	RAMP ADVISORY SPEED SIGNS		<i>Issued: FEB 2012</i>
			<i>Revised: FEB 2013</i>
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RECOMMENDED PRACTICES	PART	HIGHWAY SIGNS	
	SECTION	WARNING SIGNS	
	SUB-SECTION		

General

The primary function of a ramp or loop is to connect grade-separated highways where they intersect, typically along a freeway or expressway.

A ramp consists of two terminals and a connecting road, usually with some curvature, and on a grade.

The horizontal characteristics of ramps and loops (such as the curve radius and spiral) often impact the safe travelling speed along these roadway segments. Consequently, the speed at which the ramp or loop can be safely negotiated is often significantly lower than the posted speed limit on the mainline roadway (approach speed).

Motorists are advised of the appropriate ramp speed at the highway exit point with the use of a Ramp Advisory Speed sign. The sign has a warning and advisory function and is used in conjunction with the Ramp Ahead Advisory Speed sign.

Before these two warning signs can be introduced at an interchange ramp, the configuration of each ramp should be studied to determine the safe travelling speed along the ramp curves and the most fitting arrangement of signs.

Provincial Legislation

Based on the *Traffic Safety Act*, Use of Highway and Rules of the Road Regulation (304/2002), Section 2 (Driving at appropriate speed) and Section 57 (Must

obey traffic control device), motorists are responsible for obeying Ramp Advisory Speed warning signs and adjusting their speed for the roadway curvature based on speed information given on a sign.

Standard

The Ramp Advisory Speed sign (WA-10A) has a rectangular shape and consists of a black message on a yellow background. The standard size of the Ramp Advisory Speed sign is 900 mm x 1400 mm. The word EXIT is included on this sign to clarify that the advisory speed applies to the exit ramp, and not to the mainline roadway.



WA-10A	900 mm x 1400 mm 1200 mm x 1800 mm	
Colour	Message and border Background	Black Fluor. Yellow
Sheeting	ASTM Type IX or XI	

The Ramp Ahead Advisory Speed sign, WA-10B, also has a rectangular shape and consists of a black message on a yellow background. The standard size of the Ramp Ahead Advisory Speed sign is 900 mm x

1500 mm.



WA-10B	900 mm x 1500 mm 1200 mm x 2000 mm	
Colour	Message and border Background	Black Fluor. Yellow
Sheeting	ASTM Type IX or XI	

Use of Oversize Signs

Oversize versions of the WA-10A (1200 mm x 1800 mm) and WA-10B (1200 mm x 2000 mm) signs will be permitted in special situations where an investigation has shown that a larger sign is needed for greater visibility or emphasis.

Such situations include ramps with complex configuration or high traffic volume, and multi-lane ramps where drivers must concentrate more on driving.

In determining whether or not an oversize sign is warranted, one should consider factors such as the approach speed, background distractions, and the degree of hazard, as revealed by a collision history or field inspection.

Guidelines for Use

A Ramp Advisory Speed sign should be

used on all ramps connecting provincial highways with another provincial highway or a local road.

The Ramp Advisory Speed sign should also be used for off-ramps to Vehicle Inspection Stations and Safety Rest Areas when a reduction in travel speed on the ramp is advised.

A Ramp Ahead Advisory Speed sign should always be used in conjunction with the Ramp Advisory Speed sign.

In cases where the ramp is long and gentle, and/or where speed limit compliance is critical for motorist safety and enforceability is necessary, the department may gazette a speed limit for the ramp. In such cases, RB-1 (Maximum Speed) and RB-5 (Maximum Speed Ahead) signs should be used instead.

Signing for Bordering Interchanges

There are inconsistencies across the province in the use of signs regulating speed along exit ramps. Some urban municipalities in Alberta (e.g., Edmonton, Calgary) use regulatory speed signs for ramp exits.

As a general rule, the Ramp Advisory Speed warning sign should be used at all ramps connecting urban roadways to provincial highways.

An example of a bordering interchange is where Whitemud Drive and Anthony Henday Drive intersect in west Edmonton.

Selection of Safe Travelling Speed

Before a Ramp Advisory Speed warning sign can be introduced, the configuration of the ramp (i.e., curvature, deceleration taper) should be studied to determine the safe travelling speed along the curved portion of the ramp.

In the process of establishing safe travelling speed, finding a realistic advisory ramp speed is critical for drivers' compliance and safety.

As is the case for advisory speeds in conjunction with curve warning signs, speeds that are too low may result in driver non-compliance, and speeds that are too high can create safety problems.

Establishing the safe speed for ramps is even more complex because ramps typically have tighter radii, higher superelevation and higher speed differential between the speed along the ramp and the approach speed (or posted speed).

The combination of a small radius and large superelevation can have a large impact on truck roll stability, due to the higher center of gravity of trucks. Establishing an advisory speed based on the characteristics of cars travelling on dry pavement results in realistic speeds for this set of conditions. However, at such advisory speeds trucks may be operating within a small margin of their critical roll-over speed.

For this reason, advisory speeds should always be determined based on ball-bank indicator testing. Advisory speeds established using this method provide a small margin of safety for trucks. Detailed guidelines for establishing safe

travelling speeds along a curve are included in the Recommended Practice guideline entitled Methods for Establishing Safe Speeds on Curves.

For projects involving new construction, safe travelling speeds can be predetermined based on the design speed selected for the ramp curvature.

Guidelines for Placement

The Ramp Ahead Advisory Speed sign should be installed at the beginning of the ramp deceleration taper (preferably at the point where the exit taper is at a 2 metre offset).

Motorists begin decelerating at this point, so it is important that they have advance notification of the recommended speed along the upcoming curve.

The Ramp Advisory Speed sign should be placed at the beginning of a curve. The sign indicates that a reduced speed is advised at that point. The sign should be visible in time for drivers to make final speed adjustments.

The exact location of signs should be determined in the field based on site-specific conditions (i.e., availability of sight distances, configuration of the deceleration taper, etc).

Where an exit ramp is comprised of two or more successive curves which have a speed differential exceeding 10 km/h, a Curve sign with the speed advisory tab may be introduced to inform motorists about the advised speed reduction.

Detailed guidelines on the use of Curve signs are provided in the Recommended

Practices guideline entitled Turn and Curve Signs.

Drawing TCS-A-301 shows the appropriate placement of Ramp Advisory Speed signs.

Sign Conversion

Signing of ramp speeds was inconsistent prior to this recommended practice being issued. Some ramps used RB-1A regulatory Exit Speed signage, and others used WA-107 Ramp Ahead Advisory Speed and WA-108 Ramp Advisory Speed signs. The lack of consistency created confusion for motorists. These signs should be replaced with the new signing standard over a 3 year period. Once conversion is complete, the RB-1A, WA-107 and WA-108 signs will become obsolete in the department sign catalogue. Conversion should be completed by January 31, 2015.

On-Ramp Speed Signage

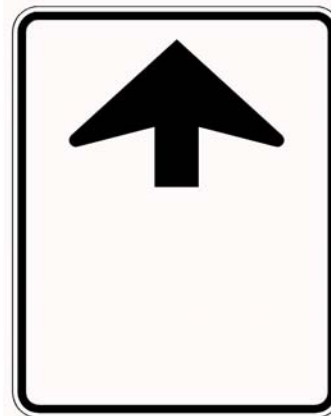
When evaluating the appropriate ramp advisory speed signage for a given ramp, consideration should also be given to the downstream on-ramp terminal.

The RB-5 Maximum Speed Ahead sign may be installed on freeway/expressway on-ramps where the length of the ramp or location of the mainline RB-1 Maximum Speed sign creates confusion for accelerating motorists. Operational issues may arise if motorists are uncertain of the freeway/expressway mainline maximum speed to which they should accelerate.

The use of the RB-5 sign for indicating a higher maximum speed ahead is reserved for situations where:

- The on-ramp is long (in excess of 350 m), or the mainline RB-1 Maximum Speed sign is out of view from the end of ramp curvature, and
- Operational issues with acceleration to the mainline speed for merging are observed.

The standard size of a Maximum Speed Ahead sign is 600 mm x 750 mm, however, if oversize RB-1 Maximum Speed signs are used on the mainline highway then the oversize version of the RB-5 sign should be used on the on-ramp.



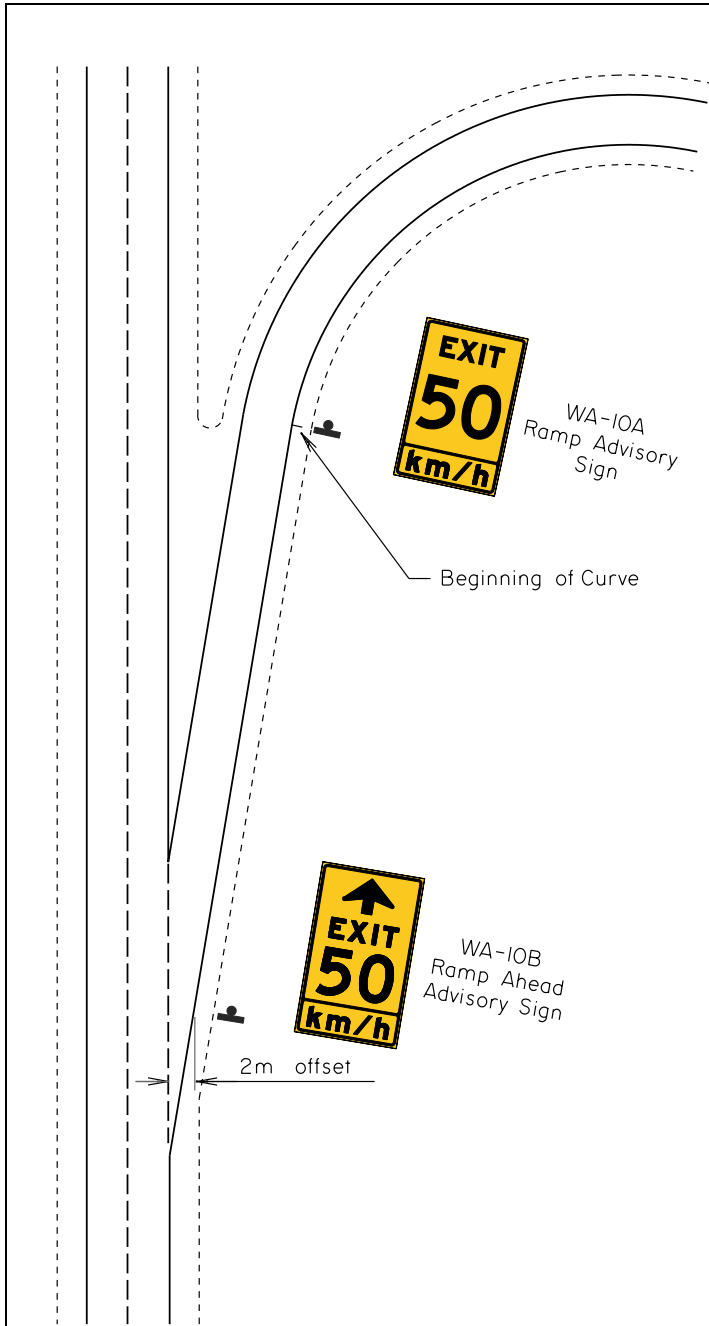
RB-5	600 mm x 750 mm 750 mm x 900 mm	
Colour	Symbol and Border Background	Black White
Sheeting	ASTM, Type III or IV	

When used for on-ramp applications, the RB-5 Maximum Speed Ahead sign should be placed at the end of the ramp curvature,

or at the point where motorists are expected to begin accelerating to the mainline maximum speed.


References to Standards

<i>Highway Geometric Design Guide</i> Chapter E	Interchanges
<i>Recommended Practices</i> , Section: Traffic Operations	Methods for Establishing Safe Speeds on Curves
<i>Recommended Practices</i> , Section: Warning Signs	Turn and Curve Signs
<i>Highway Pavement Marking Guide</i> Section C6	Interchanges



NOTES:

1. The Ramp Ahead Advisory Speed sign is placed at the beginning of the ramp deceleration taper (preferably where the taper is at a 2 metre offset).
2. The Ramp Advisory Speed sign is placed at the beginning of a curve.
3. The exact locations of signs should be established in the field based on site-specific conditions.
4. Where a ramp is comprised of two or more curves in succession with a speed differential exceeding 10 km/h, a Curve sign with the advisory speed tab may be introduced.
5. Safe travelling speed along a ramp should always be established with the use of a ball-bank indicator.

NO.	DESCRIPTION	BY	DATE
		DRAWING TCS-A-301	
		Date: JAN 2012	
PLACEMENT OF RAMP ADVISORY SPEED SIGNS			
Prepared by:	Checked by:	Scale:	SECTION A3
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