-85</td>
<td>8</td>
<td>16</td>
<td>7%</td>
<td>$11,429</td>
<td>From US 321 North to Meck County Line</td>
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<tr>
<td>Cabarrus</td>
<td>I-85</td>
<td>7</td>
<td>15</td>
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<td>All</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td>245</td>
<td>100%</td>
<td>$175,000</td>
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Request

The TCC recommend using CRTPO Planning Funds to cover prorated share

Questions?