



MEMORANDUM

To: El Paso County
From: Sean Hays, PE
Kimley-Horn and Associates, Inc.
Date: September 16, 2021
Subject: Design Documentation - Proposed Roundabout at Meadowbrook Pkwy and Newt Dr

A new roundabout is proposed at the intersection of Meadowbrook Pkwy and Newt Dr in El Paso County, Colorado. This memo summarizes the design criteria and critical design parameters for the proposed roundabout.

The design of this roundabout is based upon the criteria established in the Wisconsin Department of Transportation Facilities Development Manual, Chapter 11 Section 26 (Wisconsin DOT FDM 11-26).

Lane Configuration and Geometrics

The Crossroads Mix Use Traffic Study Letter (dated 6-13-2021) prepared by Kimley-Horn recommends a roundabout with a single circulatory lane and one lane entering on each approach at the project intersection. The report shows that the roundabout will operate at a Level of Service (LOS) of B in design year 2040. Refer to the traffic impact study for additional details.

To meet the criteria in the Wisconsin DOT FDM 11-26, the proposed roundabout was designed with the geometry displayed in Table 1. A graphical representation of the roundabout with supporting dimensions, is included as Exhibit 2 at the end of this memo.

TABLE 1 ROUNDABOUT GEOMETRICS

Inscribed Circle Diameter (ICD)	95 feet
Minimum lane width (on approach)	12 feet
Circulatory roadway width	18 feet

Fastest Path Speeds

Fastest path performance is an evaluation of the geometric elements that control driver negotiation speeds. Two primary elements were evaluated to determine the fastest path speed:

- Estimated vehicle speeds at critical path radii on the fastest path
- Speed consistency between the critical path radii

Fastest paths were reviewed in CADD with spline curves based on a technique described in the Wisconsin DOT FDM 11-26 Attachment 50.2.

Estimated vehicle speeds for entry, circulating, exit, left turn and right turn paths were calculated using standard estimation of +2%/-2% cross slope / superelevations for vehicles traveling on the estimated fastest path.

Graphical representations of the estimated fastest paths and the locations of the critical path radius used to calculate R1 thru R5 speeds, are included as Exhibits 7-10 at the end of this memo.

Table 2 below summarizes the results of the fastest path evaluation. Table 3 and Figure 1 provide additional information on the design criteria used for the calculation of the fastest paths.

TABLE 2 – FASTEST PATH RESULTS	LEG 1		LEG 2		LEG 3		LEG 4	
	SB		EB		NB		WB	
R ₁ , Radius/Speed, FT/MPH	62	18	100	21	93	20	137	24
R ₂ , Radius/Speed, FT/MPH	89	20	48	16	72	19	65	18
R ₃ , Radius/Speed, FT/MPH		25		21		24		23
R ₄ , Radius/Speed, FT/MPH	32	14	30	14	30	14	30	14
R ₅ , Radius/Speed, FT/MPH	58	17	54	17	51	16	59	17

TABLE 3 FASTEST PATH PERFORMANCE CRITERIA

Path offset from curb face	5 feet
Path offset from centerline	5 feet
Path offset from painted edge of travel way	3 feet
Single lane entry (maximum)	25 mph
Speed consistency	10-15 mph

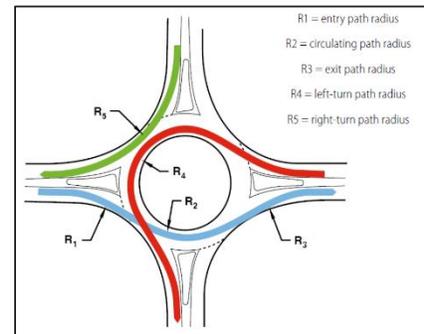


Figure 1 Typical Vehicle Speed Paths

Design Vehicle

Design vehicle paths were evaluated for likely design vehicles and their associated path required to navigate the roundabout. Vehicle profile, path and tire tracking offsets are shown in Exhibits 3-6 included at the end of this memo. The following design vehicles and design criteria were used to evaluate the tire tracking offsets:

TABLE 4 DESIGN VEHICLES

Vehicle	Category	Case	Notes
WB-50	Accommodate	Case 1	Full Access

Category and case shown above refer to criteria established in the Wisconsin DOT FDM 11-26. Information is provided below on the criteria. For additional details refer to the Wisconsin DOT FDM 11-26.

- **Category – Accommodate:** is used for low percentage of design vehicles of this type. Preferable in low speed, urban environments where pedestrian and bike traffic is prevalent. The vehicle will be able to navigate the roundabout but may do so at reduced speeds and/or encroach on the gutter. Tire tracking offsets should not encroach on non-mountable curb.
- **Case – Case 1:** Design vehicle may encroach and occupy adjacent lanes to navigate the approach, circulating and departure lanes.

MEADOWBROOK PARKWAY ROUNDABOUT

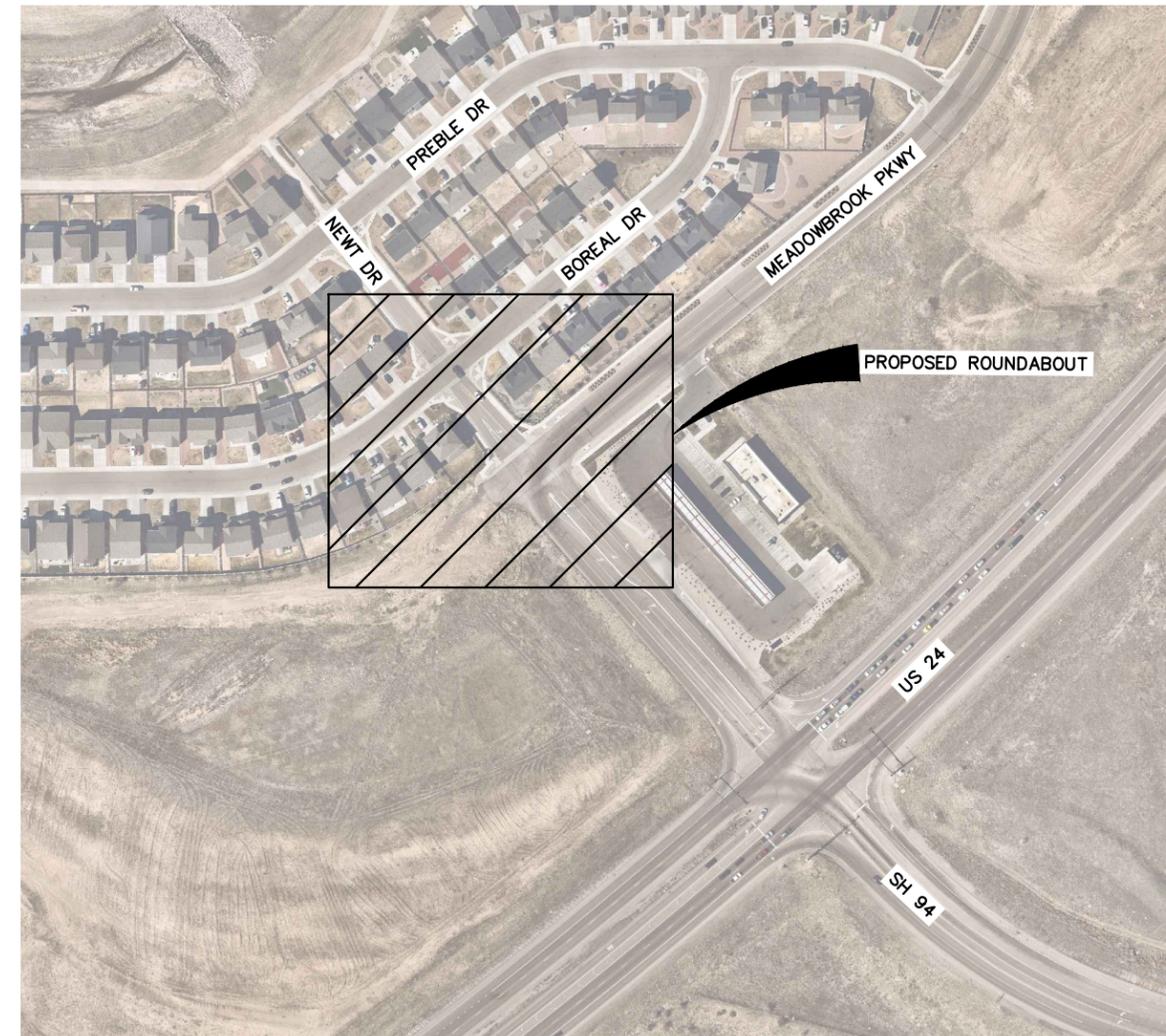
MEADOWBROOK PKWY & NEWT DR

COLORADO SPRINGS, COLORADO

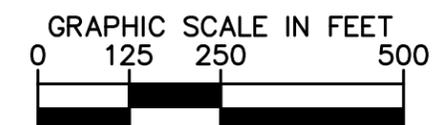
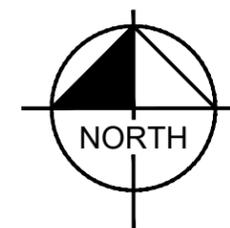
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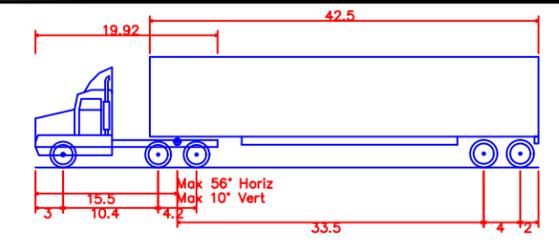
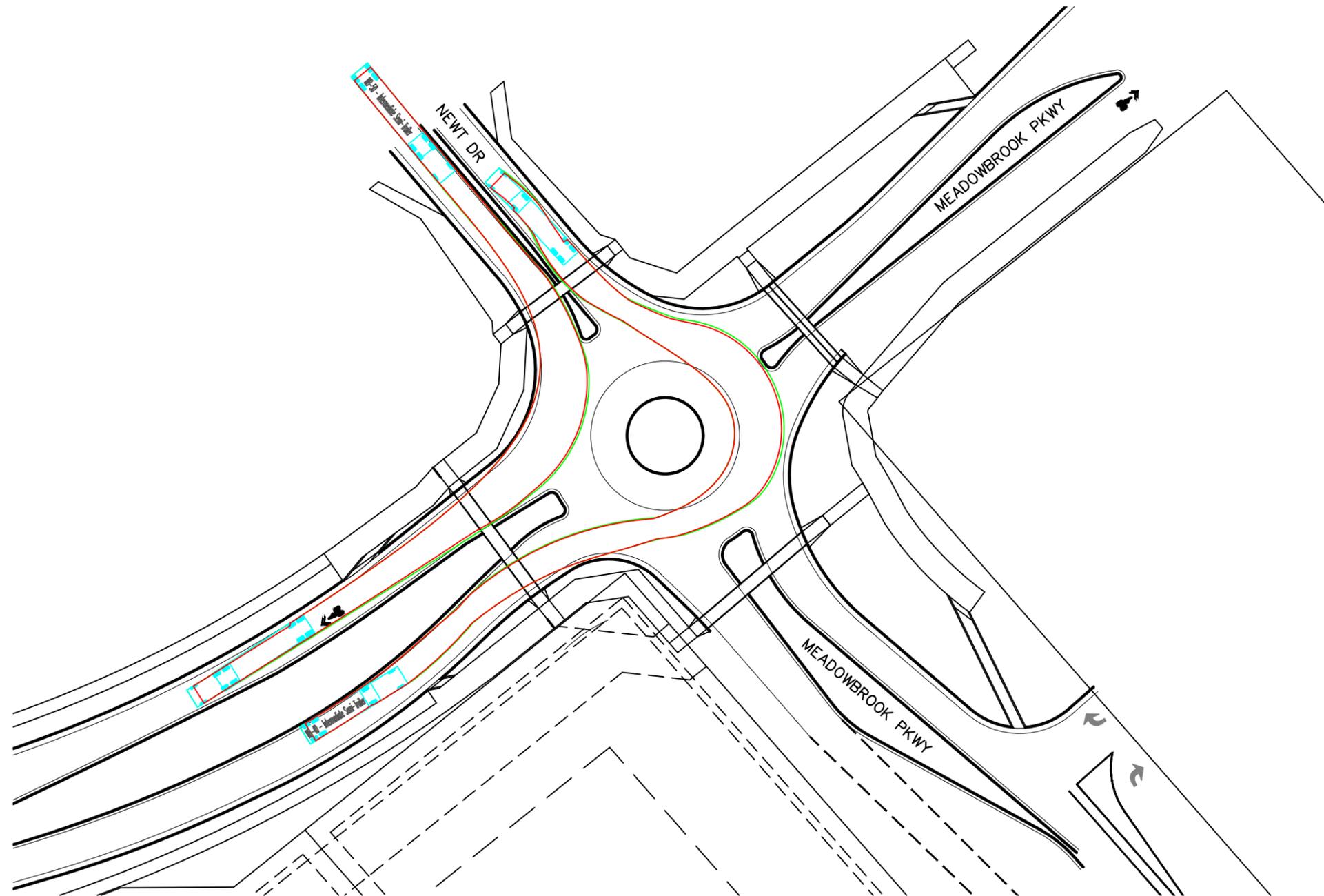
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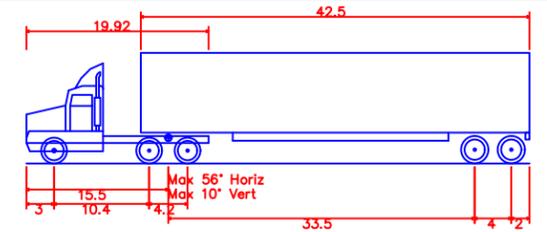
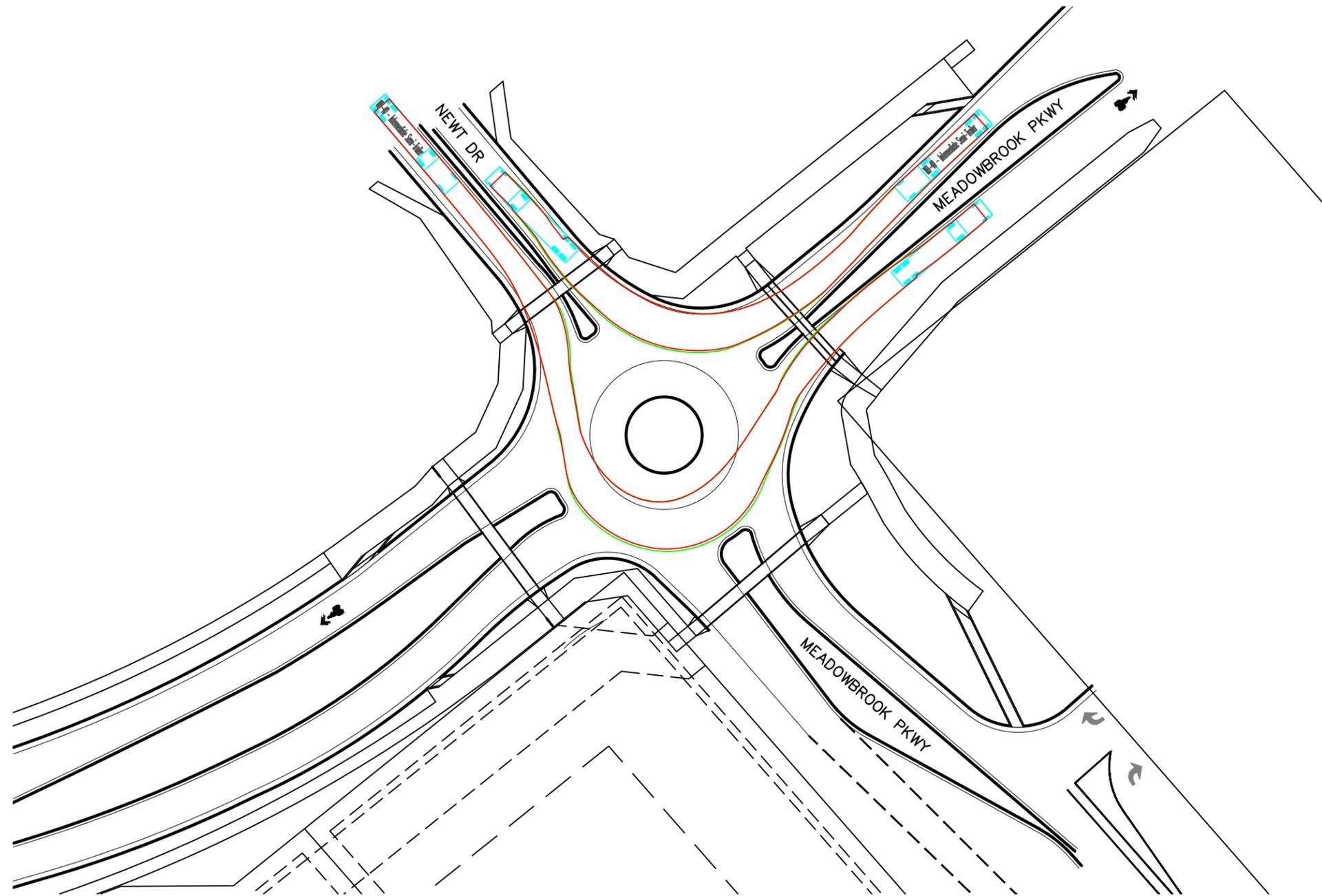


LOCATION MAP





WB-50 - Intermediate Semi-Trailer	
Overall Length	55.00ft
Overall Width	8.50ft
Overall Body Height	12.05ft
Min Body Ground Clearance	1.33ft
Max Track Width	8.50ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	17.90°



WB-50 - Intermediate Semi-Trailer	
Overall Length	55.00ft
Overall Width	8.50ft
Overall Body Height	12.052ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	17.90°



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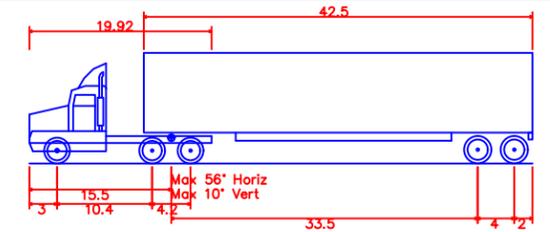
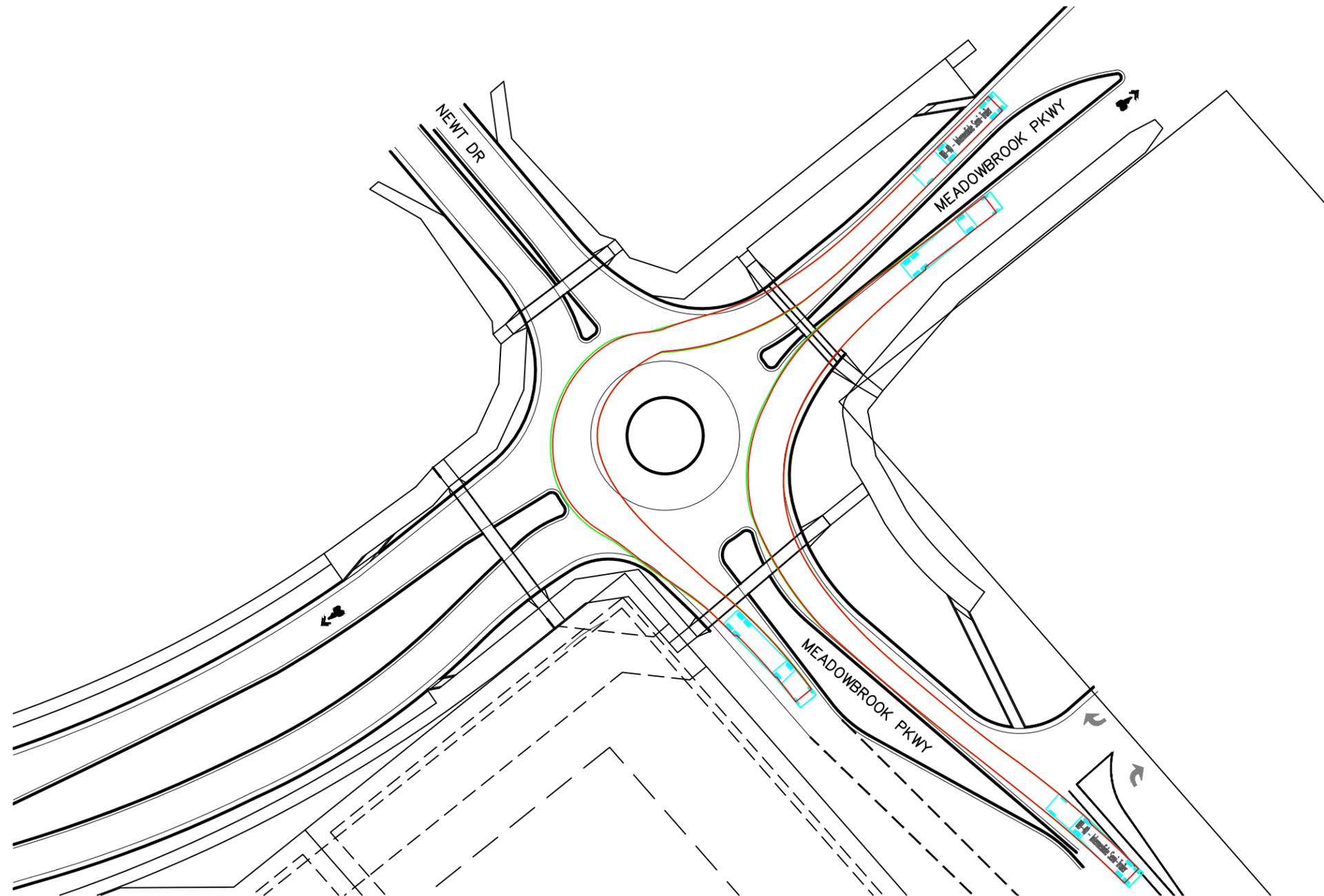
MEADOWBROOK PARKWAY ROUNDABOUT

VEHICLE PATH - DESIGN VEHICLE: WB-50



EXHIBIT:

4



WB-50 - Intermediate Semi-Trailer	55.00ft
Overall Length	55.00ft
Overall Width	8.50ft
Overall Body Height	12.052ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	17.90°



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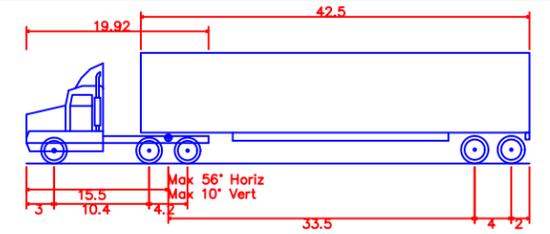
MEADOWBROOK PARKWAY ROUNDABOUT

VEHICLE PATH - DESIGN VEHICLE: WB-50

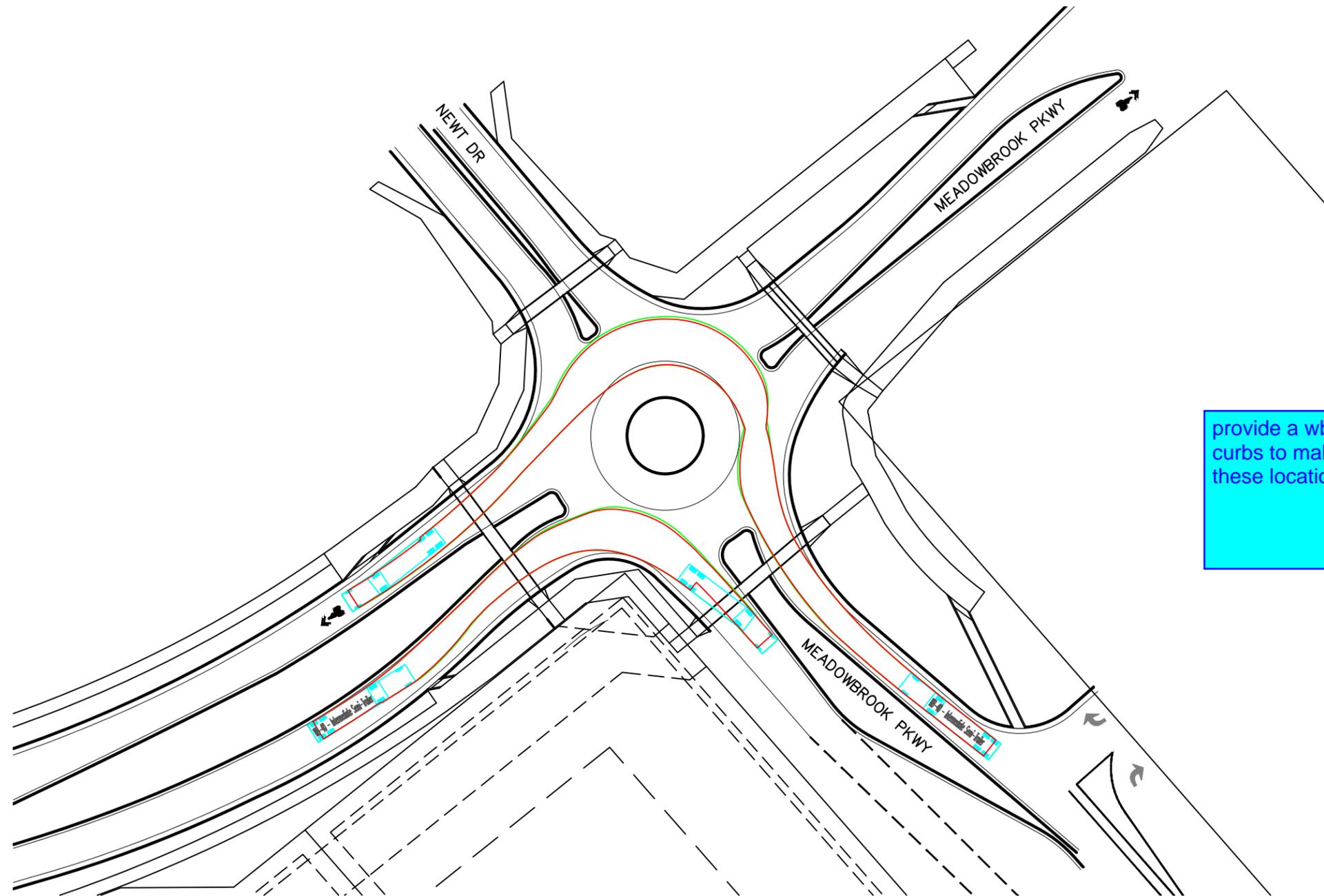


EXHIBIT:

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WB-50 - Intermediate Semi-Trailer	55.000ft
Overall Length	8.500ft
Overall Width	12.052ft
Overall Body Height	1.334ft
Min Body Ground Clearance	8.500ft
Max Track Width	6.00s
Lock-to-lock time	17.90°
Max Steering Angle (Virtual)	



provide a wb-65 to show where they go over curbs to make sure utilities are not installed at these locations



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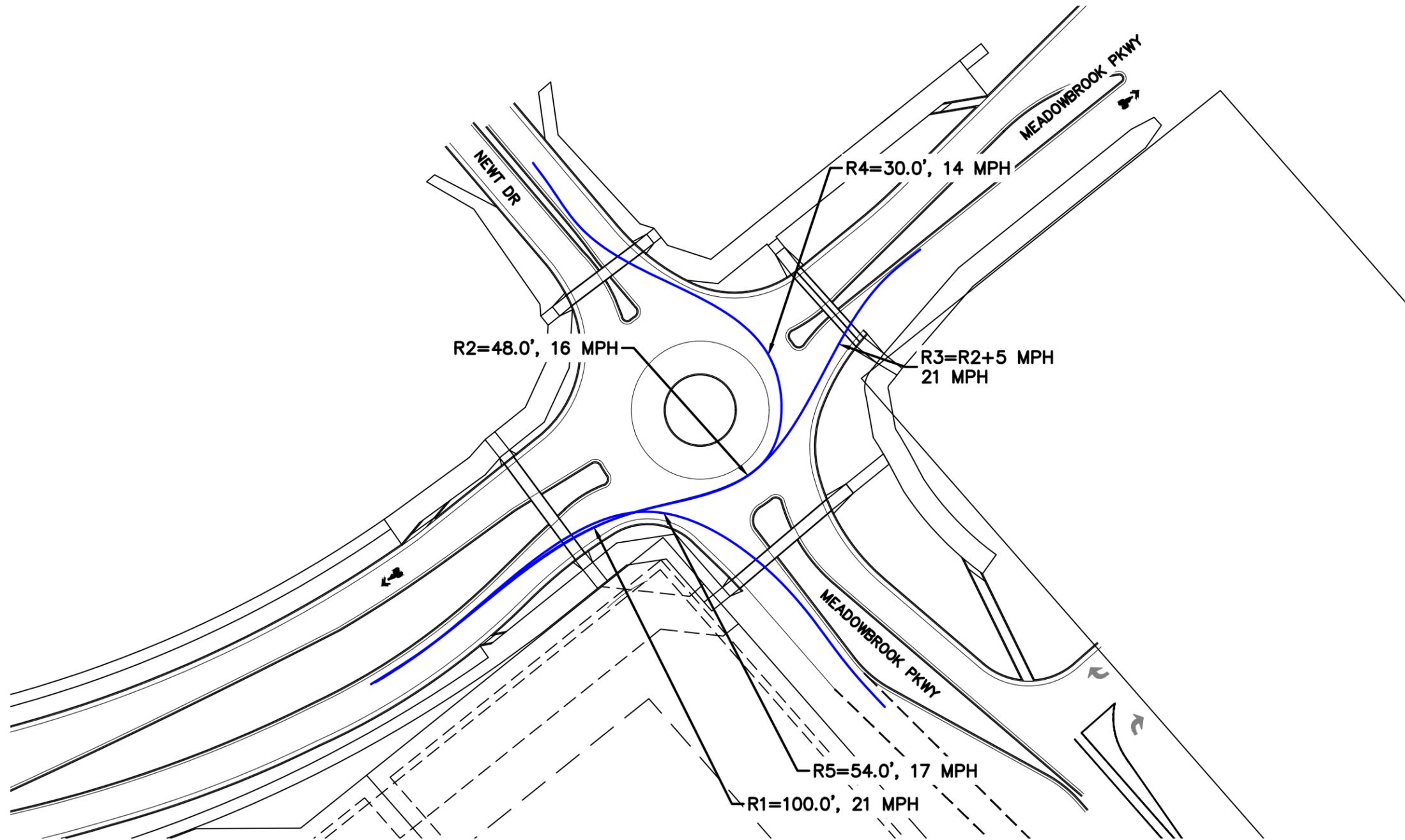
MEADOWBROOK PARKWAY ROUNDABOUT

VEHICLE PATH - DESIGN VEHICLE: WB-50



EXHIBIT:

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MEADOWBROOK PARKWAY ROUNDABOUT

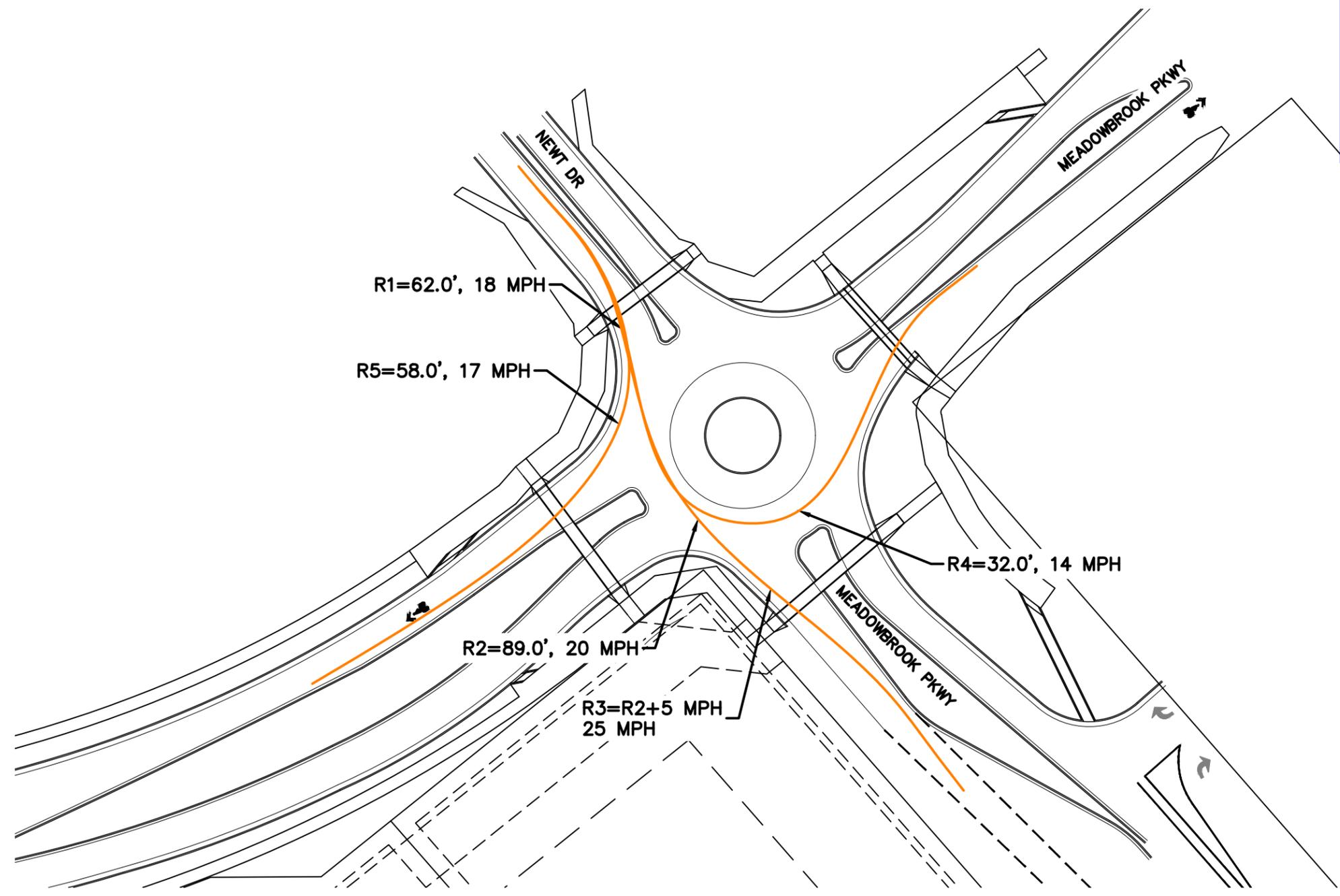
EB FASTEST PATH



EXHIBIT:

7

check fastest path offsets and calculations.
The values did not update from the previous exhibit.



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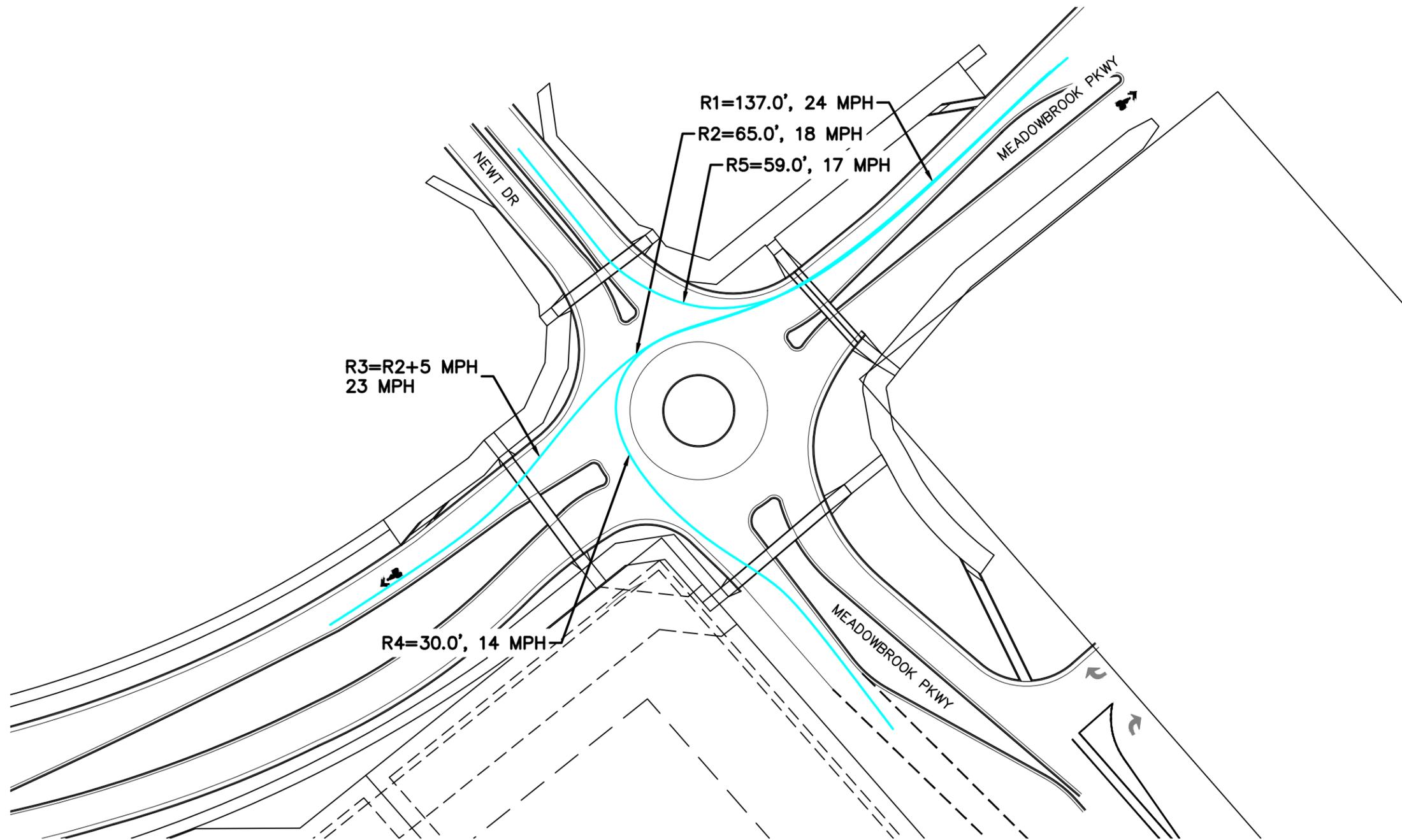
MEADOWBROOK PARKWAY ROUNDABOUT

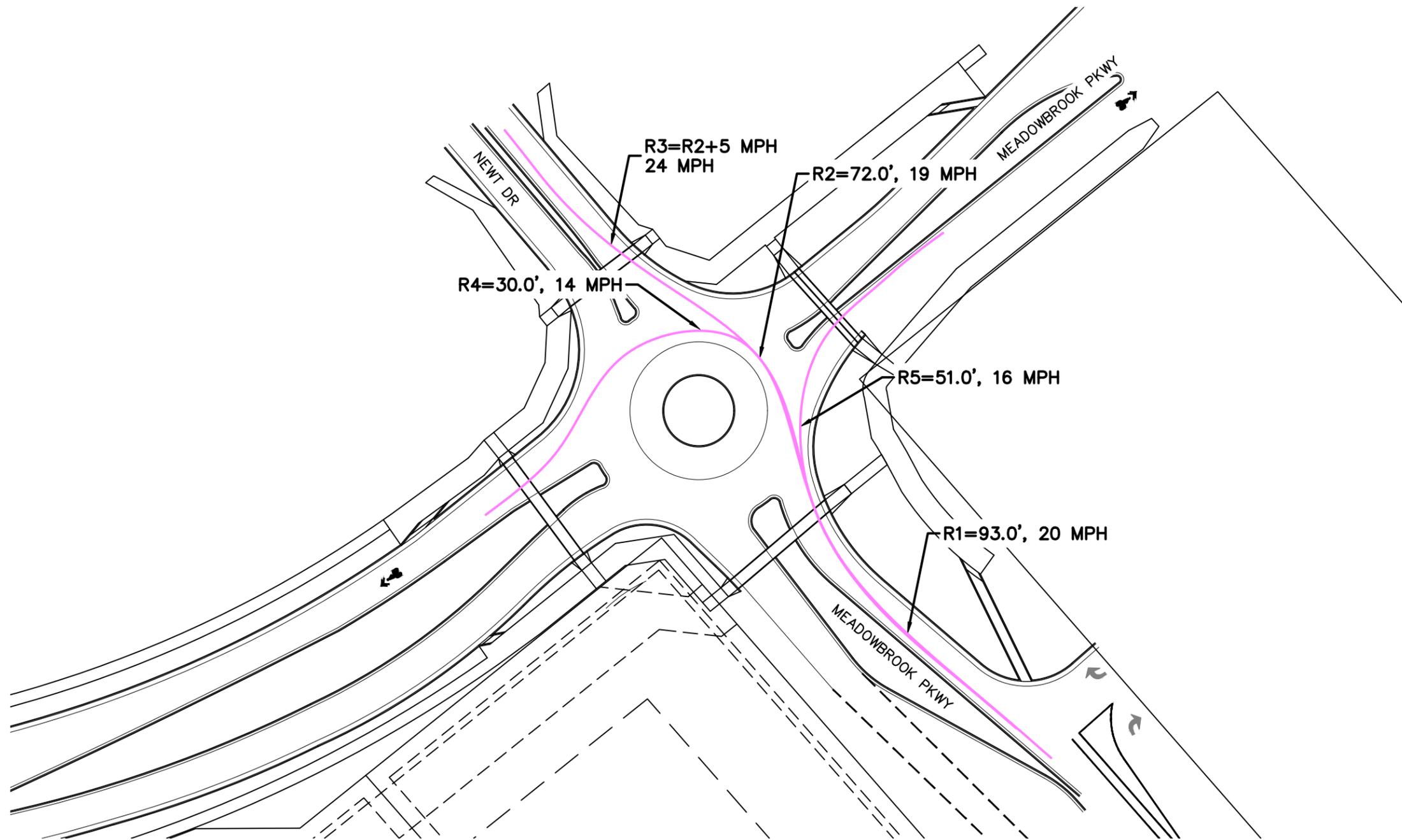
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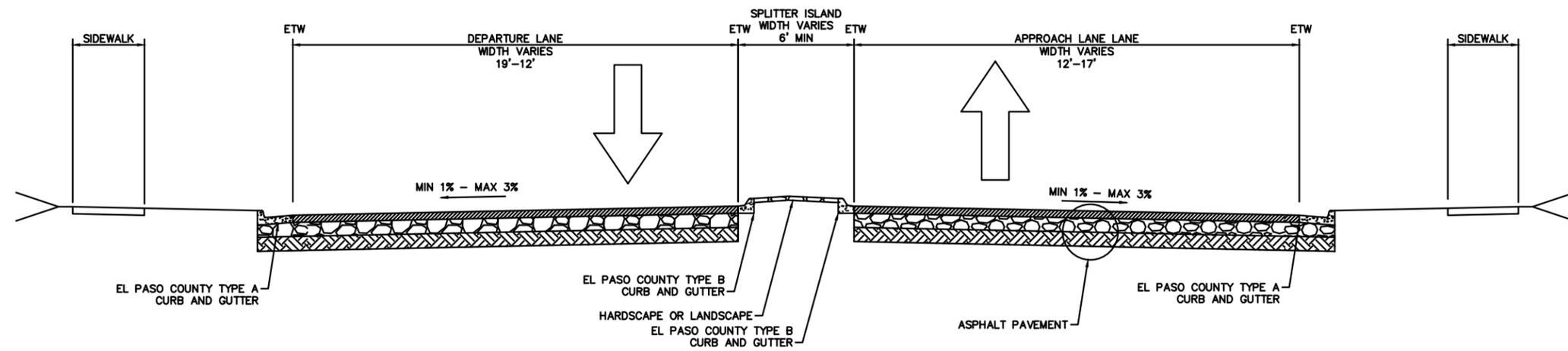


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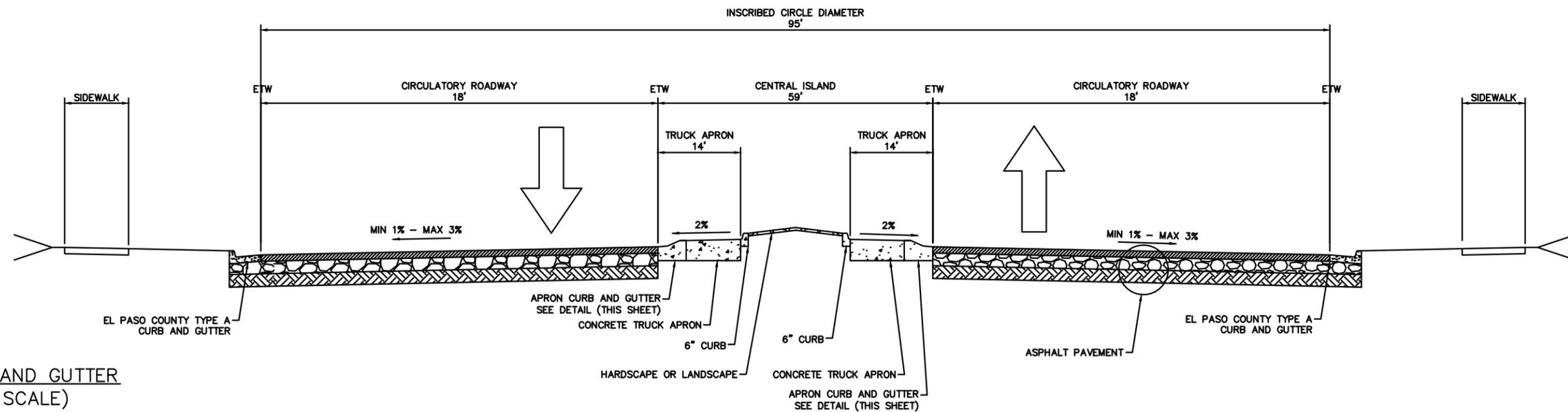
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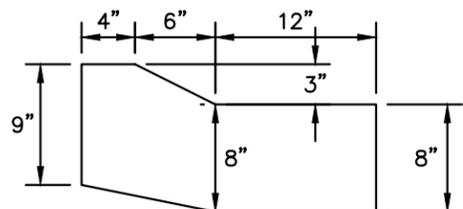


TYPICAL SECTION APPROACH

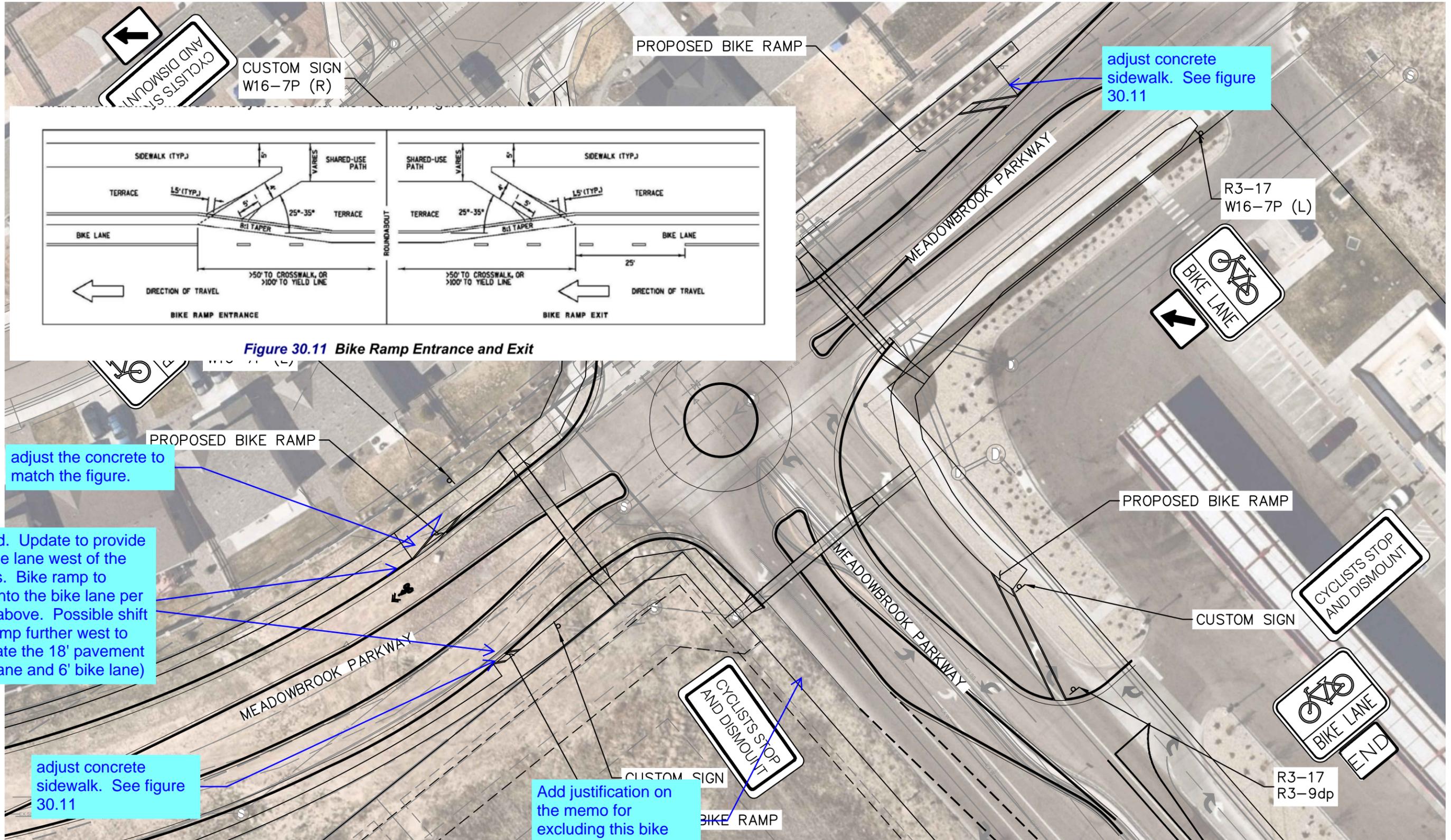


TYPICAL SECTION CIRCULATORY ROADWAY

APRON CURB AND GUTTER
(NOT TO SCALE)



MEADOWBROOK ROUNDABOUT BICYCLE PLAN



adjust concrete sidewalk. See figure 30.11

adjust the concrete to match the figure.

Unresolved. Update to provide the 18' wide lane west of the bike ramps. Bike ramp to transition into the bike lane per the figure above. Possible shift the bike ramp further west to accommodate the 18' pavement wide (12' lane and 6' bike lane)

adjust concrete sidewalk. See figure 30.11

Add justification on the memo for excluding this bike ramp.

