Alternative Intersections
&
GDOT’s ICE Policy

Chris Raymond, P.E.
State Traffic Operations Manager
Overview

- Alternative Intersections
  - Types
  - Benefits & Applicability
  - Examples

- GDOT’s ICE Policy
  - Policy
  - Process
Intersection Control Types

- Minor Stop / Two-Way Stop Control
- All-Way Stop Control
- Signalized Intersection
- Roundabout
- RCUT
- MUT
- RIRO
- Jug Handle
- Quadrant Roadway
- Continuous Green T
- Displaced Left Turn (DLT, CFI)
- Innovative Interchanges (SPUI, DDI, roundabouts)
Roundabouts

- Circulatory roadway
  - Slow Speed
  - Entry Deflection
- Central island
  - Truck Apron
  - Landscaping
- Splitter islands
  - Pedestrian refuge
- Yield on approaches
- Mini, Single-Lane or Multi-Lane

SR 18 @ SR 87, Monroe County, GA
• Open to traffic = August 2016
• ICD = 70’

$189,400 Quick Response Project
• Open to traffic = August 2018
• ICD = 74’

For both: $398,818 Quick Response Project
Quick Response/Maintenance Funds

- GDOT Maintenance: $41,800
- Quick Response: Grading work $199,900
  - Included Lighting: $37,560
- Open to traffic = March 2015
- ICD = 120’
- Landscaping = Spring 2017 (additional $3,445)

$241,669 Quick Response/Maintenance Funds
• Raised concrete central island + splitters added in April 2016 through Quick Response Project

• ICD = 90’

$152,430 Quick Response Project
Benefits

• Can improve safety
  – Vehicle
  – Pedestrian/Bicyclists

• Can improve operations
  – Higher capacity, less delay

• Can reduce footprint

<table>
<thead>
<tr>
<th>Traffic Control Prior to RBT</th>
<th>% Reduction in Injury Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signalized</td>
<td>78</td>
</tr>
<tr>
<td>All-Way Stop</td>
<td>46</td>
</tr>
<tr>
<td>Two-Way Stop</td>
<td>82</td>
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</tbody>
</table>

NCHRP 672, Exhibit 5-15

Chance of pedestrian death if hit by a motor vehicle

- 20 mph (32 km/h): 5%
- 30 mph (50 km/h): 40%
- 40 mph (65 km/h): 80%
- 50 mph (80 km/h): 100%

NCHRP 572, Table 28
• 60+ On state routes/built with GDOT $$
  • 45+ single lane/compact
  • 5+ multi-lane/hybrid
  • 10+ mini
• 20+ under construction
• 70+ in design
• 90+ in concept

• 165+ On local roads

• 250+ Other circular intersections
Roundabouts@dot.ga.gov

http://www.dot.ga.gov/DS/SafetyOperation/Roundabouts
Right-in Right-out (RIRO) with Downstream U-Turns

- No left turns or through movements from side street
- Make right turn then U-turn instead
- No left turns into side street, also use U-turn

Benefits
- Improved safety
- Reduces queueing on side street
Reduced Conflict U-Turn (RCUT)

- Prevents left turns and through movements from side street
- Make right turn and use U-turn instead
- Allows left turns into side street
Benefits

- Improved safety over TWSC
- Reduces queueing on side street
- Often easy retrofit - cheaper

32 Total
8 Merging
8 Diverging
16 Crossing

18 Total
8 Merging
8 Diverging
2 Crossing

FHWA RCUT Informational Guide, Exhibit 4-3. Vehicular conflict points
Status in GA

- 35+ Existing
- 15+ Design/under construction
- 25+ Under consideration
  - 1 signalized

Total: 70+
Median U-Turn (MUT)

- No left turns, only throughs and right turns
- Make right then use U-turn
- U-turns signalized/unsignalized
Median U-Turn (MUT)

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FHWA: [https://safety.fhwa.dot.gov/intersection/innovative/uturn/](https://safety.fhwa.dot.gov/intersection/innovative/uturn/)
Benefits

- Improved safety over traffic signal & AWSC
- Reduced signal phases
- Good alternative with existing wide medians
- Easily used in corridor with other alt. intersections
  - Roundabouts
  - RCUTs
  - RIRO
High-T/Continuous Green-T

- “Top” through movement separated from other, operates continuously
- Channelized left turn from side street

Benefits & Applicability
- Good alternative when high through volumes in one particular direction
- Relatively easy conversion with existing wide median
Quadrant Roadway

- No direct left turns at main intersection
- All left turns rerouted to connector, quadrant roadway
- Both junctions of connector road typically signalized
- All signals coordinated

**Benefits & Applicability**

- Good where there are heavy through volumes
- Reduces delay at severely congested intersections
- Simple two phase signal at main intersection
- More appropriate as a spot treatment
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Continuous Flow Intersection (CFI)

- Left turning traffic crosses opposing lanes in advance of main intersection at a signalized cross-over intersection
  - Displaced Left Turn (DLT)
- Left turns at same time as through movements
- Can have varying # of displaced left turns
Continuous Flow Intersection (CFI)

- Left turning traffic crosses opposing lanes in advance of main intersection at a signalized cross-over intersection
  - Displaced Left Turn (DLT)
- Left turns at same time as through movements
- Can have varying # of displaced left turns

SR 400 @ SR 53, Dawson County, GA
Benefits

• Reduced # signal phases
• Good alternative on high volume roadways
• Improved safety over conventional traffic signal
Status in GA

- 1 Existing
- 1 Design/under construction
- 4 Under consideration

Total: 6
Diverging Diamond Interchange (DDI)

- Vehicles shifted to left side of road
- Allows free flow lefts on to freeway
- Allows partial free flow lefts off of freeway

Gwinnet County website
Benefits

• Especially good where left turning volume high
• Reduce # signal phases
• Improved safety over conventional interchange
• Viable alternative to bridge widening for capacity increase
Status in GA

- 6 Existing
- 2 Design/under construction
- 10+ Under consideration

Total: 17+
Single-Point Urban Interchange (SPUI)

- One signalized intersection
- Left turns onto freeway can be simultaneous
Benefits

• Simpler sequence phasing for signal
• Increased capacity
• Easier to coordinate with upstream/downstream signals
• Requires less right-of-way than conventional diamond interchange, DDI or roundabout interchange
Intersection Control Evaluation

ICE
GDOT Mission Statement

Deliver a transportation system focused on innovation, safety, sustainability and mobility
Why ICE??

Integrate safety into our decision making process for intersection control on ALL projects.

75% of all crashes in GA are intersection related.
The purpose of ICE is to provide:

- **Traceability**
- **Transparency**
- **Consistency**
- **Accountability**
ICE is a **policy** and a **process**

**Policy**

Establishes the general applicability and future effect; sets forth a course of action, plan or procedure.

**Process**

Describes the framework and methodologies by which a Policy can be successfully implemented.
Implementation

• ICE is required for all projects that do not have concept approval by July 1, 2017
Intersection Control Evaluation

THE POLICY
## Requirements & Waiver

<table>
<thead>
<tr>
<th>Not Required</th>
<th>Required</th>
<th>Waiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>No changes to intersection footprint or control</td>
<td>Project is on State route/NHS and/or uses State or Federal money</td>
<td>ICE <em>may</em> be waived based on appropriate evidence and a written request</td>
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</table>
Approvals

**Level 1: Chief Engineer (or Designee)**
- Projects going through Plan Development Process
- New or revised signal permits
- New median openings

**Level 2: District Engineer with notification to Chief Engineer**
Projects that are not level 1 where:
- Leg is added to intersection
- Intersection control will be changed

**Level 3: District Engineer**
- QR, Driveway Permits, Maintenance Work that does not qualify as level 2
Intersection Control Evaluation

THE PROCESS
ICE – The Process

Stage 1
Screening

Screening effort to eliminate non-competitive options and identify alternatives for further consideration

Stage 2
Alternative Selection

Detailed evaluation of the alternatives identified in Stage 1 in order to support the selection of the preferred alternative that will be advanced to detailed design

ICE
Stage 1 - Screening

Unsignalized

- Minor Stop
- All-Way Stop
- Mini Roundabout
- Single Lane Roundabout
- Multilane Roundabout
- RCUT
- RIRO w/Downstream U-Turn
- High-T (unsignalized)
- Offset-T Intersections
- Diamond Interchange (Stop)
- Diamond Interchange (RAB)
- Turn Lane Improvements
- Other
Stage 1 - Screening

Signalized

- Signal
- Median U-Turn
- RCUT
- Displaced Left Turn (CFI)
- Continuous Green-T
- Jughandle
- Diamond Interchange (signal)
- Quadrant Roadway
- Diverging Diamond
- Single Point Interchange
- Turn Lane Improvements
- Other
Stage 1 - Screening

1. Does alternative address the **project need** in a **balanced manner** and **in scale** with the project?

2. Does alternative **improve safety performance** in terms of reducing severe crashes?

3. Does alternative incorporate **safety, convenience** and **accessibility** for **pedestrians and/or bicyclists**

4. Does alternative **improve (or preserve) traffic operations** (congestion, delay, reliability, etc.)?

5. Does alternative **appear feasible** given the site **characteristics, constrains and location context**?

6. Does alternative **appear feasible** with respect to **other project factors**?

7. **Overall feasible alternative?**
Stage 2 - Alternative Selection

- Total Project Cost
- Traffic Operations
- Safety Analysis
- Environmental Impacts
- Stakeholder Posture

Preferred Alternative
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(Plan/Concept Review & RAID)

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Questions??