MINI ROUNDBOUTS
AND
NEIGHBORHOOD TRAFFIC CIRCLES

NCTCOG Public Works Roundup
May 21, 2019
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Agenda

• Definitions of Mini Roundabout and Neighborhood Traffic Circle
• Comparison of Mini Roundabout and Neighborhood Traffic Circle
• Benefits of Mini Roundabout and Neighborhood Traffic Circle
• Site Selection for Mini Roundabouts
• City of Burleson Case Studies
  o Summercrest Traffic Circle
  o McAlister Mini Roundabout
• FHWA Mini Roundabout Study Results
• Examples and Costs
• Temporary Mini Roundabouts
• Questions
Mini Roundabouts

- Small Roundabouts with fully transversable central island
- ICD: 50 FT – 90 FT
- Minimal increase to existing footprint
- Splitter islands to direct traffic
- Yield Entry
- Target Speeds between 15-20 MPH
- Pedestrian crossings

Source: Mark Lenters
Mini Roundabouts

- Trucks may need to pass over central island.
- Splitter islands.
Neighborhood Traffic Circle

- Intended as a traffic calming measure
- Built within existing intersection footprint
- Minimal to no deflection angle at approaches
- Operates as a “rolling stop”
- Largest vehicle bus or fire truck
- Central island has landscape
Neighborhood Traffic Circle vs Roundabout

<table>
<thead>
<tr>
<th>Neighborhood Traffic Circle</th>
<th>Mini Roundabout</th>
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<tbody>
<tr>
<td>• Traffic calming measure</td>
<td>• Traffic control measure</td>
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<tr>
<td>• Can be built within existing intersection footprint</td>
<td>• Larger than traditional intersection</td>
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<tr>
<td>• No Splitter islands/Minimal to no deflection angle at approaches</td>
<td>• Splitter islands to reduce speeds and channelize traffic entering</td>
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<td>• Operates as a “rolling stop”</td>
<td>• Low entry speeds</td>
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<td>• Bus or Fire Truck largest vehicle</td>
<td>• Larger radius on entry and exits for fire trucks and buses</td>
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<td>• Central Island has landscape</td>
<td>• Mountable truck aprons for large trucks</td>
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<td>• Increases Capacity</td>
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Increasing Capacity
Benefits of Mini Roundabouts and Neighborhood Traffic Circles

• Reduced delay compared to stop control (AWSC)
• Traffic calming at intersection or along corridor
• Compact Size – fits within existing right-of-way
• Low cost
• Improve traffic safety
• Meet needs of pedestrians and bicyclists
• Aesthetics/Gateway Opportunities
Site Selection – Mini Roundabout

- Daily entering volumes will not exceed 15,000 vpd
- Hourly entering volumes will not exceed 1,600 vph
- Typical speeds are 35 MPH or less
- ROW/Space Constraints
  - Residential areas
  - Rural areas, traffic calming measure (slow speed)
- Collector/local or local/local
- Low truck volume – 3% or less
- Replacement for AWSC – Can significantly reduce delay
CITY OF BURLESON
CASE STUDIES
Summercrest Traffic Circle

- Summercrest is a Collector Street
- 9,000 vpd
- Complaints due to not being able to enter Summercrest from side streets
- Traffic Study performed by KH
- “Metering” effect of the 4-way stop added to the problem by preventing gaps in traffic
Summercrest Traffic Circle

- Existing 4 way stop causing metering effect - a steady stream of vehicles evenly spaced in the next few blocks – no gaps

- K-H recommended Traffic Circle to:
  - allow continuous traffic flow, keeping groups of cars together and allowing gaps to be created
  - Improve intersection efficiency – solve long lines at the stop signs
  - Calm traffic – still keep speeds down
Summercrest Traffic Circle

Circle Construction

• Done within existing ROW

• Modified curb return on 2 sides

• Construction Cost: $48,297.37

• Bid August 2015

• Const. Complete July 2016
Summercrest Traffic Circle
The Numbers

Traffic Volumes:
- Summercrest: 9,000 vpd
- Thomas: 6,000 vpd

Before Section:
- Exist. Pavement: 40' b-b
- No lane/pavement markings
- 2 lanes w/ on-street parking
- 4-way stop at intersection

Traffic Circle:
- 16' Lane widths
- Inner Raised Island: 23' Diameter (between curbs)
- Truck Apron: 7' wide (including curbs)
- Inside edge of Driving Lane: 18.5' Radius
Summercrest Traffic Circle

Main Complaints:
- Firetrucks can’t use it (FALSE)
- School buses can’t use it (HALF TRUE)
- Too small / difficult to maneuver
- Uncomfortable using it
- Don't like it – don't like change

Traffic Engineering Standpoint:
- Significant traffic flow efficiency improvement for 9000 vehicles per day
- Traffic flow efficiency = air quality benefit
- Peak times – school traffic – significantly less backup at the intersection (5-10 cars vs. almost to SH174)
- Improved ability to access Summercrest from side streets (no metering effect)

Public Acceptance Standpoint:
- Strong initial negative reaction from some (200-300 people)
  - (most common comment - don’t like change)
- Some remain vocal about dislike of circle 3 years later
- Most People are getting used to it / Positive (rebuttal) comments have increased on social media
- Several people that live on Summercrest like the changes to traffic:
  - Ability to get out of their driveways (not blocked by backup at stop signs)
  - Significant noise reduction
  - Much less traffic backup
Firetrucks and School Bus Facts:

- All Firetrucks and school buses can go straight thru the circle
- All Firetrucks and school buses can turn right
- All Emergency Vehicles except the Ladder Truck can make left turns in the circle
- The Ladder Truck and School Buses can **not** make left turns
  - School bus routes have been adjusted
  - Fire Department Ladder Truck can cut through the circle to go left
7 vehicles in 20 seconds

Traffic Circle is 44% more efficient in this example

7 vehicles in 36 seconds

00:00:00:00

1 2 3 4 5 6 7 8 1 2 3 4 5 6 7
Summercrest Traffic Circle

Addressing Complaints -- Options for Changing the Circle

Options to Change the Circle:

1. **Remove it – go back to 4-way Stop:**
   - Cost: $36,000
   - Concern: Might be people that prefer the circle that would then complain

2. **Make the Circle Larger**
   - Can we make the existing circle larger?
     - Answer: NO, not recommended.
       - Speeds through the circle would increase
       - Differential between speed of straight and turning movements would decrease safety significantly
       - More people would be uncomfortable due to higher speeds
   - Can we make a larger circle?
     - Answer: YES. True mini-roundabout is an option.
     - Cost: Estimated at $400,000+
Summercrest Traffic Circle

Lessons Learned

• Think twice before putting one in established neighborhoods with long-term residents

• Don’t let public opinion sway you to an unsafe design
  • The circle has to be tight to keep speeds down

• Figure out pedestrian issues and how to solve them early on
  • Traffic does not stop anymore
  • Wait for circle to clear…

• They WORK!!
  • keep traffic moving
  • Prevent traffic from going too fast
McAlister Before – 3-way Stop

Existing Conditions:

- 3-way stop condition
- All roads 1 lane each direction
- High Left Turn Volumes
- Peak hour backups 1000’+
Mini Roundabout Retrofit

Project Elements:
- Tie to existing City of Fort Worth section
- Pavement widening on the north side
- Narrow median
- Mini-roundabout at intersection

- Completed Construction Mid March 2019 (6 months)
- Project Construction Cost: $465,000
- Roundabout Only ~$325,000
Mini Roundabout Retrofit
### Summercrest Traffic Circle Size
- ICD = 68’
- Design Speed 14 mph
- 16’ lane width
- 3” mountable curb, 7’ truck apron
- Raised Inner median & with signs
- Not traversable

### Proposed McAlister Mini-Roundabout
- ICD = 80’
- Design Speed 18 mph
- 18’ lane width / 44’ diam truck apron
- 1” to 3” over 12” mountable curb
- Flat Inner median & no signs
- Fully traversable
McAlister Mini Roundabout
McAlister Mini Roundabout

How’s It Working?

• Great!
• No traffic backups
• Accepted well by the Public
  • New Neighborhood
  • Larger size
  • 4-way stops nearby that back up significantly
• Pedestrian crossings work well
MCALISTER RD AND NE MCALISTER RD
BURLESON, TEXAS
FHWA Mini-Roundabout Study

- Source: TRB Webinar March 21, 2017
  - Mini-Roundabout, Is the US Ready to Take Advantage of their Benefits?
- Study started in 2009 and concluded in 2016
- Evaluated a total of 15 mini-roundabouts in 7 states
  - 14 were converted from existing intersections
    - 8 previously AWSC
    - 6 previously TWSC
    - 1 new intersection
- ICD from 47’ to 90’
- Peak Hour demand up to 1350 vph
- Major road speed up to 50 mph
- Costs: $25K to $400k per intersection, high capacity mini’s tend to be around $300 K
FHWA Mini-Roundabout Study Results

• Prior AWSC Intersections
  • Very effective in eliminating congestion

• Prior TWSC Intersections
  • Effective in lowering major road speed, and providing more gaps to minor road traffic

• All Types of Intersections
  • Reduce pedestrian crossing distance by $\frac{1}{2}$ to $\frac{3}{4}$ (better safety)
EXAMPLES
Fort Worth

- TWSC
- Temporary Traffic Circle w/ markings (30mph)
- Mini Roundabout - Retrofit - $30,000
Fort Worth
San Antonio – 2
Intersections

- AWSC (30mph)
- Traffic Calming Program
- No drives or parking along the street (40’ wide)
- Full reconstruction due to pavement condition
- Construction Cost: $250,000 each (unit price contract)
- Begin Construction May 2019
What is a Temporary Mini Roundabout?

• Maintains Existing Intersection Footprint
• Non-permanent roundabout
• Made with readily available materials
• Can be installed and removed without affecting the existing intersection
• Allows us to test how a roundabout will function
Temporary Roundabout Materials
Temporary Roundabout

Fort Worth
- AWSC (30mph)
- $60,000
- Truck Apron Purchase Cost: $20,000
References/Resources

• ITE Mini Roundabouts in Minnesota Benefits of Roundabouts a Smaller Footprint and Lower Cost: https://www.ite.org/pub/?id=3CDB08B4-087D-EE22-4972-9E8731B3148C
QUESTIONS?