

**DIVISION 7**  
**TEMPORARY CONDITION SIGNS AND DEVICES**

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## **SECTION 701**

### **INTRODUCTION**

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#### **701.01 INTRODUCTION**

The provisions for public protection established in this division and the Department's Traffic Control Manual (TCM) are for application by all contractors employed under contract by the Department of Transportation & Infrastructure. Traffic safety in construction zones should be an integral and high priority element of every project. The goal should be to route traffic through such areas, with temporary condition signs and devices, as nearly as possible comparable to those for normal situations. The responsibility for temporary condition signs and devices rests with the Contractor.

The purpose of Division 7 and the TCM is to assist users with uniform and consistent methods for installing traffic control devices, thus ensuring safety and minimizing inconvenience to both motorists and workers while completing work activities. Diagrams are provided for most common traffic control scenarios encountered, however the TCM cannot possibly cover all scenarios that may occur. It is incumbent on the Contractor to develop an appropriate traffic control plan using this division and the TCM as a guide along with sound technical judgment. For unique situations, those preparing a traffic control plan may contact the Department of Transportation for advice; however, ultimate responsibility lies with the Contractor to ensure that the traffic control plan complies with

the regulations. A suitably qualified and competent Professional Engineer is required to certify changes to Traffic Control Plans and Sign Layout Diagrams presented in the Traffic Control Manual. (Reference 2012 OHS Regulations 373 to 375)

It is the responsibility of the Contractor working on provincial roadways to ensure that the principles and procedures contained within the Traffic Control Manual are applied. Where a municipality has developed their own traffic control procedures and been granted approval by the Minister representing Occupational Health and Safety (OHS Regulation 373(3), those established procedures may be used as an alternative to the Traffic Control Manual for locations within the municipality. In these cases, the more stringent requirements shall be adhered to.

The appropriate level of traffic control for a situation shall be determined using the guidelines provided and sound technical judgment based upon a review of the work site and local traffic conditions. The decision to use a particular traffic device at a specific location must consider all local conditions. The Traffic Control Manual, and other guidelines available, provide the basis for selecting a traffic control plan, however it is not a substitute for sound technical judgment. Safety should not be compromised in the selection of a traffic control plan. If a variation from the typical layouts provided is considered, the traffic control plan should be approved by a suitable qualified competent professional engineer prior to implementation. The typical traffic control layout diagrams presented in the manual can be used for all types of work.

All costs associated with temporary condition signing to standards as outlined in Division 7 and the Traffic Control Manual shall be the responsibility of the Contractor. Cost of signs, handling, installation, materials, and labour shall be paid by the Contractor and no payment shall be considered by the Department.

## **701.02 FUNDAMENTAL PRINCIPLES**

1. All traffic control signs and devices used for temporary conditions are designed and installed for the safety and convenience of the traveling public and for the safety of the workers.
2. Work sites shall be carefully checked to make sure that traffic controls are changed to suit changing construction conditions due to work staging and progress, or if an immediate improvement to the traffic control is needed. Any problems shall be dealt with immediately and documented.

3. All signs shall conform to the required standards in shape, color, size and position as outlined by the Traffic Control Manual and the Manual of Uniformed Traffic Control Devices for Canada.
4. Throughout the normal construction season, including weekends and overnight, all temporary condition signage shall be securely installed on either portable sign supports or permanently installed sign supports. During periods of inactivity in a construction zone, if signs are not maintained, they may be required to be installed on permanent sign supports. When portable sign supports are used, they shall be vertically adjustable such that signs will be displayed at the minimum required height. If this cannot be achieved, flags shall be added to the top of the sign supports to meet the minimum required height as per Drawing 790-1. The base of the sign supports shall not be appreciably wider than the signs. Bases which require weighting for support shall be weighted using sandbags only. The use of rocks, boulders, concrete blocks, etc, as weights shall not be permitted.
5. When signs are removed from the construction zone, the sandbags must also be removed and not left along the shoulder of the highway. Where portable sign supports are poorly maintained or unable to provide constant uninterrupted support for temporary condition signage, the contractor shall be required to install permanent sign supports.
6. Poorly maintained, defaced, damaged, or dirty temporary condition signs are ineffective and shall be replaced, repaired, or cleaned without delay. Signs which have been defaced or damaged and are not replaced within 24 hours of notification shall be expropriated by the Department. All signage expropriated in this manner will remain the property of the Department of Transportation and Works. Any work or costs associated with sign removal, sign replacement or traffic control will be the responsibility of the Contractor.
7. No work will be permitted to commence until all traffic control devices are installed in position, as shown in the TCM manual and reviewed by the Contractor and Owner's Representative.
8. After a work zone is completed all traffic signs used on that construction zone shall be removed immediately. Any installed signs not applicable during a phase of construction shall be removed or covered. The Department reserves the right to expropriate all temporary condition signs that are left in place after the work zone is completed. In particular the Department especially focuses upon unwarranted and misused speed limit signage and flag person signage. All signage and

associated hardware will remain the property of the Department of Transportation and Infrastructure.

9. Objects within the roadway or immediately adjacent to the roadway, which constitute a hazard to traffic shall be marked with a delineator device.
10. Construction Speed Zones shall be implemented only as shown on the applicable drawing. A hazard assessment shall be part of determining an appropriate speed limit in a construction zone. The Department representative shall be consulted prior to implementing a posted speed limit change on a provincial roadway.
11. After dark, all signs shall be checked for visibility and those that cannot be clearly seen shall be cleaned, replaced or adjusted.
12. Any signs not supplied by the Department of Transportation and Infrastructure shall meet all specifications in the Manual of Uniform Traffic Control Devices for Canada and the Traffic Control Manual.
13. Sound technical judgment must be utilized in the application of the principles put forward in this Division and the Traffic Control Manual. Traffic plans within the TCM requiring adjustment to local conditions must be reviewed and approved by a suitably competent and qualified Professional Engineer or other person named by the Contractor and acceptable to the assistant deputy minister representing Occupational Health and Safety. (Reference OHS Regulations 373 to 375 and other 2012 OHS Regulations). The location of all traffic control devices and operations shall be documented on a daily basis, including any changes made to adjust to current conditions. Work site conditions vary greatly from Traffic Control Manual layouts presented and it is up to the Contractor to adapt the principles of the manual to the given situation. The Traffic Control Manual layouts shall be considered minimum standards for required signage for the noted situations.

### **701.03 SPECIFICATIONS AND CLASSIFICATION OF SIGNS**

Unless modified by the following, the specifications outlined in the Manual of Uniform Traffic Control Devices for Canada will apply to temporary condition signs in all details concerning symbols, lettering, illumination, reflectorization, position, installation, material, support, and maintenance.

One sign only shall be placed on each support, with the exception of tab signs installed to provide supplementary or complementary information associated with warning signs or

detour signs, or with the exception of signs placed on the back (reverse) side of the same support, which is intended for motorists traveling in the opposite direction.

**Temporary Condition Signs** – shall have black symbols or lettering on an orange retro-reflectorized High Intensity Prismatic background. *The use of florescent paint on signage shall not be considered and is not acceptable.*

**Regulatory and Information Signs** – which may be used for temporary traffic control or guidance shall have the same color and shape as described in the Manual of Uniform Traffic Control Devices for Canada.

#### **701.04        COLORS, SHAPES, SIZES AND MATERIALS**

The color, shape, size and material requirements for all signage for use on Department projects shall be in accordance with the standards set forth in the Manual of Uniform Traffic Control Devices for Canada.

All temporary condition signage shall be made with a rigid backing consisting of either plywood or aluminum. Flexible or roll up type signage will not be permitted.

#### **701.05        PORTABLE OR REMOVABLE SIGN SUPPORTS WITH FLAGS**

In construction zones, where the use of permanently installed rigid sign supports are not considered or required, temporary condition signs shall be installed on portable or removable sign supports. Signs shall be located on the right side of the roadway not to exceed 4 metres from the edge of the traveled portion of the roadway. Supplementary signs shall also be located on the left hand side of the roadway on divided highways.

If portable sign supports do not elevate temporary condition signs to the minimum required height, then two orange flags must be installed on the portable sign support, such that the required height is achieved. See drawing 790-1.

#### **701.06        PERMANENTLY INSTALLED TEMPORARY CONDITION SIGN SUPPORTS**

In construction zones, where the use of portable sign supports are not desired or properly maintained, temporary condition signs shall be installed on permanently installed rigid sign posts, as directed by the Owner's Representative. Signs shall be located on the right side of the roadway not to exceed 4 metres from the edge of the traveled portion of the roadway. Supplementary signage shall also be located on the left hand side of the roadway on divided highways.

Signs 900 millimetres or less in width/length shall be installed on a single post to a height of 1.5 to 2.5 metres above the traveled portion of the roadway to the bottom edge of the sign. Most signs in this category can be securely installed on 100 x 100 millimetre wooden posts with a minimum of 1 metre of the post in the ground. Care must be exercised to ensure that the post is securely anchored in the ground so that it cannot be 'turned' or removed by vandals.

Signs exceeding 900 millimetres in width/length shall be installed according to Section 580, for the corresponding size of the sign.

The use of flags to achieve minimum required heights on permanently installed sign posts shall not be permitted.

#### **701.07 MOUNTING CHEVRON AND HAZARD MARKERS ON REBAR FOR INSTALLATION ON PAVED SURFACES**

Where traffic has to be diverted or channelized to cross multi-lanes of paved surfaces, delineator devices, such as hazard markers and chevrons, shall be installed as outlined in the TCM.

Signs 300 millimetres or less in width shall be installed on a single piece of 25 millimetre rebar to a height of 1 metre minimum above the traveled portion of the roadway to the bottom edge of the sign.

Signs greater than 300 millimetres in width shall be installed on two pieces of 25 millimetre rebar to a height of 1 metre minimum above the traveled portion of the roadway to the bottom edge of the sign.

#### **701.08 CHEVRON AND HAZARD MARKERS USED DURING THE WINTER SEASON**

Chevrons and Hazard markers shall be mounted on rebar or wooden posts in order to delineate traffic through a transition. Signs shall be installed as outlined Sections 701.06 and 701.07 as appropriate.

#### **701.09 BASIS OF PAYMENT**

All costs associated with temporary condition signing to standards as outlined in this section shall be the responsibility of the Contractor. Costs of the signs, handling, installation, removal, asphalt reinstatement and / or repair, materials, and labour shall be paid by the Contractor and no payment shall be considered by the Department.

## SECTION 705

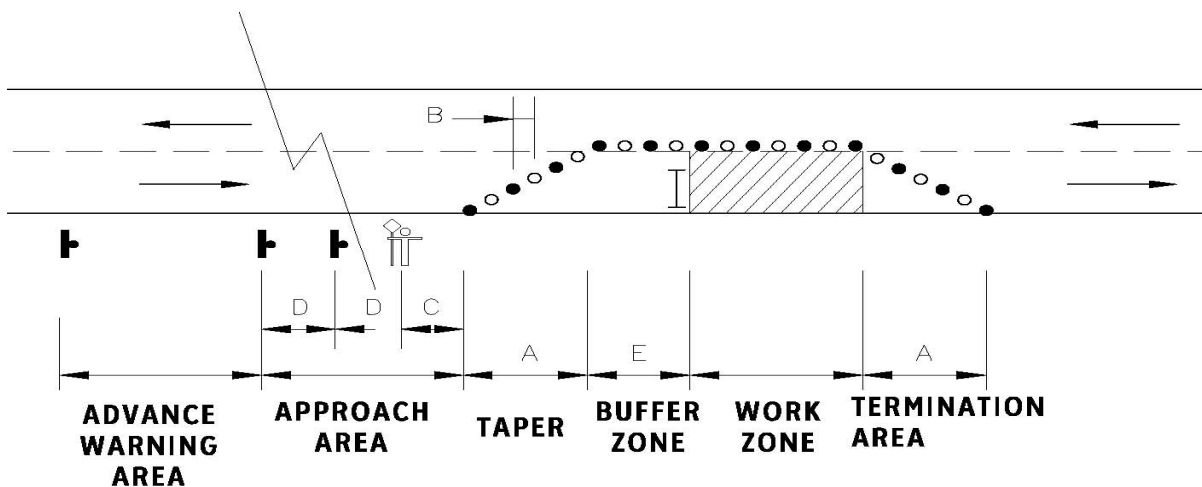
### LOCATION AND PLACEMENT OF SIGNS

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- 705.03 APPROACH AREA
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- 705.09 BASIS OF PAYMENT

#### 705.01 GENERAL

Seven categories of signing are distinguished with regard to location of devices relative to work sites, namely, Advance Warning Area, Approach Area, Taper, Buffer Zone, Work Zone, Termination Area and Intersecting Roads. See the diagram below for further explanation.





## 705.02 ADVANCE WARNING AREA

The advance warning area is the section of the roadway where motorists are first alerted to roadwork ahead. Signing in this area may begin up to 2km from the approach area and ending at the TC-1 CONSTRUCTION AHEAD sign.

## 705.03 APPROACH AREA

The approach area is the section of the roadway where motorists are given final warning and information on what actions to take before entering the work zone. Signing in this area typically begins immediately following the TC-1 CONSTRUCTION AHEAD sign and ends at the beginning of the buffer zone.

## 705.04 TAPER

The taper or transition area is the section of the roadway where motorists are channelized from the normal alignment to proceed safely past the work zone. Depending on the location of the work a taper may not be required if there is no encroachment into the travelled portion of the roadway. The taper is normally delineated with the use of pylons, construction markers, chevrons, drums or delineator posts. The transition area may include several diagonal and parallel sections to safely route vehicles to bypass the work zone. The length of the taper sections are important to properly guide traffic, and are shown on each of the Sign Layout Diagrams and the Construction Distance Table on Drawing 799-1 in the Traffic Control Manual.

The taper length is the length of the section of roadway required to achieve the rerouting from the normal travel path and shall be as follows when no lane control is present (based on the normal posted speed limit):

SPEED	LENGTH
50 km/h or less	30 m
60 km/h	40 m
70 km/h	60 m
80 km/h	90 m
90 km/h	110 m
100 km/h	180 m

When lane control and low speed is present on the approach to the work zone, the taper may be reduced to 30 metres. Lane control would be in the form of a flagperson, temporary traffic control signal or lane controlling signage in low speed and low volume traffic areas.

## **705.05 BUFFER ZONE**

The buffer zone provides a recovery area for errant vehicles by providing a clear zone between the taper/transition area and the work zone. The buffer zone is usually delineated by traffic devices and no work material, vehicles or equipment are stored/used in this area. When a Control Vehicle is placed in advance of the work zone, the buffer zone should be provided between the Control vehicle and the work zone. Buffer zone lengths are shown on each of the Sign Layout Diagrams and the Construction Distance Table 799-1 in the Traffic Control Manual.

## **705.06 WORK ZONE**

The work zone is the portion of the roadway that contains the work activity (workers, equipment, and construction materials). The work zone may be fixed in one location or moved as the work progresses. The area is usually delineated by channelizing devices or in some instances shielded by barriers.

Potential hazards and conflicts will increase in the work area if:

- The work area is close to the travel lane(s)
- A physical obstruction exists (uneven pavement, trucks turning, etc.)
- Speed of traffic increases
- The distance the traffic is shifted gets greater or more complex
- The duration of the work increases (in excess of 12 hours)

The layouts found in this manual will illustrate the typical delineation and distance signs are to be installed in advance of a work zone.

## **705.07 DESCRIPTION OF TERMINATION AREA**

The termination area is used to transition vehicles back to the normal travel lanes of the roadway after the work zone. The termination area extends from the end of the work zone to where normal vehicle operation can resume. This transition is normally similar to the taper leading into the work zone. The driver is informed of the end of the construction zone after leaving the termination area and can usually return to the original operating speed of the roadway upon leaving this area.

## **705.08 INTERSECTING ROADS**

Consideration shall be given to signing intersecting secondary roadways that exist within a work zone and the area reserved for the approach signage to the work zone. As a minimum, this signing shall consist of a TC-1 Construction Ahead sign displaying an appropriate directional arrow. See drawings 756-1 and 756-2 in the TCM for examples of

signing intersecting roads. Additional signage on the intersecting roadway may only be considered if the last two signs in the sequence of approach signage are not apparent to motorists on the intersecting roadway. Adjusting sign spacing may also be considered as a means of reducing sign requirements on intersecting roadways while providing pertinent information that is apparent to all motorists. In all situations, the placing of signs shall be based on a review of traffic conditions, traffic volumes, sight distances and sound technical judgment.

#### **705.09 BASIS OF PAYMENT**

All costs associated with temporary condition signing to standards as outlined in this Section shall be the responsibility of the Contractor. Cost of the signs, handling, installation, removal, asphalt reinstatement and / or repair, materials, and labour shall be paid by the Contractor and no payment shall be considered by the Department.

## **SECTION 70**

### **DELINEATION DEVICES**

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## 708.01 APPLICATION

Temporary condition and delineation devices shall be used to channelize traffic when traffic flow is impeded as a result of obstructions, work areas or a narrowing of the roadway. They form part of the general category called **Traffic Control Devices** and shall be used as a supplement to signs and barricades.

Where the temporary condition exists during darkness, delineation shall be achieved by the use of construction markers, traffic barrels, barricades, chevron markers, delineator posts, flashing beacons or similar devices. In all cases, markers and barricades used to achieve delineation during the hours of darkness shall be retro-reflectorized using high intensity grade sheeting to show the same color and shape by night as by day. ***Fluorescent paint shall not be used as a reflectorized substitute and is not acceptable.***

Delineators including all construction markers, chevrons, barricades etc. shall be in reasonable condition to be effective for both day and night conditions. While delineation devices cannot always be in new condition, they shall always be in reasonable condition. Unacceptable conditions that warrant replacing shall be those which are: covered in asphalt splatter, dirt, dust or snow; have several large abrasions or tears; have deformation and dented considerably; have significant loss of lettering; lettering has been touched up or poorly modified; message is partly missing or illegible; have colour fading or loss of more than 20% of its reflectivity.

## 708.02 LOCATION OF DELINEATION DEVICES

Any construction activity on or within 1 metre of a roadway shall be marked by delineators along the work site and the approaches to the work site or obstruction. The angle at which the delineations are placed across the closed portion of the road is called the taper and should vary according to the maximum regulatory speed and shall be as follows:

REGULATORY SPEED LIMIT	MINIMUM TAPER LENGTH
50 km/h or less	30 m
60 km/h	40 m
70 km/h	60 m
80 km/h	90 m
90 km/h	110 m
100 km/h	180 m

If the work area affects more than one traffic lane width, each traffic lane shall be closed separately and a tangent section provided between the two tapers. The minimum length of the tangent section shall be as follows:

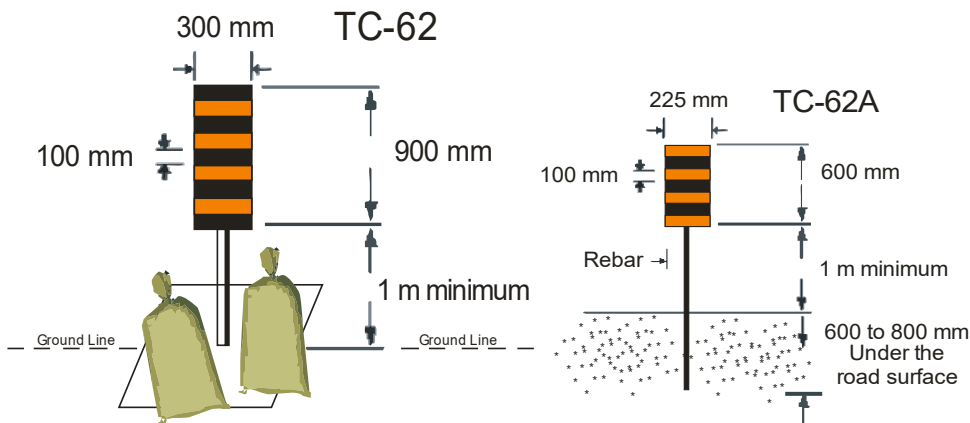
REGULATORY SPEED LIMIT	MINIMUM TANGENT BETWEEN TAPERS
50 km/h or less	50 m
60 to 70 km/h	100 m
80 km/h	150 m
90 km/h or greater	240 m

### 708.03 SPACING OF DELINEATORS

The centre-to-centre distance between delineators varies with the regulatory speed for both tapers and tangents. Refer to the Construction Distance Table 799-1 IN THE Traffic Control Manual for further details.

### 708.04 CONSTRUCTION MARKERS (TC-62 AND TC-62A)

Construction Markers shall be of the dimensions indicated. They shall be retro-reflectorized using high intensity grade orange reflective sheeting to indicate the same color and shape by night as by day.



Where Construction Markers are required for a distance greater than 300 metres, the use of the 225 millimetre x 600 millimetre marker is permissible (TC-62A).

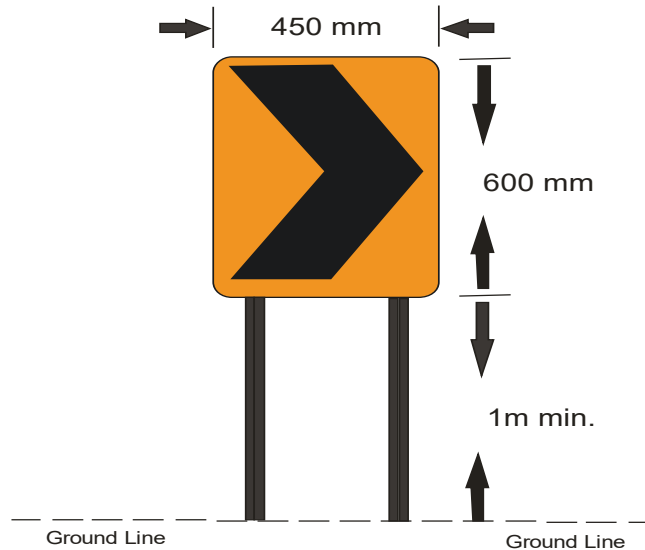
### 708.05 CHEVRON MARKERS (TC-31)

Chevron Markers shall be used on tapers for detours and diversions. They shall replace the normal construction marker at a spacing of every 30 m from the start of the taper. The arrow head shall point in the direction of the turn. They shall be retro-reflectorized

using high intensity grade orange reflective sheeting to indicate the same color and shape by night as by day.

Markers that may require a weight to keep them from being knocked down or blown over shall use sandbags. **The use of rocks or boulders will not be considered.**

TC-31 signs shall be installed on two piece of 25 millimetre rebar to a height of 1 metre minimum above the traveled portion of the roadway to the bottom edge of the sign.



Where chevron markers are used to divide two-way traffic, chevron markers must be installed back-to-back on both sides of the same rebar installation.

### 708.06 BARRICADES

For reasons of traffic safety and for the protection of workers, barricades shall be used to define the work area where required by the traffic control layout and is considered a part of the temporary signing arrangement. Barricades shall also be used to close streets or roads in the area where the work is being carried out.

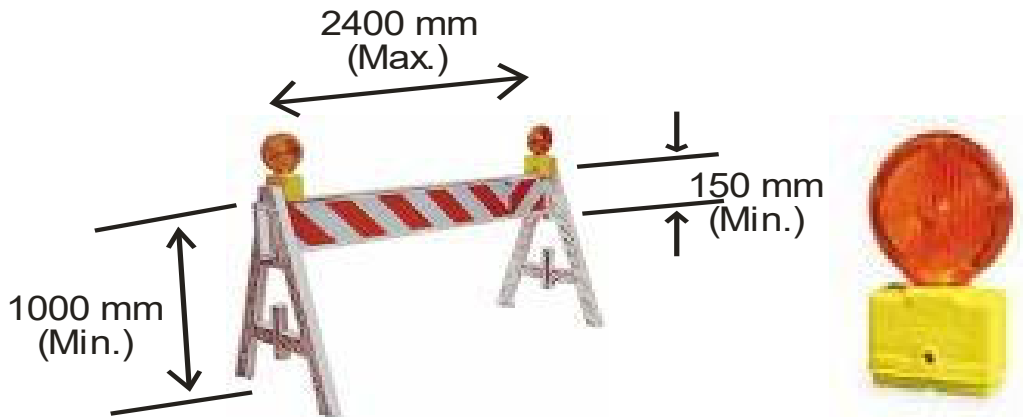
Barricades are always placed immediately preceding the work area on the approach side between the road user and the obstruction or activity.

These barricades shall be reflectorized to indicate the same color and shape by night as by day. **The use of fluorescent paint on barricades shall not be considered for use after dark.**

All barricades shall have a retro-reflective high intensity grade orange background and black print meeting the approval of the Department.

**708.06.01 LIGHT BARRICADE**

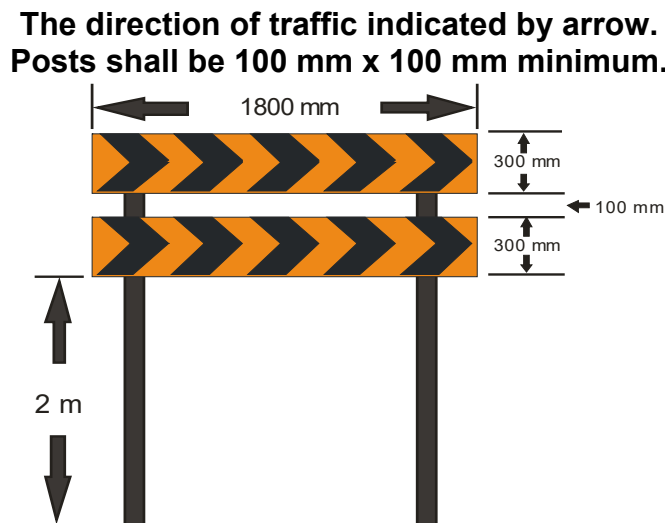
Light barricades shall be used for work of short duration to provide closure of a traffic lane or roadways or blocking road excavation sites or other work site hazards. Light barricades shall not be used as a channelizing device. The use of fluorescent paint on light barricades shall not be considered for use after dark (TC-64A sign is required on each light barricade).



**Flashing Beacon (Optional)**

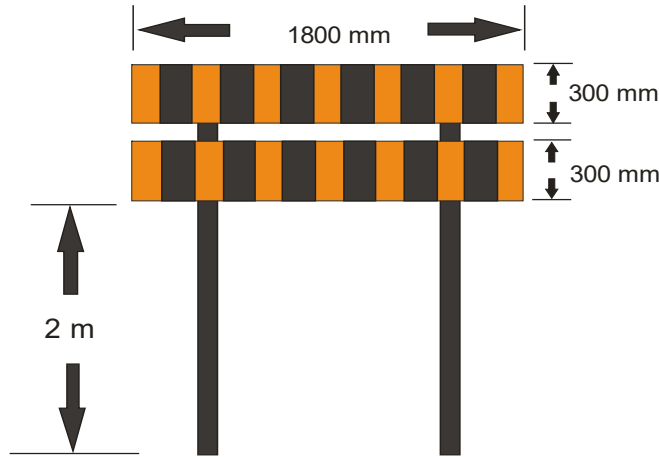
**708.06.02 HEAVY BARRICADE**

Heavy barricades shall be used to provide complete closure of a road or lane for an extended period of longer than 5 days. Their supports shall consist of posts set in the ground with two TC-64C heavy barricade faces attached as shown below:





Where no direction is required barricade TC-64B shall be used, as shown below:



**Posts shall be 100 mm x 100 mm minimum.**

### 708.07 TRAFFIC CONES

The required height of traffic cones is related to the normal maximum posted speed of the roadway and shall comply with the following minimum requirements.

Maximum Speed	Minimum Height
50 km/h or less	450 mm
Greater than 50 km/h	700 mm



**The use of traffic cones is only permitted during hours of daylight.**

### 708.08 DELINEATOR POSTS

Delineator posts used to channelize or delineate traffic shall be 1100 millimetres in height and 100 millimetres in diameter. The markings consist of two white high intensity reflective bands 75 millimetres in width. The unit is weighed down with a standard 6.8 kilogram rubber base. Additional 6.8kilogram base inserts may be required to prevent turning or toppling by wind conditions.



### **708.09 DRUMS**

Drums are to be flexible and typically 200 liters in capacity. Drums shall be reflectorized to indicate the same color and shape by night as by day. The drums are to be predominantly orange, not fluorescent, with a minimum of two white reflectorized strips (100 millimetres width minimum) per drum.

Flexible drums may be used as an alternative method to channelize or delineate flow and shall be approximately 1000 millimetres in height and a minimum of 550 millimetres in diameter at the base. The markings on the flexible drums shall be horizontal, circumferential alternating black and reflectorized orange strips. Drums frequently require weighted bases to prevent movement.



### **708.10 BARRIERS**

Barriers are devices designed to physically prevent road users from entering into the work zone area which may be occupied by workers, materials, equipment or hazards. Barriers provide the following primary functions:

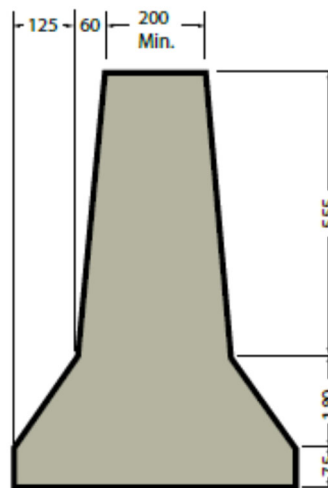
- Protect workers by preventing errant vehicles from entering the work zone.
- Protect errant drivers by redirecting them from a hazard.
- Provide separation for two-way traffic on one side of a normally divided roadway.

Barriers will typically be found installed in areas around excavations and scaffolding where the prevention of vehicles entering this area is of high importance.

In order to be effective, barriers must be properly installed otherwise they may pose a hazard instead of providing protection. Proper installation practices include:

- Securely fastening individual barrier devices together to form a continuous structure that acts as a single unit when impacted.
- Ensuring there are no gaps between each barrier device.
- Ensuring that the barrier is installed at a 4:1 taper on the approaches to minimize the probability of blunt end collisions.
- Any blunt ends exposed to traffic must be protected by an impact attenuator. The attenuation devices used must meet the requirements, based on the roadway speed limit, of the National Highway Research Program NCHRP 350 TL-3 for current inventory and MASH TL-3 for devices acquired after 2018.
- Maintaining at least a 0.5 metre offset between the Barrier and the adjacent travelled lane, where possible
- Installing appropriate retroreflective markings, such as construction markers or other devices meeting a minimum ASTM Type III, along the length of the barrier system.

There are many different types of Barrier devices available. The only Barrier device pre-approved for use on provincial roads is the F-shape concrete Barrier meeting the NCHRP 350 TL-3 standard. Other Barriers may be approved by the Department of Transportation and Infrastructure, provided the devices offer an equivalent level of protection.



Dimensions are in mm

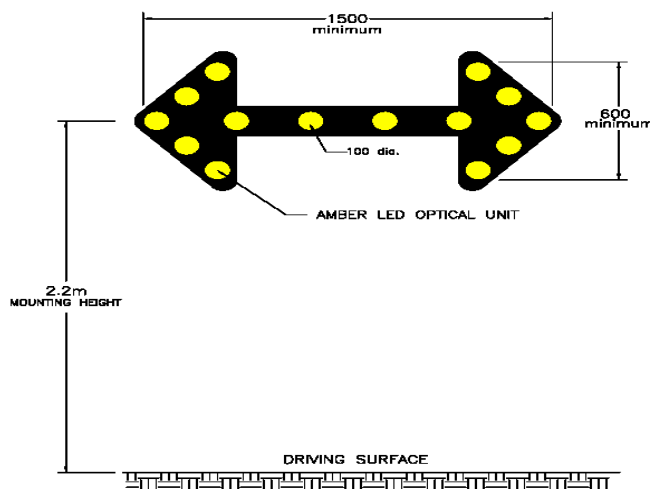
## 708.11 FLASHING ARROW BOARDS

Flashing Arrow Boards (FABs) are traffic Control Devices comprised of a group of lighting elements capable of displaying directional arrows (Arrow Mode) or a horizontal line (Caution Mode).

Arrow mode may be used on multilane roads to direct approaching traffic from a closed lane into the adjacent open lane. The caution mode may be used on both multilane and two lane roads when the location of work does not require any lane closures or when a Traffic Control Person is directing traffic. The left arrow shall never be used on a two lane road, as this may cause drivers to divert into the lane of oncoming traffic. No other displays, such as sequential arrows or ‘four corner’ warning lights, are permitted.

For highways with a speed limit equal or greater than 90 km/h, detours and diversions that are anticipated to be in place 12 hours or more shall have a standalone flashing arrow board unit located within each taper. The arrow board shall be of a type and design as approved by the Department.

Flashing arrow boards shall have an arrowhead height of 600 to 760 millimetres and a minimum length of 1200 to 1500 millimetres. These arrow boards shall consist of an array of a minimum of 14 AMBER lights, with each light being 100 millimetres in diameter, and provide a minimum legibility distance of 600 metres. The AMBER arrow signals shall be on a black background with all bulbs displaying the same yellow or amber colour and light intensity. The flashing arrow boards may be mounted on a vehicle or trailer and will achieve a height from the driving surface to the centreline of the Flashing arrow board of approximately 2.2 m



Flashing Arrow Boards shall be in reasonable condition to be effective for both day and night operation. While such devices cannot always be in new condition, they shall always be in reasonable condition. Unacceptable conditions that warrant replacing shall be those which operate: in Arrow Mode with 2 or more lamps out in the bar or any out in the arrow head; or have less than 5 bulbs operating in Caution Mode.

A 35 watt incandescent bulb is considered the standard element for flashing arrow boards. Alternate elements such as low wattage or halogen bulbs and groups of light-emitting diodes (LEDs) may be used provided they maintain the same flash rate and brightness as a 35 watt incandescent bulb. Any flashing arrow board used during night work shall be equipped with at least one photocell that progressively reduces light intensity during hours of darkness to prevent road users from being temporarily blinded.

### **708.12 ATTENUATION DEVICES**

Attenuation devices are energy absorbing devices that may be attached to a truck or in a trailer format which upon impact deform in a controlled manner. Attenuation Devices perform the following functions:

- Reduces the rate of deceleration of the errant striking vehicle thereby reducing the impact upon the attenuation device which also reduces the likelihood of injury to the occupants of the vehicle striking the attenuator.
- Reduces the rate of acceleration of the attenuator device, thereby protecting the attenuator operator if it is truck mounted, and protecting the workers in the work zone.

Attenuation devices, either truck mounted or trailer type, must meet the requirements of the National Highway Research Program NCHRP 350 TL-3 for current inventory. Any attenuator acquired after April 2016 must meet MASH TL-3 standards. (Manual for Assessing Safety Hardware which is administered by the American Association of State Highway and Transportation Officials, AASHTO).

Sign Layout Diagrams have been developed showing use of attenuation devices, however these devices may also be included in other layout diagrams and situations for added protection of workers in work zones. In general these devices shall be placed in advance of the work zone within the buffer area.

### **708.13 BUFFER VEHICLE**

Buffer Vehicles, typically a truck with a truck mounted attenuator, are placed in advance of the work zone and used to block a travel lane to protect workers from errant vehicles.

In addition to the truck mounted attenuator a buffer vehicle shall have a flashing arrow board to provide warning and guidance to approaching vehicles.

The buffer vehicle used must meet the truck mounted attenuator manufacturer's requirement, such as overall vehicle mass, in order for the device to be effective. The truck mounted attenuator must be approved to meet the following requirements:

- If approved before 2018.01.01, it must meet the requirements of NCHRP 350 Level TL-3(100km/h impact speed).
- If approved on or after 2018.01.01 it must meet MASH TL-3 standards.

While in active use as a temporary traffic control device, a buffer vehicle:

- Must be fitted with a highback seat and a head rest for the operator.
- Must not be loaded with materials that would have a reasonable expectation of causing a fire or a chemical hazard, if the vehicle is struck.
- Must not carry passengers while actively providing protection.
- Must remain in constant radio contact with the operators of work and control vehicles.
- Must be positioned to protect the workers.
- Must display the correct flashing arrow board message.

Must have the wheels angled away from the open travel lane and workers.

When a buffer vehicle is used at a stationary location in advance of the work zone the additional requirements must be followed:

- Have the vehicle's brakes set.
- Be placed in 'park' or in a low gear.
- Be unoccupied while performing the blocking function.

#### **708.14 CONTROL VEHICLE**

Control vehicles used during Very Short Term Work (low speed or low volume), Short Term Work (low speed or low volume), and Snow Cleanup Operations, shall be equipped with a vehicle mounted flashing arrow board. In addition, the vehicle shall be equipped with a 360 degree beacon, standard four-way flashers and two bumper mounted signs, being 150 millimetres high x 450 millimetres long, with orange and black alternating and opposite stripes at 45°. The signs shall be reflectorized to indicate the same shape and color by day or night. Examples of the use of this vehicle can be found in the Traffic Control Manual on pages 80 to 85.

Where the nature of the operations does not encroach on the travel lane or impede traffic flow, such as slow moving inspection of culverts or utility lines, etc., the control vehicle may be substituted by an alternate vehicle equipped with flashing lights and a roof mounted 360 degree revolving, appropriately coloured, beacon. If this type of operation becomes stationary for periods exceeding 30 minutes and the parked distance from the travel lane does not exceed 0.6 metres, then the operation is no longer considered very short term work, and shall be signed as per the relevant Work Adjacent to Roadway diagrams.

### **708.15 PILOT VEHICLES**

Pilot vehicles may be used in situations where traffic control is required over a considerable length of work zone and where it may otherwise be difficult to control traffic with traffic control persons or temporary traffic signals. The decision to use Pilot Vehicles to control traffic rests with the road authority having jurisdiction. The pilot vehicle may guide or lead a platoon of vehicles in one direction through the work zone where it would be complex to delineate and would be more efficient to pilot traffic. Pilot vehicles may also be used to control vehicle speeds in the work zone and to protect workers by preventing vehicles from entering a closed lane too soon (such as when milling asphalt or waiting for placed asphalt to cool.).

The following procedures shall be used when Pilot Vehicles are used:

1. Traffic Control Persons (TCP) shall regulate traffic at each end of the Pilot Vehicle controlled section. The operation of using Pilot Vehicles must include communication links with the other traffic controls at each end of the work zone, such as the TCPs.
2. The Pilot Vehicle shall move into leading position at the front of the stopped vehicle queue prior to release by the TCP.
3. When directed by the TCP, the Pilot Vehicle shall guide traffic through the Work Zone, travelling at a speed that would keep traffic together in a continuous flow till the end of the work zone.
4. At the end of the Work Zone, the Pilot Vehicle shall pull over at the first safe location to allow the queue of vehicles to pass.
5. When the last following vehicle has passed, the Pilot Vehicle shall then return to the end of the Work Zone to guide a queue of vehicle back to the original starting end of the work zone.

To maintain driver discipline and ensure delays are kept to a minimum, at least two Pilot Vehicles shall be used in this continuous operation. More Pilot Vehicles would be required

for a higher volume roadway with a long work zone. All Pilot Vehicles should be equipped with a 360-degree amber flashing light and a “Follow Me” sign mounted over a “Do Not Pass When Flashing” sign mounted in a conspicuous location on the rear of the Pilot Vehicle. Where significant queuing occurs or is expected to occur, or visibility at the end of the queue is not sufficient a “Prepare to Stop” Sign should be used upstream of the expected end of the queue.

The Traffic Control Persons should manage work vehicles that enter the work zone so that they are the last vehicle in the Pilot vehicle queue, to avoid other vehicles following the work vehicles in the Work Zone.

Where work zones extend over a long distance and pilot vehicles are in use for traffic control, intermediate signs should be placed at 0.5 kilometre intervals to restrict vehicles from passing. Sign RB-31 “Do Not Pass” with tab sign RB-31T are required to be installed.

#### **708.16 VEHICLE STROBE LIGHTS**

Government maintenance vehicles are to be equipped with Blue Strobe Lights and a 360-degree beacon. All other vehicles, such as contractor vehicles, tow trucks; survey vehicles, etc. are to be equipped with Amber Strobe Lights and a 360 degree beacon.

#### **708.17 PORTABLE TRAFFIC LIGHTS**

With the approval of the Department, portable traffic control signals may be used to alternate traffic past a work zone, in lieu of flagpersons. The Assistant Deputy Minister shall be advised in each case of the intent to use this device before application.

Portable signals shall be used only under conditions where the lights are clearly visible to an approaching motorist such that the vehicle can be brought to a safe stop. Intensity of the signal lamps shall be maintained in such a manner that the lights are clearly visible for a distance of at least 500 metres.

It is essential that these devices be removed immediately when conditions no longer require them.

Traffic light timings are calculated using the table shown in drawing 791-1 of the Traffic Control Manual. It is essential that traffic flow be monitored regularly to determine if timing adjustments are required. Time of Day sequences may be required to handle traffic patterns which are not symmetric.



## **708.18      AUTOMATIC FLAGGER ASSISTANCE DEVICES (AFADS)**

An Automated Flagger Assistance Device (AFAD) is an automated flagging machine that features a circular red lens, a circular yellow lens, and a gate arm. The device is considered an extension of the flagperson's arm and is used to stop/control the flow of traffic. This device is not considered as a portable traffic signal. The flagperson operates the AFAD using a remote control rather than a paddle to control traffic movement along the work zone, this allows the flagperson to be positioned outside the travel lane while still maintaining control of traffic. Two AFADs can be operated by a single TCP at one end of the work zone or at a central location, or multiple AFADs can be operated by multiple TCPs, each positioned near an AFAD. In general the AFADs are placed either at each end of the work zone area or when one unit is used, at one end of the work activity area with a TCP at the opposite end

The AFAD shall be comprised of the following:

- The AFAD shall have two 300 millimetre diameter signal lenses—i.e., a lens that displays solid red above a lens that displays flashing yellow. The flashing yellow lens shall also have solid yellow capability for change intervals.
- The AFAD shall have a conflict monitor that prevents simultaneous illumination of the red and yellow lenses on the same device.
- The AFAD shall have a gate arm with the following properties:
  - A fluorescent orange or red flag shall be installed at the end of the gate arm when the AFAD is in use.
  - The gate arm shall be at least 3.05 metres long, including the flag, and shall have a vertical aspect of at least 100 millimetres.
  - The gate arm shall lower and remain lowered on a red signal.
  - The gate arm shall rise to an upright position on a flashing yellow signal.
  - The gate arm shall have retroreflectivity on both sides with alternating fluorescent red and white bands. The bands shall be 200 millimetres long measured horizontally.
- A black-on-white STOP HERE ON RED or STOP HERE ON RED SIGNAL sign shall be installed on the right side of the approach at the point where drivers are expected to stop. This sign is typically provided with the AFAD, and may be installed on it.

The following guidelines must be considered when determining possible use of AFAD's within a work zone:

- AFADs may be used only on two-lane, two-way roadways and on multilane roadways that have been reduced to one lane.

- AFAD are suitable for low speed locations. High-speed roadways require a speed reduction.
- An AFAD is not a traffic control signal, and it cannot be used to replace or substitute for a continuously-operating temporary traffic control signal.
- An AFAD can be operated only by a TCP who has been trained to operate it.
- A TCP operating an AFAD shall not leave it unattended at any time while it is in use.
- The preferred operating procedure is to have a TCP controller for each AFAD. Assigning a TCP to each device becomes more critical on high-volume roadways and in more complex work zones where construction traffic may be entering and exiting frequently. For simpler, lower volume situations where there are good sight lines, a single TCP may control up to two AFADs:

Where AFAD's have been implemented on a work zone, the following conditions must be observed:

- For road users to **stop**, the AFAD shall display a **steadily-illuminated red lens** with the gate arm in the down position.
- For road users to **proceed**, the AFAD shall display a **flashing yellow lens** with the gate arm in the upright position.
- For the **change** interval between flashing yellow and steady red, the AFAD shall display a **steadily-illuminated yellow lens** with the gate arm remaining in the upright position. The change interval should be at least 3 seconds unless a different duration is approved by engineering judgment. There is no change interval between the steady red and flashing yellow displays.
- During operations with two flagpersons:
  - One flagperson shall operate each AFAD at either end of the work zone; or
  - One flagperson shall operate an AFAD at one end of the work activity area and the second flagperson controls traffic with a paddle at the other end.
- During operations with one flagperson:
  - The flagperson is positioned in a central location simultaneously operates two AFADs that are positioned at either end of the work zone; or
  - The flagperson operates a single AFAD that is positioned at one end of the work activity area while also controlling traffic with a paddle at the opposite end.
- During single operations with one flagperson, all of these conditions shall be met:
  - The flagperson has an unobstructed view of the AFAD(s).
  - The flagperson has unobstructed views of approaching traffic in both directions.
  - The average daily traffic volume on the roadway is 6,000 vehicles or less.

- The maximum distance between traffic control locations (TCP or AFAD) is 250 metres.
- A TCP shall not activate the flashing yellow display (proceed) until the last vehicle from the opposing queue has cleared the work activity area.

Refer to Layouts 792-1 through 792-4 in the Traffic Control Manual for application of AFAD's.

## **708.19 VARIABLE MESSAGE SIGNS**

Variable Message Signs are electronic signs that are used to convey additional information about upcoming road work. These signs shall be used only as a supplement to, but not a substitute for, conventional temporary condition signs and devices. Their use in the field shall be limited to installation either prior to, or within the advance warning area.

Variable Message Signs may display either a single fixed message or a number of sequential messages. When programmed to display sequential messages, each message will be referred to as a phase. Each phase shall be visible to approaching motorists for a minimum of three seconds, and shall be able to be read at least twice by the approaching motorist. If sequential messages exceed two phases, additional Variable Message Signs may be required. In this situation, the distance between Variable Message Signs shall be given careful consideration, based on the speed limit and the phase cycle, ensuring that the message(s) on each sign can be read twice by approaching motorists.

The following guidelines shall be used to determine the information to be displayed on Variable Message Signs:

- Messages shall consist of upper case text with a minimum letter height of 30cm.
- The messages shall be displayed in bright yellow or orange, providing a sharp contrast to the sign's black or dark blue/grey background colour.
- Each message shall convey a single, relevant and concise thought.
- Abbreviations shall only be used if they are easily understood.

Roadway construction applications, where Variable Message Signs may be considered, include the following:

- On high speed, multi-lane roadways where significant delays, queuing or lane changes are anticipated;

- On high volume roadways where complex and frequently changing alignment or surface conditions exist;
- Approaching a construction project where an alternate route may be available, but not apparent to approaching motorists.

Variable Message Signs shall be in reasonable condition to be effective for both day and night operation. While such devices cannot always be in new condition, they shall always be in reasonable condition. Unacceptable conditions that warrant replacing shall be those which operate with less than 90% of the pixels in each character.

#### **708.20 RADAR DISPLAY SPEED SIGNS**

Radar Display Speed Signs are electronic signs that are equipped with a radar unit that detects an approaching vehicle's speed, and displays the information back to the driver. These signs shall be used only as a supplement to, but not a substitute for, conventional temporary condition signs and devices. Their use in the field shall be limited to installation within the approach area, where speed control is essential.

Radar Display Speed Signs shall only be used where speeding is an issue, and to achieve maximum effectiveness, their use should be supplemented with law enforcement from time to time. Where approved for use a Radar Display Sign shall meet the following requirements:

- The numbers displayed on Radar Display Speed Signs shall be a minimum of 45 centimetres high.
- The threshold speed to activate the sign's display shall be set at a minimum of 5 km/h over the posted speed.
- A maximum threshold speed to activate the sign's display shall be set to prevent drivers from try to test how fast they can go.
- If the sign is capable to display any supplementary message, then the minimum requirements for Variable Message Signs shall apply.
- The only approved message for display shall be "SLOW DOWN".
- Signs shall be installed in the Approach Area adjacent to posted speed limit signs, where present as part of the typical advance warning signage, or in a similar location when reduced speed limit signage is not required.

#### **708.21 TEMPORARY CONDITIONS PAVEMENT MARKINGS**

Temporary Conditions Pavement Markings are used in combination with other appropriate warning signs, delineation devices and traffic control devices to mark the intended vehicle path traffic is expected to follow through the work zone.

Instances where temporary pavement marking may be used are on a paved diversion to bypass a work site, such as a new bridge construction, or where partial pavement removal or incomplete replacement has occurred in a multiple asphalt overlay process.

Where temporary condition pavement markings are used they shall be placed as soon after an original lane marking has been removed to restore the guidance which was in place prior to the construction operations. In the case of temporary diversions, lane markings shall be placed prior to opening of the diversion.

Whenever temporary condition pavement markings are applied, any conflicting pavement markings shall be removed or obscured to eliminate any possible confusion. Paint grinders and black sealing compounds can be used but must be approved for the removal operation based on existing lane marking conditions.

Typical temporary pavement markings consist of temporary marking tape, raised pavement markers and standard traffic paint with glass beads. Yellow markings shall be used where two-way traffic occurs and to delineate opposing traffic. White markings shall be used for shoulder edge lines or multiple lanes where traffic flows in the same direction, such as on divided highways.

Short term lane markings may be smaller in size and with a less frequency of spacing. More temporary markings shall be used in areas of curves than on straight sections to highlight road curvature. Temporary markings for long term applications shall follow usual line painting practices governed by national standards.

## **708.22      TEMPORARY RUMBLE STRIPS**

Temporary rumble strips are portable rubber devices placed across a roadway perpendicular to the direction of traffic flow. The primary use of temporary rumble strips is their effectiveness in alerting drivers, through noise and vibration, to other traffic control devices and upcoming circumstances such as lane changes, detours, or other hazardous conditions. These devices may also provide a secondary benefit in providing a small reduction in roadway speeds in the direct vicinity of the rumble strip installation.

When determining if use of temporary rumble strips is applicable, the following key factors must be considered:

- A sign warning drivers of the rumble strips should be placed in advance of the rumble strip installation.

- Temporary rumble strips should not be placed on roadways used by bicyclists unless a minimum clear path of 4 feet is provided at each edge of the roadway or on each paved shoulder.
- Temporary rumble strips should not be placed within intersections, through pedestrian crossings, or on sharp horizontal or vertical curves.
- Temporary rumble strips are not recommended for quickly moving mobile road work.
- Potential to cause erratic or avoidance manoeuvres by drivers.
- Potential rough ride or hazard for motorcyclists.
- Potential for movement of rumble strips due to inadequate installation.
- Noise complaints by nearby residents.
- Can result in increased breaking and reduced speeds
- Temporary rumble strips are primarily practical for low speeds only because they are easily dislodged by high speed traffic.
- Even strips with very shallow depths or heights may affect control of motorcycles and bicycles, especially in night situations where these users cannot see them in advance.

Refer to Layouts 740-1 through 740-4 in the Traffic Control Manual for general information of the placement of temporary rumble strips.

### **708.23 MISCELLANEOUS**

Other miscellaneous traffic control devices, such as flares, flashlights, floodlights, lanterns, etc., may be used, as required, to supplement the signs and other devices described in this section.

### **708.24 BASIS OF PAYMENT**

All costs associated with temporary condition signing to standards as outlined in this Section shall be the responsibility of the Contractor. Cost of the signs, handling, installation, removal, asphalt reinstatement and / or repair, materials, and labour shall be paid by the Contractor and no payment shall be considered by the Department.

## SECTION 715

### FLAGPERSON OPERATIONS

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#### **715.01 SCOPE**

Under certain conditions, during construction activities on or along a roadway, the use of a flagperson may be required to safely guide motorists through the work site area. The following sections specify the appropriate equipment, signs, and usage of flagpersons under such circumstances. The final decision as to the use of flagpersons shall be as directed by the Owner's Representative. The use of Automatic Flagger Assistance Devices, as detailed in Section 708, may be used as an alternative to flagpersons allowing for the greater safety in some situations.

#### **715.02 FLAGPERSON EQUIPMENT**

The flagperson shall, at a minimum, wear CSA approved high visibility safety jacket or vest, safety boots, safety headgear, and hearing and eye protection. They shall be equipped with a flagpersons "STOP" and "SLOW" reflectorized sign. This sign shall be attached to a support pole, such that the sign and pole combination has an overall height of 2.0 to 2.3 metres. For night operation, the flagperson shall have a red signaling baton flashlight to supplement the reflective diamond sign.

#### **715.03 FLAGPERSON ADVANCE SIGN**

Except for very short-term work situations, "Flagperson Ahead" (TC-21) signs shall be posted in advance of each flagperson. The sign shall be of a design as shown in the Manual of Uniformed Traffic Control Devices for Canada and shall be retro-reflectorized



with high intensity prismatic grade sheeting to indicate the same color and shape by night as by day.

All advance flagperson signage shall be removed or covered promptly when the flagging operations are terminated from a construction work zone for any period of time. Signage left up will be expropriated by the Department.

#### **715.04 GENERAL GUIDELINES**

Flagpersons shall be highly visible. For this reason, they must stand alone, never permitting a group of workers to congregate around them.

Flagpersons working as a team shall agree to appropriate signals before commencing their duties. If the flagpersons are not visible to one another, an intermediate flagperson or two-way radios are necessary to ensure proper communications and directing of traffic. See Layout 757-1 and 757-2 of the Traffic Control Manual for details.

No flagperson shall start working unless all required advance flagperson signs are in place. No other construction signs shall be located between the flagperson position and the advance flagperson signage.

While on duty, the flagperson should refrain from participating in distracting activities. The flagperson is not permitted to use any audio or video devices, earphones or any other device that could impair sight, hearing, or attention while working. Flagpersons are not be permitted to use any cellular devices during hours of operation unless it is deemed an emergency. Any flagperson observed using any device that distracts from their work will be asked to leave site immediately. The Department will not accept any claims resulting from work delays for the dismissal of any flagpersons who fail to abide by this requirement. The Contractor is strongly advised to enforce this item promoting site safety.

The Contractor is advised that flagpersons shall be equipped with either 2-way or 3-way radios only. At no time are flagpersons permitted to use flags to control traffic.

No flagperson shall leave his or her post unless authorized to do so or replaced by another flag person. As long as traffic cannot flow freely, even at mealtime, the flagperson must stay on duty until relieved.

Flagpersons are to be located outside the active lane of traffic, typically on the shoulder adjacent to the lane of traffic being controlled, and at a point from the end of the working area to be able to protect personnel and equipment. The distance from the flagperson to



the work site shall be based on normal speed limit and as indicated in the Construction Distance Table 799-1 in the Traffic Control Manual.

During some situations, it may be necessary for a Flagperson to stand on the driver's side of the lane of traffic being controlled. This position is only allowed after more than one vehicle has been stopped from the shoulder of the lane of traffic being controlled and it is necessary for the Flagperson to move into the lane to assess queue length or to achieve a better view of approaching vehicles. The Flagperson must then return to the shoulder of the lane before directing the traffic to proceed. At no point are Flagpersons to be positioned on the driver's side of the lane if the Flagperson will be exposed to traffic in the adjoining lane, as the presence of traffic will result in that position not being safe

Flagpersons and equipment operators working at a location are to make every effort to keep delays to motorists to a minimum. In heavy traffic, delays shall be split equally between the opposing lanes of traffic and in normal operations, traffic shall not be delayed in excess of five (5) minutes per direction. At all times priority shall be given to the motorist to proceed through the construction zone. Flagpersons not following these guidelines shall be dismissed from the work site.

When the flagperson leaves their position at the end of operation on a work zone, the Contractor must remove or cover all applicable advance flagperson signage. The Department reserves the right to expropriate all flagperson signs that are left in place after the flagperson no longer controls traffic.

## **715.05 FLAGPERSON REQUIREMENTS**

Any construction activity that results in encroachment into a travel lane requires traffic control, usually in the form of flagpersons. The following construction situations shall be used as guidelines in use of flagpersons:

- At least one flagperson shall be provided on local roads when the traffic flow in one direction is diverted wholly or partially into the lane of oncoming traffic and the lane of oncoming traffic is clearly visible beyond the one lane section for the distance as shown in Table 715.05.01 for the appropriate speed limit.
- At least two flagpersons shall be provided on local roads when the traffic flow in one direction is diverted wholly or partially into the lane of oncoming traffic and the lane of oncoming traffic is not clearly visible beyond the one lane section as noted in Table 715.05.01.

**TABLE 715.05.01**

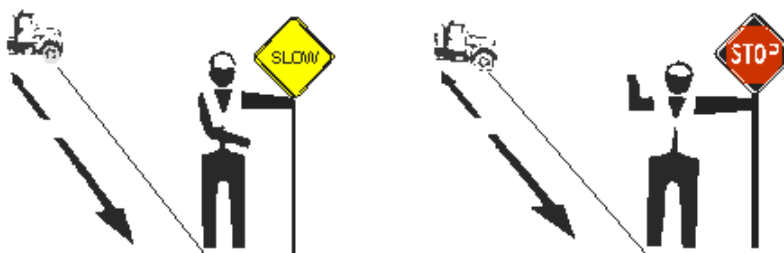
Max Speed	Clear Visibility Required in Each Direction
80 km/h	250 m
70 km/h	200 m
60 km/h	170 m
50 km/h	140 m
40 km/h	110 m

- The Contractor may, where the normal traffic volume on a local road is less than 15 vehicles per hour, reduce the flagpersons requirements.
- At least two flagpersons shall be provided on collector and arterial roads when the work activities require the traffic flow in one direction to be diverted either wholly or partially into the lane of oncoming traffic.
- At least two flagpersons shall be provided when the traffic flow in both directions is diverted from the normal vehicle path onto a one-lane section. Where traffic flow in both directions is diverted from the normal vehicle path onto a two-lane section, the use of a flagperson is not required. Traffic flow may be safely regulated through the area by the proper use of construction signs.
- At least two flagpersons shall be provided to direct traffic at a major detour. These flagpersons must be located at each end of the detour and must be familiar with the area of the detour route. Additional flagpersons must be provided at all significant road intersections (with the exception of local roads). Extended operations of a detour will require public advertising and detour signs along the complete detour route in place of the flagpersons.
- At least two flagpersons shall be provided at truck entrances/exits on arterial roads when the truck traffic entering or exiting the access road is in excess of ten vehicles per hour.
- At least two flagpersons shall be provided at truck entrances/exits on collector and local roads with a normal traffic volume of 50 vehicles per hour on the through road and when the truck traffic entering and exiting the access road is in excess of 10 vehicles per hour.
- At least three flagpersons shall be provided, as shown in the Traffic Control Manual (Sign Layout Diagrams 757-1 and 757-2), on collector and arterial roads when the work activities require that traffic flow in one direction be diverted either wholly or partially into the lane of oncoming traffic and when the horizontal and/or vertical alignment at the work site does not have the distance of clear visibility required in Table 715.05.01.

- At least one flagperson shall be provided on arterial roads that have two lanes of one-way traffic and traffic volumes in excess of 100 vehicles per hour where the work activities require that one lane be closed at the work site.
- The use of a flagperson is not required on sections of new highway that are not open to the public use.
- At least one flagperson shall be provided on a temporary bridge bypass of one lane width. At locations where portable traffic lights are in operation, the use of a flagperson is not required. At a two-lane by-pass, the use of a flagperson is not required as traffic flow may be safely regulated through the area by the proper use of construction signs.
- When traffic control is required at signalized intersections, due diligence shall be exercised and every effort made by the Contractor to deactivate the traffic lights, immediately before flagpersons are required to direct traffic through the intersection. If in the event that traffic control is required through a signalized intersection, and time restraints or emergency situations exist, such that the traffic lights cannot be deactivated immediately prior to work commencing through the intersection, then the flagpersons shall exercise caution and good judgment to ensure the traffic flow around the work zone is maintained in conjunction with the operation of the traffic light sequences. A minimum of two flagpersons shall be used at a signalized intersection. However, there may be situations, depending on the location and type of work, that require more flagpersons to be utilized.
- Any other situation as determined by the Owner's Representative.

## 715.06 WHERE TO STAND

1. Stand outside the lane of traffic, typically to the shoulder of the lane being controlled.
2. Stand at a distance from the working area as indicated on the sign layout diagram, so as to be able to protect personnel, equipment and motorists.
3. Stand where you can be seen by approaching traffic.



The guidelines above pertain to the location of the flagperson at the beginning and end of the work zone, these conditions do not apply to intermediary flagpersons which may be required on a construction project due to local roadway conditions or hazards.

## **715.07 FLAGGING SIGNALS**

Standard flagging signals shall be used and given in a clear and precise manner.

- To instruct a fellow flagperson to halt traffic, raise the free hand with fist clenched straight above the shoulder, wave the entire arm slowly from the upright position to a position directly out to the side at shoulder height and repeat signal as long as necessary;
- To indicate an all clear situation and instruct a fellow flagperson that he or she may allow traffic to proceed, raise the free hand directly out to the side at shoulder height, lower the entire arm until it rests against the side of the body and repeat signal as long as necessary;
- To indicate the approach of emergency vehicles, drop the stop and slow paddle, raise both arms to the side at shoulder height, then rapidly wave both arms from the shoulder level to a point above the head where the wrists will cross and continue signal until the fellow flagperson is seen to take necessary action;

A flagperson shall stand in a safe position where he or she will be clearly visible and where he or she has an unobstructed view of approaching traffic.

Flagpersons shall use normal signals when stationed on the driver's (left) side of the lane used by traffic under their control and appropriate signals shall be used only when the flag person is stationed on the right side of traffic under their control.

### **Normal signals to STOP traffic are:**

#### **In daylight,**

- The flagperson shall face approaching traffic and shall extend their free arm horizontally across the approach lane,
- The flagperson's paddle shall be held upright with the "STOP" side facing traffic,
- When an approaching vehicle has almost stopped, the free arm shall be used to indicate the point at which vehicles are required to stop.

#### **In darkness,**

- The flagperson shall assume the same basic position as for the day signal.
- They shall hold a reflectorized paddle in their free hand and flashlight with red signaling baton attached in their other free hand,

- The free arm shall be moved slowly back and forth between limits corresponding to the third and sixth hour positions on a clock face, and
- When an approaching vehicle has almost stopped, the flashlight and baton shall be used to indicate the point at which the vehicle is required to stop.

**Normal signals to SLOW traffic are:**

**In daylight,**

- The flagperson shall take up a position similar to the one used for the signal to stop with the "SLOW" side of the paddle facing approaching traffic

**In darkness,**

- The same position and motions shall be assumed as for the night stopping signal except that the "SLOW" side of a reflectorized paddle shall face approaching traffic

**Normal signals to MOVE traffic are:**

**In daylight,**

- The flagperson shall face across the approaching traffic lane and shall look across their shoulder at the traffic he or she is about to move
- Traffic shall be advanced by rotating the lower free arm in an oval manner corresponding to the direction in which the vehicle wheels will rotate
- If traffic is required to proceed slowly, the flagperson shall also extend their free arm horizontally towards the approach lane with the "SLOW" side of the paddle facing traffic; and
- If traffic is allowed to proceed at the prevailing speed limit, the flagperson shall lower the STOP/SLOW Paddle and ensure it is hidden from motorists.

**In darkness,**

- The same signals as for daytime shall apply.
- A flashlight with red baton attached shall be used in the free hand.
- The order to proceed or to proceed slowly may be given verbally.
- The flagpersons paddle shall not be used to wave traffic on and shall never be displayed to traffic in other than a static manner.
- All motions of the flagpersons arms, both by day and night, shall be performed precisely and unhurriedly so that the meaning of signals given cannot be misunderstood.

**715.08 BASIS OF PAYMENT**

Refer to "Wages of Flagperson", Section 125.

## SECTION 717

### CONSTRUCTION SPEED ZONES

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- 717.03 SPEED SIGNS**
- 717.04 GUIDELINES FOR SPEED LIMITS**
- 717.05 BASIS OF PAYMENT**

#### **717.01 SCOPE**

Construction Speed Zones will be established on all construction projects or portions of projects requiring traffic control.

#### **717.02 GENERAL INFORMATION**

Speed limits must reflect the road conditions in existence at the time. Signs must be removed or changed immediately when the condition changes. When the road condition does not warrant reduced speed during non-working periods, overnight, or weekends, the signs shall be removed or covered.

For situations where a roadway does not warrant a speed limit reduction, however a motorists may need to slow down for a localized condition, an advisory speed sign may be installed to inform motorists of a potential need to reduce speeds. Such instances would be situations such as paving operations that have finished however, a low shoulder remains or where small milled or bumps are present prior to completing paving operations for a section of roadway.

On a divided highway, if construction involves only one side of the highway, the speed limit will be lowered in the affected direction of travel only and will remain unaltered in the opposite direction.

The reducing of a speed limit through the entire work project will not be permitted. Having each work zone individually considered, based on the general geometric conditions of the work zone, is the only acceptable method of speed limit signing.

All conflicting speed limit signs within the reduced speed zone shall be removed or covered while the temporary speed limit is in effect.

Double fines apply in construction zones. In order for the regulations to be enforced, the speed limit and the beginning and end of the construction zone must be marked. Advanced warning signage of the double fine penalty is not always required but should be provided on long projects at the beginning of the project limit in the advance warning area (Sign TC-CZ3) and also on projects where the work will be long term on high speed and high volume roads.

### **717.03      SPEED SIGNS**

All speed limits shall be signed using reflectorized maximum speed limit signs as specified in the Manual of Uniform Traffic Control Devices for Canada.

All speed limits indicated on these signs shall be in 10 km/h increments.

Maximum Speed Ahead signs are required where speed limit reductions of more than 10 km/h are present. When required these signs shall be placed 150 to 250 metres in advance of a construction speed sign.

Where the Maximum Speed Ahead sign is positioned in advance of normal temporary condition signage an advance "Construction Ahead" sign must be installed ahead of the speed ahead sign.

At the end of the construction zone, which has a reduced speed limit posted, a speed limit sign shall be posted indicating a return to the normal speed limit on that particular section of highway. This sign may be omitted if there exists a permanently installed speed limit sign within 300 metres of the end of the reduced speed zone.

The Department may expropriate reduced speed limit signs left in place when the work zone condition does not warrant any reduction.

### **717.04      GUIDELINES FOR SPEED LIMITS**

The recommended speed limits shown in Table 717.04.01 are provided for geometrics only. Sound technical judgment must be used to adjust these speeds depending on the surface condition, the proximity and number of workers, equipment, and type of obstruction to the through traffic.

**Table 717.04.01**

CONSTRUCTION ZONE SPEED LIMIT	SIGHT DISTANCE IN EACH DIRECTION
90 km/h	280 m or greater
80 km/h	230 m – 279 m
70 km/h	200 m – 229 m
60 km/h	170 m – 199 m
50 km/h	140 m – 169 m
40 km/h	110 m – 139 m
30 km/h	Less than 110 m

**717.05 BASIS OF PAYMENT**

All costs associated with provision and maintenance of construction speed zones to standards as outlined in this section including costs of the signs, handling, installation, materials, and labour shall be paid by the Contractor and no payment shall be considered by the Department.



## **SECTION 720**

### **PROJECT SIGNS**

#### **INDEX**

- 720.01 SCOPE**
- 720.02 TYPES OF SIGNS**
- 720.03 HANDLING AND ERECTION OF SIGNS**
- 720.04 REMOVAL OF SIGNS**
- 720.05 BASIS OF PAYMENT**

#### **720.01 SCOPE**

On all construction projects undertaken for the Department of Transportation & Infrastructure, the Contractor shall be responsible for erecting project sign(s) at each work site included in the project. For Roadwork projects, two project signs are required, one at each end of the work site, in a location approved by the Owner's Representative. For Bridge/Structure projects, a single project sign is required on the work site such that it is visible by traffic for all directions.

#### **720.02 TYPES OF SIGNS**

The Department of Transportation & Works produces two different types of project signs for use on construction projects:

1. On Provincially funded projects, two signs measuring 1200 millimetres x 2400 millimetres each shall be erected.
2. On Federally funded projects, two signs measuring up to 2400 millimetres x 2400 millimetres each shall be erected.

#### **720.03 HANDLING AND ERECTION OF SIGNS**

Project signs can be picked up by the Contractor at either of the following Department of Transportation & Infrastructure depots: White Hills (St. John's), Clarenville, Grand Falls-Windsor or Deer Lake.

Project signs shall be erected and installed by the Contractor using proper methods and materials as required for the size of the project signs used, as outlined in Section 580.

After the sign posts are firmly in the ground, the Contractor shall affix the sign to the posts using 9 millimetre x 75 millimetre galvanized lag screws.

#### **720.04        REMOVAL OF SIGNS**

After the project is complete, project signs and posts shall be removed by the Department of Transportation & Works without claim from the Contractor.

#### **720.05        BASIS OF PAYMENT**

Project signs shall be supplied by the Department of Transportation & Infrastructure at no charge to the Contractor. However, all handling charges from the depots to the project and all installation costs for all required project signs shall be the Contractor's responsibility, and no payment shall be considered by the Department.

## SECTION 730

### PROCUREMENT AND COST OF SIGNAGE (TEMPORARY)

#### INDEX

**730.01 SCOPE**

**730.02 COST**

**730.03 PROCUREMENT OF SIGNS**

**730.01 SCOPE**

As previously stated in Section 701.02, no construction work will be permitted to commence until all traffic control devices are installed as shown in the Traffic Control Manual and reviewed by the Contractor and Owner's Representative.

**730.02 COST**

All costs associated with temporary condition signing to standards outlined in Division 7 and the Traffic Control Manual shall be the responsibility of the Contractor. The Contractor shall pay costs of the signs, handling, installation, materials, and labour. The Department shall supply project signs, at no charge, to the Contractor. However, all handling charges from the depots to the project and all installation costs for the project signs shall be the Contractor's responsibility.

**730.03 PROCUREMENT OF SIGNS**

Temporary Condition signs described in this Division and the Traffic Control Manual can be purchased from the Department's Sign Shop located at the White Hills in St. John's.

Orders for signs shall be placed through the Owner's Representative who will complete the sign requisition to Department requirements and verify that the correct signs are being used.

Contractor's sign orders must include a purchase order number, certified cheque, or money order made payable to the Newfoundland Exchequer Account.

## **SECTION 750**

### **TRAFFIC CONTROL MANUAL (TCM)**

#### **INDEX**

#### **750.01 GENERAL INFORMATION**

#### **750.01 GENERAL INFORMATION**

The Contractor is advised that typical layouts for construction signage for work undertaken for the Department can be found in the Department's Traffic Control Manual and its amendments. The Traffic Control Manual and any amendments are available for download from the publications section of the Department's website at the following location:

<https://www.gov.nl.ca/ti/publications/>

It is the Contractor's responsibility to ensure the latest version of the TCM is used when planning their work.