MINI ROUNDABOUTS
AND
NEIGHBORHOOD TRAFFIC CIRCLES

NCTCOG Public Works Roundup

May 21, 2019

Laura Melton, PE

Dana Shumard, PE

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
  - Summercrest Traffic Circle
  - 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

Mini Roundabouts

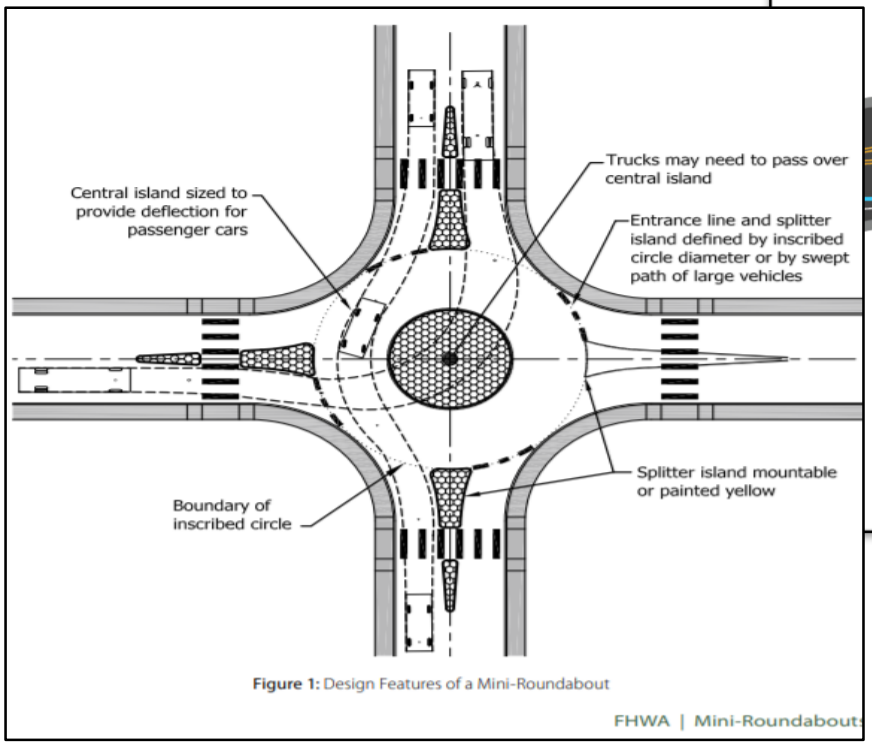
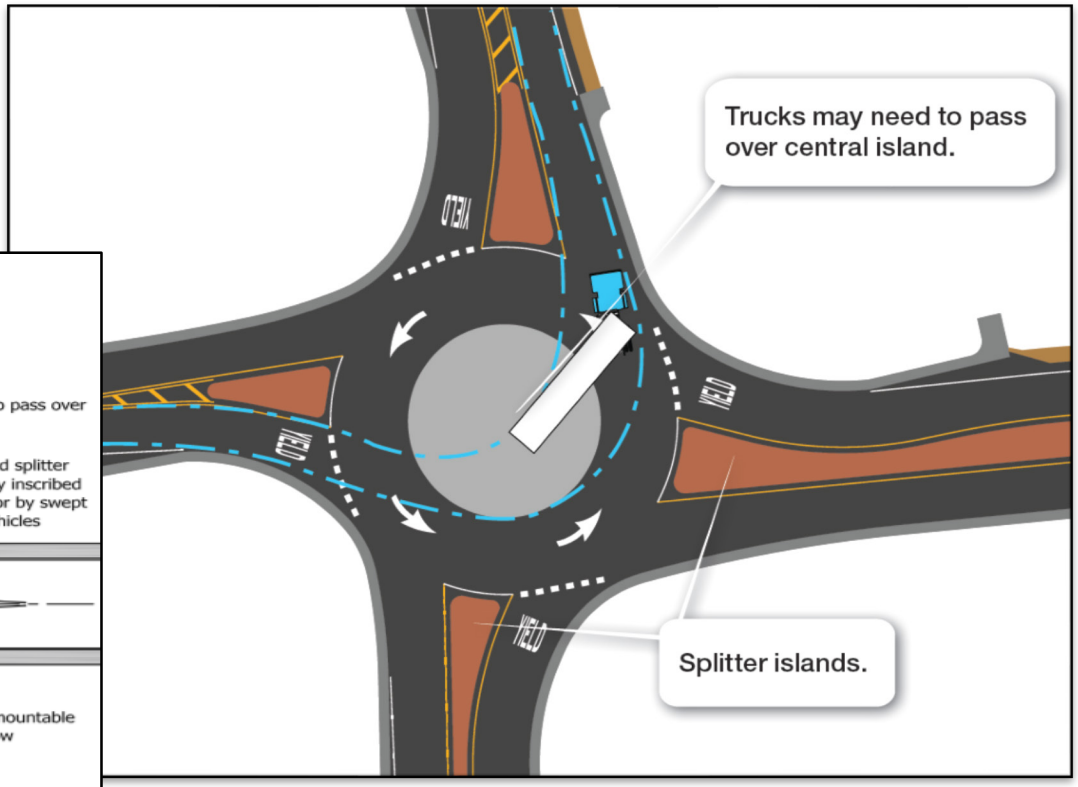


Figure 1: Design Features of a Mini-Roundabout

FHWA | Mini-Roundabouts



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

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

Vicinity Map

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

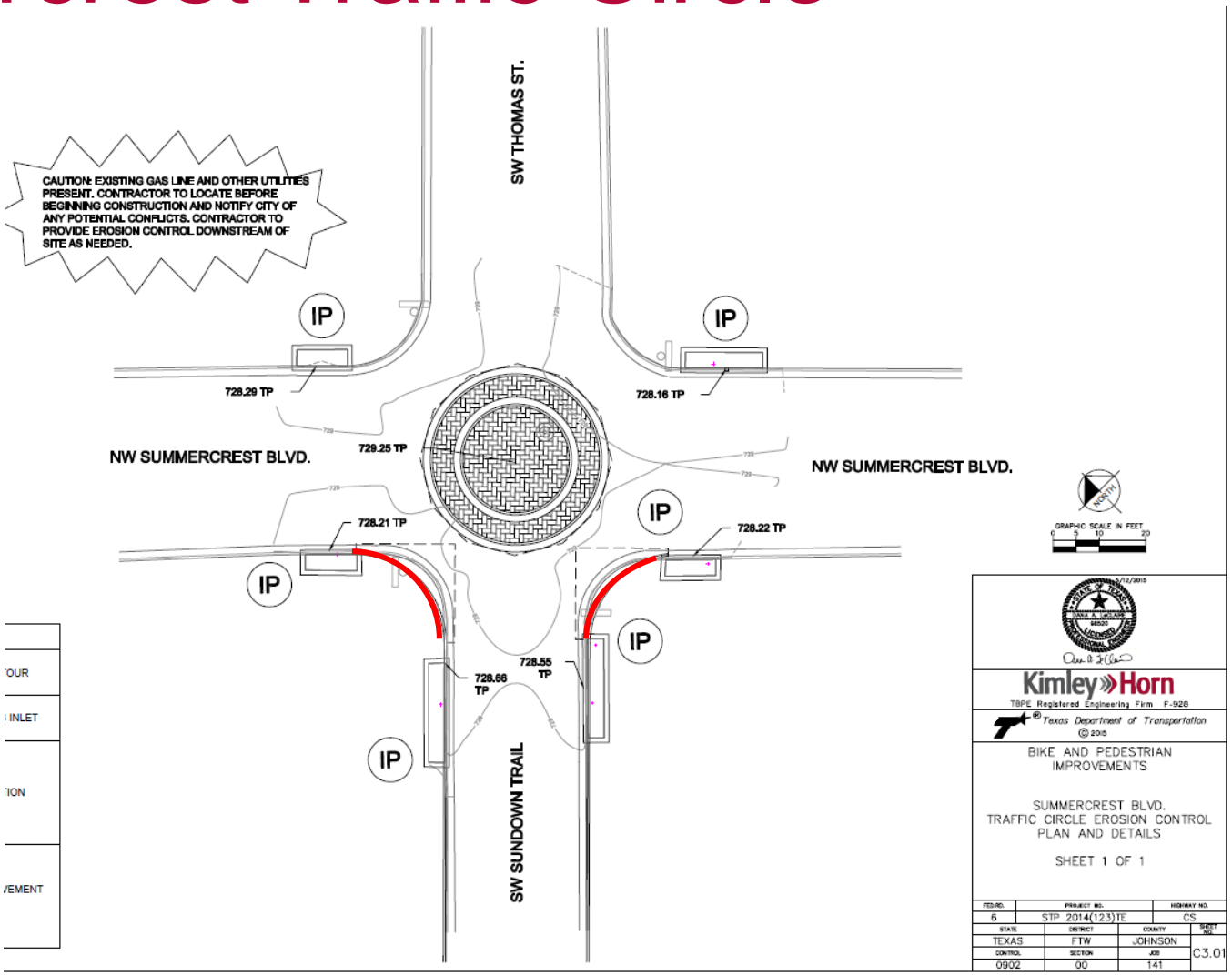
- Existing 4 way stop causing metering effect - a steady stream of vehicles evenly spaced in the next few blocks – no gaps

- 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

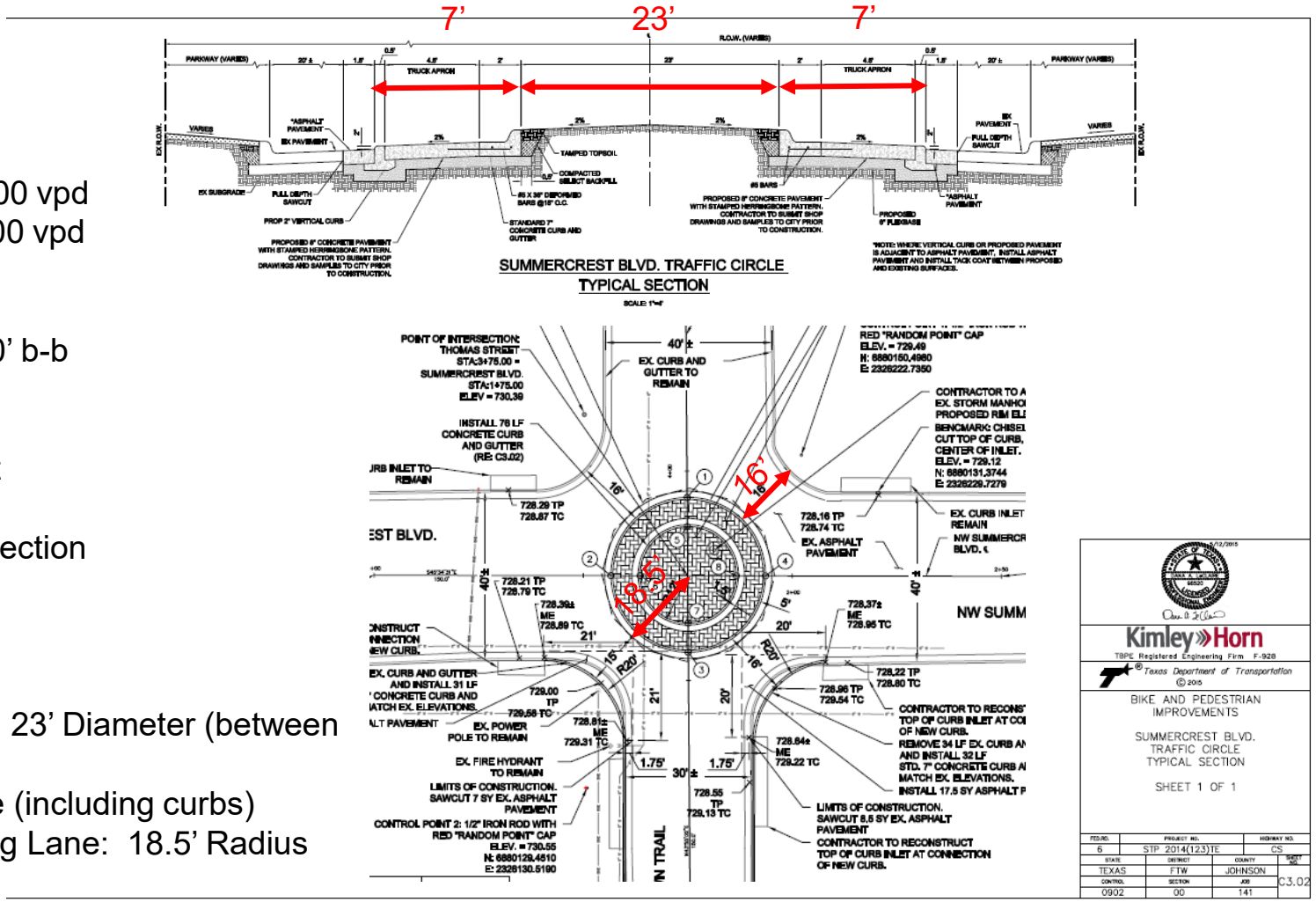
Summercrest Traffic Circle

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

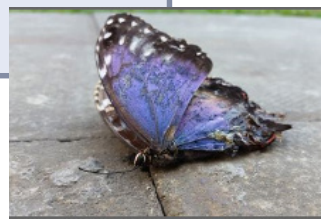
Traffic Circle:
- 16’ Lane widths
- Inner Raised Island: 23’ Diameter (between curbs)
- Truck Apron: 7’ wide (including curbs)
- Inside edge of Driving Lane: 18.5’ Radius



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)

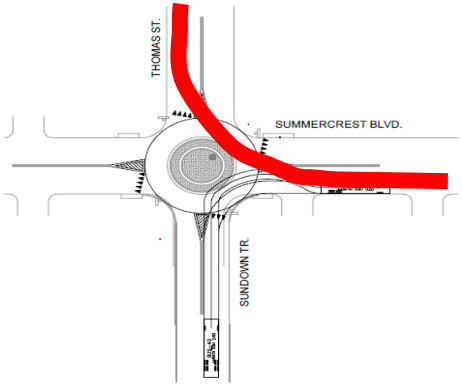
Public Acceptance Standpoint:

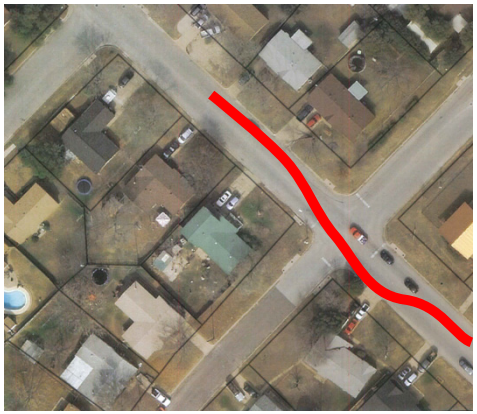
- Strong initial negative reaction from some (200-300 people)
  - (most common comment - don't like change)
- Some remain vocal about dislike of circle 3 years later
- Most People are getting used to it / Positive (rebuttal) comments have increased on social media
- Several people that live on Summercrest 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

Summercrest Traffic Circle

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

7 vehicles in 36 seconds

Traffic Circle is 44% more efficient in this example

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

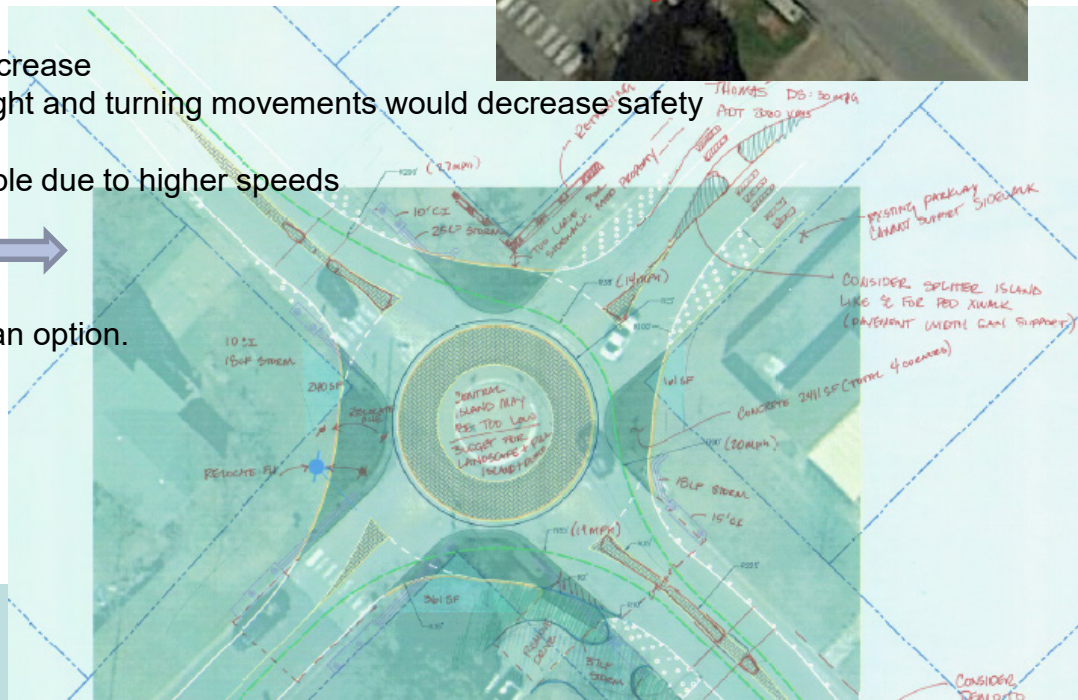
Options to Change the Circle:

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+



Kimley»Horn

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 Road - Mini Roundabout

McAlister Before – 3-way Stop

Existing Conditions:

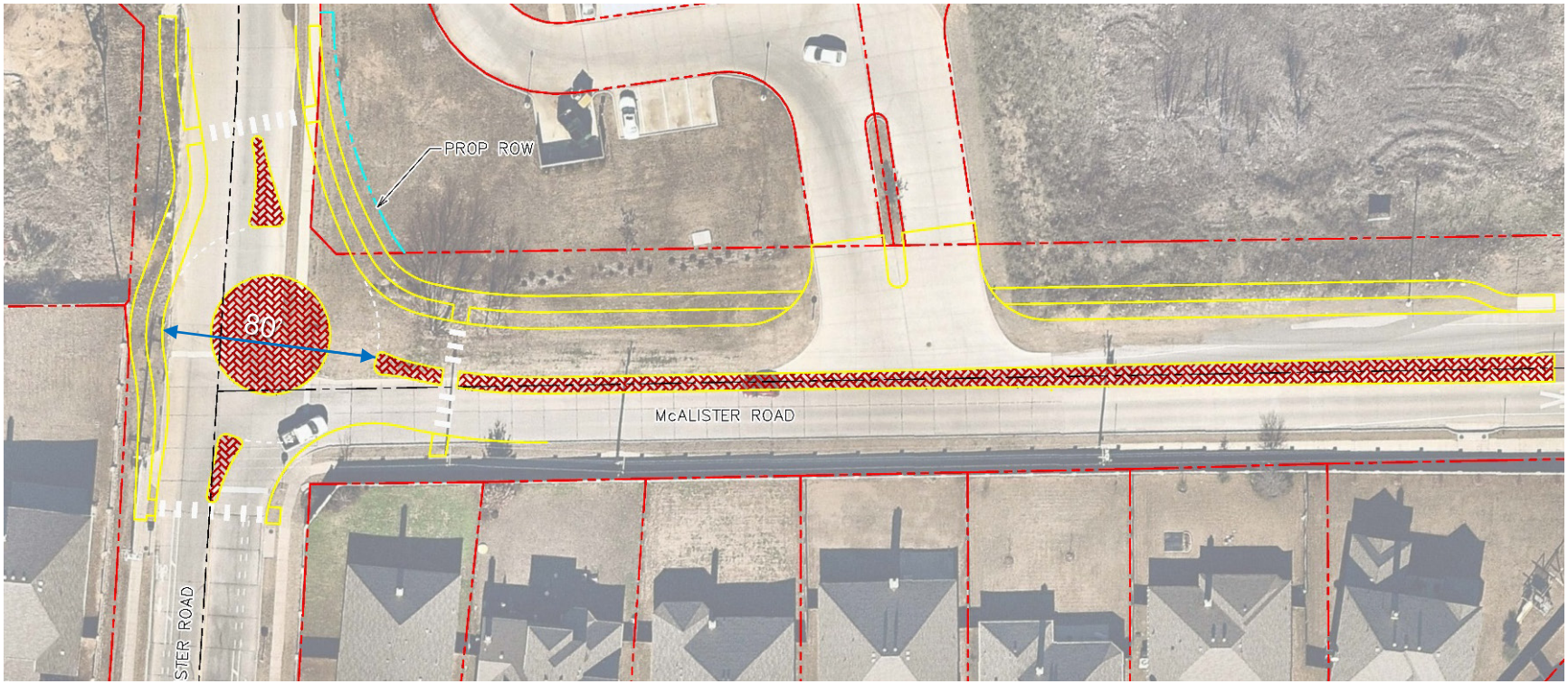
- 3-way stop condition
- All roads 1 lane each direction
- High Left Turn Volumes
- Peak hour backups 1000'+

Mini Roundabout Retrofit

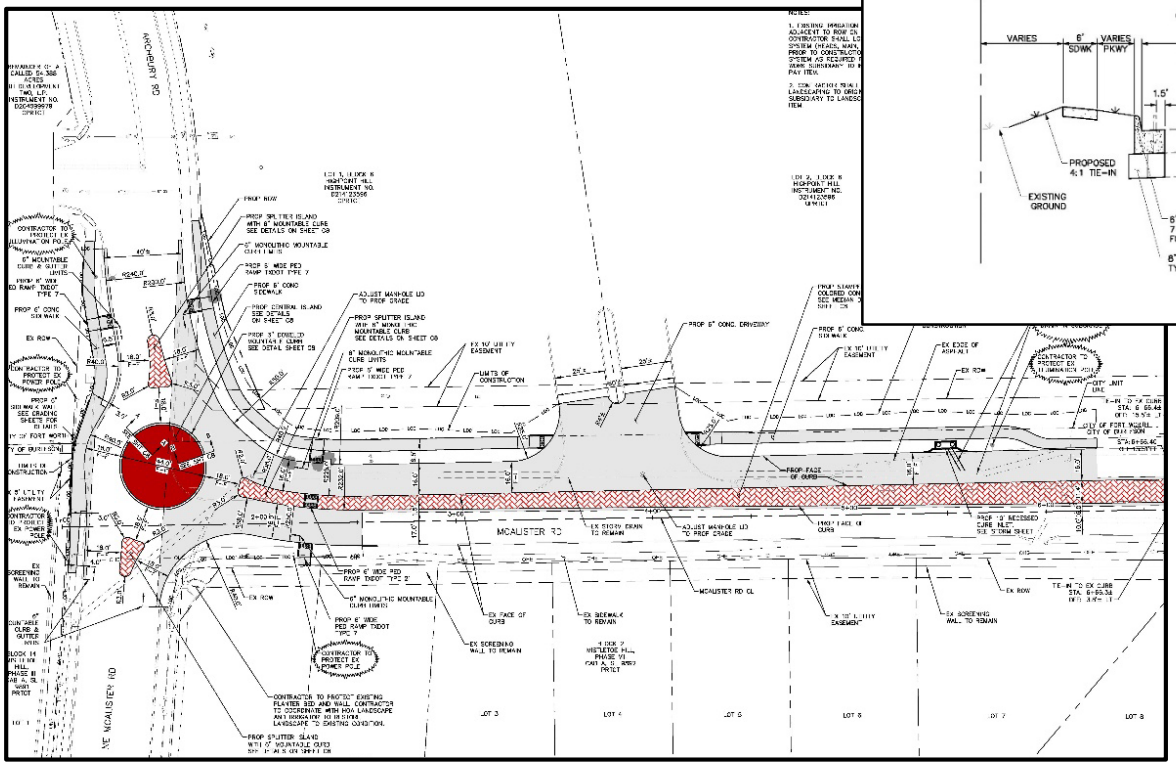
Project Elements:

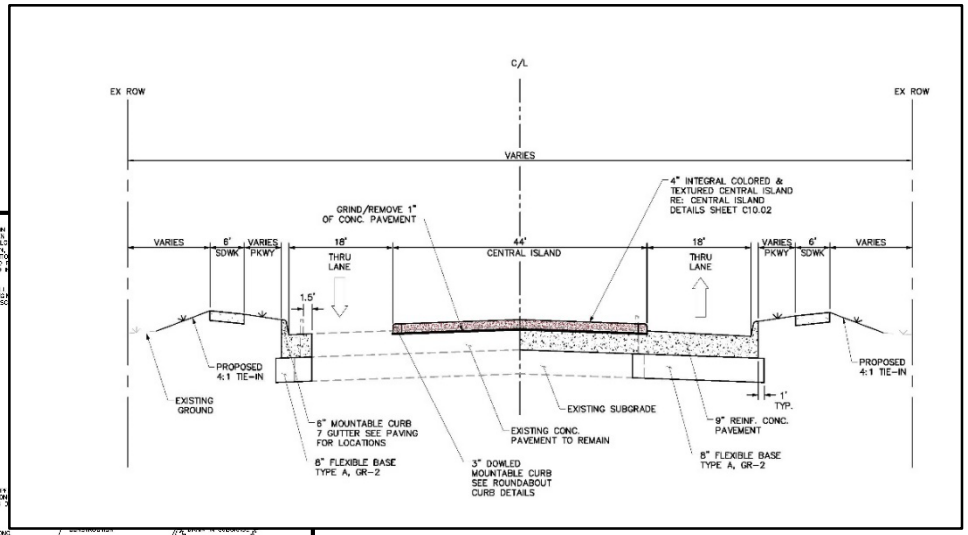
- Tie to existing City of Fort Worth section
- Pavement widening on the north side
- Narrow median
- Mini-roundabout at intersection

- Completed Construction Mid March 2019 (6 months)
- Project Construction Cost: $465,000
- Roundabout Only ~$325,000

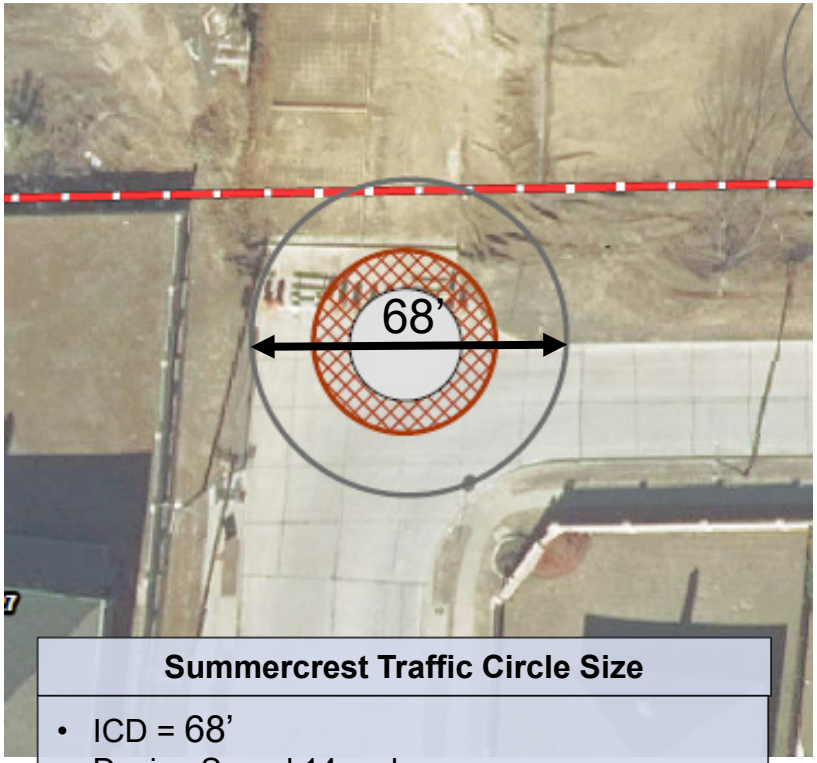


Mini Roundabout Retrofit



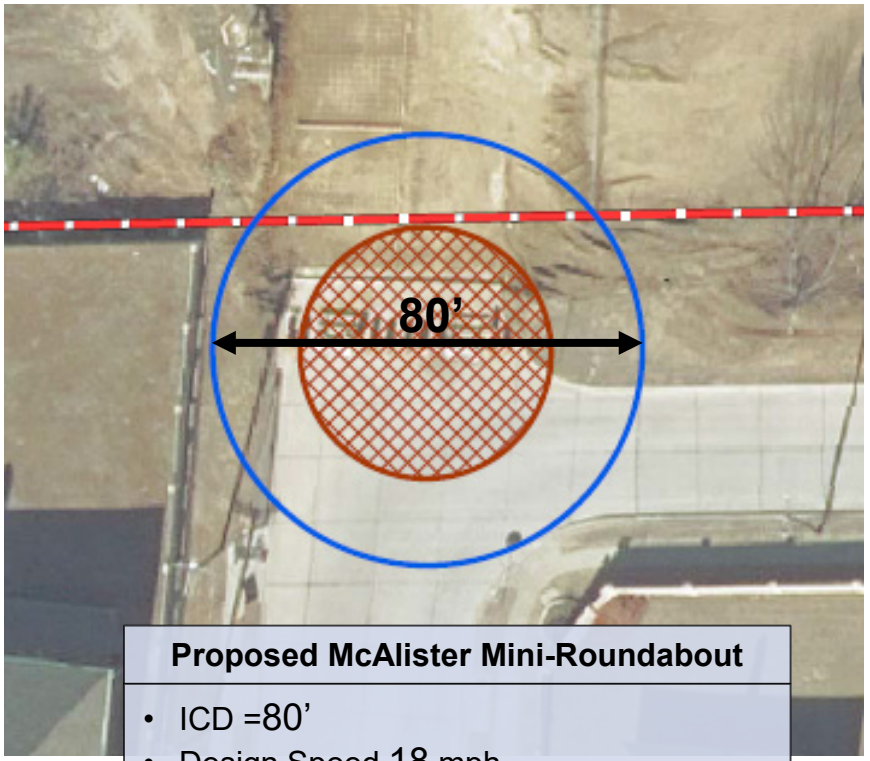


Summercrest vs. McAlister



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

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

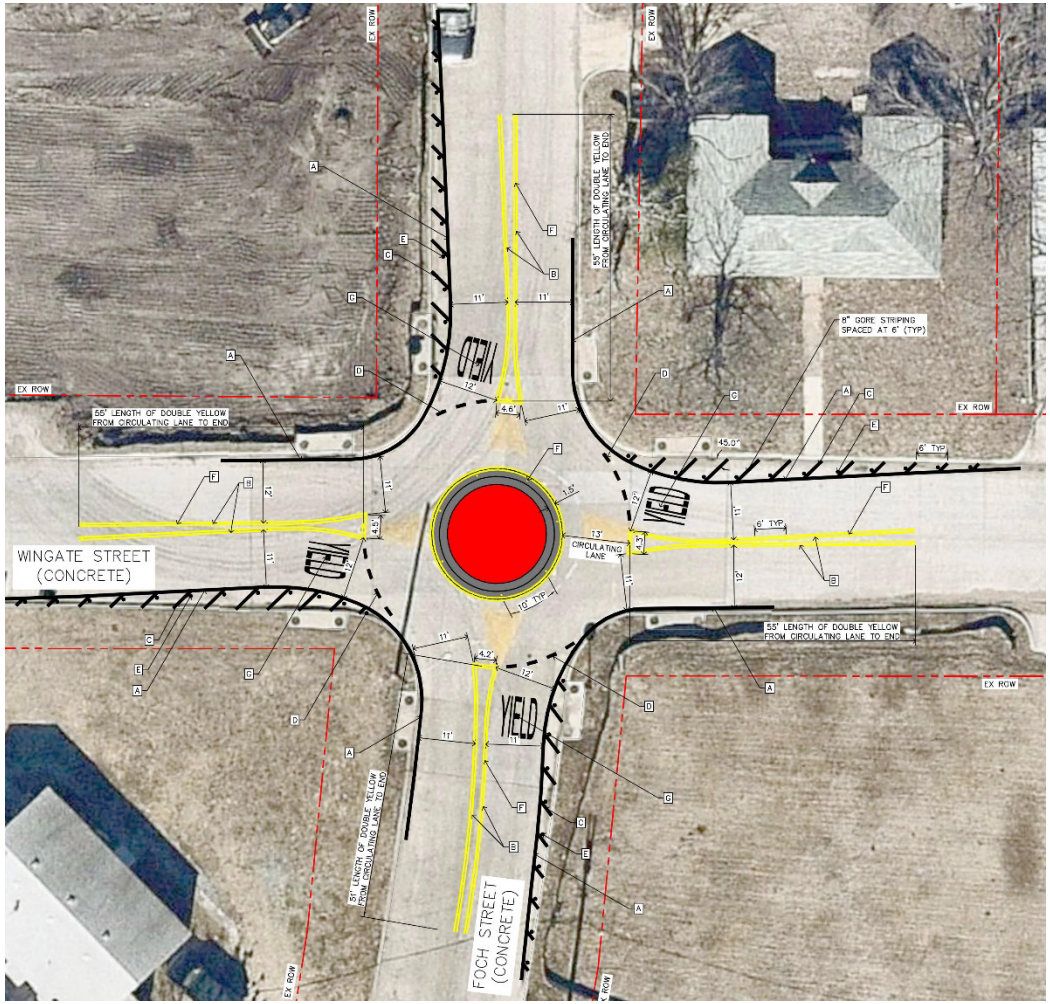
- Source: TRB Webinar March 21, 2017
  - Mini-Roundabout, Is the US Ready to Take Advantage of their Benefits?
- Study started in 2009 and concluded in 2016
- Evaluated a total of 15 mini-roundabouts in 7 states
  - 14 were converted from existing intersections
    - 8 previously AWSC
    - 6 previously 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 ½ to ¾ (better safety)

EXAMPLES

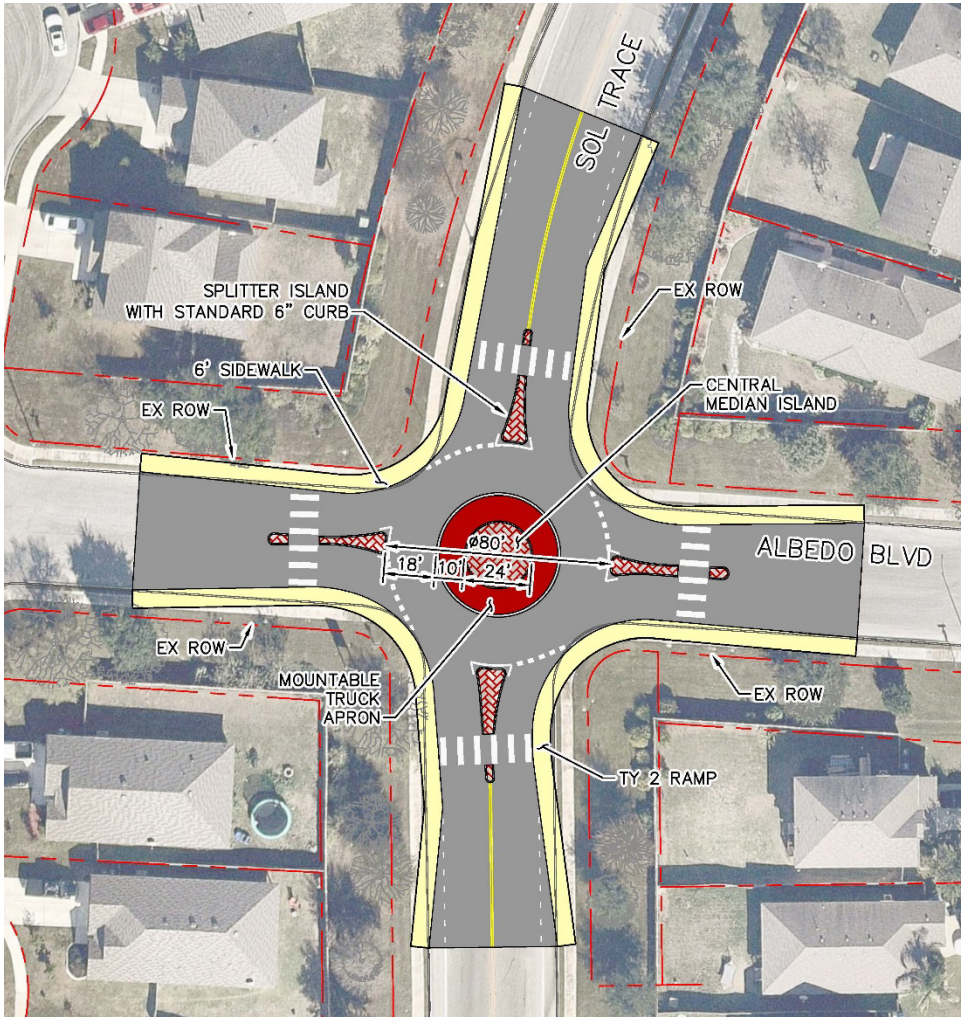
Fort Worth



- TWSC
- Temporary Traffic Circle w/ markings (30mph)
- Mini Roundabout - Retrofit - $30,000

Fort Worth

San Antonio



San Antonio – 2 Intersections

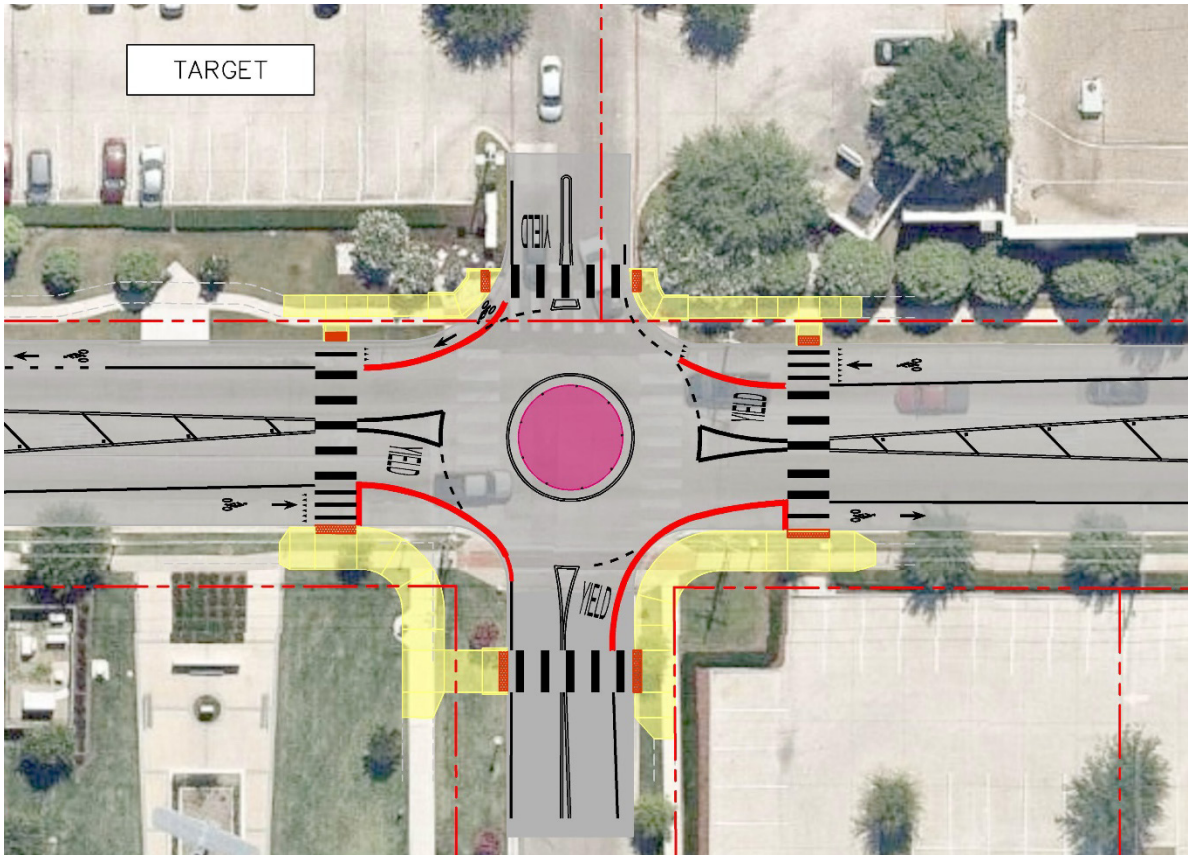
- AWSC (30mph)
- Traffic Calming Program
- No drives or parking along the street (40' wide)
- Full reconstruction due to pavement condition
- Construction Cost: $250,000 each (unit price contract)
- Begin Construction May 2019

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

- FHWA Mini Roundabout Technical Summary, 2009: https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/fhwasa10007/fhwasa10007.pdf
- NCHRP 672, Section 6.6: https://www.fhwa.dot.gov/exit.cfm?link=http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf
- 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
- TRB Webinar March 21, 2017 - Mini-Roundabout, Is the US Ready to Take Advantage of their Benefits? http://onlinepubs.trb.org/onlinepubs/webinars/170321.pdf
- NACTO, Urban Street Design Guide: https://nacto.org/publication/urban-street-design-guide/intersections/minor-intersections/mini-roundabout/
- Traffic Products Australia Rubber Roundabouts: https://www.ctstraffic.com.au/roundabouts
- Traffic Systems West Rubber Roundabouts https://www.trafficsystemswest.com.au/products/traffic-calming/rubber-roundabouts/

QUESTIONS?