



JACKSON COUNTY DEPARTMENT OF TRANSPORTATION

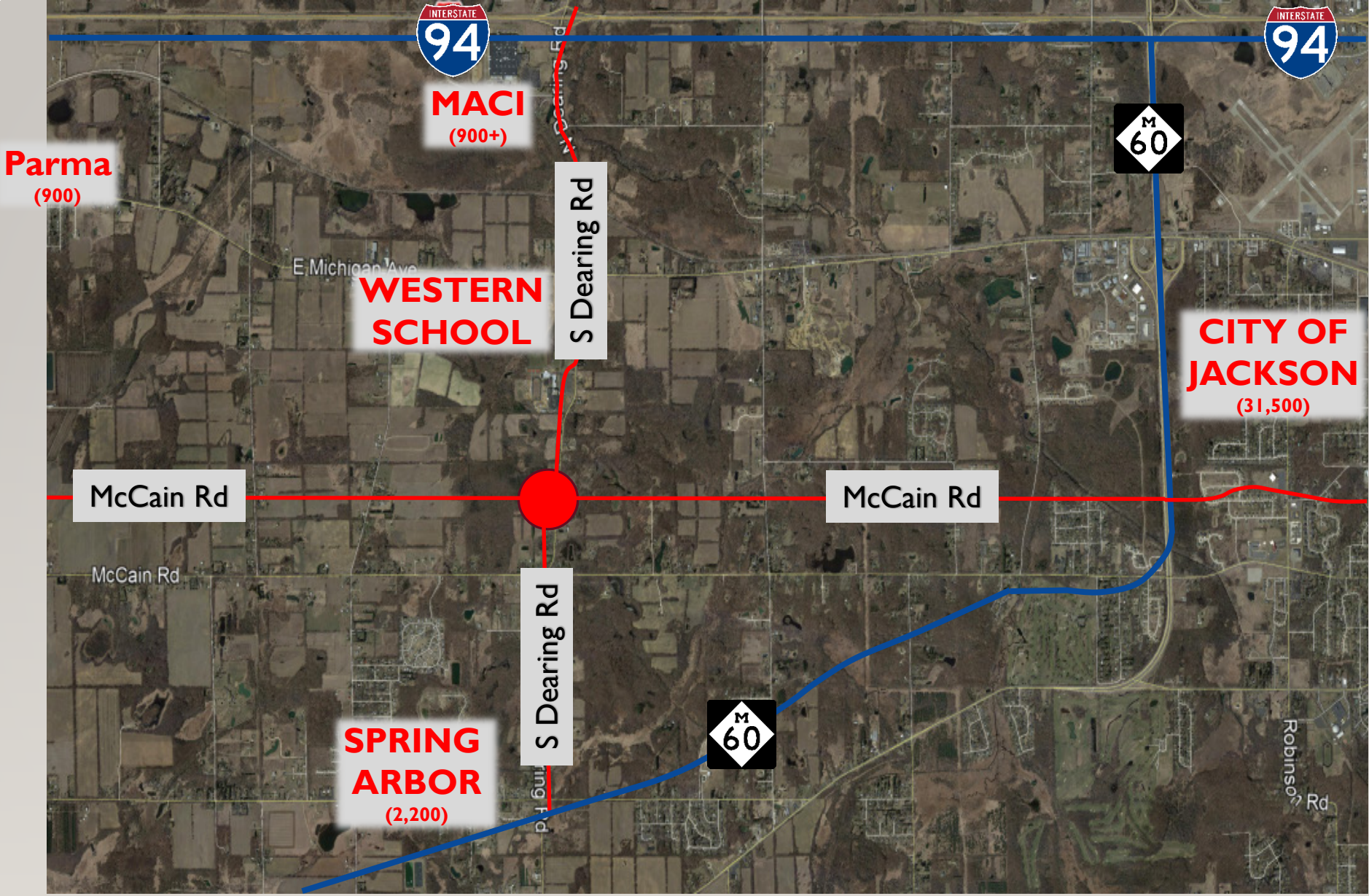
COUNTY ENGINEERS WORKSHOP



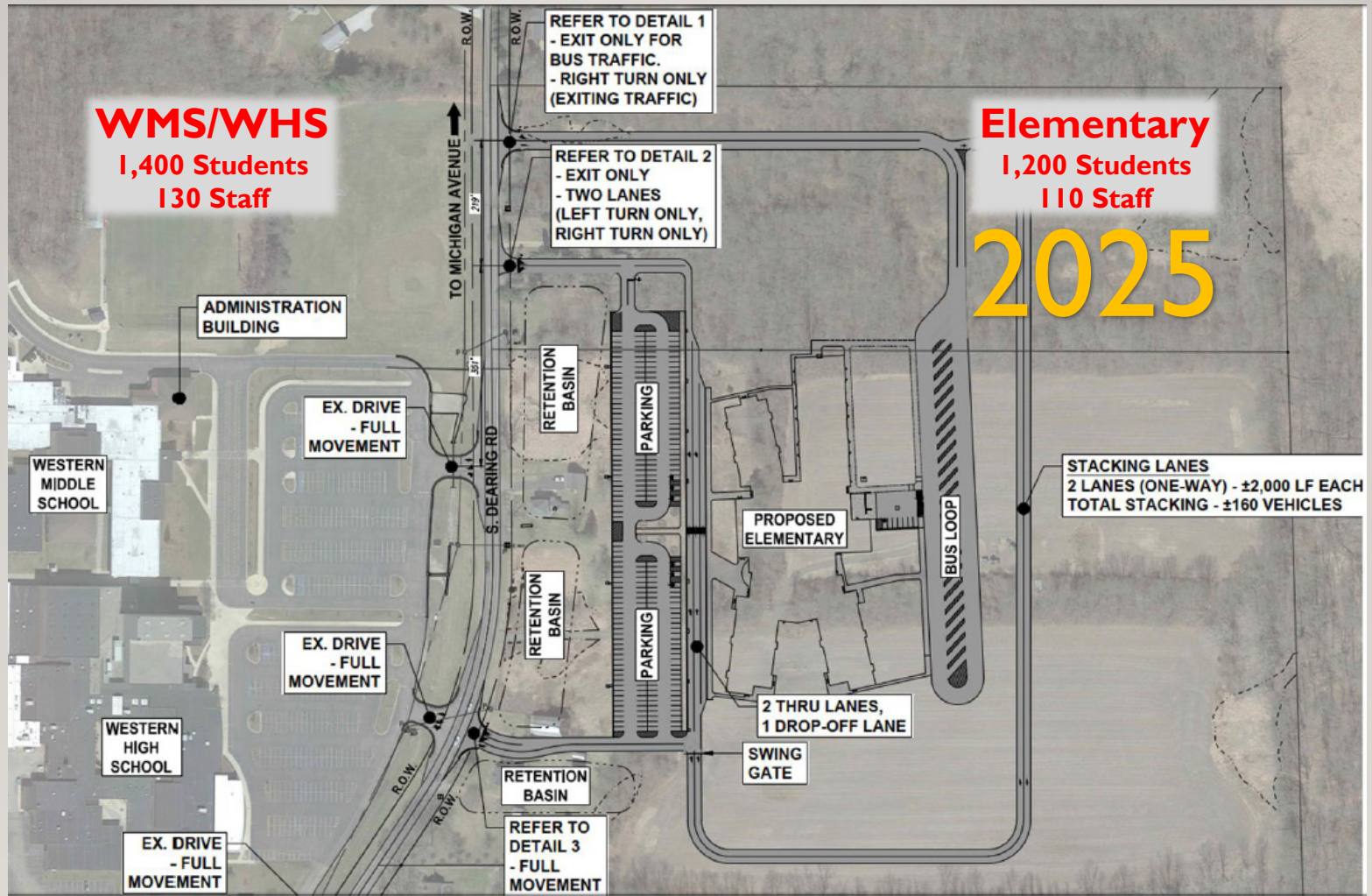
Angela Kline, P.E. & Charles Briner, P.E.
Peanut Roundabout
February 5, 2024

PROJECT BACKGROUND





WESTERN SCHOOL INTO SINGLE CAMPUS





Dearing Road







LED Sign

Dearing Road

McCain Road



CRASH DATA

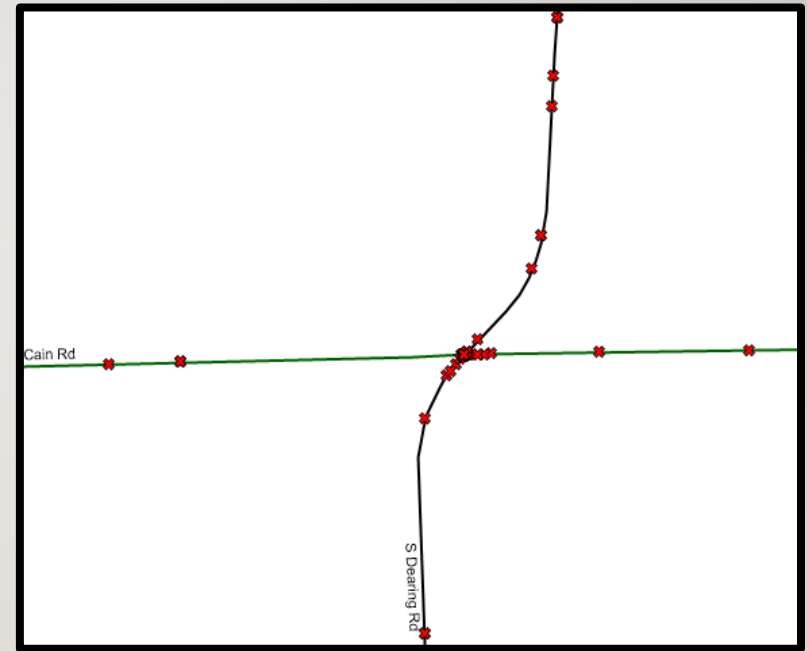
- 1 Fatal Crash
- 3 Type “A” Crashes
- 24 Total crashes from 2014 to 2018

MLIVE Reports

Jackson officials question safety of crossroads where mother, 2 children died

More than 3,700 sign petition to alter intersection where mom, children died

Two-car crash leaves three shaken up, no injuries

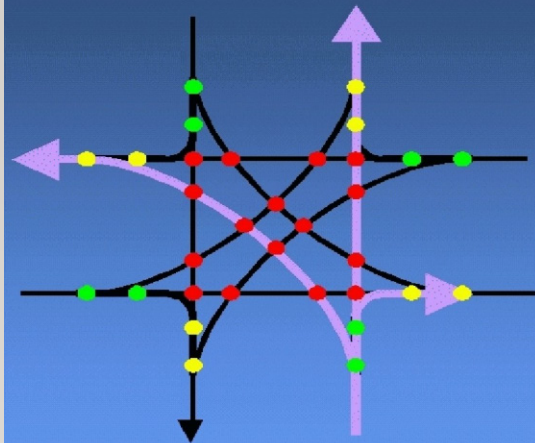


ROUNDAABOUT FACTS

At locations where roundabouts have replaced stop signs and/or traffic signals:

- Crashes decreased **39%**
- Injuries decreased **76%**
- Fatalities and/or incapacitating injuries decreased **90%**

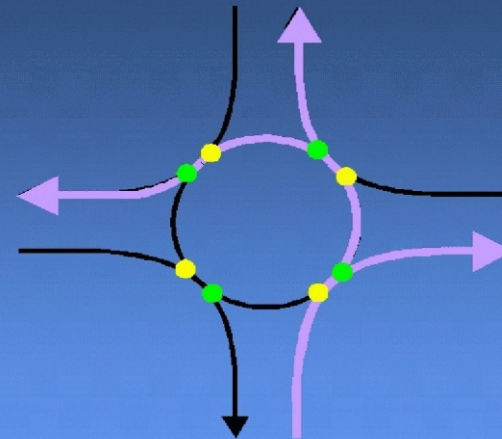
Vehicle conflict points: Conventional intersection



Conflict Types

● Diverge:	8
● Merge:	8
● Crossing:	16
Total:	32

Vehicle conflict points: Roundabout

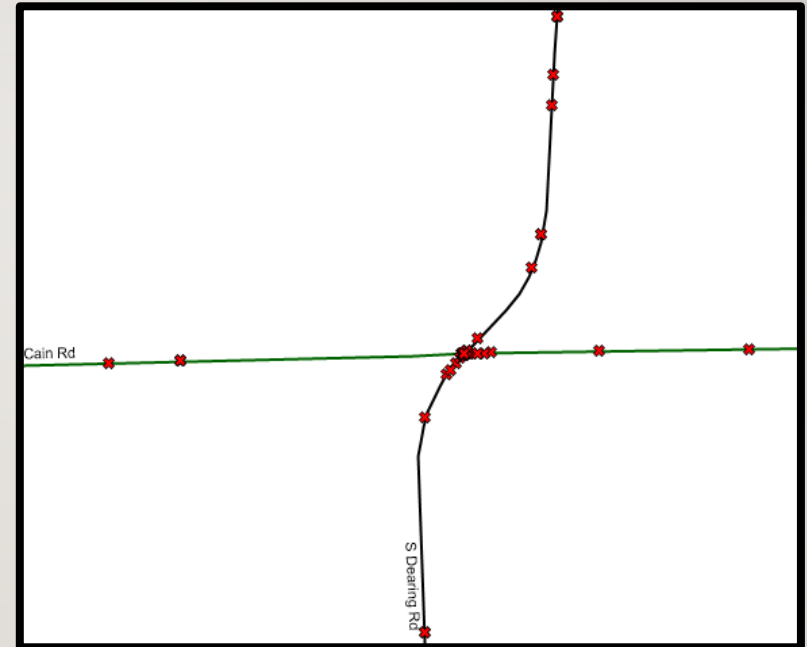


Conflict Types

● Diverge:	4
● Merge:	4
● Crossing:	0
Total:	8

SAFETY GRANT

- Limited sight distance & large skew
- Additional ROW on SW corner
- Proposed 90' Diameter Mini Roundabout
- Engineers Estimate \$326,894
- Time of Return = 0.52
- Submitted for HRRR Safety Grant 2021



DESIGN....

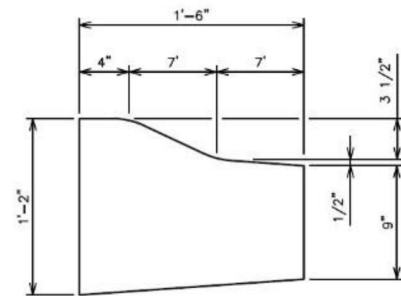
How do we design a roundabout now that we have funding for it?



LEARNING FROM OUR NEIGHBORS

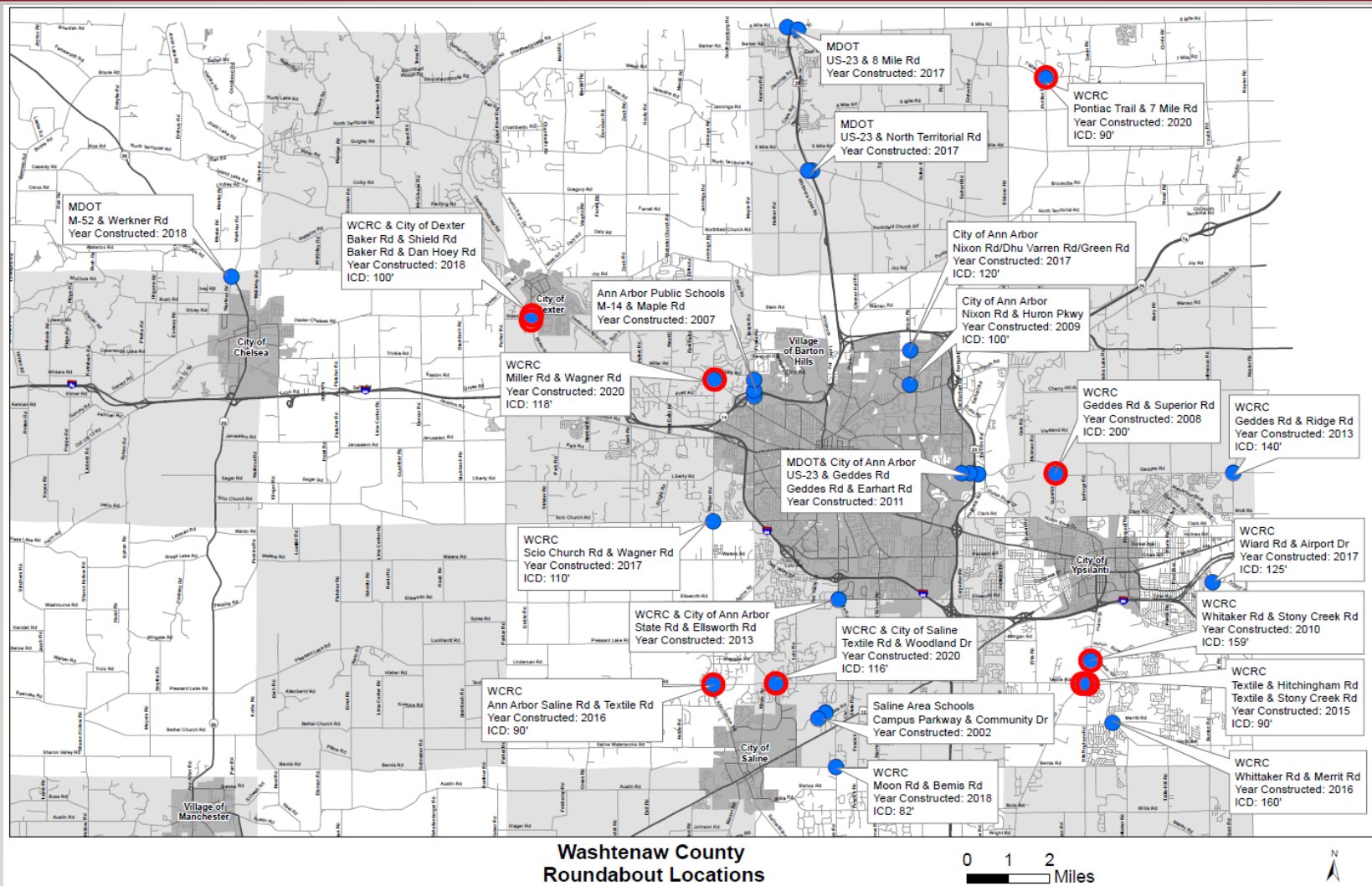
MEETING WITH WASHTENAW CRC

- Lighting coordination – Design and Construction
- Splitter island with modified curb
- Stamped Concrete & minimize green space
- Completely shut down intersection for construction
- Education – help provide a visual of turning movements for different size vehicles



**CURB AND GUTTER, CONC.
DET D2, MODIFIED, SPLITTER**
NO SCALE

FIELD TRIP... WHY REINVENT THE WHEEL?

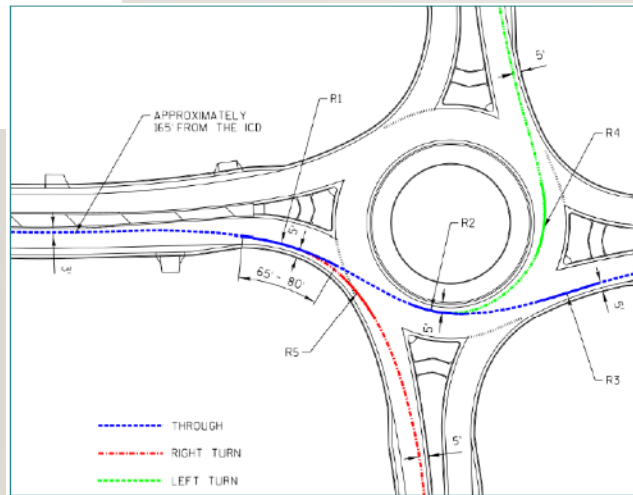
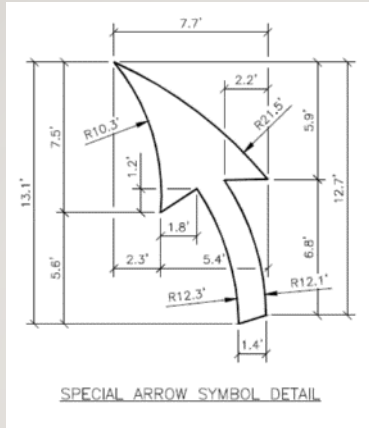


HOW DO WE DESIGN A ROUNDABOUT?



GDOT Roundabout Design Guide

Office of Traffic Operations | December 12, 2019

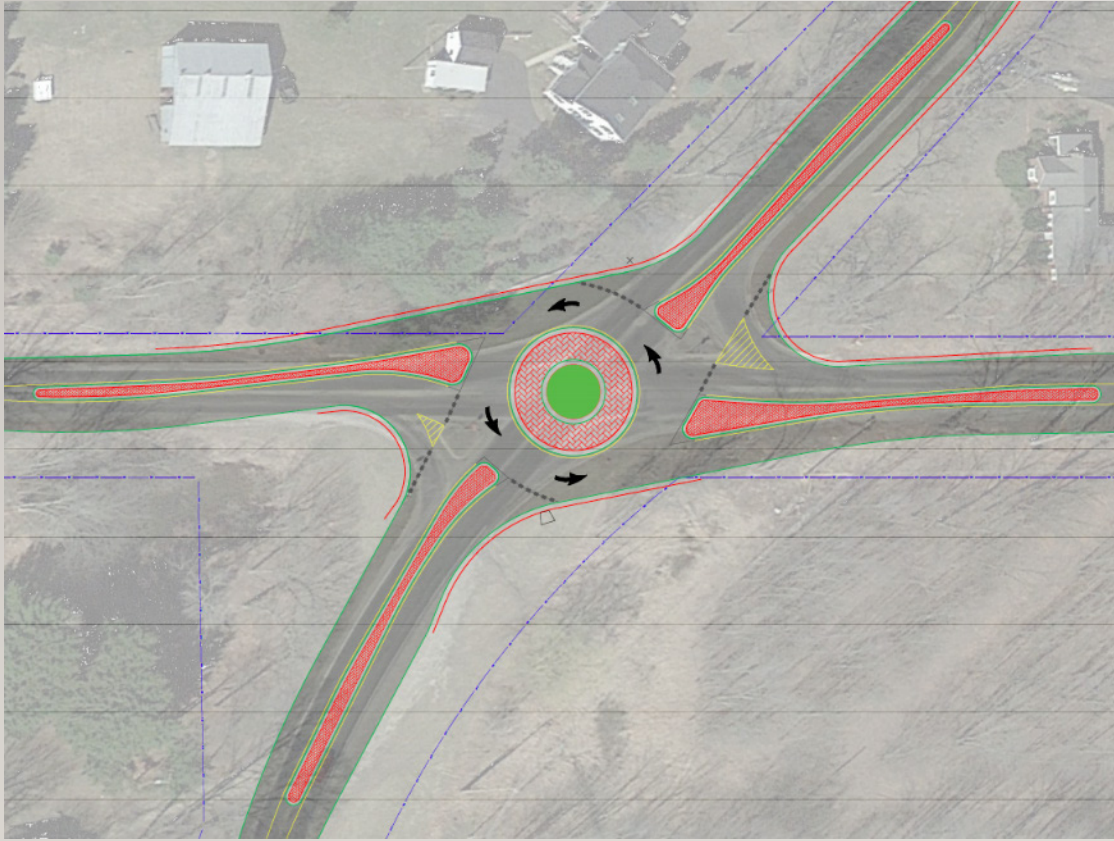


GUIDANCE FROM CONSULTANT

- Mark Linters with Kimerly-Horn
- Provided guides and spreadsheets
- Reviewed milestones
 - Fast Paths
 - Turning Movements
 - Plan sheets
 - Profile and Alignments



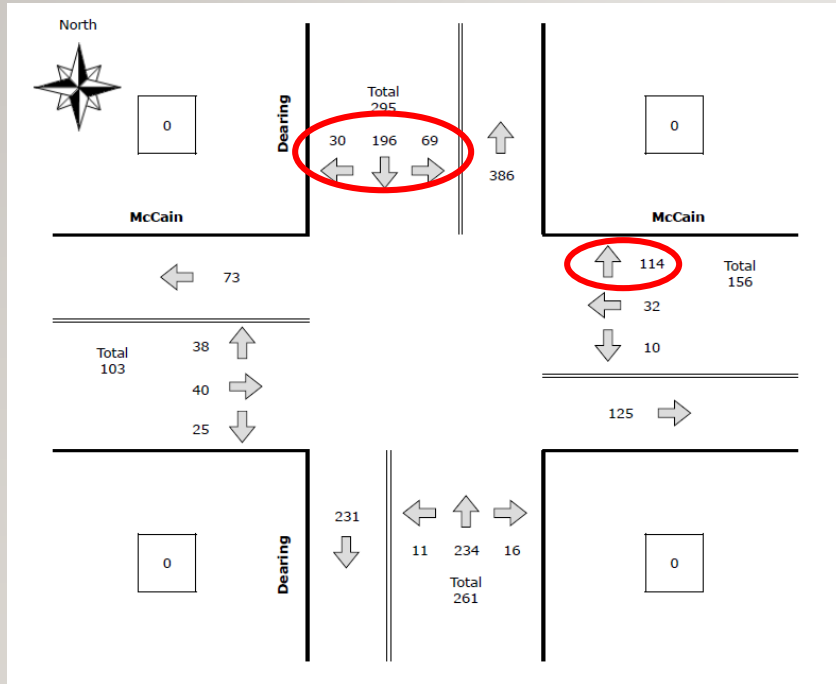
TRADITIONAL ROUNDABOUT



- Purpose: Increase Safety & slow traffic down
- ADT:
 - Dearing 3,000 veh/day
 - McCain 1,500 veh/day
- Design speed: 45 MPH
- Truck traffic: 3%
- ICD: 100 feet
- Construction estimate: \$450,000

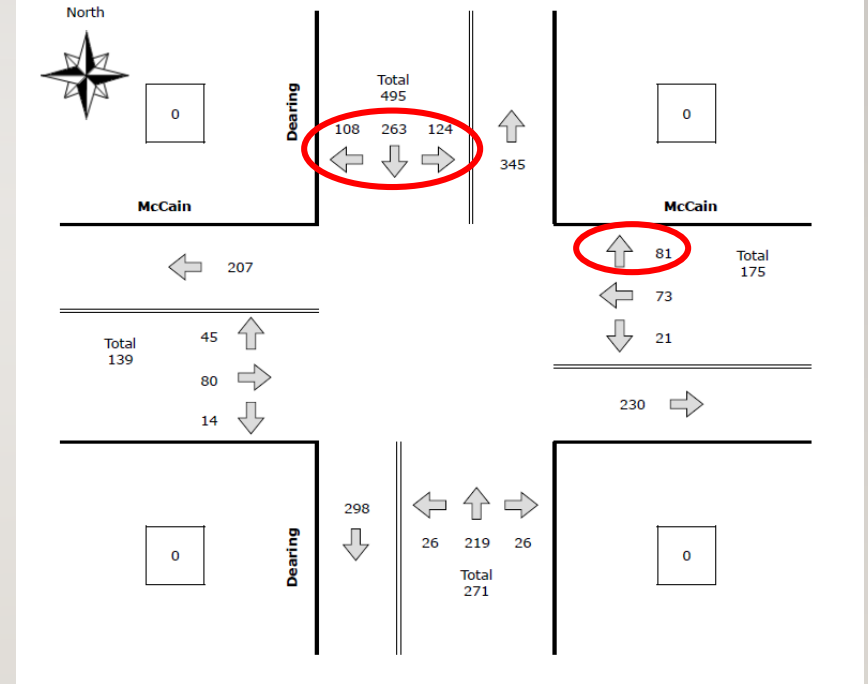
TURNING MOVEMENTS

AM



Peak Hour 7:00 AM – 8:00 AM

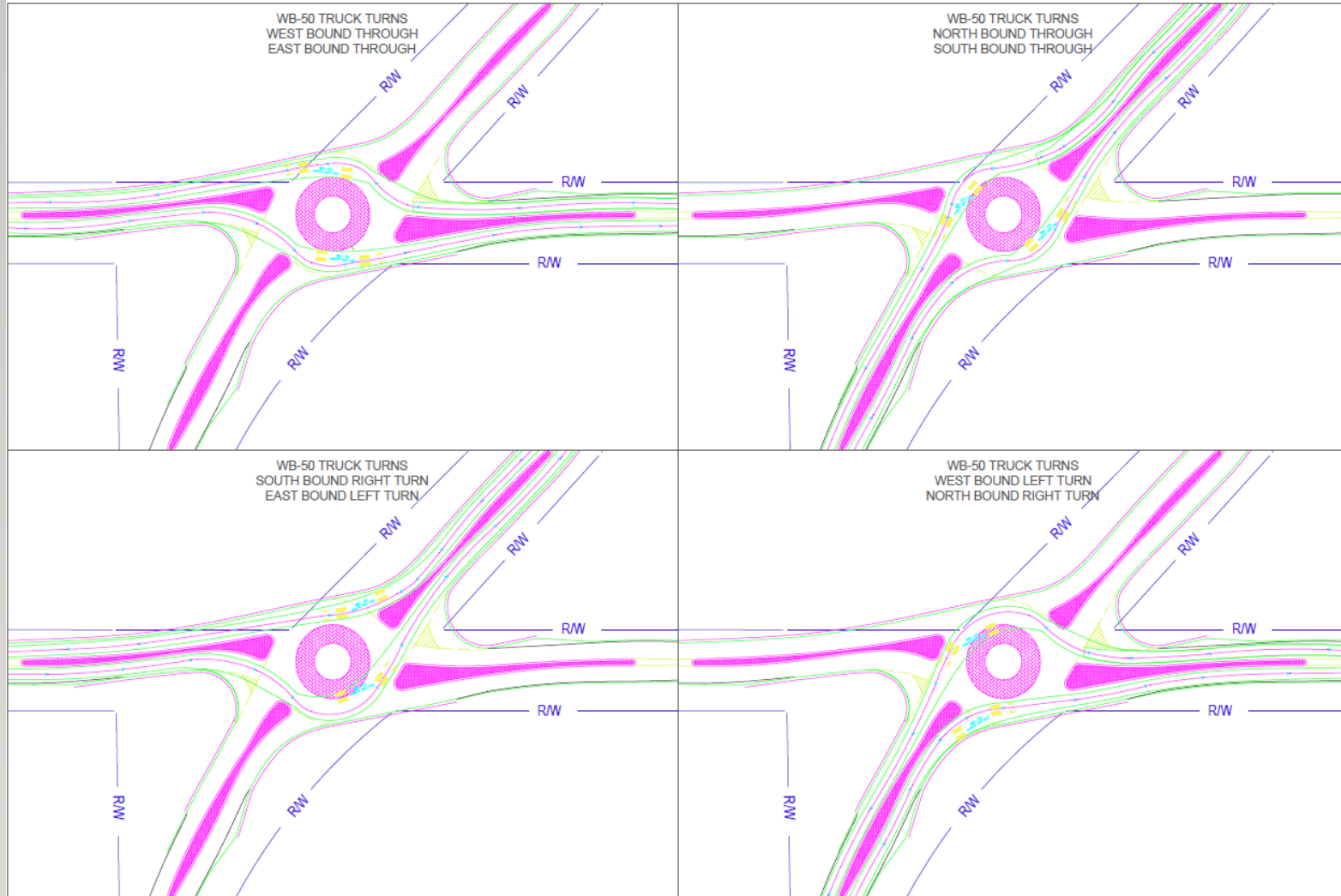
PM



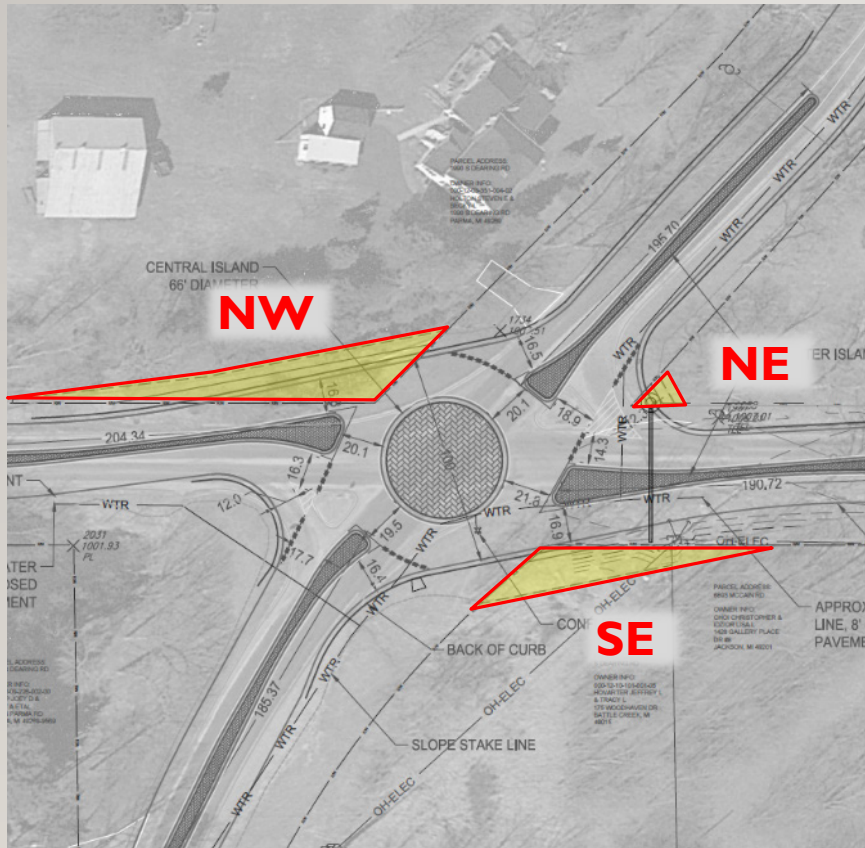
Peak Hour 2:15 PM – 3:15 PM



BEGINNING DESIGN



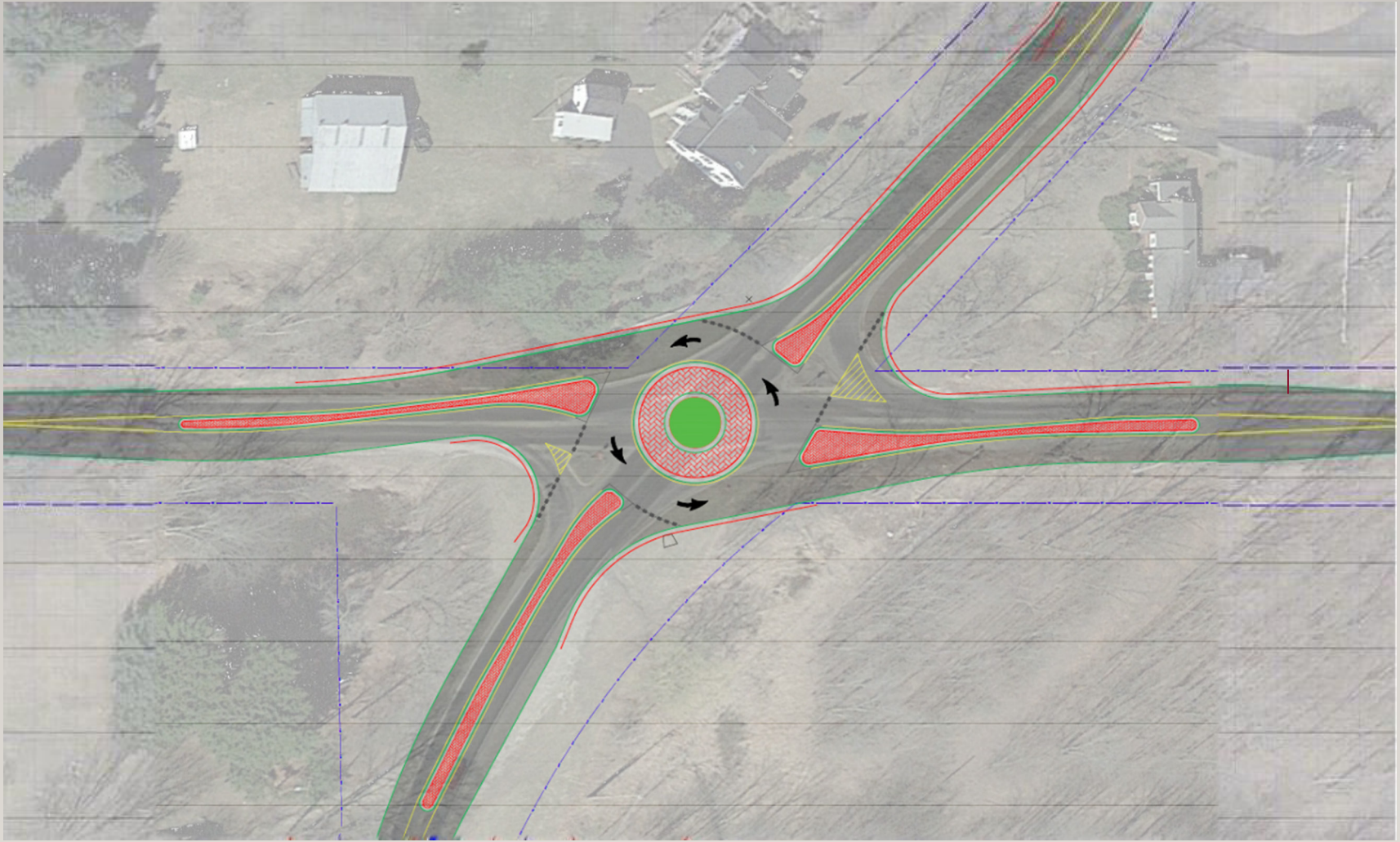
RIGHT-OF-WAY: THE DEAL BREAKER



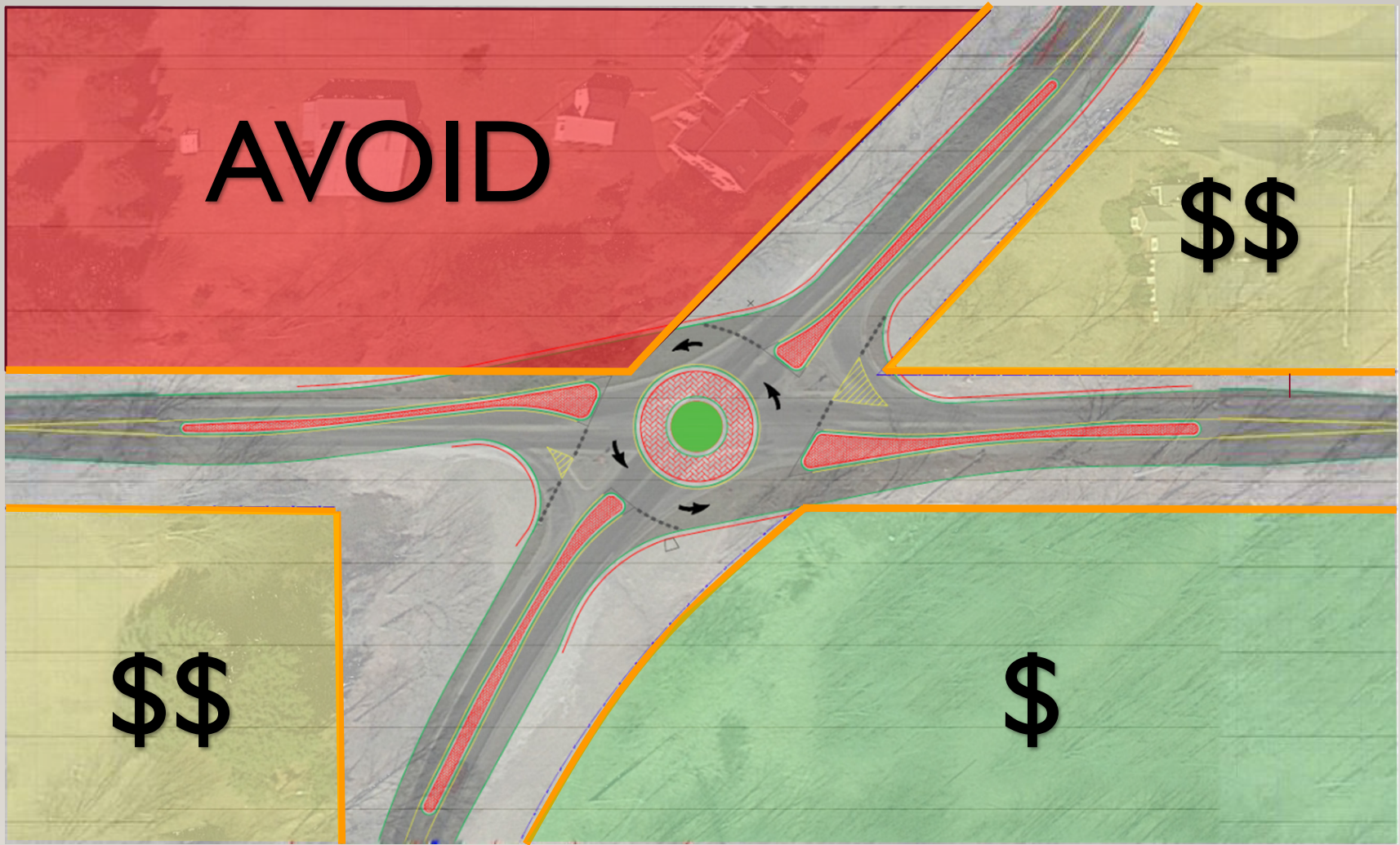
Corner	Footage	Offer
North East	Perm: 108 ft ² Temp: 80 ft ²	Offer: \$100. ⁰⁰ Counter Offer: \$300. ⁰⁰
South East	Perm: 120 ft ² Temp: 1200 ft ²	Offer: \$300. ⁰⁰ Counter Offer: \$1,000. ⁰⁰
North West	Perm: 1,746 ft ² Temp: 1,027 ft ²	Offer: \$1,000. ⁰⁰ Owner Rejected Final Offer: \$25,000. ⁰⁰ Counter Offer: - \$50,000. ⁰⁰ - 6' tall fencing (750 LF) - Automatic Driveway Gate

- Total ROW would be over \$100,000
- NW property owner proven to be very difficult to negotiate with

ABANDON PROJECT OR REDESIGN?



BACK TO THE DRAWING BOARD...

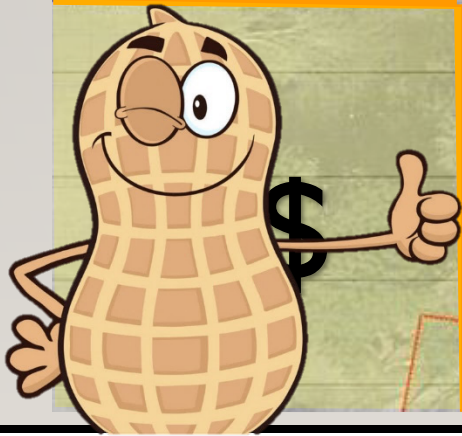


BACK TO THE DRAWING BOARD...

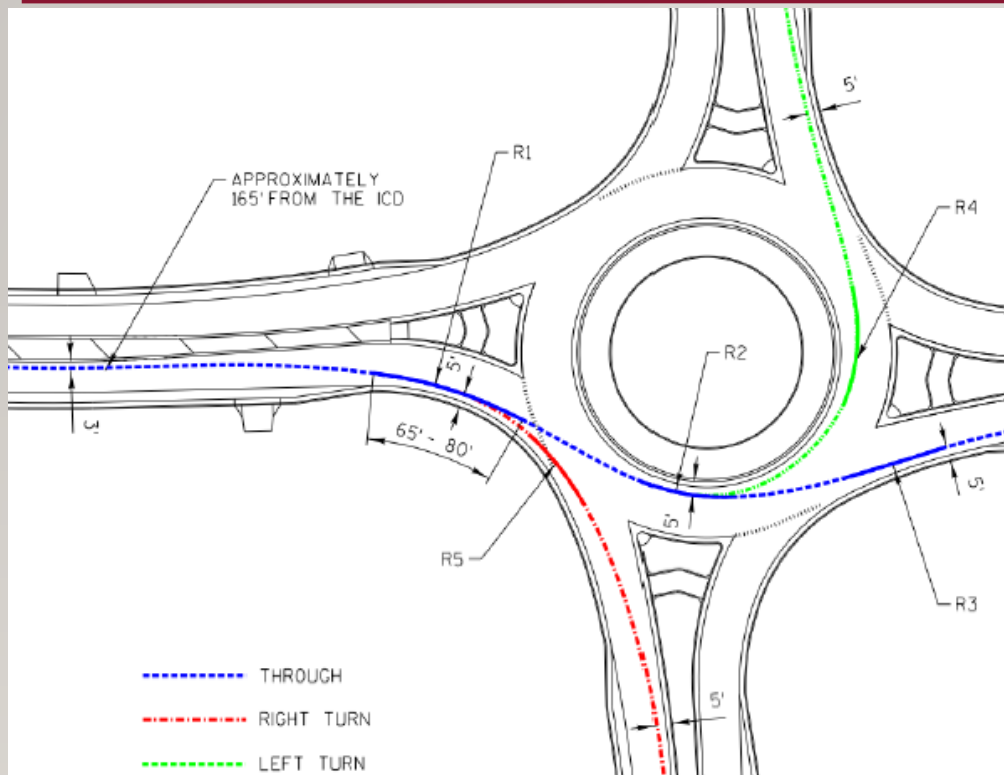
AVOID

\$\$

\$



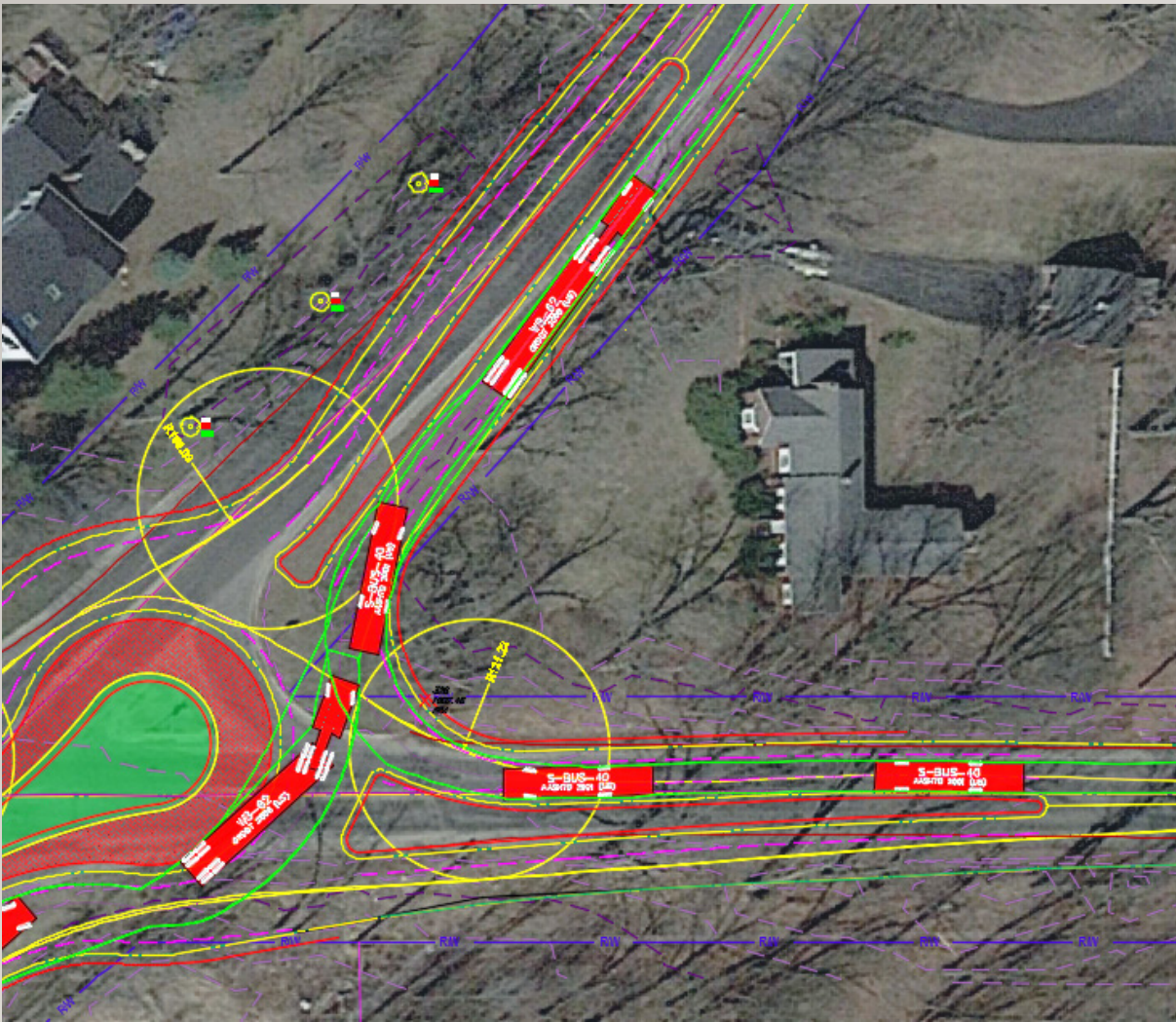
UNDERSTANDING FAST PATHS



- Extremely critical safety performance measure in the design of roundabouts
- Drawing the fastest path possible for a passenger car making a through movement
 - Drawn by a spline
 - Least amount of grip-points
- Starting 165 ft. in advance of the yield line.
- Offset of 5 ft. from curbs

Critical Radius	Description	Desirable Range of Radii and Corresponding Speeds
Entry Path Radius, R1	The minimum radius on the fastest through path prior to the yield line. (This is not the same as Entry Radius.)	Single Lane $R1 \leq 170'$; $V1 = 20$ to 25 mph Multilane $R1 \leq 275'$; $V1 = 25$ to 30 mph
Circulating Path Radius, R2	The minimum radius on the fastest through path around the central island.	$R2 \leq 170'$; $V2 = 15$ to 25 mph

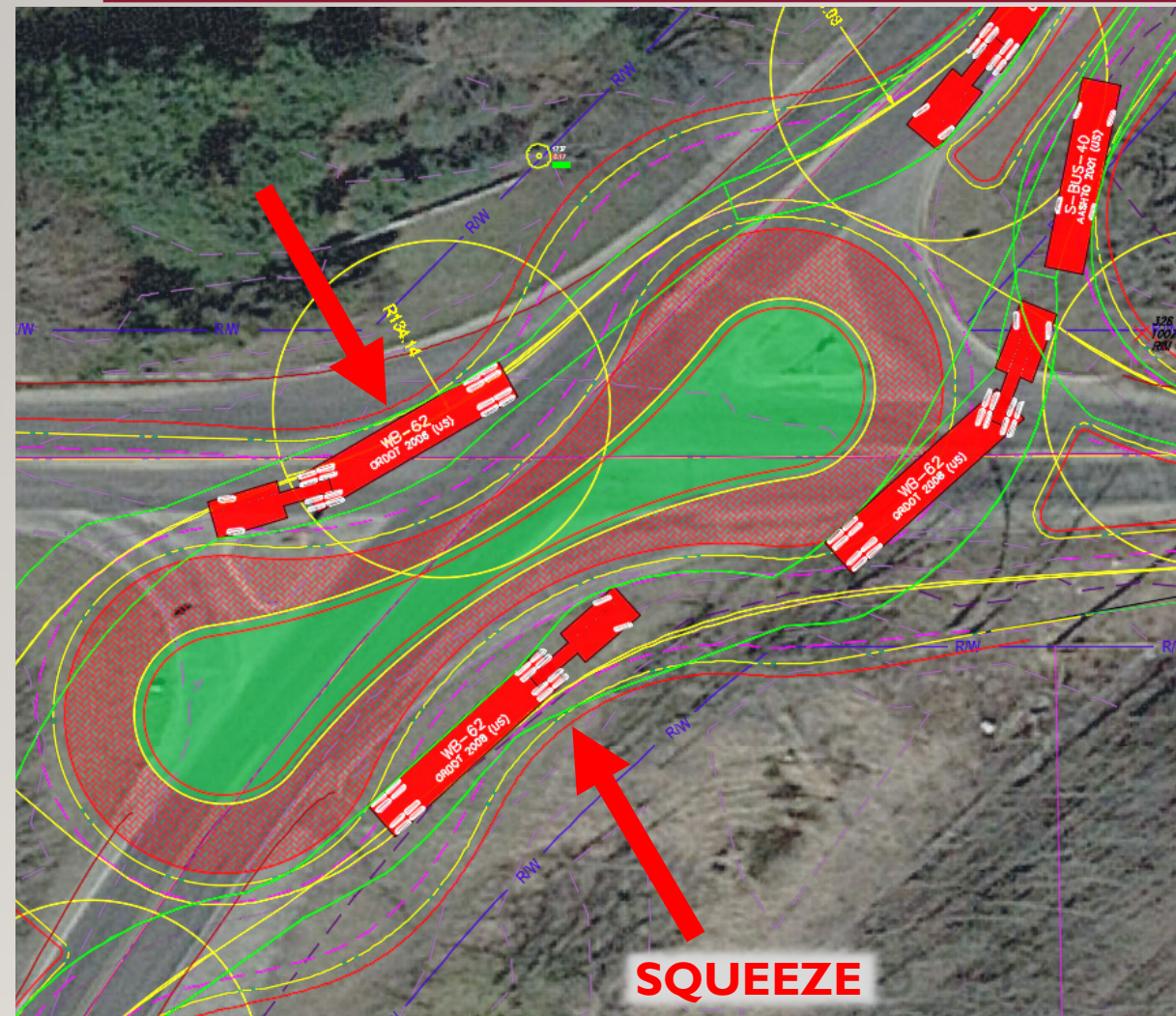
DESIGN AS TWO SEPARATE ROUNDABOUTS



- Not a lot of peanut roundabout design guides
- Work on 1/2 the roundabout with 2 approaches
- Design Checks
 - Fast Passes
 - Turning Movements
 - Body Language
 - Minimize ROW impact



DESIGN AS TWO SEPARATE ROUNDABOUTS



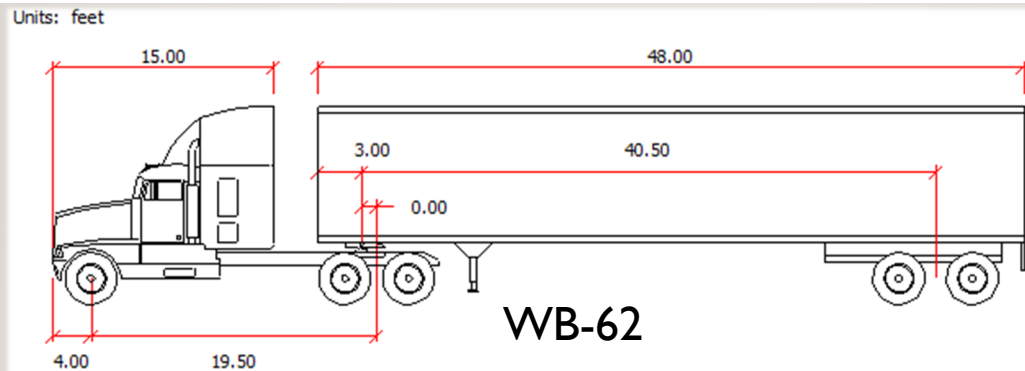
- Tying the two together
- Heavily dependent on the fast pass
- Tighten fast pass to control speeds, but without risking loss in turning movements.
- Ensure a WB-62 passage

WHY A WB-62?

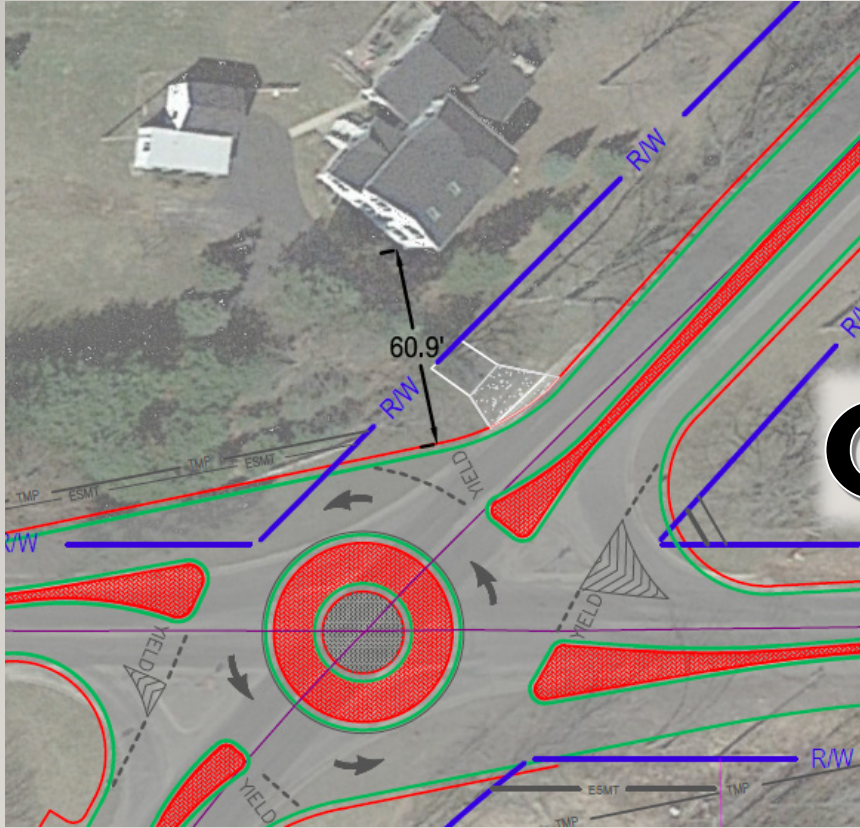
AASHTO Green Book 2018

The WB-67 [WB-20] truck should generally be the minimum size design vehicle. . .

. . . In many cases, operators of WB-67 [WB-20] and larger vehicles pull the rear axles of the vehicle forward to maintain a kingpin-to-rear-axle distance of 41 ft [12.5 m], which makes the truck more maneuverable and is required by law in many jurisdictions. Where the practice is prevalent, the WB 62 [WB 19] may be used in design for turning maneuvers, but the WB-67 [WB-20] should be used in design situations where the overall length of the vehicle is considered, such as for sight distance at railroad-highway grade crossings.

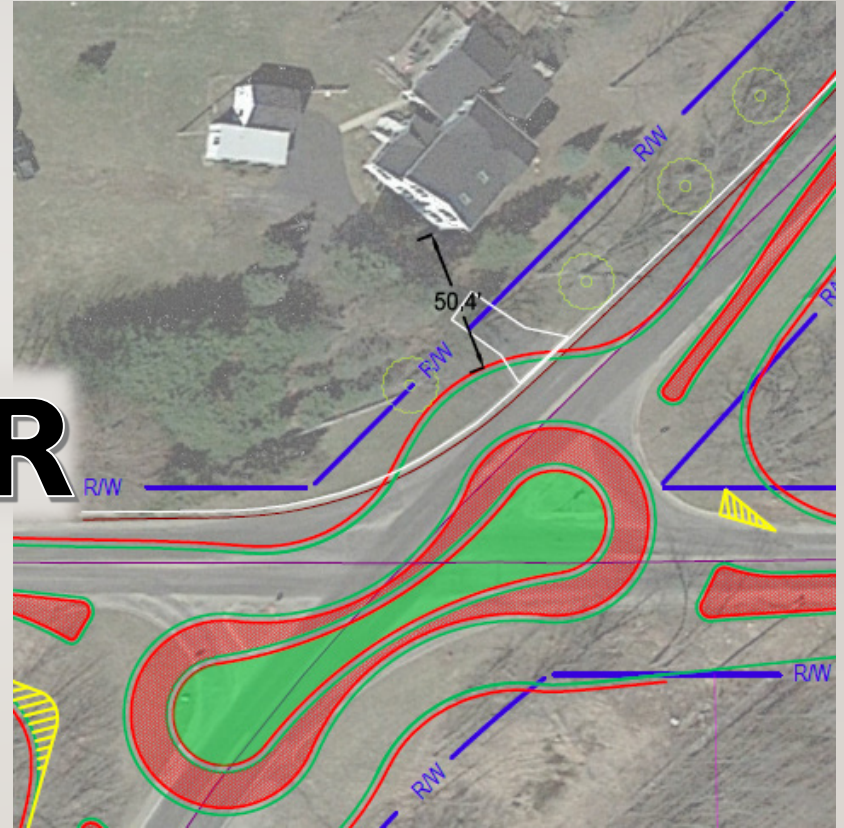


ONE LAST ATTEMPT..



60 ft from house & \$25,000?

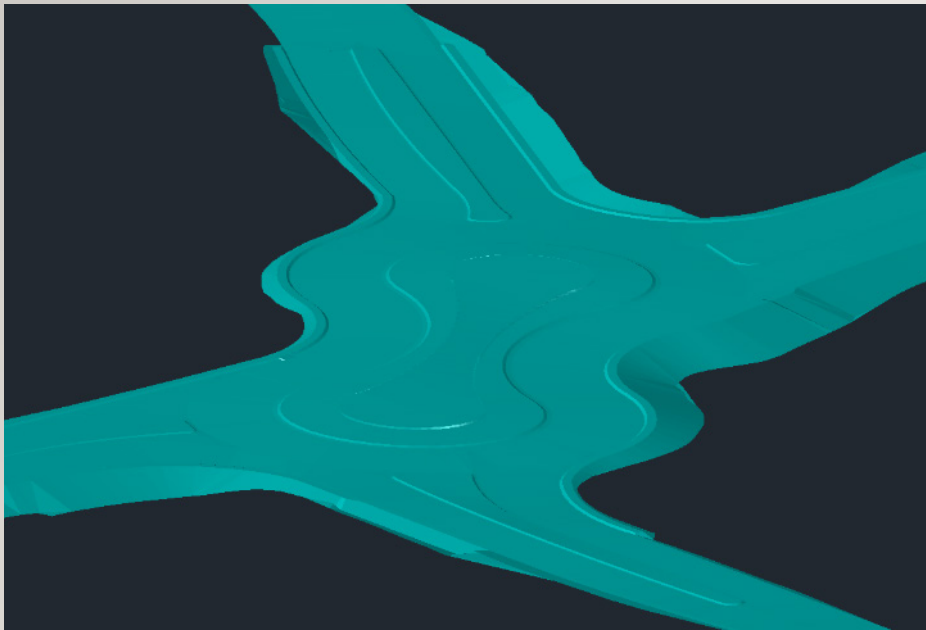
OR



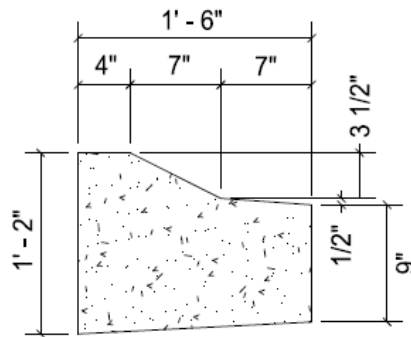
50 ft from house & No Money?

FULL STEAM AHEAD

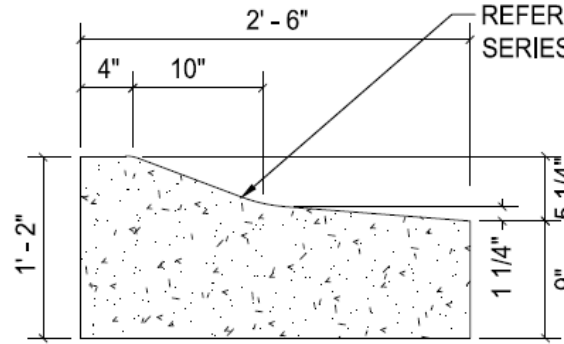
- Start vertical design
 - Creating alignment profiles (13 in total)
 - Running subassemblies to build surface



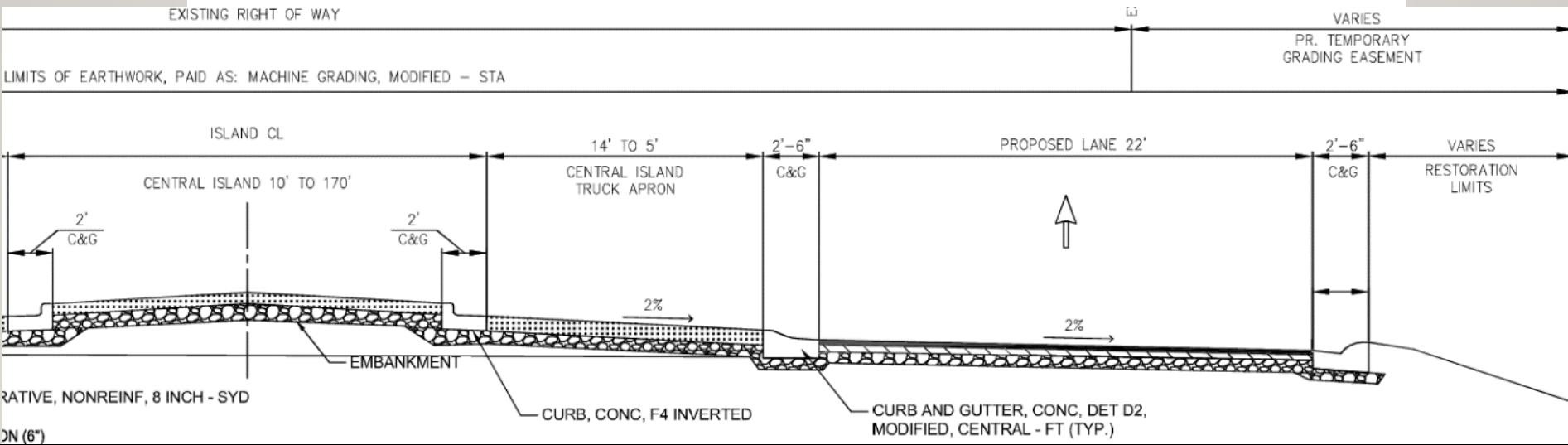
MOUNTABLE CURBS



**CURB AND GUTTER, CONC,
DET D2, MODIFIED, SPLITTER**
(USED IN SPLITTER ISLANDS)
NOT TO SCALE



**CURB AND GUTTER, CONC,
DET D2, MODIFIED, CENTRAL**
(USED IN CENTRAL ISLAND)
NOT TO SCALE



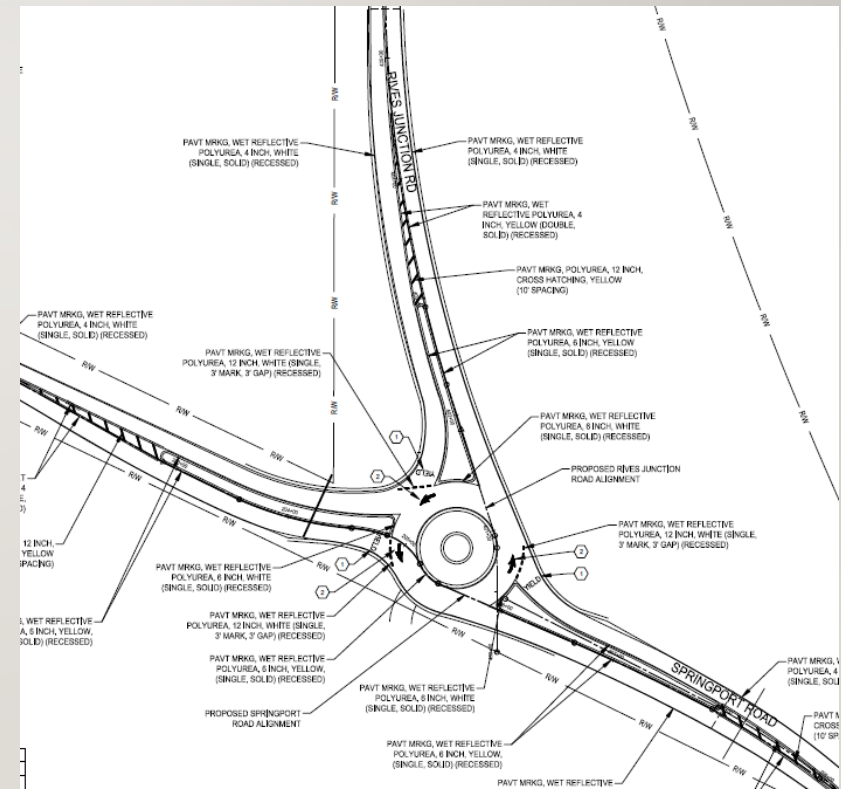
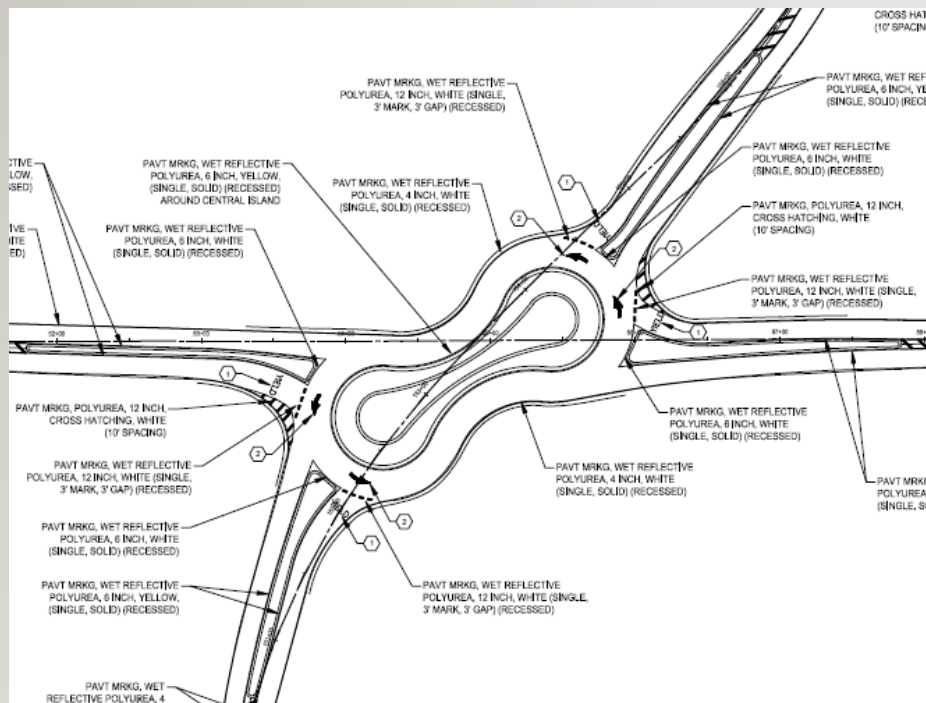
ON (6")



IN HOUSE PLANS

Package two roundabout projects into one

- Plan set was 39 pages (combined)
- Would make project more attractive to larger contractors (Saving \$50,000)
- Projects only 5 miles apart



SHOW ME THE \$\$\$\$\$



ESTIMATE AND BID LETTING

- Updated Engineers Estimate \$750,000.00

- HRRR \$294,204.⁶⁰
- Rural STP \$301,005.⁰⁵
- State \$105,198.⁰⁰
- Local \$49,592.35

- Bid Letting #1

- \$898,884.⁷³

- Bid Letting #2

- \$842,301.⁷⁹

JCDOT						
Engineer's Opinion of Costs						
Project Number: 210343			Project Engineer: LAP			
Estimate Number: 4: Rebid March 2023			Date Created: 1/4/2023			
Project Type: Safety			Date Edited: 1/4/2023			
Location: Roundabout at Dearing/McCain			Fed/State #:			
Description: Spring Arbor Township, Jackson County			Fed Item:			
Construct peanut-shaped roundabout at intersection. Total budget \$718,407.65.			Control Section: 38000			
Line	Pay Item	Description	Quantity	Units	Unit Price	Total
Category: 0001 90% Federal/10% State						
0001	1100001	Mobilization, Max	0.560	LSUM	\$127,300.000	\$71,288.00
0002	2030001	Culv, Rem, Less than 24 inch	3.000	Ea	\$750.000	\$2,250.00
0003	2040020	Curb and Gutter, Rem	973.000	Ft	\$8.000	\$7,784.00
0004	2050041	Subgrade Undercutting, Type II	50.000	Cyd	\$35.000	\$1,750.00
0005	2057002	_ Machine Grading, Modified	19.000	Sta	\$5,250.000	\$99,750.00
0006	2080036	Erosion Control, Silt Fence	1,391.000	Ft	\$2.500	\$3,477.50
0007	3020001	Aggregate Base	300.000	Ton	\$30.000	\$9,000.00
0008	3050002	HMA Base Crushing and Shaping	4,090.000	Syd	\$3.250	\$13,292.50
0009	3070006	Approach, CI I, 4 inch	114.000	Syd	\$10.000	\$1,140.00
0010	3070121	Shld, CI II	167.000	Ton	\$30.000	\$5,010.00
0011	3080010	Geotextile, Stabilization	3,000.000	Syd	\$2.500	\$7,500.00
0012	4010047	Culv End Sect, Conc, 12 inch	4.000	Ea	\$1,000.000	\$4,000.00
0013	4020004	Sewer, CI A, 12 inch, Tr Det A	368.000	Ft	\$75.000	\$27,600.00
0014	4030045	Dr Structure Cover, Type J	6.000	Ea	\$1,350.000	\$8,100.00
0015	4030200	Dr Structure, 24 inch dia	4.000	Ea	\$1,500.000	\$6,000.00



CONSTRUCTION TIME



CRUSHING AND SHAPING



TAKING SHAPE



**TWO WEEKS
LATER...**



POURING DECORATIVE CONCRETE



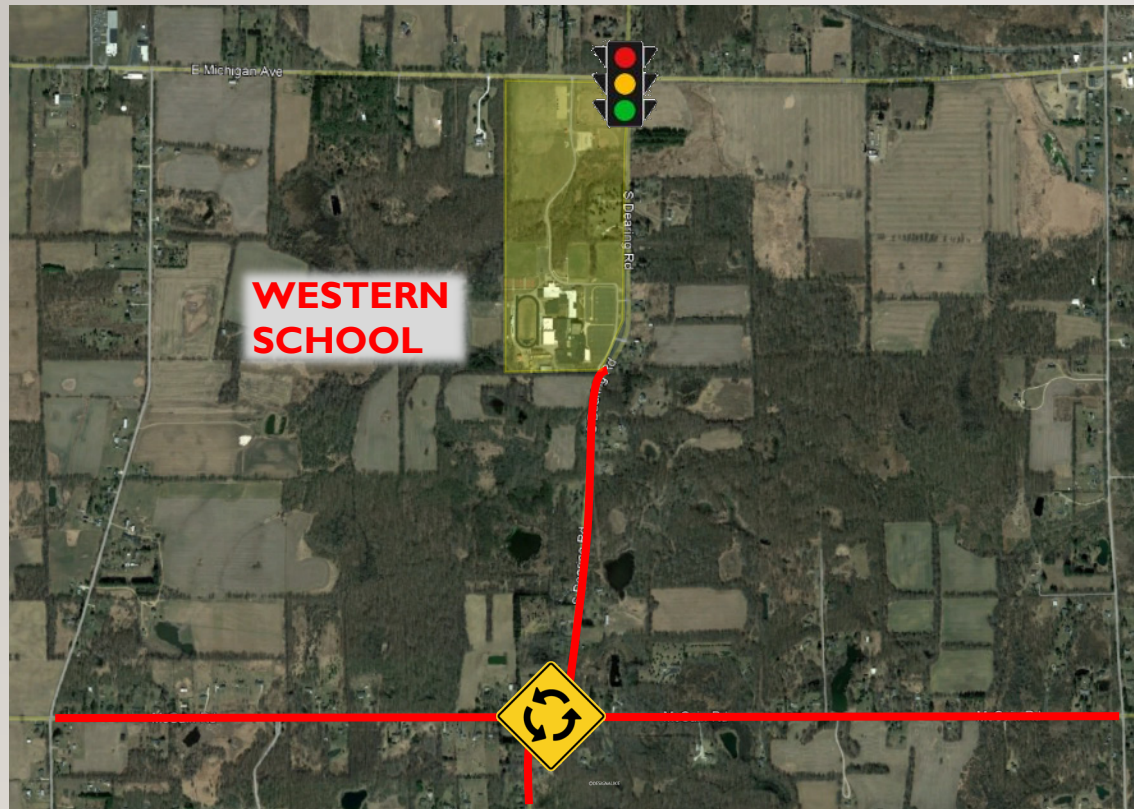
BASE COURSE PAVING



TOP COURSE PAVING



SCHOOLS BACK IN SESSION...



- School starts Wednesday, August 30, 2023
 - No Pavement markings
 - No street lighting
- Congestion at northern Intersection
 - Michigan Ave & Dearing Rd

 : Closed Section of Road

LIGHTING - CONSUMERS

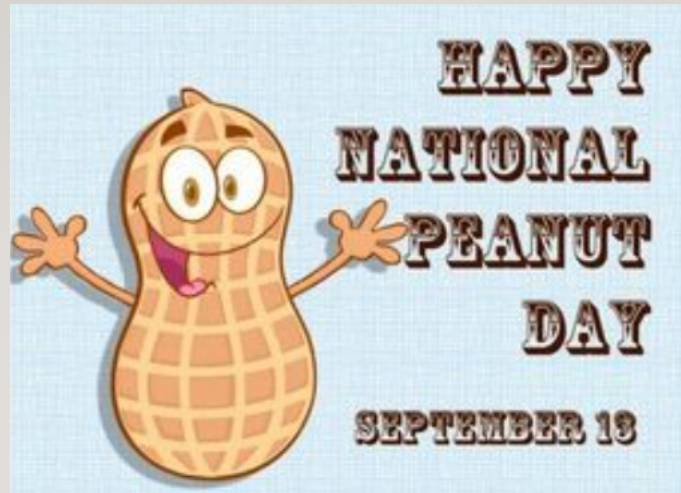


Monday, September 11, 2023

PAVEMENT MARKINGS



OPENING DAY – NATIONAL PEANUT DAY



Wednesday, September 13, 2023



OPEN FOR SCHOOL TRAFFIC



FINAL COSTS

Activity	Cost
In House Design & Kimely-Horn	\$20,000
Survey	\$5,000
Right-of-Way	\$12,000
Tree Clearing	\$18,000
Street Lights	\$1,500
Construction Engineering	\$20,000
SME	\$18,500
Payment to Contractor	\$850,000
Final Cost	\$945,000



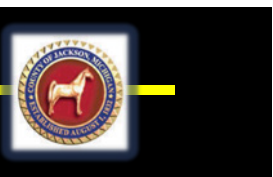
LESSONS LEARNED

- Roundabout estimating is more variable than a traditional road project
- Crushing the road was a great savings, but did cause logistical issues due to the 10+ inches of existing HMA
- Agree on ROW ASAP, property owners can always change their mind
- Double check with utility companies/municipalities on any future expansion
- Think about the colors used for your decorative concrete...





MICHIGAN RESIDENTS SAY
THAT JACKSON'S NEW
ROUNABOUT LOOKS LIKE A
MAXI PAD



THANK YOU!

