RDA 103-01 | FEBRUARY 26, 2026

PRELIMINARY GEOMETRIC REVIEW – EXAMPLE SUBMITTALS

Reference: 14-2.01(03) Preliminary Geometrics Review [Rev. Aug. 2024]

INTRODUCTION

This Road Design Aid provides guidance on preparing a Preliminary Geometrics Review submittal in accordance with Indiana Design Manual Section 14-2.01(03), supporting the plan development framework of revised Chapter 103. Preliminary geometrics review before formal plan development begins is required for non-conventional or innovative intersections, and is used to confirm layout feasibility, geometric design compliance, operational considerations, and design vehicle accommodation early in project development.

The purpose of this RDA is to introduce example submittals that illustrate the expected quality, organization, and level of detail for this review stage.

ABOUT THE EXAMPLE SUBMITTALS

This Road Design Aid presents three sample Preliminary Geometrics Review submittals:

- Reduced Conflict Intersection (RCUT) Example
- Single-Lane Roundabout Example 1
- Single-Lane Roundabout Example 2

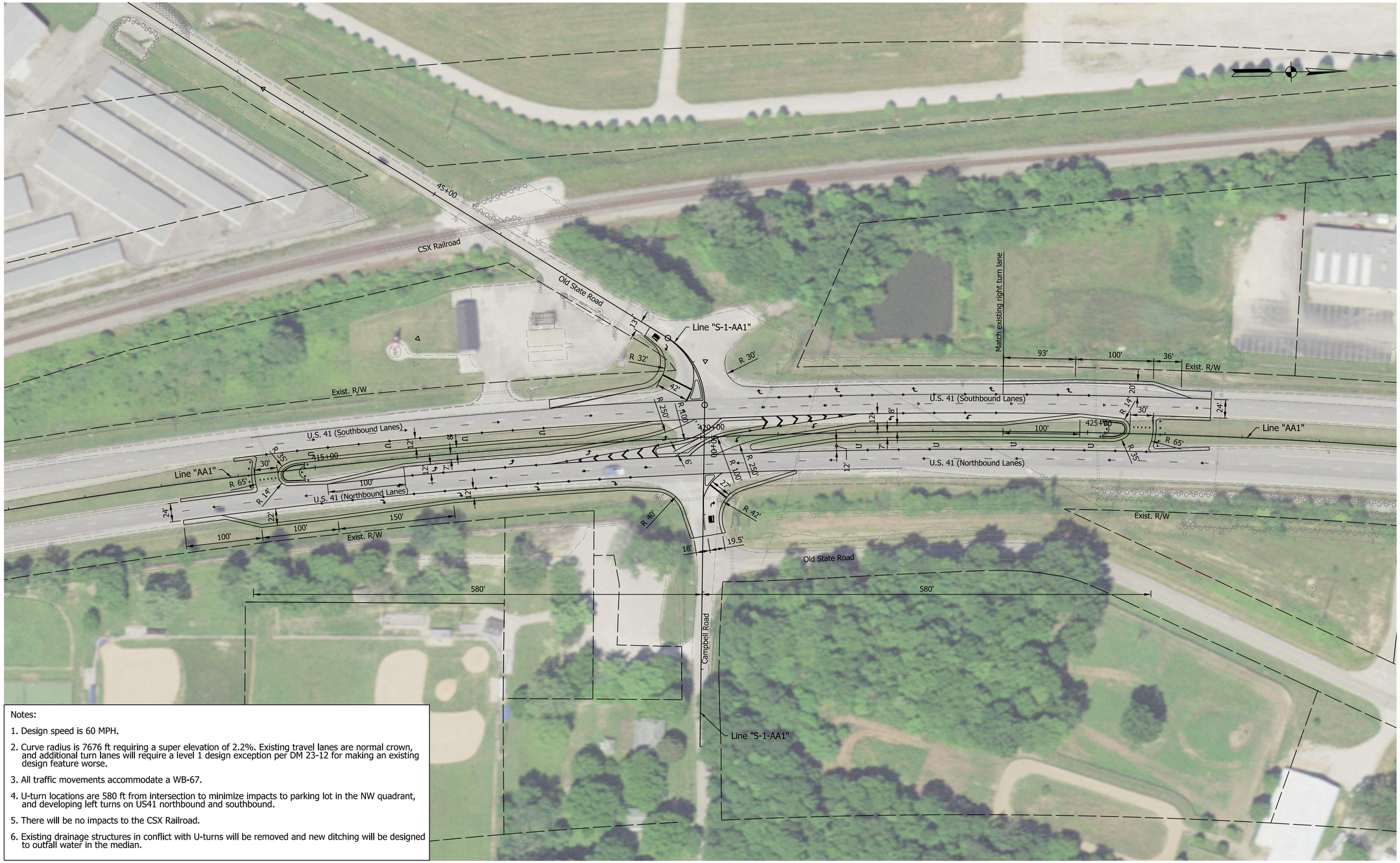
Each example demonstrates how required elements can be documented, including:

- Typical sections
- An overall plan view at appropriate scale
- Lane configurations, tapers, radii, traffic islands, and auxiliary lanes
- Existing right-of-way, utilities, drainage features, and adjacent access points
- Preliminary pavement marking concept
- Design-vehicle wheel-path diagrams
- For roundabouts: entry geometry, circulating width, truck apron configuration, and fastest-path evaluation

These examples are intended as reference illustrations, not prescriptive standards. Designers should adapt the formatting and content to each project's context while meeting all requirements of Section 14-2.01(03).

CONTACT INFORMATION

If you have any questions regarding the content of this Road Design Aid, please contact lularacuente@indot.in.gov.



Notes:

1. Design speed is 60 MPH.
2. Curve radius is 7676 ft requiring a super elevation of 2.2%. Existing travel lanes are normal crown, and additional turn lanes will require a level 1 design exception per DM 23-12 for making an existing design feature worse.
3. All traffic movements accommodate a WB-67.
4. U-turn locations are 580 ft from intersection to minimize impacts to parking lot in the NW quadrant, and developing left turns on US41 northbound and southbound.
5. There will be no impacts to the CSX Railroad.
6. Existing drainage structures in conflict with U-turns will be removed and new ditching will be designed to outfall water in the median.

DRAFT
NOT FOR CONSTRUCTION

RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: MBM DRAWN: RJS
CHECKED: LMC CHECKED: LMC

INDIANA
DEPARTMENT OF TRANSPORTATION

PROJECT OVERVIEW

HORIZONTAL SCALE	BRIDGE FILE
1"=60'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
SURVEY BOOK	SHEETS PO-01
ELECTRONIC	1 of 5
CONTRACT	PROJECT
R-45274	2301093

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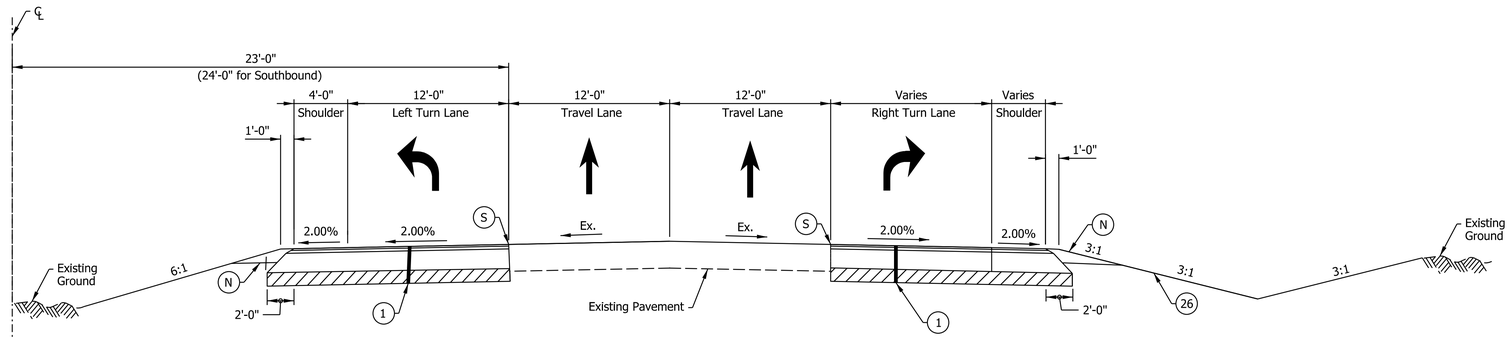
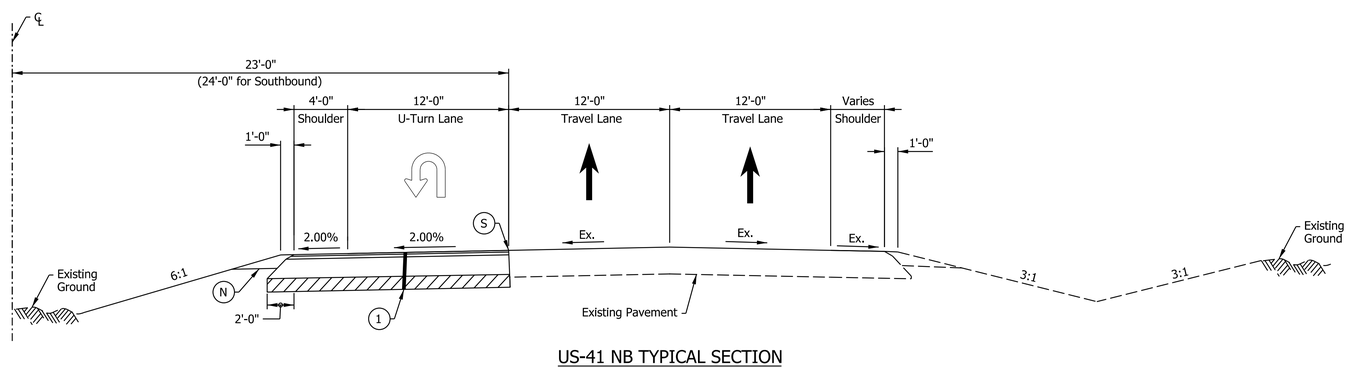


US-41 NB TYPICAL SECTION

(Mirror for Southbound)



US-41 NB TYPICAL SECTION

(Mirror for Southbound)

Legend:

(S) Saw Cut (No Direct Pay)

(N) Compacted Aggregate, No. 53

(26) Seed Mixture, R

(1) Full Depth Widening:
Saw cut and remove pavement at existing edge to create a clean vertical face, then
165#/Syd. QC/QA-HMA, 4, 58E, Surface 9.5 mm, on
275#/Syd. QC/QA-HMA, 4, 58E, Intermediate, 19.0 mm, on
440#/Syd. QC/QA-HMA, 4, 58S, Base, 19.0 mm, on
440#/Syd. QC/QA-HMA, 4, 58S, Base, 19.0 mm, on
7" Compacted Aggregate, No. 53, on
Subgrade Treatment, Type IC

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RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: RJS DRAWN: RJS

CHECKED: LMC CHECKED: LMC

INDIANA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

HORIZONTAL SCALE	BRIDGE FILE
3/16"=1'-0"	N/A
VERTICAL SCALE	DESIGNATION
3/16"=1'-0"	2301093

SURVEY BOOK	SHEETS	TYP-01
ELECTRONIC	2 of 5	
CONTRACT	PROJECT	
R-45274	2301093	

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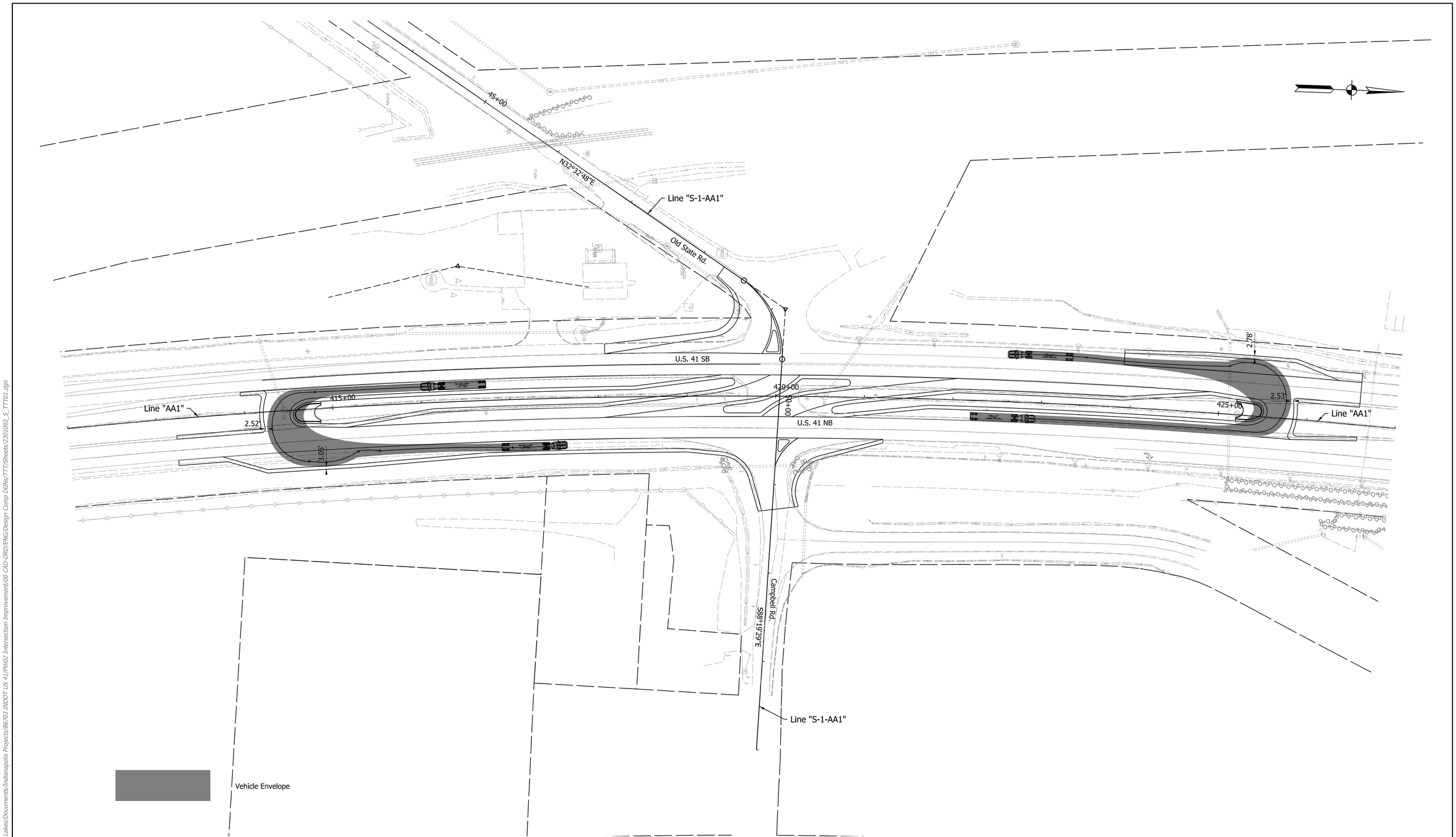

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NOT FOR CONSTRUCTION

RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: MBM | DRAWN: RJS
CHECKED: LMC | CHECKED: LMC

INDIANA
DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67
U-TURN ONTO U.S. 41 NB/SB

HORIZONTAL SCALE	BRIDGE FILE
1"=50'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
SURVEY BOOK	SHEETS TTT-01
ELECTRONIC	1 of
CONTRACT	PROJECT
R-45274	2301093

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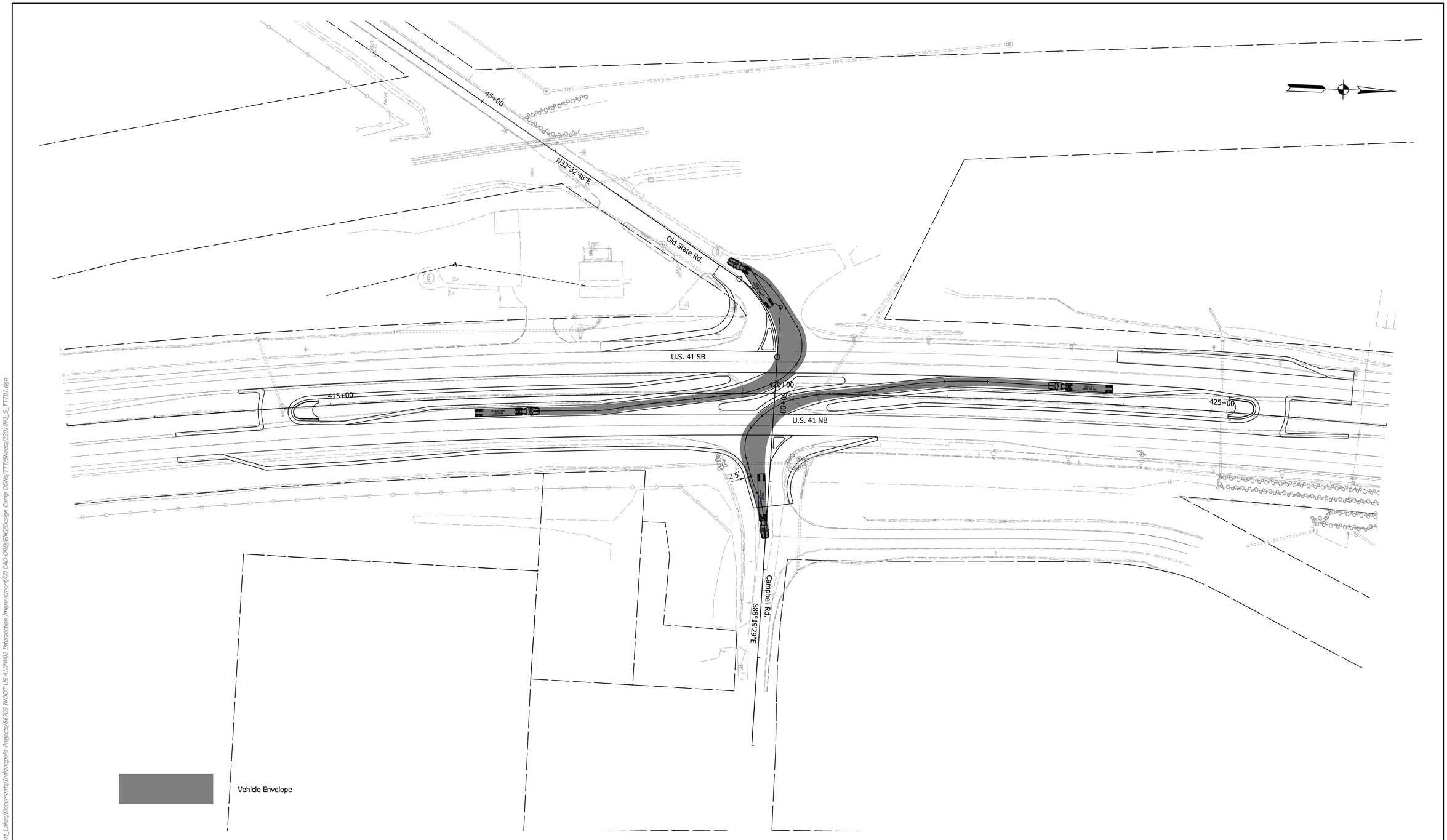

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RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: MBM | DRAWN: RJS
CHECKED: LMC | CHECKED: LMC

INDIANA
DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67
LEFT TURN FROM U.S. 41 EB/WB

HORIZONTAL SCALE	BRIDGE FILE
1"=50'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
SURVEY BOOK	SHEETS TTT-02
ELECTRONIC	2 of
CONTRACT	PROJECT
R-45274	2301093

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NOT FOR CONSTRUCTION

RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: MBM | DRAWN: RJS
CHECKED: LMC | CHECKED: LMC

INDIANA
DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67
RIGHT TURN ONTO U.S. 41 NB/SB

HORIZONTAL SCALE	BRIDGE FILE
1"=50'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
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CONTRACT	PROJECT
R-45274	2301093

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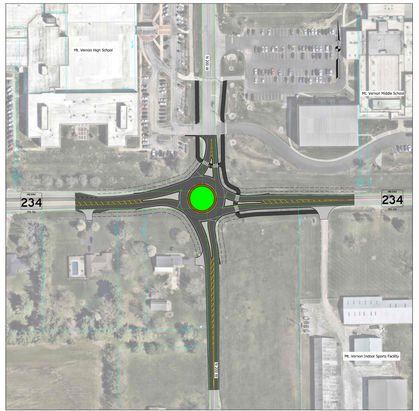
Engineering Assessment
US 41 at Boonville-New Harmony Rd. & US 41 at Old State Rd.
Vanderburgh County, IN
Vincennes District

Prepared By:
Emily Siler, P.E.
Infrastructure Engineering, Inc.

Prepared For:
Duane Decker, P.E.
Vincennes District Scoping Manager

November 11, 2022

Prepared For
Indiana Department of Transportation



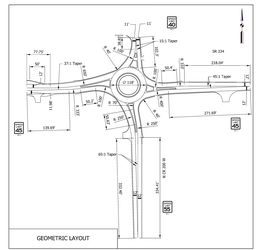
Scale: 1" = 60'

PROJECT LOCATION MAP
Scale: 1" = 45000'

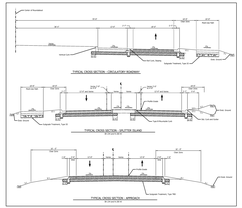
PROJECT LOCATION SHOWN BY HANCOCK COUNTY

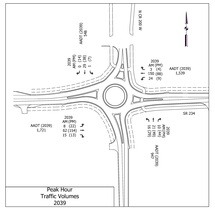
DESIGN PARAMETERS	LEG 1 SB	LEG 2 WB	LEG 3 NB	LEG 4 EB
Approach Width, FT	10.83	12.00	11.50	12.75
Entry Width (E/REP), FT	16.5	17.6	18.4	17.4
Entry Angle, PHI-e, DEG	12.2	25.7	27.7	17.6
Inscribed Circle Diameter, FT	118	118	118	118
Ext Width (E/REP), FT	13.8	16.5	17.1	17.3
Circulating Roadway Width Upstream of Entry, FT	18	18	18	18

FASTEST SPEED PATH								
R_1, Radius/Speed, FT/MPH	107	21	151	24	163	25	164	25
R_2, Radius/Speed, FT/MPH	64	17	93	20	126	22	106	20
R_3, Radius/Speed, FT/MPH	N/A	29	N/A	30	N/A	30	N/A	30
R_4, Radius/Speed, FT/MPH	109	21	103	20	76	18	107	21
R_5, Radius/Speed, FT/MPH	131	23	68	18	87	21	137	23
Bypass R_1, Radius/Speed, FT/MPH		NA		NA		NA		NA



GEOMETRIC LAYOUT





Peak Hour Traffic Volumes 2039

TRUCK TURNING MOVEMENTS THROUGH MOVEMENTS EB/WB — Design Vehicle: WB-67

*WB-50 Truck Turns were completed with a 0' offset to curb
*WB-67 Truck Turns were completed with a 2' offset to curb

TRUCK MOVEMENTS THROUGH MOVEMENTS NB/SB — Design Vehicle: WB-50

TRUCK MOVEMENTS RIGHT TURNS — Design Vehicle: WB-50

FASTEST PATHS - NB

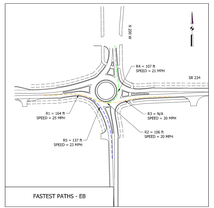
FASTEST PATHS - SB

INTERSECTION SIGHT DISTANCE TRIANGLES

TRUCK TURNING MOVEMENTS LEFT TURNS NB/SB — Design Vehicle: WB-50

TRUCK TURNING MOVEMENTS LEFT TURNS EB/WB — Design Vehicle: WB-50

FASTEST PATHS - WB



FASTEST PATHS - EB

INDIANA DEPARTMENT OF TRANSPORTATION	SCALE: NONE	RANGE FILE: N/A	
		DESIGNATION: 2300706	
GEOMETRIC REVIEW EXHIBIT		SHEET: 1	
	CONTRACT: R-40137	PROJECT: 2300706	

DESIGNED ___ BEL DRAWN ___ BEL
CHECKED ___ TBK CHECKED ___ TBK

SR 234 and N 200 W Roundabout
Des# 2300706
Hancock County

NOTES:
PLAN VIEW SCALE: 1" = 60'
TYPICAL SECTIONS: NTS

ROUNDABOUT DESIGN CHECKLIST

DESIGNER	
DATE:	7/7/2025
DESIGNATION No.:	2300706
LOCATION:	SR 234 at CR 200W, Hancock County, Greenfield District
PREPARED BY:	Reece Soel, EI
CHECKED BY:	Tom Heustis, PE

REVIEWER	
DATE:	
NAME:	

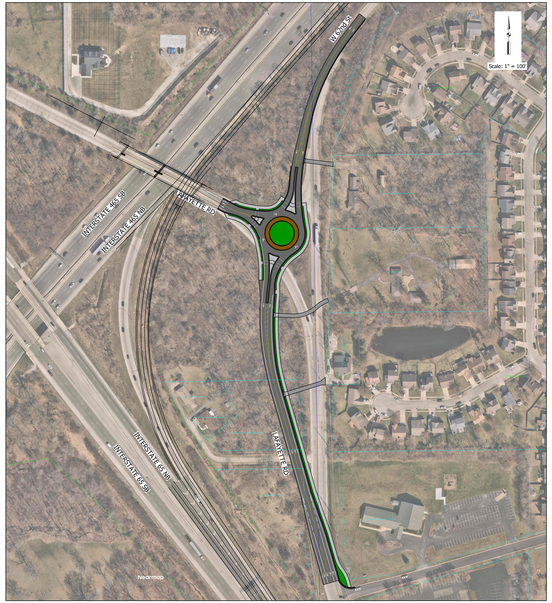
		DESIRED VALUE	REFERENCE	CALCULATIONS PROVIDED	MEETS DESIRED VALUE	EXPLANATION PROVIDED	REQUIRED STAGE	REMARKS	DESIGNER COMMENTS
PLANNING DOCUMENTATION									
1	**Location Appropriate for Roundabout**		*INDOT Intersection Decision Guide and Intersection Traffic Analysis Procedures*		X		1	The Engineer's Assessment/Report should include documentation in accordance with the INDOT's *Intersection Traffic Analysis Procedures* and the *Intersection Decision Guide* to demonstrate that the appropriate analyses have been completed to determine the feasibility of a roundabout.	
2	**Traffic Data for 10 and 20 Years After Construction**		INDOT *Intersection Traffic Analysis Procedures*		X	X	1	Traffic Forecasts should be provided. It may be desireable to phase construction if a multi-lane roundabout is not required at 10 years, but will be in 20 years. If phased construction approach is utilized, engineer must provide appropriate documentation.	Engineer's Report forecasted volumes through 2048. Updated Traffic Forecast shown in Preliminary Geometrics is for 10 years, but will be revised at Stage 1 submittal for 20 years.
3	**Capacity Analysis for 10 and 20 Years After Construction**		INDOT *Intersection Traffic Analysis Procedures*		X		1	The analysis should be in accordance with the INDOT *Intersection Traffic Analysis Procedures* document located on the INDOT Designer's web page.	
4	**Meets LOS Threshold**		*IDM Chap. 53 - 56, NCHRP 8.4.1, 8.4.2*		X		1		
5	**Meets Queue Length Threshold**	Approach Geometry matches dimensions included in capacity analysis.			X	X	1	Queue lengths do not cause blocking of nearby major driveways, intersections or railroad crossings.	AM Peak is 50 lft, PM peak is 35 lft, along the north leg which does not impact school drives to the north
DESIGN DOCUMENTATION									
6	**Speeds Appropriate / Fastest Paths**	Mini - 20mph Single Lane - 25mph Multi-Lane - 25mph - 30mph	*NCHRP 9.4* *IDM*	X		X	1	Fastest Path diagrams need to be submitted with Level 2 calculations and should be constructed consistent with NCHRP 672 process. Exit Speeds must be a calculated using accleration equation (NCHRP Equation 6-4), instead of fastest path tables. Any and all fastest paths not meeting desired values should be explained as a part of calculations submittal. The desired speeds shown are recommended values only. If good engineering judgement has been used, speeds in excess of the desired speeds listed can be accepted.	Meximum Speed is 30 mph. Coordination with INDOT Distrcit and Central Office to balance slightly higher speeds with cost savings on RAB footprint and construction costs
7	**Speed Differential / Consistency**	10mph - 15mph	*NCHRP 10.14.3,* *IDM*	X	X		1	Any and all fastest paths not meeting desired values should be explained as a part of calculations submittal. As with other design elements, speed consistency should be balanced with other objectives in establishing a design.	
8	*** Stopping Sight Distance**		*NCHRP 9.5.1,* *IDM*		X		1	SSD for circulating movements should be shown graphically, based on the appropriate fastest path speed. Three SSD locations should be checked. SSD Calculations should be included in Level 2 calculations.	
9	*** Intersection Sight Distance**		*NCHRP 9.5.2,* *IDM*		X		1	ISD should be shown graphically and included in Level 2 design calculations. It is very important that pedestrians are clearly visible by approaching vehicles.	
10	**Allowable Landscaping Areas**		*NCHRP Chapter 14.4*				2	Designer should include an overlay of graphical checks of ISD and SSD to reveal the areas where landscaping height is not restricted. Additionally, designer should identify locations where landscaping is restricted. Restrictions on the properties of the	
11	**Lighting Design**		*NCHRP Chapter 14.1, 14.2, 14.3,* *IESNA* *Publication DG-19-08*				3	Illumination calculations and graphical checks match the lighting fixtures and proposed heights of fixtures. Light poles can be placed in central island if necessary, but should not be placed in splitter islands.	
ROUNDABOUT DESIGN									
12	**Geometry matches capacity analysis**		*ENGINEER'S REPORT*		X		1	Capacity of a roundabout is directly correlated to its geometry, therefore, the design must be completed in accordance with the parameters used in the capacity analysis.	
13	**Inscribed Circle Diameter Range**	Mini / Compact SU 30 45' - 90' Single Lane B-40 90' - 150' WB-50 105' - 150' WB-67 130' - 180' Two Lane WB-50 150' - 220' WB-67 165' - 220' Three Lane WB-50 200' - 250' WB-67 220' - 300'	*NCHRP 2.3.1*		X	X	1	See NCHRP 672, Section 6.3.1 for recommended sizes of roundabouts by design vehicle type.	ICD = 118'

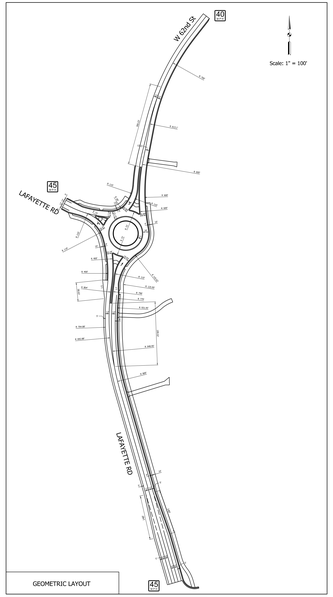
		DESIRED VALUE	REFERENCE	CALCULATIONS PROVIDED	MEETS DESIRED VALUE	EXPLANATION PROVIDED	REQUIRED STAGE	REMARKS	DESIGNER COMMENTS
				ROUNDABOUT DESIGN					
14	**Approach Alignment Offset Left or Centered**	Right offset should be avoided, Left offset preferred	*NCHRP 10.3.3*	X	X		1	Left offset typically provides better deflection and reduces speeds more effectively. Justification for right offset approaches should be included with Level 2 calculations.	
15	**Circulatory Roadway Width**	Single Lane - 16' - 20' Multi Lane - 14'-16' per lane 1.0-1.2 x Entry Lane Width	*NCHRP 10.6.6*	X	X		1	Single Lane Roundabout Rule of thumb 100%-120% of entry width.	18' Circulatory Lane Width
16	**Approach Radii**	Single Lane - 50'-100' Multi-Lane - 65'-120'	*NCHRP 10.6.4*	X	X		1	Design should match geometry used in scoping document / capacity analysis. A wide range of entry curb radii may be appropriate depending upon the other components of the design.	
17	**Entry Width**	Single Lane - 14'-18' Two-Lane - 24'-30' Three Lane - 36'-45'	*NCHRP 10.6.4*	X	X		1	Measured from point where entrance line intersects the left edge of traveled way to the right edge of the traveled way, along a line perpendicular to the right curb line.	
18	**Exit Radii**	100'-800' Allowable 300'-600' Desireable	*NCHRP 10.6.5*	X	X		1	Exit Radii as small as 50 ft can be used if necessary to control exit speeds at the crosswalk in certain situations. However, small exit radii can affect the natural flow of traffic through a roundabout and therefore reduce capacity and increase the pote	
19	**Checking for Vehicle Path Overlap (Multi-lane only)**		*IDM Section 51-12.09(14)*				1	See NCHRP 672, Sections 6.2.3, 6.5.4, & 6.5.6 for additional information.	N/A
20	**Central Island Truck Apron Width**	Desirable - 12-ft. Minimum - 5 ft. Max - Per Design Vehicle Templates	*NCHRP 10.5.2*	X	X		1	The apron width is dependent on the design vehicle turning templates. Curb height for truck aprons on INDOT routes should be a 2" sloping curb on single lane RABs. On multi-lane RABs, 3" sloping curb maybe considered providing the center island design accommodates encroachments by OSOW vehicles and has the approval of the District Traffic Engineer.	
21	**Pedestrian Crossing Placement**	20'-40' (One (1) to Two (2) car lengths) behind Yield Line	*NCHRP 10.4.7*	X	X		1	Ample length and width of splitter island should be designed to provide a safe refuge for pedestrians. Location of crosswalks at the locations shown in guides typically coincides with a vehicles slowest approach speeds.	
22	**Pavement Markings Appropriate**		*MUTCD 3C / NCHRP 12*				1	Pavement markings play a major role in the operation of a roundabout, pavement marking schematics should be included in early plan submissions.	No markings completed due to stage
23	**Entry Grade Profile**	Entry Grade Profile should be leveled out so as not to exceed 3%	*NCHRP 11.3*				1	The Entry Grade Profile is not the same as the approaching road grade. Roundabouts have been placed on roadways with a mainline grade up to 10%. The entry grade profile is defined as the area approximately two car lengths from the outer edge of the circle.	No profile design completed due to stage
24	**No Drainage Structures in Circulatory Roadway**	Avoid Drainage Structures within Circulatory Roadway. Desireable location is between circulatory roadway and curb ramps.	*NCHRP 11.4.1*				2	Placing inlets within circulatory roadway should be avoided. Primary concern with inlets in the circulatory roadway include maintenance difficulties (traffic restrictions in roundabout may be necessary for cleaning) and lane encroachment/spread within the roundabout and approaches.	
25	**Signs**		*MUTCD 2B.43-45 / NCHRP 12*				3		
26	**Lighting Structures Placement**	All roundabout elements must be lit so they are clear to motorists. Lights must be located in advance of crosswalks to avoid pedestrian backlighting.	*NCHRP Chapter 14, IESNA Publication DG-19-08*				3	Light poles can be placed in central island if necessary, but should not be placed in splitter islands.	
				DESIGN PLANS					
27	**Radii Clearly Labeled**				X		1	Stage 1 submittal should include enough information for a reviewer to identify the critical radii elements (ICD, Approach Radii Exit Radii)	
28	**Spot Elevations and/or Grading Plans are Clear and Concise.**						3	Can a contractor build the roundabout with the information provided?	
29	**Sign Types and Locations Clearly Defined.**						3	Signs should be located outside the path of the Design Vehicle.	
30	**Specialty Markings Clearly Detailed.**						3		

NCHRP 1043 Link:

*** Denotes level 1 criteria. All level 1 calculations should be included with standard INDOT Level 1 checklist just as any other project. All other criteria should be considered Level 2. Deviation from standards on Level 2 items requires written approval**

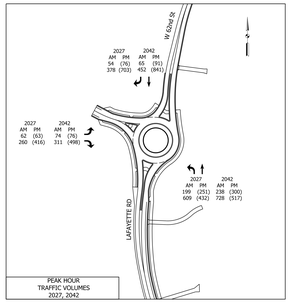
Lafayette Rd Intersection Improvement Roundabout at W 62nd St
Des# 2002581
Marion County



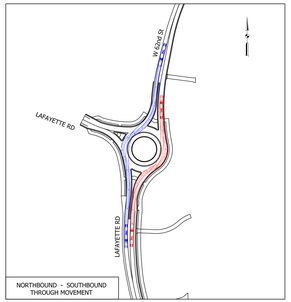


GEOMETRIC LAYOUT

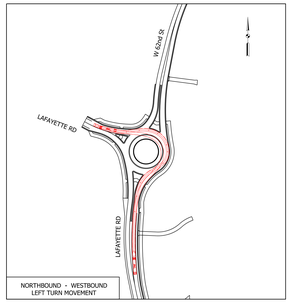
	W 62ND ST (NORTH LEG)	LAFAYETTE ROAD (WEST LEG)	LAFAYETTE ROAD (SOUTH LEG)
DESIGN SPEED (MPH)	40	45	45
SPLITTER ISLANDS LENGTH (FT)	140	34	150
DECELERATION LENGTH (FT)	235	295	295



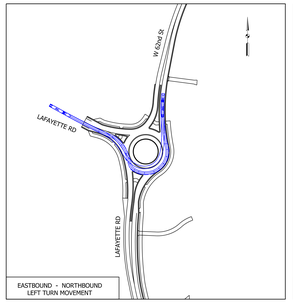
PEAK HOUR
TRAFFIC VOLUMES
2027, 2042



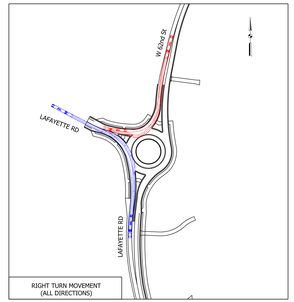
NORTHBOUND - SOUTHBOUND
THROUGH MOVEMENT



NORTHBOUND - WESTBOUND
LEFT TURN MOVEMENT



EASTBOUND - NORTHBOUND
LEFT TURN MOVEMENT



RIGHT TURN MOVEMENT
(ALL DIRECTIONS)

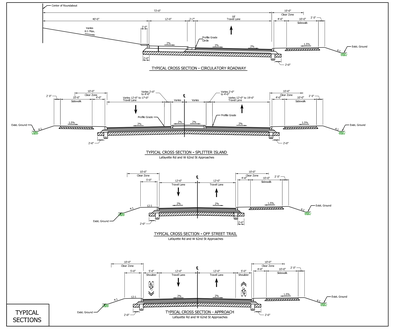
DESIGN
VEHICLES

DESIGN PARAMETERS	W 62ND ST (NORTH LEG)	LAFAYETTE ROAD (WEST LEG)	LAFAYETTE ROAD (SOUTH LEG)
Approach Width, FT	12	12	12
Entry Width (EP/EP), FT	20.9	20.6	23.8
Entry Angle, PHI (Ø), DEG	14.9	21.1	23.7
Inscribed Circle Diameter, FT	148	148	148
Exit Width (EP/EP), FT	20.9	24.1	20.2
Circulating Roadway Width Upstream of Entry, FT	18	18	18

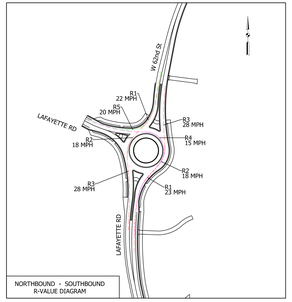
APPROACH	CURVE	RADIUS (FT)	e (FT/FT)	SPEED (MPH)	REALATIVE SPEED DIFFERENCE (MPH)
LEG 1 SOUTHBOUND	R1	121	0.02	22	7
	R2	84	-0.02	18	3
	R3	NA	0.02	28*	NA
	R4	NA	-0.02	NA	NA
	R5	92	0.02	20	5
LEG 2 EASTBOUND	R1	143	0.02	23	8
	R2	57	-0.02	15	0
	R3	NA	0.02	NA	NA
	R4	76	-0.02	17	2
	R5	247	0.02	29	14
LEG 3 NORTHBOUND	R1	135	0.02	23	8
	R2	83	-0.02	18	3
	R3	NA	0.02	28*	NA
	R4	57	-0.02	15	0
	R5	NA	0.02	NA	NA

* Calculated Speed R3, based on distance from R2 to 20 ft beyond Roundabout (NCHRP Report 1043 Equation 9.8)

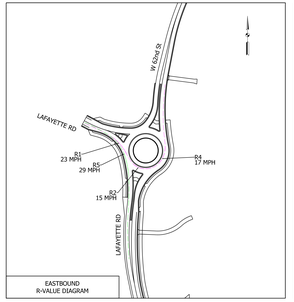
ROUNDABOUT
CRITICAL DESIGN PARAMETERS



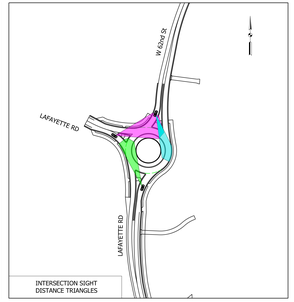
TYPICAL
SECTIONS



NORTHBOUND - SOUTHBOUND
R-VALUE DIAGRAM



EASTBOUND
R-VALUE DIAGRAM



INTERSECTION SIGHT
DISTANCE TRIANGLES

RECOMMENDED FOR APPROVAL			
		DESIGN ENGINEER	DATE
DESIGNED: JRH	4/25/25	DRAWN: JTV	4/25/25
CHECKED: TJH	4/25/25	CHECKED: JRH	4/25/25

INDIANA
DEPARTMENT OF TRANSPORTATION

LAFAYETTE RD. & 62ND ST. ROUNDABOUT
GEOMETRIC REVIEW EXHIBIT

SCALE	BRIDGE FILE
VARIES	N/A
	DESIGNATION
	2002581
	SHEETS
	1 of 1
CONTRACT	PROJECT
R-44782	2002581

NOTES:
PLAN VIEW SCALE: 1" = 100'
TYPICAL SECTIONS: NTS