2 Review of Large Circular Intersections

Opportunities
- Supporting/creating unique land use pattern around circle
- Place-making/Public space opportunity inside circle
- Joining more intersecting streets than a conventional intersection

Potential Challenges
- Safety
  - Rear-end crashes at entries if priority given to entering traffic
  - Side-swipe crashes at exits if lane-changing within circle is allowed
- Crash severity concerns related to high entry speed
- Operations
  - Potential for gridlock if priority given to entering traffic
  - Weaving issues if lane-changing within circle is allowed

3 Designing a Large Circle That Operates Like a Roundabout

Key design considerations
- Design speed – limited to 35 mph
- Exit radius – design for speed similar to circulating speed
- Entrance angle – limit entry speed, encourage “gap-seeking” vs. “merging” behavior
- Avoid path overlap

The Big Circle
Is Not Dead

Jonathan DiGioia
AECOM

1 Background

- Need and purpose:
  - Place-making opportunities at the intersection of Pleasant Hill Road and Satellite Boulevard
  - Economic redevelopment
  - Handle design year traffic

- Context:
  - Existing large suburban signalized intersection
  - AECOM tasked with feasibility study of a concept developed previously by another consultant

- Goals:
  - Further develop the traffic circle concept introduced in a previous planning study
  - Investigate its potential to contribute to place-making and economic redevelopment goals
  - Compare with other alternative intersection types

Acknowledgements:
Gwinnett Place CID, Mark Lenters, Purvil Patel, Erick Fry

Network approach -- analyzed interaction with upstream and downstream intersections

Potential Challenges
- Network approach -- analyzed interaction with upstream and downstream intersections
- Analysis method:
  - Determined critical gap acceptance based on HCM and FHWA-SA-15-070
  - Applied that value in Vissim models
  - Gap acceptance considerations:
    - Gap acceptance a critical issue for analysis of circles like this one
    - For planning level
    - Truck gap acceptance is very high, so may not be acceptable for applications with high truck percentages

5 Results & Conclusions

Travel Time Comparison

<table>
<thead>
<tr>
<th>Direction</th>
<th>From Intersection</th>
<th>To Intersection</th>
<th>Move-</th>
<th>Existing</th>
<th>Unsignal-</th>
<th>Signal-</th>
<th>Bypass</th>
<th>Traffic Circle</th>
<th>CFI</th>
<th>DLT</th>
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Conclusions
- A large circle can uniquely contribute to place-making goals while addressing traffic demands.
- Operational concerns commonly associated with large circles can be mitigated by designing to operate like a modern roundabout.

4 Analysis

Legend
- green = travel time decreased
- red = travel time equivalent
- orange = travel time increased

Alternative 1: Yield Entry
Alternative 2: Signalized Entry
Alternative 3: Yield Entry + Thru Bypass
Alternative 4: Continuous Flow Intersection (CFI)

Alternatives Discussion
- Of the circle alternatives considered, only the yield-entry bypass alternative handled traffic adequately (a key project priority)
- The continuous flow intersection (CFI) also handled traffic adequately
- For pedestrian access to the center island, all three circle alternatives could be fitted with pedestrian signals and/or pedestrian bridges/tunnels
- Compared with the CFI, the yield-entry bypass circle alternative provided superior economic re-development and place-making potential and also handled traffic better; however, it also came with significantly higher costs and property impacts compared with the CFI.

Traffic Methodology
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- Analysis method:
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Citations