Ontario

Book 11

Ontario Traffic Manual

March 2000

Pavement, Hazard and Delineation Markings

reduced by high truck traffic, vandalism, vehicle collisions, and changeable traffic conditions. Maintenance or replacement of damaged PMDs should be periodically scheduled.

4.2 Curb Markings for Delineation

Reflectorized solid yellow markings may be placed at the tips of islands located in the line of traffic flow where the curb channels traffic to the right of the obstruction. Reflectorized solid white markings may be used when traffic is permitted to pass on either side of the island.

Where island curbs become parallel to the direction of traffic flow, it is not necessary to mark the curbs unless a study indicates the need for this type of delineation. If these curbs are marked, the colours must conform to the general principles of marking described in Section 3.1 of this Book.

Curbs at openings in a continuous median island do not need to be marked unless the need has been demonstrated.

4.3 Delineators

Colours

Delineators used on the through portion of a roadway must be either yellow or white, and conform to the colour of the edge line as described in Section 3.1 of this Book. An exception is interchange ramps, where yellow delineators must be used, whether on the left or right side of the ramp roadway.

Applications

Delineators assist motorists in correctly interpreting changes in roadway alignment, lane reductions and transitions at preview distances greater than those provided by pavement markings. They may also be beneficial in reducing run-off-the-road type collisions on long tangent highway sections. Delineators visually reinforce the proper path for the driver to follow, reducing the probability of confusion and error resulting from unexpected changes in the roadway. Specific areas in which delineators are required or should be considered are described below.

Roads, Ramps and Curves

Delineators are appropriate where there are changes in the horizontal alignment, particularly where the nighttime collision frequency is high or the roadway alignment at night is not otherwise apparent.

Delineators must be provided on medians and on the outside of interchange ramps. They must also be provided on the right side of freeways, but may be omitted, through tangent sections only, provided any one of the following conditions is met:

- the route is substantially straight, with long sections of tangent alignment, and road side delineators are used in advance of, and through, all curves;
- roadway pavement markers are used continuously on lane lines throughout all curves and tangent sections to supplement pavement markings; or
- the roadway is fully illuminated, at and between all interchanges.

Before omitting delineators on tangent sections of freeways, it should be confirmed that they are not required for the guidance of winter maintenance vehicles.

Delineators should be used on the approaches to, and around, all horizontal curves where the safe speed (as measured by ball bank indicator) is less than the speed limit. When used on sections of undivided roadway, bidirectional white delineators (delineators visible from both approach directions) or back-to-back unidirectional white delineators must be installed on the outside of curves.

Acceleration and Deceleration Lanes

Double or vertically elongated delineators may be installed at 30 m intervals along acceleration and deceleration lanes.

Lane Width Transitions

Delineators of the appropriate colour may be used to indicate the narrowing of the pavement where either an outside or inside lane merges into an adjacent lane. The delineators should be used adjacent to the reduced lane or lanes for the full length of the transition, and should be spaced to indicate the reduction, as shown in Figures 54, 55, and 56.

Delineators are not necessary for traffic flow moving in the direction of a wider pavement or on the side of the roadway where the alignment is not affected by the lane reduction.

Delineators should be provided on the approaches to and over narrow bridges and culverts.

On a highway with continuous delineation on either or both sides, delineation should be carried through transitions, where delineator spacing may be reduced.

Median Emergency Crossovers

Where median crossovers are provided for official or emergency use on divided highways, these crossovers should be marked by a double yellow delineator. These delineators are to be placed on the left side of the through roadway on the far side of the crossover for each roadway.

Truck Escape Ramps

Red delineators should be placed on both sides of truck escape ramps. The delineators should be spaced at 15 m intervals for a distance sufficient to identify the ramp entrance. Delineator spacing beyond the ramp entrance should be adequate for guidance according to the length and design of the escape ramp.

Median Barrier Delineation

Delineators may be placed on the top or side of a median barrier to indicate its alignment. The choice of top- or side-mounted delineators should be made with reference to expected positioning and exposure:

- If mounted on a centre barrier, the visibility of top-mounted delineators can be reduced by the glare from opposing headlights.
- Top-mounted barrier delineators, or side-mounted delineators placed close to the top of the barrier, can be covered by an accumulation of snow during the winter.
- Side-mounted barrier delineators can be exposed to splashing from passing traffic. The resulting layer of salt dust or road film can reduce their visibility.

Figure 54 – Ends of Divided Highways
(Two Lane to Four Lane Divided – Offset Centre Lines)

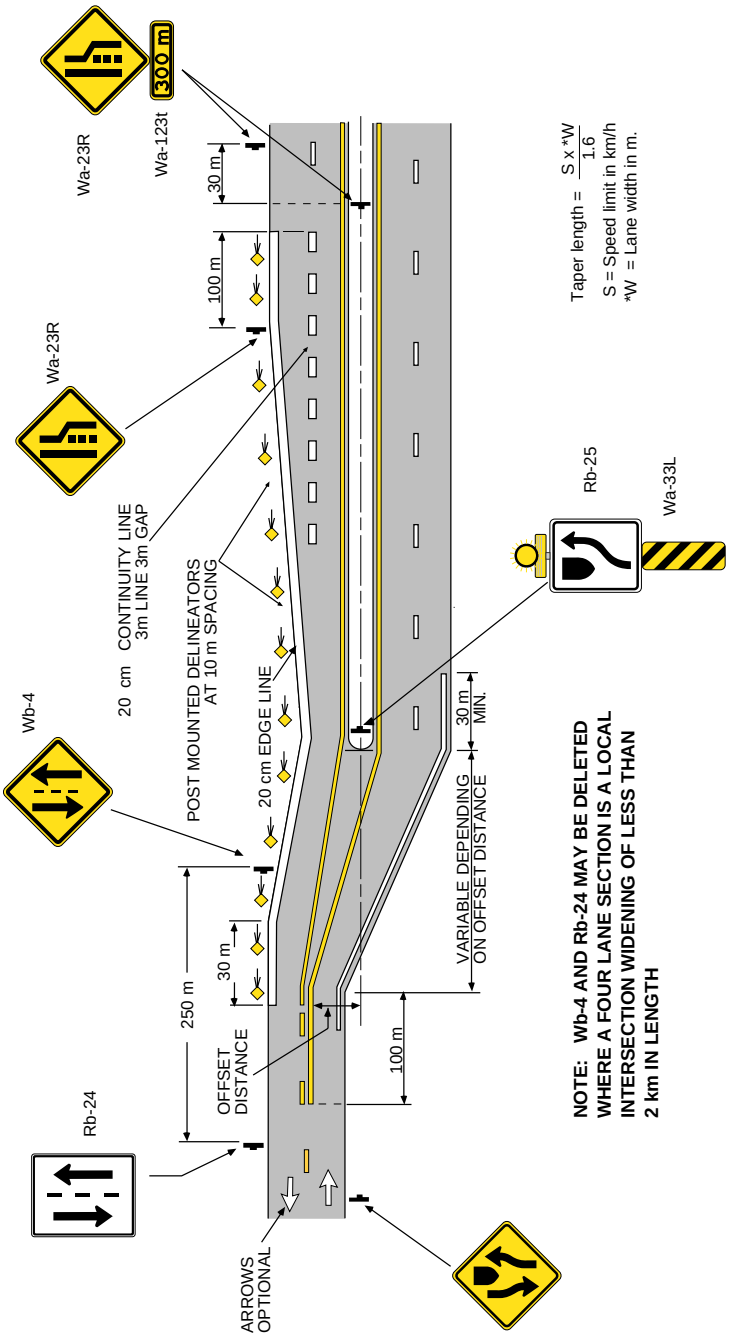


Figure 55 – Ends of Divided Highways
(Four Lane to Four Lane Divided)

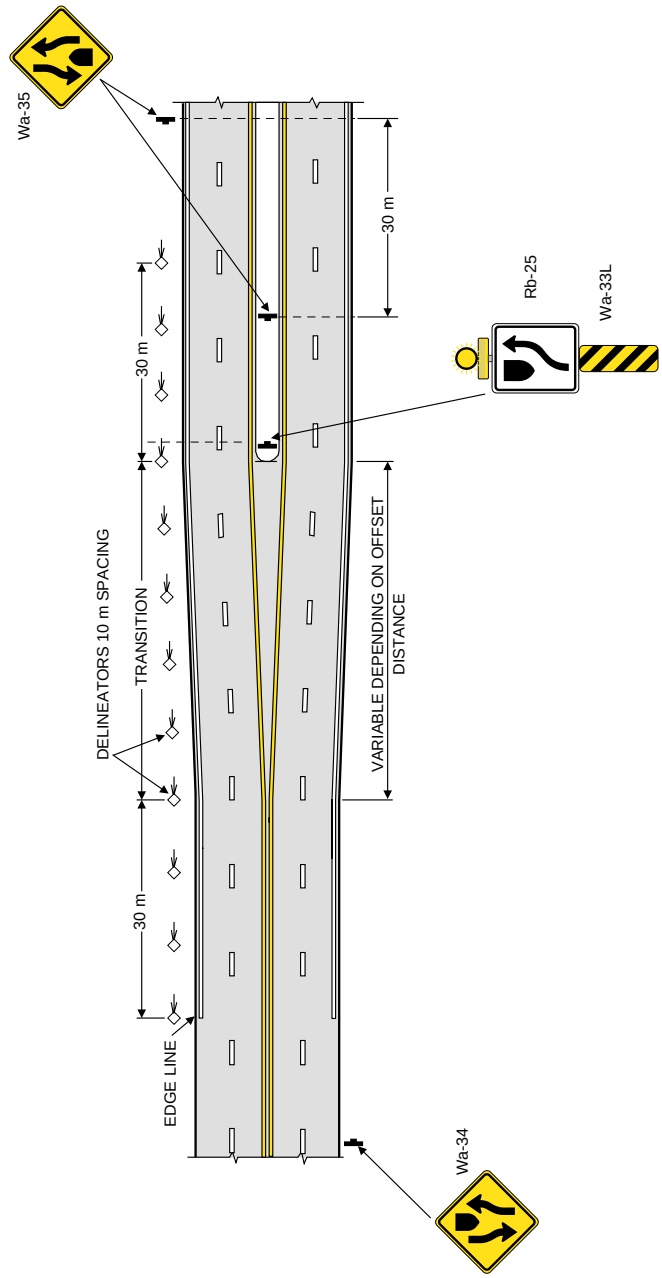
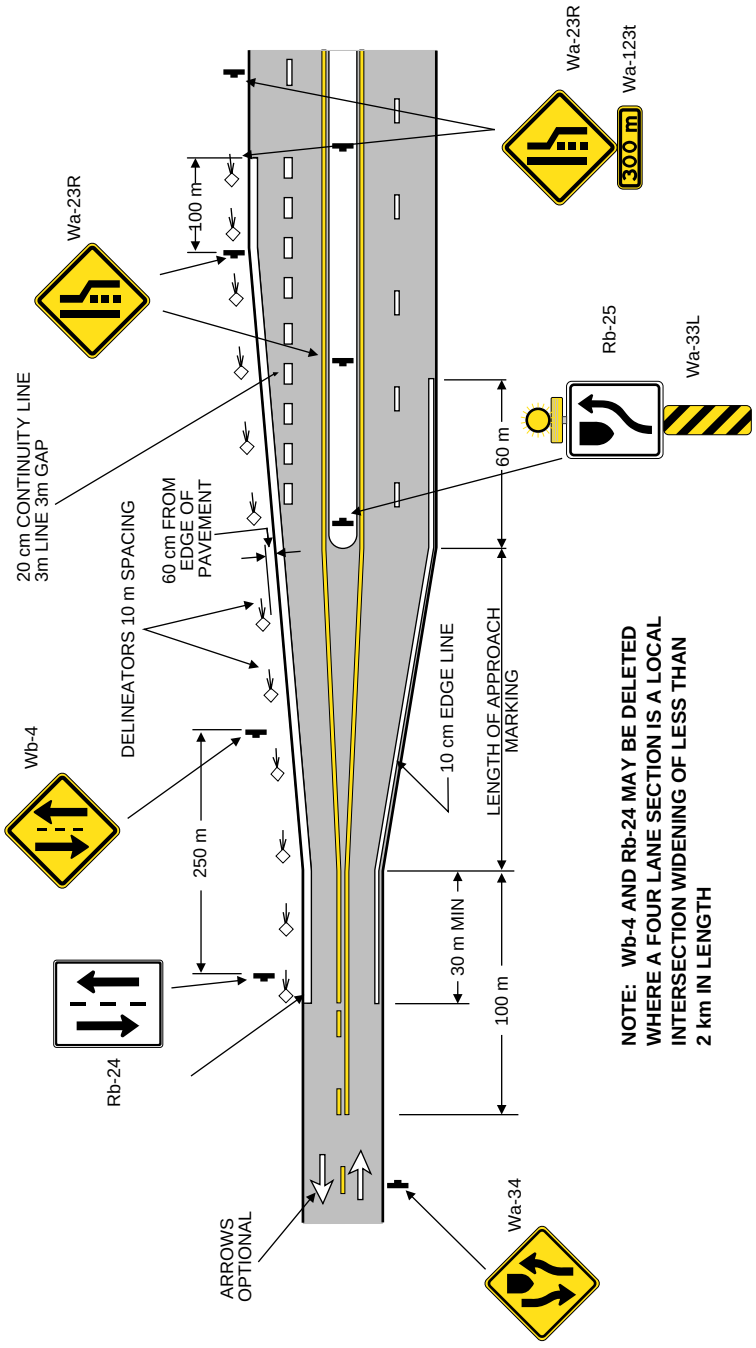


Figure 56 – Ends of Divided Highways
(Two Lane to Four Lane Divided)



Delineation for Winter Maintenance Operations:

In circumstances were delineators might not otherwise be considered necessary to guide road users, they may be required to guide the operators of winter maintenance vehicles engaged in winter maintenance operations. This type of delineation is commonly referred to as "snowplow delineation".

While it is specifically intended to assist winter maintenance vehicle operators, snowplow delineation provides added guidance for all road users.

When used, snowplow delineation should be installed in the following circumstances:

- in the median of a divided roadway, where the median is either raised or depressed;
- on the median barrier of a divided roadway, where one is present;

Table 4 – Spacing of Highway Delineators on Horizontal Curves

			Spacing in Advance of Curve (m)		
Curve Radius (m)	**Degree of Curvature (°)**	**Spacing on Curve (m)**	**1st Space**	**2nd Space**	**3rd Space**
1750	1	27	48	60	60
580	3	15	28	48	60
350	5	12	22	36	60
250	7	10	18	32	60
195	9	9	16	29	56
145	12	7	15	24	48
115	15	7	13	21	44
95	18	6	12	20	39
85	21	6	10	18	36
70	25	6	10	16	35
60	30	5	9	15	30
			3rd Last Space	2nd Last Space	Last Space
			Spacing Beyond Curve (m)		

- the right side of divided and undivided roadways, through horizontal and vertical curves; and
- the right side of divided and undivided roadways, on tangent sections where the roadway is not illuminated.

The design, location and spacing of snowplow delineators should comply in all respects with the guidelines for delineators contained within this Manual.

Placement and Spacing

Post-mounted Delineators

PMDs should be mounted on suitable supports so that the top of the highest retroreflector is 1.2 m above the near roadway edge.

On straight sections of roadway, PMDs should be spaced no more than 60 m apart.

Table 5 – Spacing of Chevron Alignment Signs on Horizontal Curves

			Spacing in Advance of Curve	
Radius (m)	**Degree of Curvature (°)**	**Spacing on Curve (m)**	**1st Space (m)**	**2nd Space (m)**
1750	1°	80	145	150
580	3°	45	85	145
350	5°	35	65	110
250	7°	30	55	95
195	9°	30	50	90
145	12°	20	45	70
115	15°	20	40	65
95	18°	20	35	60
85	21°	20	30	55
70	25°	20	30	50
60	30°	15	30	45

Note: On freeway exit ramps and free flow channelizations, the Chevron Alignment signs shall only be erected on the curves, and not in advance of the curves.

PMD spacing should be adjusted on the approaches to and along horizontal curves so that five PMDs are always visible to the right of the directional dividing line on a two-lane roadway, or to the right of the right-hand lane of a multi-lane roadway.

Table 4 shows the recommended spacing for PMDs on horizontal curves. Spacing for specific radii not shown may be interpolated from the Table. Three PMDs should be placed in advance of the curve and three beyond the curve at intervals shown in Table 4, not to exceed 60 m.

Median Barrier Delineators

Median barrier delineators may be placed at 50 m intervals. A spacing of 30 m may be appropriate for collision prone locations on tangent sections, and where glare from opposing headlights could impair the driver's perception of the barrier.

Top median barrier delineation may be installed with angularity of 15 degrees to obtain the most reflectivity from both directions on both flat and curved sections of roadway.

4.4 Chevron Alignment Sign

For chevron alignment sign design details, refer to OTM Book 6 (Warning Signs).

Purpose and Background

The purpose of the chevron alignment sign is to provide additional guidance to drivers at sharp changes in the horizontal alignment of the roadway. Sharp curves on rural roads or non-illuminated urban roads are often hazardous. Chevron alignment signs warn drivers of the need to be cautious in the approach to a sharp curve.

Sign Types

The standard-sized chevron alignment sign (Wa-9) should be used where the posted speed is 60 km/h or less.

The oversize chevron alignment sign (Wa-109) should be used where the posted speed is 70 km/h or greater.

Guidelines for Use

Where the advisory speed tab sign is used on sharp curves, sharp reverse curves or turns, chevron alignment signs must be used along the curves/turns and their approaches if:

- The location is rural in nature; or
- The location is urban in nature and is non-illuminated.

Curve delineation devices are not required in urban, illuminated areas, since roadside features such as buildings and streetlights offer drivers ample indication of changes in horizontal road alignment.

The arrow symbol on the chevron alignment sign must point in the direction of the curve.

All signs used at a given location must be the same size.

Where chevron alignment signs are used, post-mounted delineators must be omitted. Using both signs and delineators would create visual clutter and promote driver confusion.