

West Carolina Traffic Calming

Staff studied all sections of the 1.47 miles of West Carolina Avenue from South Main Street to West Richardson Avenue since the December 2019 council meeting. At the December 2019 council meeting council took action that directed staff to install additional “Stop” signs at the intersection of West Carolina Avenue and Beaufort Street making this intersection a three-way stop intersection. Notice signs were installed on Monday, January 6, 2020 advising motorists that new stop signs would be in effect Monday, January 13, 2020. The new stop signs have been erected and are covered in black bags. White stop bars will be applied on the pavement at the new stop signs after the new stop signs are unveiled.

In July 2019, the Summerville Police Department conducted a speed / volume study of West Carolina Avenue at South Laurel Street over a nine day time period (July 9-18, 2019). This study only captured north bound traffic on West Carolina Avenue, not two-way traffic speeds and volumes. The interpolated average daily traffic volume based on the data is 6,700 vehicles per day. This data was collected while school was out of session, so that annual average daily traffic volume is higher due to school traffic. The summarized results of the study are shown below.

Speed Statistics		10 MPH Pace		Number Exceeding Limit				
Posted	25	Pace Speed	26 to 35	Speed	25+	35+	45+	Total
#At/Under limit	5508	# in Pace	20,917	Number	20917	3683	78	24,676
# Over Limit	24676	% in Pace	69.29%	Percent	69.29%	12.2%	0.25%	81.75%
Average Speed	29.52	85% Percentile	35					

Staff’s study of the corridor considered several traffic calming measures. Staff recommendations are for narrowing the lane widths to 10’ wide, applying an 8” white edge line to delineate travel lanes and a series of lateral traffic shifts through introducing short center medians, and realigned intersections. Realigned intersections and center median applications are explained in more detail below from the FHWA website with tables, exhibits and photos. The work can be done with Street Department personnel and by using a roadway pavement marking contractor. A cost has not yet been determined for the work. Detailed recommendations for West Carolina traffic calming are below.

1. Reduce lane widths to 10’ in width by applying new 8” wide edge lines along entire corridor. Some edge lines will require eradication, while some may be covered and widened with new thermoplastic material.
2. Implement narrow center median with pavement markings and RPMs to cause a lateral diversion in traffic causing slower speeds. Median may ultimately be converted to be landscaped. This would be implemented near 524 West Carolina Avenue.
3. Implement narrow center median with pavement markings and RPMs to cause a lateral diversion in traffic causing slower speeds. Median may ultimately be converted to be landscaped. This would be implemented near 418-420 West Carolina Avenue.
4. West 2nd South Street – Realigned intersection will cause a lateral diversion of traffic at the intersection causing slower speeds.
5. Cuthbert Street – Realigned intersection will cause a lateral diversion of traffic at the intersection causing slower speeds.
6. South Laurel Street – Realigned intersection will cause a lateral diversion of traffic at the intersection causing slower speeds.
7. Sumter Avenue – Realigned intersection will cause a lateral diversion of traffic at the intersection causing slower speeds.
8. Linwood Lane – Realigned intersection will cause a lateral diversion of traffic at the intersection causing slower speeds.

- At intersections where realignments are not recommended, the new 8" wide white edge line will be used to "tighten up" intersection radii restricting free flow turns at intersections.

3.6 Realigned Intersection

DESCRIPTION AND GENERAL PURPOSE

For the purpose of traffic calming, a realigned intersection is the reconfiguration of an intersection with perpendicular angles to have skewed approaches or travel paths through the intersection (as illustrated in the Figure 3.6.1 schematic). The expectation is that these physical features will remove or discourage fast vehicle movements through the intersection.

The most common application is the conversion of a T-intersection with straight approaches into curving streets meeting at right angles. The result is the removal of all straight paths through the intersection.

[A realigned intersection is sometimes called a modified intersection]

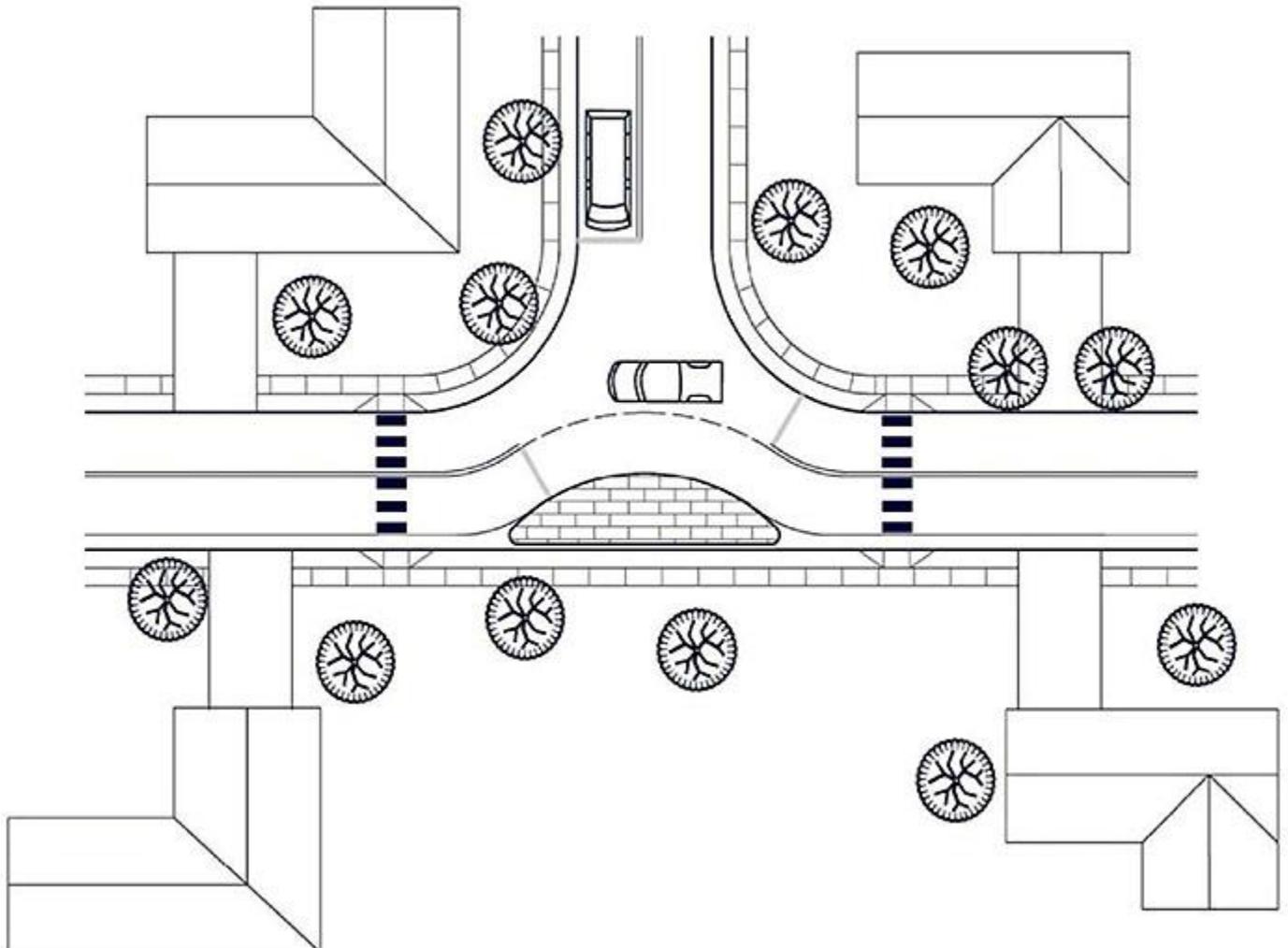


Figure 3.6.1. Realigned Intersection Schematic
(Source: Delaware Department of Transportation)

APPROPRIATE APPLICATION

Appropriate Application – Realigned Intersection	
Type of Street	<p>Appropriate for collector, local, and subdivision streets (see Figure 3.6.2)</p> <p>Can be appropriate in both an urban and suburban setting</p>
Intersection or Roadway Segment	Typically applicable only at a T-intersection
Roadway Cross-Section	<p>Can be used on both one-way and two-way streets</p> <p>Most commonly installed on a roadway with an urban cross-section (i.e., curb and gutter); could be acceptable for an intersection with shoulders only</p> <p>Can be applied both with and without a bicycle facility</p> <p>Can be applied on a roadway with or without on-street parking</p>
Speed Limit	Should be in line with the nature of the street network; 25 mph speed limit is the most common maximum
Vehicle Traffic Volume	Not typically a direct consideration in determination of applicability
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services if appropriate turning radii can be provided
Transit Route	May be appropriate along a bus transit route if adequate turning radii can be provided
Access Route	Typically not appropriate along primary access route to a commercial or industrial site if adequate turning radii are not provided
Grade	<p>Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided</p> <p>Maximum grade should comply with local standards and criteria; as an example, Delaware uses a maximum grade of 6 percent</p>



Figure 3.6.2. Realigned Intersection in Residential Area
 (Source: Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Realigned Intersection	
Vehicle Speed	<p>Slows traffic by introducing horizontal deflection to an otherwise straight path of travel (see Figures 3.6.3 and 3.6.4)</p> <p>Can reduce speeds within intersection limits between 5 and 13 mph and between 1 and 6 mph in the vicinity</p>
Vehicle Volume	As a single installation, there is little traffic diversion from the street
Pedestrian Safety and Mobility	<p>Introduction of stop- or signal-control reduces pedestrian/vehicle conflicts and improves pedestrian safety</p> <p>Median island can be placed on the intersection approach and serve as a pedestrian refuge (if its width is at least six feet)</p>
Bicyclist Safety and Mobility	No direct effect on bicyclists
Motorist Safety and Mobility	<p>Likely introduces delay on the major (i.e., realigned) leg of the intersection</p> <p>Minimal impact on motorist comfort</p>
Emergency Vehicle Safety and Mobility	<p>Little effect on emergency vehicle safety or on emergency response time</p> <p>Refer to Module 5 for additional discussion</p>

Large Vehicle Safety and Mobility	Little effect on a large vehicle, provided the realigned curb has an adequate turn radius Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Should not require the removal of on-street parking
Environment Could be used as a landscaping opportunity	
Design Issues	Attention needed to avoid need to relocate drainage features (catch basins, concrete channels, valley gutters, inlets, and trench drains) Should not require relocation of above- and below-ground utilities

3.18 Median Island

Description and General Purpose

A median island narrowing is a raised island located along the street centerline that narrows the travel lanes at that location (see Figure 3.18.1). The visual appearance of narrowed lanes encourages a motorist to slow.

A median island is physically different from and serves a different purpose as a standard median on a 4-or-more-lane roadway. The latter median provides separation between opposing vehicle travel lanes, an opportunity for landscaping or visual enhancements to a roadway corridor, and a place of refuge for a pedestrian crossing a multi-lane street – all in support of improved and safe traffic flow.

A median island may simply be a painted area that is designated for non-automobile use. But a median island is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street (see Figure 3.18.2). Median islands often incorporate textured pavement on the island itself, particularly for a median island without a raised concrete curb.

A median island can often double as a pedestrian refuge island if a cut in the island is provided along a marked crosswalk. Where there is an existing midblock crosswalk, it is desirable to locate the median island at the crosswalk.

When placed at or near the entrance to a neighborhood, a median island provides a visual cue to the motorist about the preferred vehicle speed (see Figure 3.18.3). If a median island has textured pavement on either side or a monument sign, it can serve as a gateway or entry feature.

[A median island is also called a center island narrowing, midblock median, median slow point, median choker, and refuge island (when part of a marked crosswalk)]

[A median island that narrows lanes from the centerline is the opposite of a choker that narrows lanes toward the centerline]

[Eight field studies of 15 median islands measured reductions between 1 and 8 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) http://www.safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/reducing_speed.cfm]

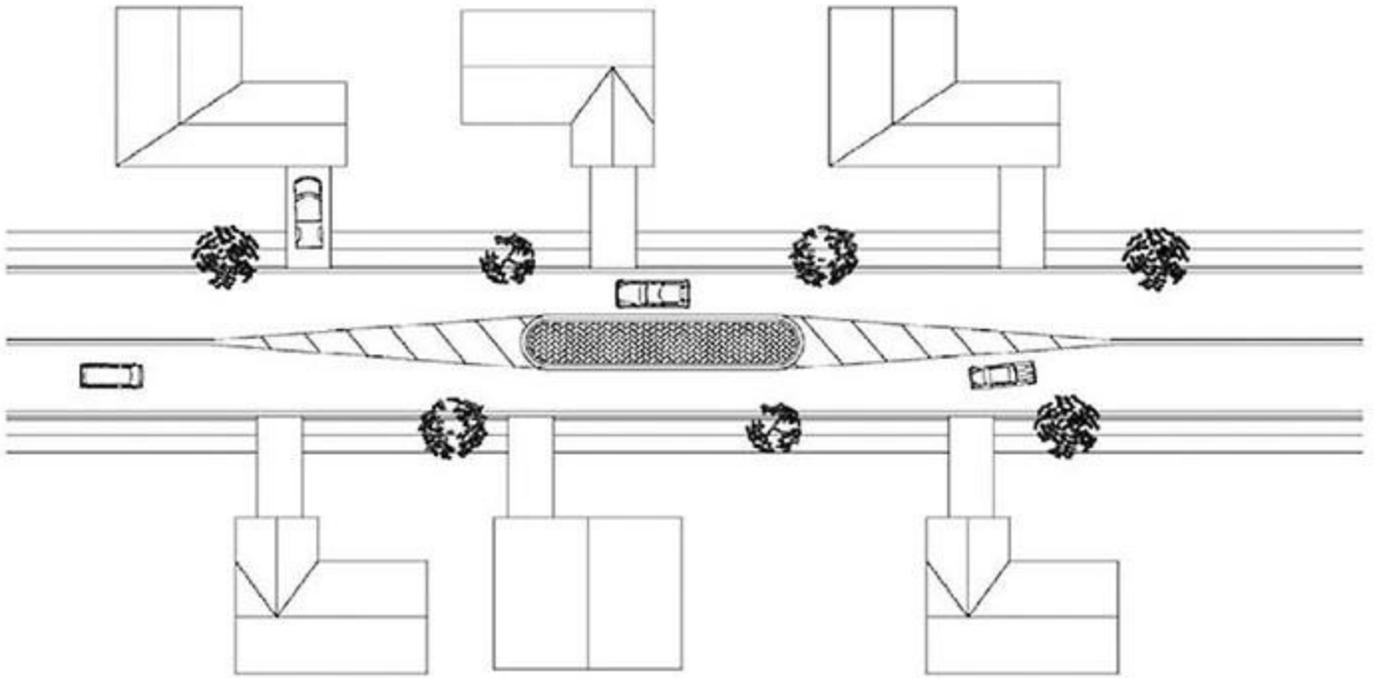


Figure 3.18.1. Median Island Schematic
(Source: Delaware Department of Transportation)



Figure 3.18.2. Landscaped Median Island
(Source: Ian Lockwood)



Figure 3.18.3. Landscaped Oval Median Island
 (Source: Ken Sides)

APPROPRIATE APPLICATION

Appropriate Application – Median Island	
Type of Street	Appropriate for an arterial, collector, or local street – whether in an urban or suburban setting
Intersection or Roadway Segment	<p>Can be placed at a midblock location or on the approach to an intersection</p> <p>If placed through an intersection, a median island is considered a median barrier [provide link to section 3.24]</p> <p>When placed on a curve, can be effective in reducing or retaining low vehicle speeds (see Figure 3.18.4)</p> <p>May be effective when placed immediately downstream of an intersection; island forces motorist to turn in accordance with curb radius (i.e., and not swing wide at a higher speed)</p>

<p>Roadway Cross-Section</p>	<p>Appropriate only on a two-way street; number of lanes in each direction can be one or more</p> <p>Typically installed only on a roadway with an urban cross-section (i.e., curb and gutter)</p> <p>Can be applied on a cross-section both with and without sidewalks or bicycle facilities</p> <p>Can be applied on a roadway with on-street parking as long as there is sufficient lane width for the design vehicle</p> <p>If intended to serve as a pedestrian refuge for a pedestrian crossing (along with an at-grade or raised crosswalk), median width of at least 6 feet is needed (see Figure 3.18.5)</p> <p>Can be used in combination with a curb extension on one or both sides of the street</p>
<p>Speed Limit</p>	<p>Can be appropriate for any common urban speed limit, provided an adequate shy distance is provided between the travel lane and the median island curb; Portland OR uses a maximum of 45 mph; Pennsylvania uses 40 mph; Delaware uses 35 mph; and South Carolina uses 30 mph</p>
<p>Vehicle Traffic Volume</p>	<p>Can be appropriate at all levels of traffic volume</p>
<p>Emergency Route</p>	<p>Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services if adequate turning radii can be provided</p>
<p>Transit Route</p>	<p>Can be appropriate along a bus transit route if appropriate turning radii can be provided</p>
<p>Access Route</p>	<p>Typically not appropriate along a primary access route to an industrial site; a roadway cross-section designed to accommodate large combination vehicles at a median island will likely result in a travel lane that is too wide to have an effect on passenger vehicle speeds</p>
<p>Grade</p>	<p>Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided</p> <p>Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent</p>



Figure 3.18.4. Median Island Near Curve at Entrance to Residential Area
(Source: Scott Wainwright)



Figure 3.18.5. Median Island with Crosswalk
 (Source: Dona Sauerburger)

EFFECTS AND ISSUES

Effects and Issues – Median Island	
Vehicle Speed	Traffic speeds likely to decrease slightly (typically between 1 and 5 mph, with reductions of 2 to 3 mph being the most common); Figures 3.18.6 and 3.18.7 provide photos of median islands placed at intersections; Figures 3.18.8 and 3.18.9 provide photos of median islands placed midblock
Vehicle Volume	Has little effect on traffic volumes
Pedestrian Safety and Mobility	<p>Safety of a pedestrian crossing collector or arterial street can be significantly improved without substantial delay to vehicular traffic</p> <p>Shortens street crossing distance for pedestrian and serves as pedestrian refuge during two-stage crossing</p> <p>FHWA¹⁶ reports 46 percent reduction in pedestrian crashes at marked crosswalk and 39 percent reduction at unmarked crosswalk</p> <p>If wide enough to satisfy ADA ramp slope requirements, pedestrian can be elevated, potentially improving both line-of-sight and visibility to oncoming motorist</p> <p>Refer to Module 6 for additional discussion</p>

Bicyclist Safety and Mobility	Reduces travelway width and forces bicyclist and motor vehicle to share travel lane; shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage could be appropriate
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort Separates opposing vehicle travel lanes and reduces opportunities for vehicle-vehicle collisions Can be used on horizontal curve to encourage slower operating speed and prevent vehicle from swinging wide across centerline
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued easy flow of emergency vehicles; may obstruct emergency vehicle from making turn directly at destination driveway (solution is to travel in the wrong direction for a short distance next to the median island) Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Retains sufficient width to allow for the continued easy flow of large vehicles like combination trucks; may obstruct large vehicle from making turn directly at destination driveway (solution is to travel the wrong way for a short distance next to the median island) Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking and may, therefore, slightly reduce the accessibility of adjacent property Can restrict direct access to a driveway that is located within limits of median island
Environment	Can be used as a landscaping opportunity, provided visibility of pedestrian in crossing is not compromised
Design Issues	May require relocation of drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains May require relocation of above- and below-ground utilities

¹⁶ Source: FHWA, Proven Safety Countermeasures



Figure 3.18.6. Median Island at Intersection
(Source: Scott Batson)



Figure 3.18.7. Small Median Islands at Intersection
(Source: Scott Batson)



Figure 3.18.8. Short Midblock Median Island
(Source: Lewis Grimm)



Figure 3.18.9. Long Midblock Median Island
(Source: James R. Barrera)

ADDITIONAL DESIGN CONSIDERATIONS

A median island can be designed in conjunction with an at-grade crosswalk or a vertical traffic calming feature (e.g., speed hump, speed table, raised crosswalk) to increase the likelihood of lower vehicle speeds.

If a median island is at least 6 feet wide, a pedestrian refuge area can be included in the design (see Figures 3.18.10 and 3.18.11). The island reduces the pedestrian/vehicle conflict area and allows a pedestrian to cross one direction of traffic at a time. The pedestrian crossing can be level with the pavement (with a corresponding break in the median island), or raised, such that the pedestrian crossing is level with the sidewalk.

On-street parking should not be permitted along the curbing of a median island that is used for traffic calming. If the parking spaces are unoccupied, the potential roadway width reduction caused by the island (and its traffic calming effect) is absent.

A median island should not be placed in front of or in close proximity to a driveway, unless access control is desired.

A median island should include MUTCD compliant signs in order to alert motorists of the presence of the median island. Signs can be supplemented by landscaping.

A sample design for a median island is presented in Figure 3.18.12.



Figure 3.18.10. Median Island with Pedestrian Refuge and Offset Crosswalk
(Source: Scott Batson)



Figure 3.18.11. Median Island with Pedestrian Refuge
(Source: James R. Barrera)

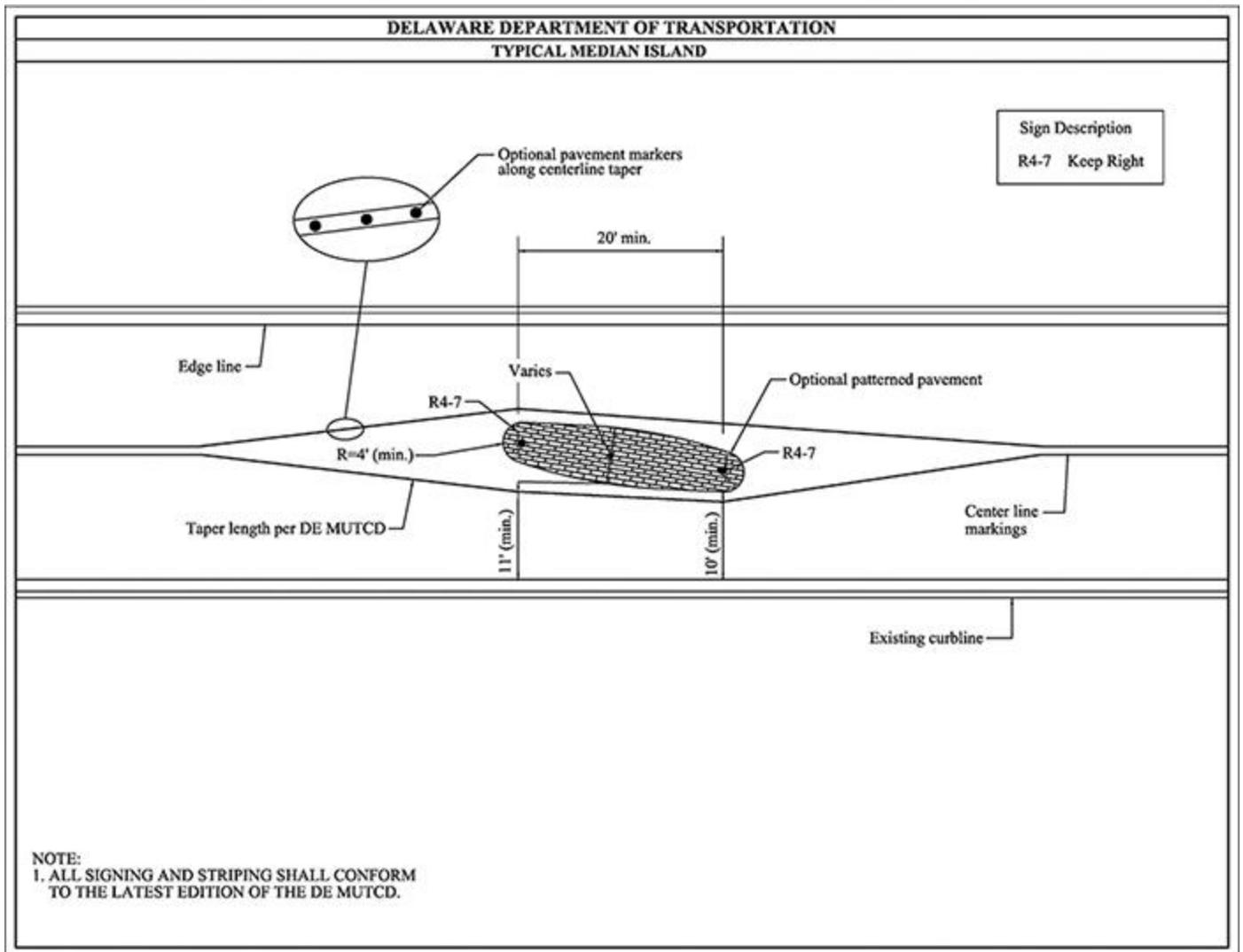


Figure 3.18.12. Sample Design for Median Island
(Source: Delaware Department of Transportation)