APPENDIX 'C'

Manitoba Infrastructure Work Zone Traffic Control Manual, Policies and Specifications

Manitoba Infrastructure and Transportation

Work Zone Traffic Control Manual

Provincial Roads
and
Provincial Trunk Highways

Manitoba
Infrastructure and
Transportation
Traffic Engineering

EDITION 2015

2015 Work Zone Traffic Control Manual

Interim Release

In December, 2013, the Government of Manitoba passed Highway Traffic Act (HTA) amendments that required the establishment of Designated Construction Zones for prescribed projects and prohibited the use of the '60 When Passing Workers' sign on all highways throughout Manitoba.

As a result of the introduction of these regulations the Work Zone Policies and Traffic Management Plans (TMP's) contained in Manitoba Infrastructure and Transportation's *Work Zone Traffic Control Manual* required significant revision to comply with the HTA amendments.

This interim release of the ***2015 Work Zone Traffic Control Manual*** is the second step in providing an updated resource for contractors, MIT personal, utility companies, and others who carry out work on provincial highways.

This initial release includes a full complement of updated TMP's providing the minimum standard for the protection of road users and workers on Manitoba's highways. In addition four updated policies reference in the TMP's are also being released at this time.

It is anticipated that the entire 2015 Workzone Traffic Control Manual with a full complement of updated policies will be ready for release later this year. In the interim, users are asked to reference the policies in the 2013 manual for general guidance keeping in mind that the 2013 changes to the HTA have not been reflected in these documents.

Some of the key changes in 2015 manual include:

- The definitions of Short Term and Long Term work have been revised to align with DCZ legislation. Short Term work is any work less than 4 hours in duration. Long term work is any work more than 4 hours in duration.

- As outlined in Policy 915-A-7, Manitoba Infrastructure and Transportation requires that all **work zones within a declared provincial highway or provincial road right-of-way be established as a Designated Construction Zone if the duration of the work is more than 4 hours.** The 4 hour time limit shall be the sole criteria used to determine if a DCZ will be established. The location of the work within the right-of-way, the nature of the roadway surface, and the posted speed limit on the highway shall not be determining factors for the establishment of DCZ's on provincial highways and roads.

- The decision to reduce speeds within a work zone should only be taken after a risk analysis has been conducted. Specific guidelines governing the

establishment of regulatory speed reductions on provincial highways are provided in Policy 915-A-6.

- As outlined in Policy 915-E-1, mandatory speed reductions to 60 km/h are required for flagging operations on highways with an Annual Average Daily Traffic (AADT) volume greater than 1000 vehicles per day.

Please contact the Traffic Engineering Branch at (204) 945-3781 for advice and recommendations on dealing with traffic control situations not included in this manual, or where standards in the manual fail to adequately control traffic or protect workers.

Original Signed By

Glenn Cuthbertson P. Eng.

Director, Traffic Engineering Branch

2015 WORK ZONE TRAFFIC CONTROL MANUAL

TABLE OF CONTENTS

A – Standards, Guidelines and Legislation

915-A-1 Introduction
915-A-2 General Guidelines
915-A-3 Bilingual Traffic Signing (incl. Bilingual Signing Area Maps)
915-A-4 Working near Railway Crossings
915-A-5 Temporary Storage of Objects in Right-of-Way
915-A-6 Speed Limits in Work Zones
915-A-7 Designated Construction Zones
915-A-8 Night Work
915-A-9 Shoo-fly Detour Standards

B – Fundamental Principles

915-B-1 Overview of Fundamental Principles
915-B-2 Work Zone Requirements
915-B-3 Worker Visibility on Roadway
915-B-4 Vehicle Visibility on Roadway

C – Work Zone Components

915-C-1 Overview of Work Zone Components
915-C-2 Transition Tapers

D – Traffic Control Devices

915-D-1 Signs
915-D-2 Sign Placement
915-D-3 Portable Signs
915-D-4 Optional Sign Mounting Locations
915-D-5 Sign Spacing
915-D-6 Truck Entrance Signing
915-D-7 Overhead Wires Signing
915-D-8 Pavement Markings (formally Passing Restrictions)
915-D-9 Barricades
915-D-10 Gateway Assembly
915-D-11 Channelizers and Delineators (combine with former Hazard Markers)
915-D-12 Variable Message Signs
915-D-13 Speed Reader Boards
915-D-14 Precast Concrete Median Barrier
915-D-15 Tritan Barrier
915-D-16 Crash Attenuators

915-D-17 Temporary Traffic Signals
915-D-18 Sign Reflectivity
915-D-19 Maintenance
915-D-20 Enhancement
915-D-21 Temporary Rumble Strips

E – Flagging Operations

915-E-1 Flagpersons
915-E-2 Flagman for String-line Person
915-E-3 Flagman for Worker Installing Temporary Overlay Marker
915-E-4 Flagman for Paving Operations
915-E-5 Survey Crew Traffic Control
915-E-6 Pilot Vehicle Traffic Control
915-E-7 Daylight Detour - Flagpersons Required Continuously
915-E-8 Remote Controlled Mechanical Flaggers

F – Setting up Work Zones

915-F-1 Traffic Management Plans
915-F-2 Traffic Control Coordinator
915-F-3 Installation and Removal of Traffic Control Devices
915-F-4 Mobile Operations
915-F-5 Fast Moving Operations
915-F-6 Short Duration Work
915-F-7 Long Duration Work
915-F-8 Roadside Work and Shoulder Work
915-F-9 Lane Closures
915-F-10 Bridge Work
915-F-11 Shoo-Fly Detours
915-F-12 Four Lane Divided Highway - Conversion to 2L2W Operation
915-F-13 Route Detours
915-F-14 New 4-Lane Divided Highway Intersection Traffic Control
915-F-15 Intersection Work

Appendix A – Typical Traffic Management Plans

Appendix B - Traffic Sign Schedule

Appendix C - Traffic Sign Schedule (Bilingual Signs)

Purpose

It may be necessary to control traffic speeds in work zones by the use of regulatory speed limits. Under Section 79(6) of The Highway Traffic Act the Minister of Infrastructure and Transportation, as traffic authority on provincial highways, may set the maximum speed at which vehicles may be driven on a highway. This authority has been delegated to the Director of Traffic Engineering.

Policy

The decision to reduce speeds within a work zone should only be taken after a risk analysis has been conducted. Factors to be considered when evaluating the need for a speed reduction include: the duration and nature of the work zone hazard or condition; highway geometry; environmental conditions; traffic volume; traffic speed; the longitudinal offset between the hazard/condition and traffic; and the potential negative impact of a speed reduction on vehicular collision frequency.

Only traffic authorities (the Director of Traffic Engineering on provincial highways) are authorized to approve speed reductions in work zones. A traffic authority may reduce the maximum speed in all or part(s) of a work zone. Longer work zones may have a number of reduced speed areas to enhance the safety of workers and road users.

Pre-approved Speed Reductions

Where a risk analysis supports the need for a speed reduction, the Director of Traffic Engineering has granted blanket pre-approval for regulatory speed reductions for the following common work zone conditions and hazards:

WORK ZONE CONDITION / HAZZARD	PRE-APPROVED MINIMUM SPEED LIMIT	APPROVED EXTENT OF REDUCED SPEED ZONE*
Workers are located in close proximity to traffic (up to a maximum of 12m from an open traffic lane)	60 Km/h	500m in advance of workers to 300m beyond workers
A significant unprotected roadside hazard (e.g. excavation area) is located within the clear zone	70 Km/h	500m in advance of hazard to 300m beyond hazard
The conversion of a 4-lane divided highway to 2 lane/2 way operation	80 Km/h	500m in advance of 2 lane/2 way operation to 300m beyond 2 lane/2 way operation

*Unless otherwise shown in an approved Traffic Management Plan

Written approval must be obtained from the Director of Traffic Engineering for any speed reduction that falls outside of the above pre-approved guidelines (contact MIT's Traffic Engineering Branch at 204-945-3781).

The use of reduced speed limit signs must be limited to those specific sections of highway where the condition or hazard exists. They must **NOT** be used throughout the project unless the condition or hazard dictates. Speed limit signs must be removed immediately when the conditions change or hazards no longer exist.

Where operations dictate, multiple regulatory speed reductions may be established within a single work zone. Typically when work areas are separated by more than 3 km individual regulatory speed reductions will be required with the speed limit being returned to normal levels between each work area.

Procedures

In the past, traffic authorities/contractors commonly used the '60 When Passing Workers' sign to inform drivers to reduce their speed. This sign, and any similar sign that links a speed reduction to the presence or absence of workers/equipment, is now *prohibited* from use on all highways throughout Manitoba.

Traffic authorities/contractors must now identify all maximum speed reductions in work zones using the sequence of regulatory signage detailed below (typical examples of signing for regulatory speed reductions in both single and multiple work areas are illustrated at the end of this policy).

Reduced-Speed Ahead Warning Sign

- A reduced-speed ahead warning sign (WB-9) is to be placed in advance of the speed reduction.

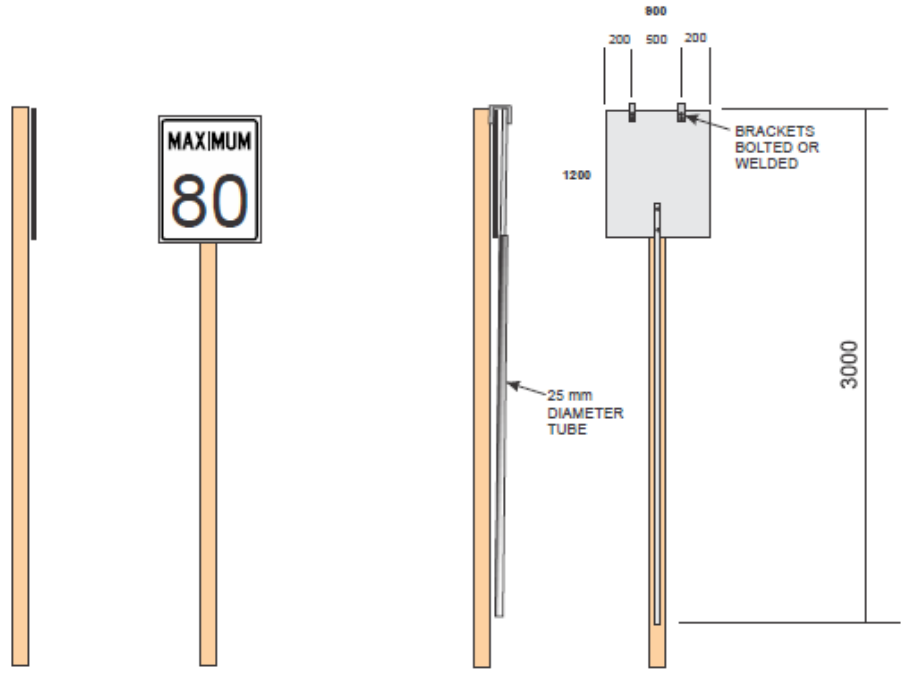
Maximum Speed Signs

- The beginning of a reduced-speed area must be identified using a regulatory 'Maximum Speed' sign (RB-1).

RB-1

- The end of a reduced-speed area **must** be identified using a regulatory 'Maximum Speed' sign (RB-1) to inform drivers that they may increase their speed to the normal posted maximum.

- All existing regulatory speed signs within the reduced speed zone **must** be covered. This may be accomplished using a number of methods such as affixing an opaque material securely to the face of the sign or by using the sign cover device illustrated below which eliminates the need for a ladder.



SIGN UNCOVERED

SIGN COVERED

A written record detailing the location, time of installation and time of removal of all regulatory speed reductions must be maintained by the traffic authority/contractor.

Speed limit signs should be repeated at minimum 1 km intervals, and following intersections.

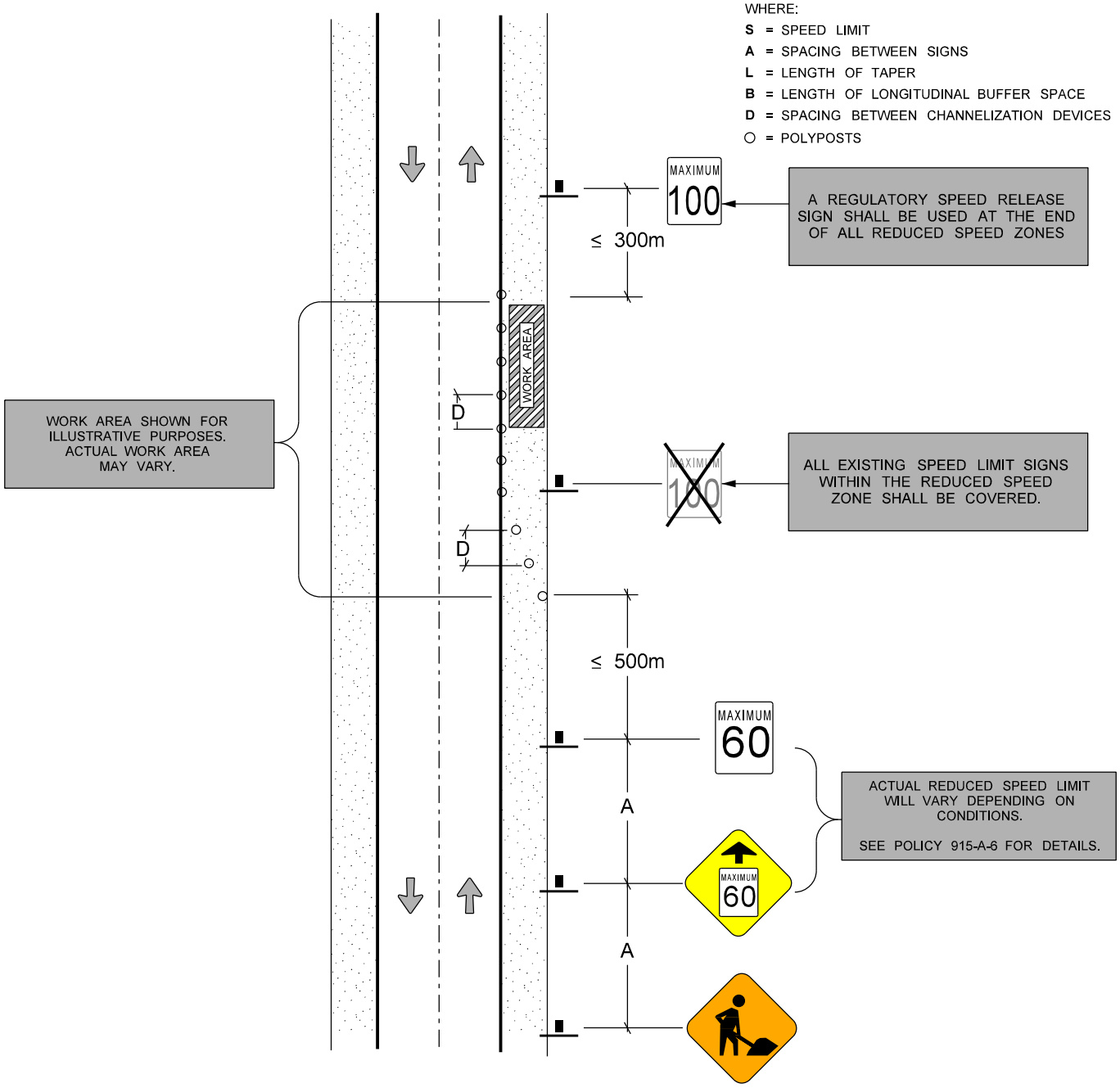
Note: These approved speed limits in construction and maintenance areas are enforceable by R.C.M.P. or local police.

SHORT DURATION SINGLE WORK AREA

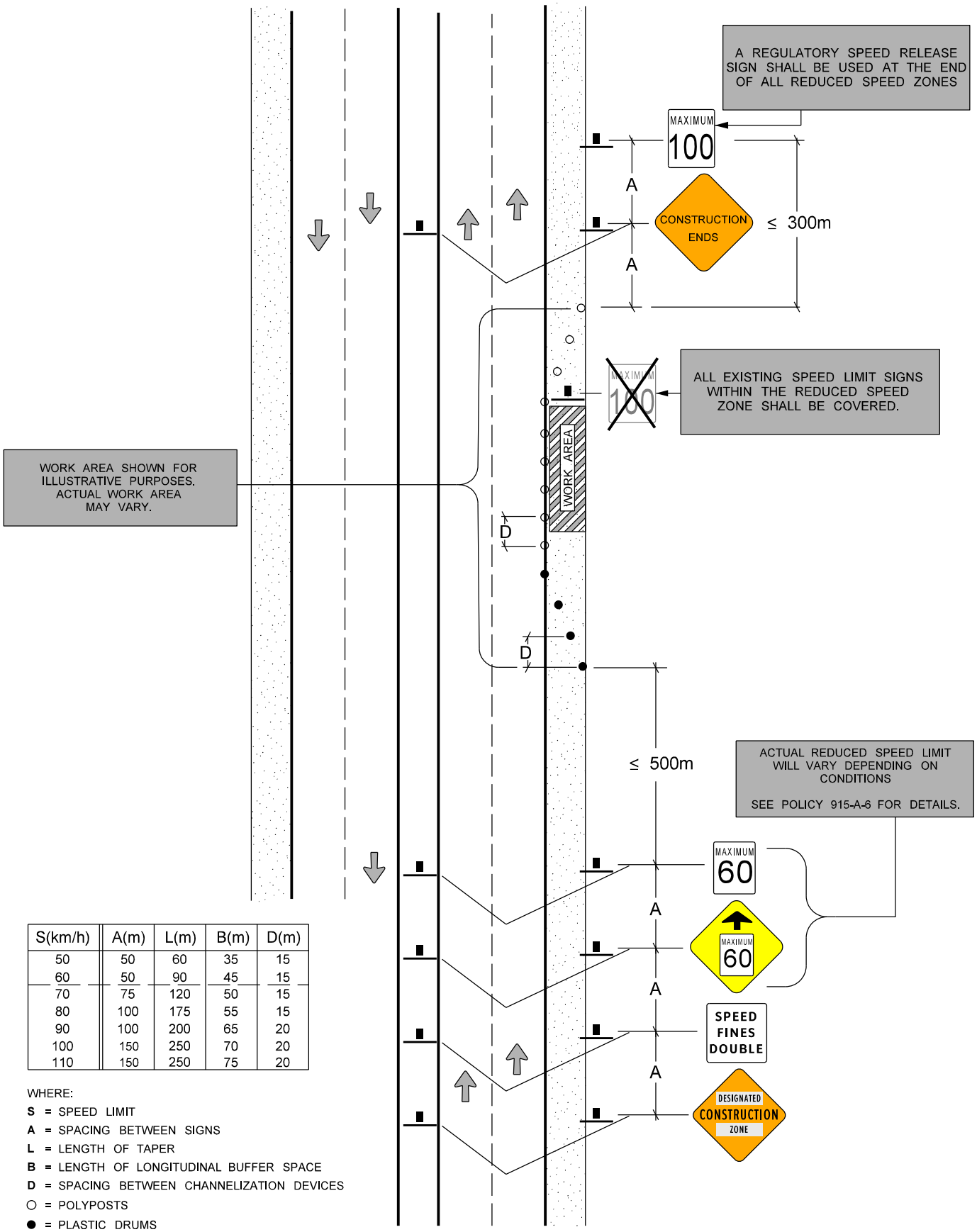
S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS



LONG DURATION SINGLE WORK AREA

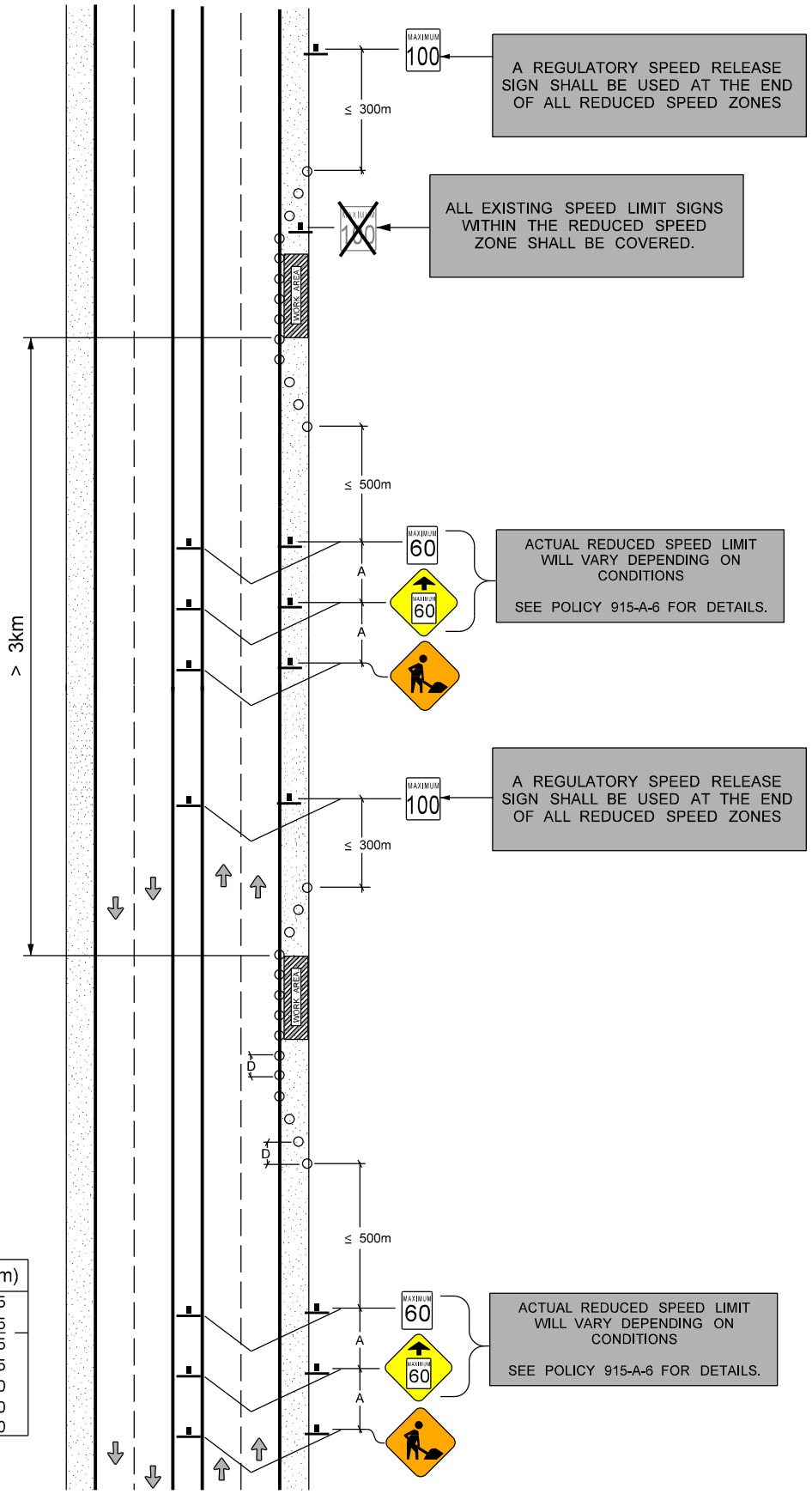


S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS

SHORT DURATION MULTIPLE WORK AREAS



A REGULATORY SPEED RELEASE SIGN SHALL BE USED AT THE END OF ALL REDUCED SPEED ZONES

ALL EXISTING SPEED LIMIT SIGNS WITHIN THE REDUCED SPEED ZONE SHALL BE COVERED.

ACTUAL REDUCED SPEED LIMIT WILL VARY DEPENDING ON CONDITIONS

SEE POLICY 915-A-6 FOR DETAILS.

WHERE WORK AREAS ARE SEPERATED BY MORE THAN 3km. TRAFFIC SHALL BE RETURNED TO THE NORMAL REGULARY SPEED LIMIT.

WORK AREAS SHOWN FOR ILLUSTRATIVE PURPOSES. ACTUAL WORK AREAS MAY VARY.

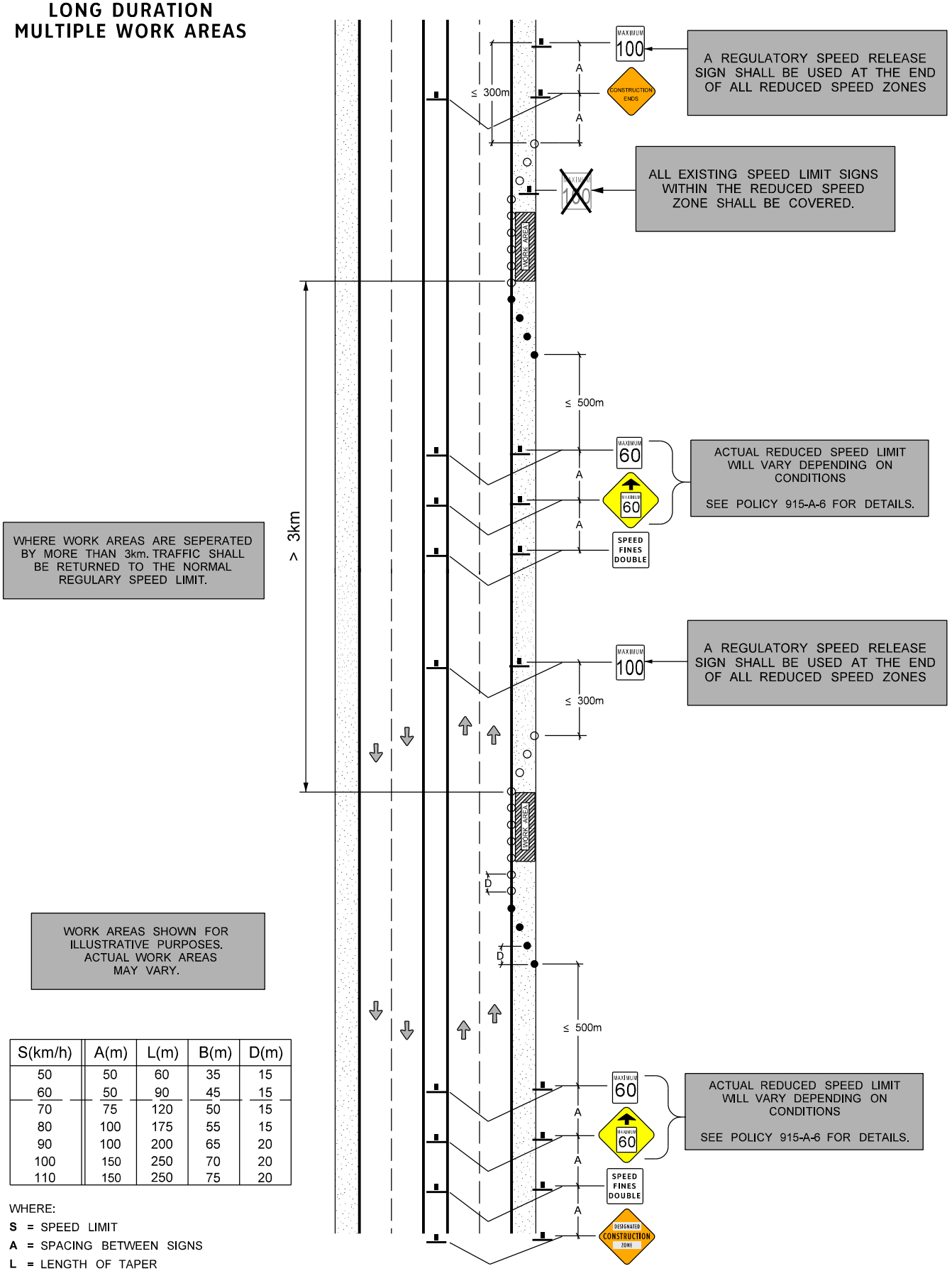
S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS

TYPICAL SPEED REDUCTION IN THE WORK ZONE

LONG DURATION MULTIPLE WORK AREAS



S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS

Work Zone Traffic Control Standards, Guidelines and Regulations Designated Construction Zones

Purpose

In December, 2013, the Government of Manitoba passed Highway Traffic Act (HTA) amendments that double the set fines for speeding in a designated construction zone (DCZ). The amendments authorize double fines for speeding:

- Whether or not there are workers/equipment present; and
- Whether or not there is a reduction in the maximum speed within the DCZ.

The amendments require traffic authorities, and contractors working on their behalf, to establish DCZs, and to identify them using the signage prescribed in the Designated Construction Zones Regulation.

Regulation

A traffic authority/contractor must establish a work zone as a DCZ if the work being undertaken on a road meets ALL of the following conditions:

1. Work is on the roadway portion of a highway, i.e. the area of a highway where vehicles travel, this does not include the shoulder, sidewalk or ditch/median;
2. Work is 4 hours or more in duration;
3. Work is on a paved roadway; and
4. Work is on a road where the maximum speed is 80 km/h or more.

Optional DCZ's

A traffic authority has the option of establishing a work zone as a DCZ if doing so will enhance the safety of workers and other road users. To do this, the work being undertaken must be road construction, reconstruction, widening, improvement, repair, or other similar work in relation to the road.

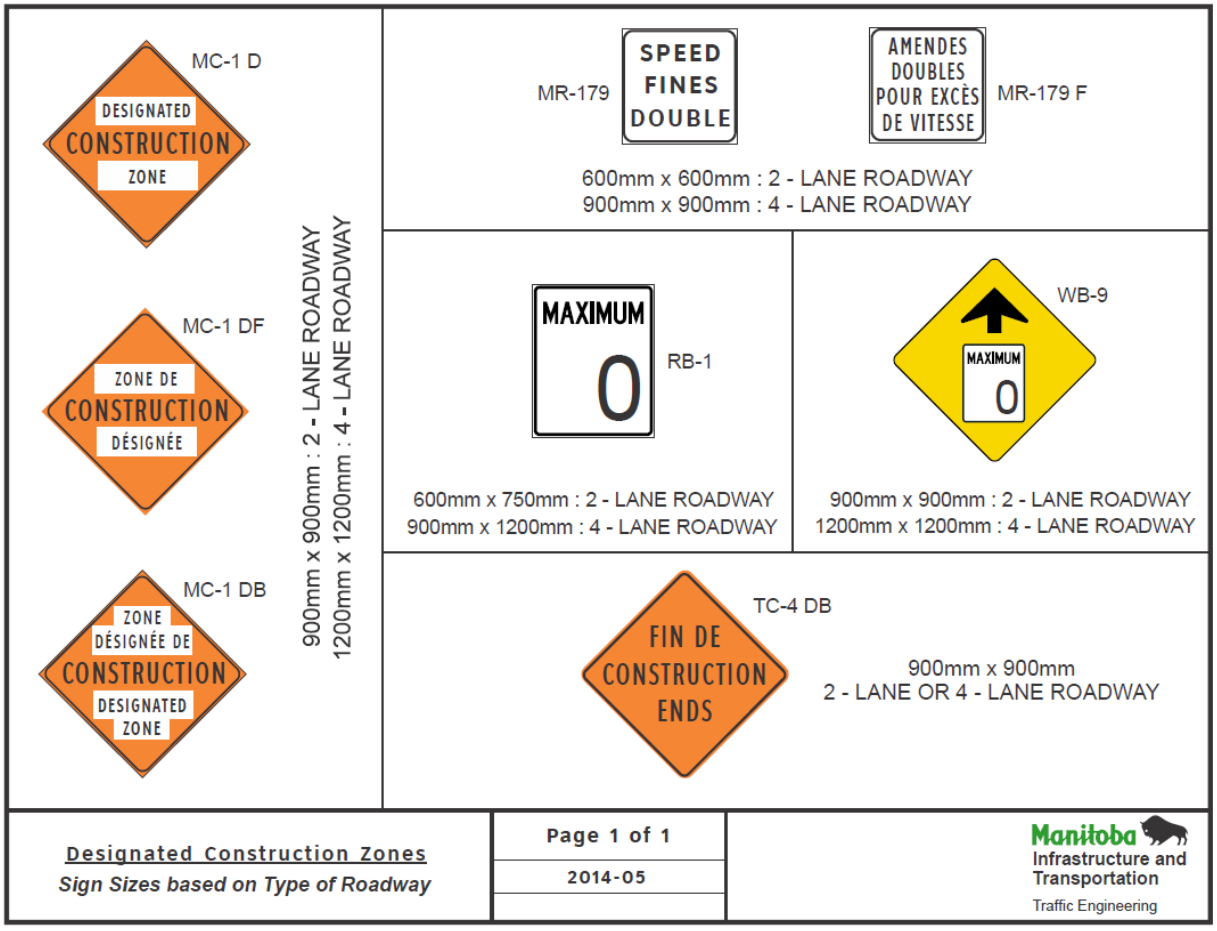
Policy

As permitted by regulation, Manitoba Infrastructure and Transportation (the traffic authority on provincial highways) has narrowed the DCZ criteria outlined above. MIT requires that all work zones within a declared provincial highway right-of-way be established as a Designated Construction Zone if the duration of the work is **more than 4 hours.** The 4 hour time limit shall be the sole criteria used to determine if a DCZ will be established. The location of the work within the right-of-way, the nature of the roadway surface, and the posted speed limit on the highway shall not be determining factors for the establishment of DCZ's on provincial highways.

Procedures

DCZ Signage

A traffic authority/contractor is responsible to erect/place the approved signage shown below:



RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Designated Construction Zone Sign

The beginning of a DCZ must be identified with the 'Designated Construction Zone' sign. Drivers must have an unimpeded view of the sign. In accordance with MIT's Standard Construction Specifications, Construction Area Signs are also to be installed at the intersection of every Provincial Trunk Highway or Provincial Road that enters onto the project.

Construction Ends Sign

The end of a DCZ must be marked with the 'Construction Ends' sign (TC-4 or TC-4 DB). Drivers must have an unimpeded view of the sign.

Speed Fines Double Warning Sign

At least one 'Speed Fines Double' sign (MR-179) must be placed within a DCZ and be no more than 150 m after the 'Designated Construction Zone' sign which marks the beginning of the DCZ.

A traffic authority/contractor may place more than one 'Speed Fines Double' sign in a DCZ to heighten driver awareness. The sign may also be used to mark a portion of road within the DCZ that intersects with another roadway. For example, where a high volume road intersects with a DCZ, the traffic authority/contractor may use the 'Speed Fines Double' sign to warn drivers entering the DCZ.

Bilingual Traffic Signing

Bilingual Traffic Signing Areas as identified in Policy 915-A-3 of this Manual shall be signed in both official languages using either the bilingual sign, or separate English and French signs with the French sign installed the English sign, at a distance of approximately 30m.

Work Zone Traffic Control
Work Zone Components
Transition Tapers

Purpose

Transition tapers are used to channel/direct traffic around an activity area within a work zone. The length of the taper and the channelizer spacing is extremely important. Inadequate tapers result in undesirable traffic movements and increase the potential for accidents.

Policy

Whenever traffic must be moved from the normal path of travel due to the presence of an activity area, a proper transition taper must be installed. The transition area must be obvious to motorists, and must be delineated with channelizing devices so motorists do not mistakenly follow the wrong path. For long duration projects, existing pavement markings must be removed where they conflict with transition delineation. Additional pavement markings may need to be installed to guide motorists.

Taper lengths for the first taper encountered by a motorist as they enter a work zone shall be selected based on the posted speed limit in place prior to the work beginning. Taper lengths within an established work zone can be based on the reduced work zone speed limit.

Tapers on long term projects shall be delineated using Plastic Drums. For short term and fast moving operations tapers may be delineated using Poly Posts (See Policy 915-D-11 for additional information).

Standard

There are five common transition tapers as described below. The included tables provide normal taper lengths and channelization device spacing for the various taper types.

- **Merging Taper** - Merging tapers, used on multi-lane divided roadways to channel traffic from a closed lane into an adjacent lane, require the greatest length. A merge lane must allow a motorist to locate and move into a gap in the adjacent traffic stream. On typical traffic management plans this distance is represented by the letter “L”.

- **Shifting Taper** - When a merge is not required, a shifting taper is used to channel vehicles onto a different travel path. This taper is often used when traffic is routed around a work area by shifting it onto the shoulder or median. Changes in the travel path may also be accomplished with horizontal curves designed for normal highway speeds. Shifting tapers are ½ the length of a merging taper or “1/2L” rounded up to the nearest 5m.

- **Shoulder Taper** – Shoulder tapers are used to close shoulders. This taper provides a visual clue to passing traffic indicating that bthe shoulder is closed. Because traffic is not required to merge or shift for a shoulder taper the required length is 1/3 the merging taper length or “1/3L” rounded up to the nearest 5m.

- **One-Lane Traffic Taper** - A one-lane traffic taper is used in advance of work areas that require a portion of the road be used alternately by traffic in both directions. Traffic is typically controlled by flagpersons and since no merging is taking place, the taper used to direct vehicles onto the one-way road section can be quite short. One Lane tapers are always 30m in length.

- **Downstream Taper** - A downstream taper is placed at the end of the work zone to indicate that vehicles can safely move back onto the lane that was closed. They are placed in the termination area and are the same length as one-lane traffic tapers. Downstream tapers are always 30m in length.

Minimum Taper Lengths (m)

Normal Operating Speed (km/h)	Merging Taper (L)	Shifting Taper (L/2)	Shoulder Taper (L/3)	One Lane Traffic Taper	Downstream Taper
50	60	30	20	30	30
60	90	50	30	30	30
70	120	60	40	30	30
80	175	90	60	30	30
90	200	100	70	30	30
100	250	125	85	30	30
110	250	125	85	30	30

Maximum Channelization Device Spacing (m)

Normal Operating Speed (km/h)	Merging Taper (D)	Shifting Taper (D/2)	Shoulder Taper (D/3)	One Lane Traffic Taper	Downstream Taper
50	15	10	5	5	5
60	15	10	5	5	5
70	15	10	5	5	5
80	15	10	5	5	5
90	20	10	10	5	5
100	20	10	10	5	5
110	20	10	10	5	5

Work Zone Traffic Control
Flagging Operations
Flagpersons

Purpose

The flagperson (alternately referred to as "flagman", “flagger” or “traffic control person”) is one of the most effective and flexible "devices" available to control traffic in work zones. For a variety of reasons the flagperson has one of the most difficult jobs to perform.

In Section 77(10) of The Highway Traffic Act, a **flagperson** is defined as:

> "a person employed by a traffic authority, or a contractor doing work on behalf of a traffic authority, for the purpose of directing the movement of traffic on any portion of a highway under construction, or where repair work or other work is being carried on".

Under Section 77(11) of The Highway Traffic Act

> "every driver of a vehicle shall obey and observe the directions given by a flagman".

The Highway Traffic Act gives the flagperson the authority to control traffic by signalling for a motorist to stop, to reduce speed, to proceed as directed, or by advising how to pass safely through or around a work area.

Standard

To optimize this traffic control function the following guidelines/principles should be utilized when controlling traffic through a work area by the use of flagpersons.

- All flagpersons shall be trained, certified, and equipped in accordance with The Workplace Safety and Health Act (Manitoba) and associated regulations.
- Flagging operations shall be conducted in accordance with the procedures outlines in the *Manitoba Flagperson Training Manual*
- A symbolic Flagperson Ahead sign (MC-64) should always be placed a minimum of 150 m in advance of the flagperson. The back of the Flagperson Ahead sign must be visible to the flagperson at all times and should never be located more than 500 m from the Flagperson.

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Director, Traffic Engineering

APPROVED: “ORIGINAL SIGNED BY”
Executive Director
Highway Engineering

- The "stop/slow" sign paddle (MC-44A / MC-44A B) will be used by all flagpersons.

MC-64
900 x 900

MC-44A
450 x 450

MC-44A B
450 x 450
(BILINGUAL TRAFFIC SIGNING AREAS)

- Flagpersons will typically be used under the following circumstances:
    - To stop and release traffic on an alternating basis when a two lane road is converted to one-way operation.
    - When it is necessary to give some message to the motorist to allow them to safely traverse a work area.
    - To slow traffic that is passing workers in an exposed location during hazardous operations (e.g. paving operations, string line installation, temporary overlay marker installation, centreline survey work, etc...)
    - To control traffic during a pilot vehicle operations
- In areas of high traffic volume an additional mobile flagperson shall be provided to move back as the queue builds up beyond the view of the initial flagperson. Furthermore, an additional Flagperson Ahead sign shall be installed a minimum 150m in advance of the end of the vehicle queue.

- On higher volume highways (AADT > 1000 VPD) a regulatory speed reduction to 60 km/h shall be instituted in advance of the flagging station. On lower volume highways (AADT < 1000 VPD) a regulatory speed reduction is not mandatory but should be considered if sight lines to the flagging station are obstructed by roadway geometry, environmental conditions, or if operational conditions dictate.

- Overuse of flagpersons causes disrespect by the public, for the function. When not needed as a flagperson, that person should be taken out of view of the motorist, and possibly given some other duty.

- The flagperson must be kept apprised of the changing conditions in the work area so he/she can effectively communicate with the motorist.

Note: Refer to the *Manitoba Flagperson Training Manual* for information about employer and employee responsibilities, equipment, clothing, flagging practices, and procedures.

Appendix A

Typical Traffic Management Plans

Traffic Management Plan Index

Typical Activity	Type of Work			
	Mobile	Fast Moving	Short Duration	Long Duration
Roadside Work and Shoulder Work on a Two-Lane Road				
Right Shoulder Work	TMP-915- 1	TMP-915- 1	TMP-915- 2	TMP-915- 3
Encroachment in Right Lane	TMP-915- 4	TMP-915- 5	TMP-915- 5	TMP-915- 6
Roadside Work and Shoulder Work on a Multi-Lane Road				
Right Shoulder Work	TMP-915- 1	TMP-915- 1	TMP-915- 2	TMP-915- 3
Left Shoulder Work	TMP-915- 7	TMP-915- 7	TMP-915- 8	TMP-915- 9
Work in Median	TMP-915- 10	TMP-915- 11	TMP-915- 11	TMP-915- 12
Encroachment in Left Lane	TMP-915- 13	TMP-915- 14	TMP-915- 14	TMP-915- 15
Encroachment in Right Lane	TMP-915- 4	TMP-915- 5	TMP-915- 5	TMP-915- 6
Single Lane Closed				
Two lane Road - Right Lane Closed	TMP-915- 16			
i)Yeild to oncoming Traffic - Volume < 500 AADT		TMP-915- 17	TMP-915- 17	TMP-915- 18
ii) Flagperson - Volume 500 - 1000 AADT		TMP-915- 19	TMP-915- 19	TMP-915- 20
iii) Flagperson - Volume > 1000 AADT		TMP-915- 21	TMP-915- 21	TMP-915- 22
iii) Temprary Traffic Signals				TMP-915- 23
Iv) Use Shoulder				TMP-915- 24
Multi Lane Road - Left Lane Closed	TMP-915- 25	TMP-915- 26	TMP-915- 26	TMP-915- 27
Multi Lane Road - Right Lane Closed	TMP-915- 25	TMP-915- 28	TMP-915- 28	TMP-915- 29
Median Cross-Over				
At Existing Intersection			TMP-915-30	TMP-915- 31
Detour				
Alternative Roads				TMP-915- 32
Shoo-Fly Detour				TMP-915- 33
Lane Closed at Intersection Two-Lane Roads				
Near Side Lane Closed		TMP-915- 34	TMP-915- 34	TMP-915- 35
Far Side Lane Closed		TMP-915- 36	TMP-915- 36	TMP-915- 37

Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

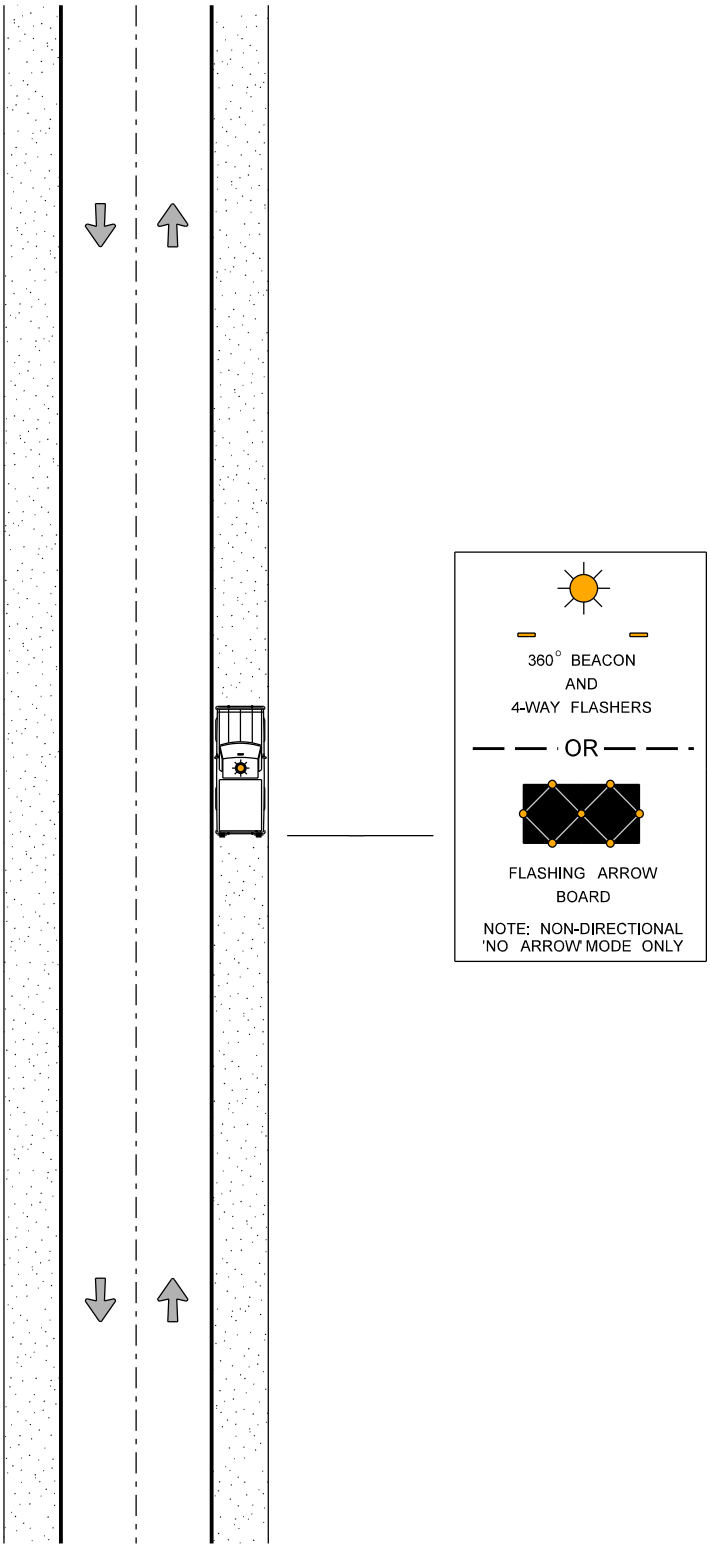
WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

RIGHT SHOULDER WORK

THIS LAYOUT APPLIES TO:

MOBILE
(LESS THAN 5 MINUTES)
& FAST MOVING
(LESS THAN 10 MINUTES)



DATE OF ISSUE: 2015-05; REVISED:

http://www.gov.mb.ca/mit/contracts/workzone.html

APPROVED: Original Signed By
Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-1

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

RIGHT SHOULDER WORK

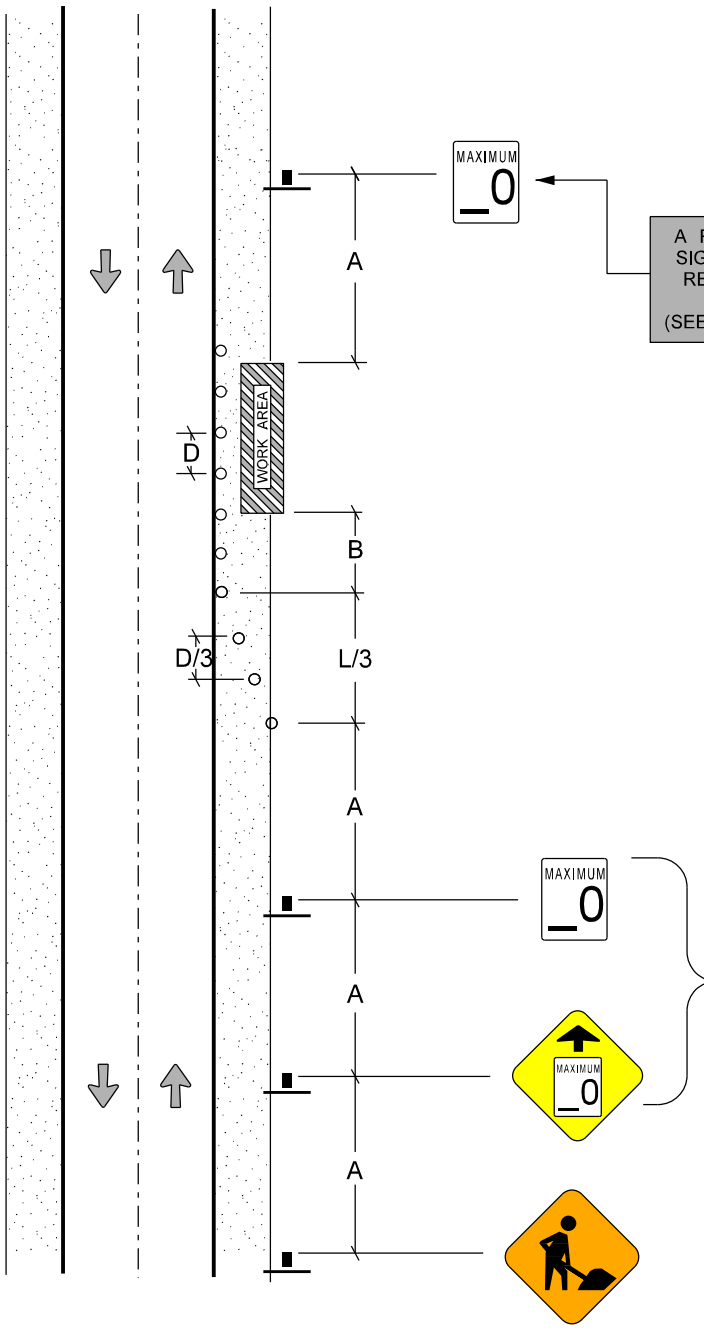
THIS LAYOUT APPLIES TO:

SHORT DURATION
(LESS THAN 4 HOURS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS



A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)

NOTE: ON MULTI-LANE ROADS WITH MEDIANS, SIGNS ARE TO BE DUAL MOUNTED

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TMP-915-2

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

RIGHT SHOULDER WORK

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)

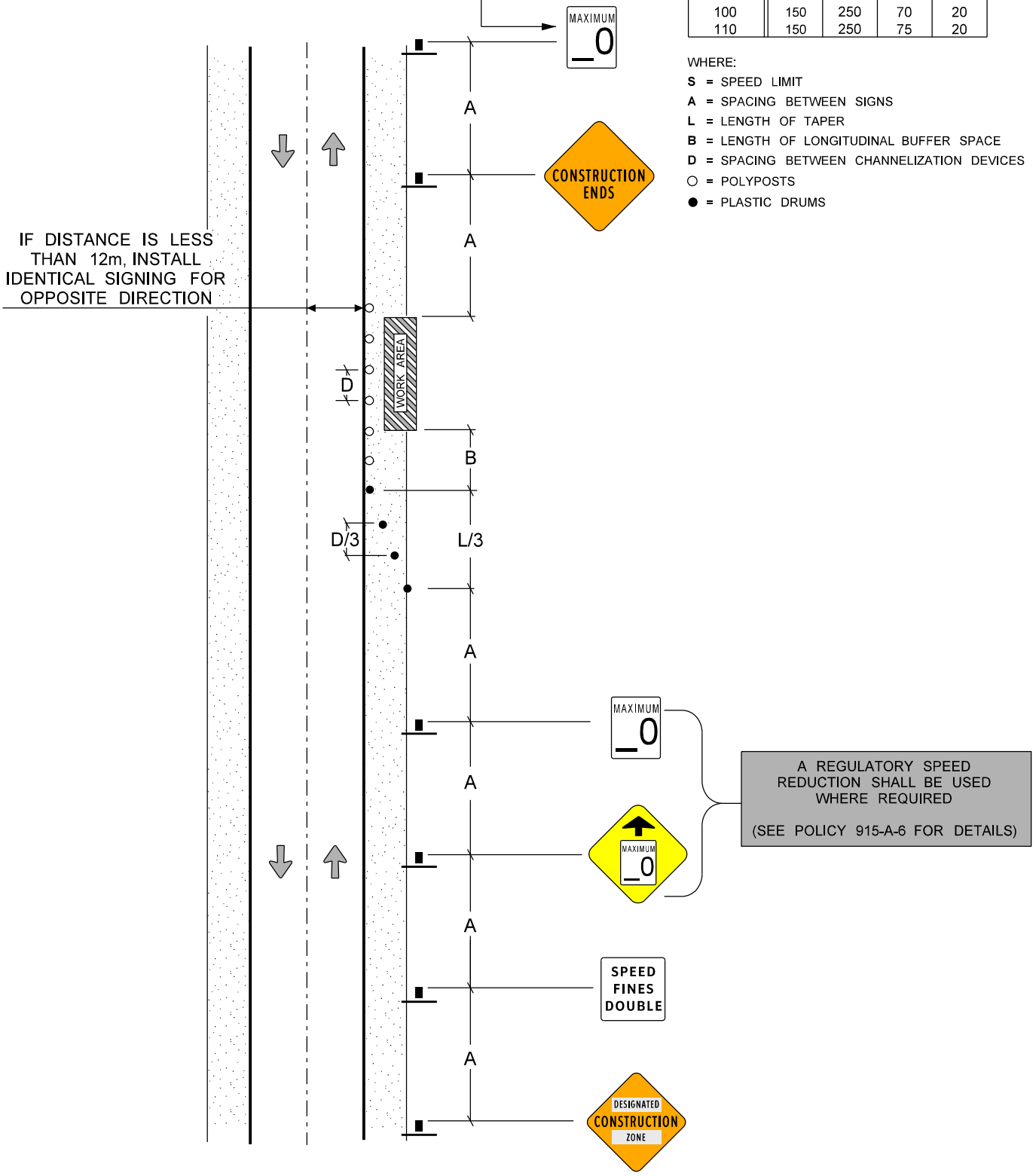
A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)

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http://www.gov.mb.ca/mit/contracts/workzone.html

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Glenn Cuthbertson P. Eng.
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TMP-915-3

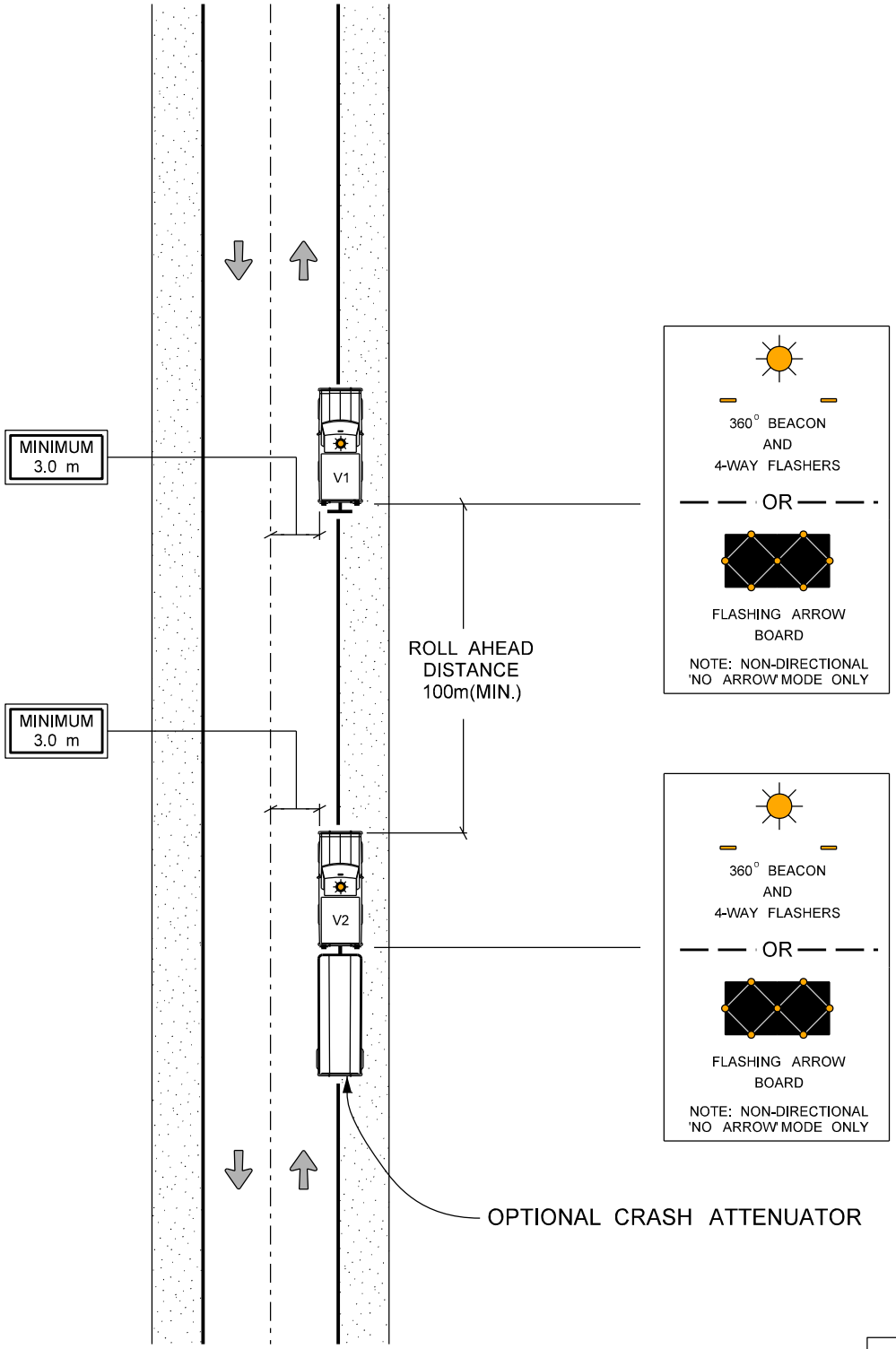
Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

THIS LAYOUT APPLIES TO:
MOBILE WORK
(LESS THAN 5 MINUTES)

ENCROACHMENT IN RIGHT LANE



LEGEND
V1 = WORK TRUCK
V2 = BUFFER TRUCK

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APPROVED: Original Signed By
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TMP-915-4

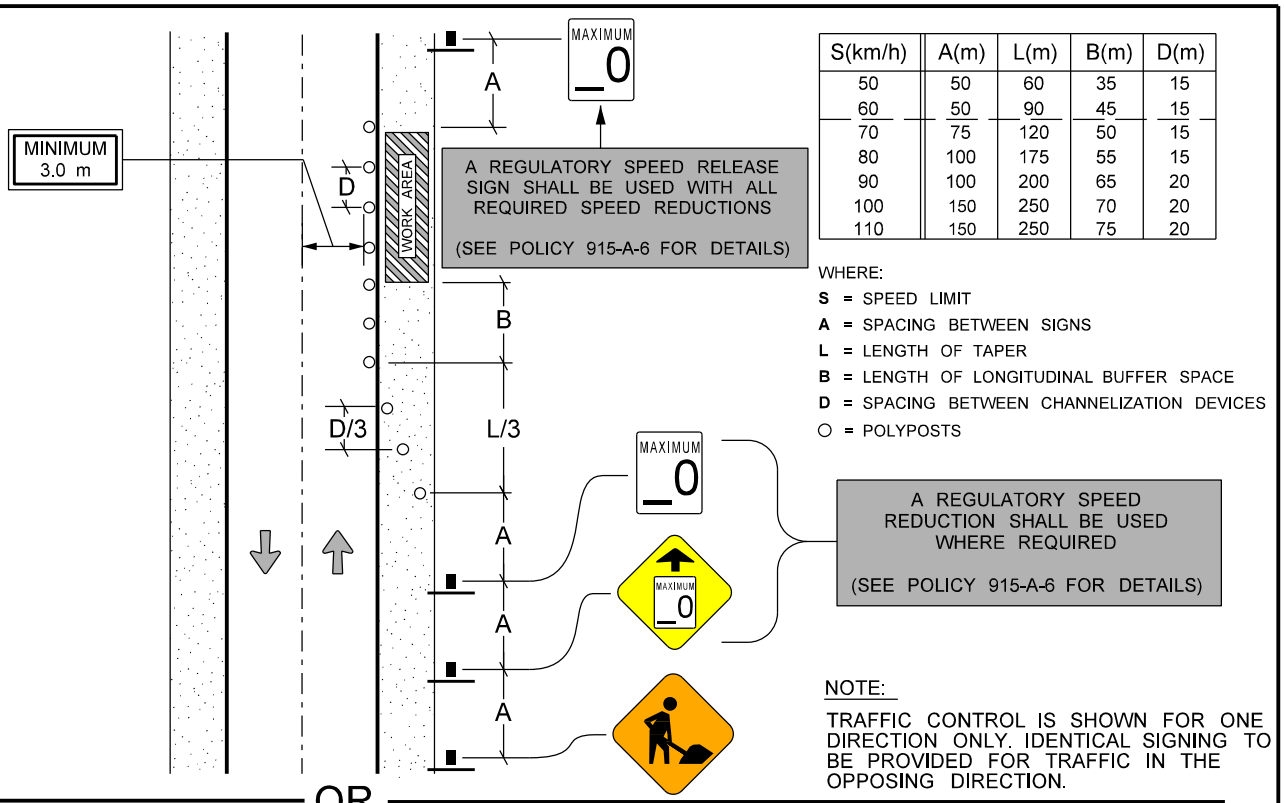
Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

ENCROACHMENT IN RIGHT LANE

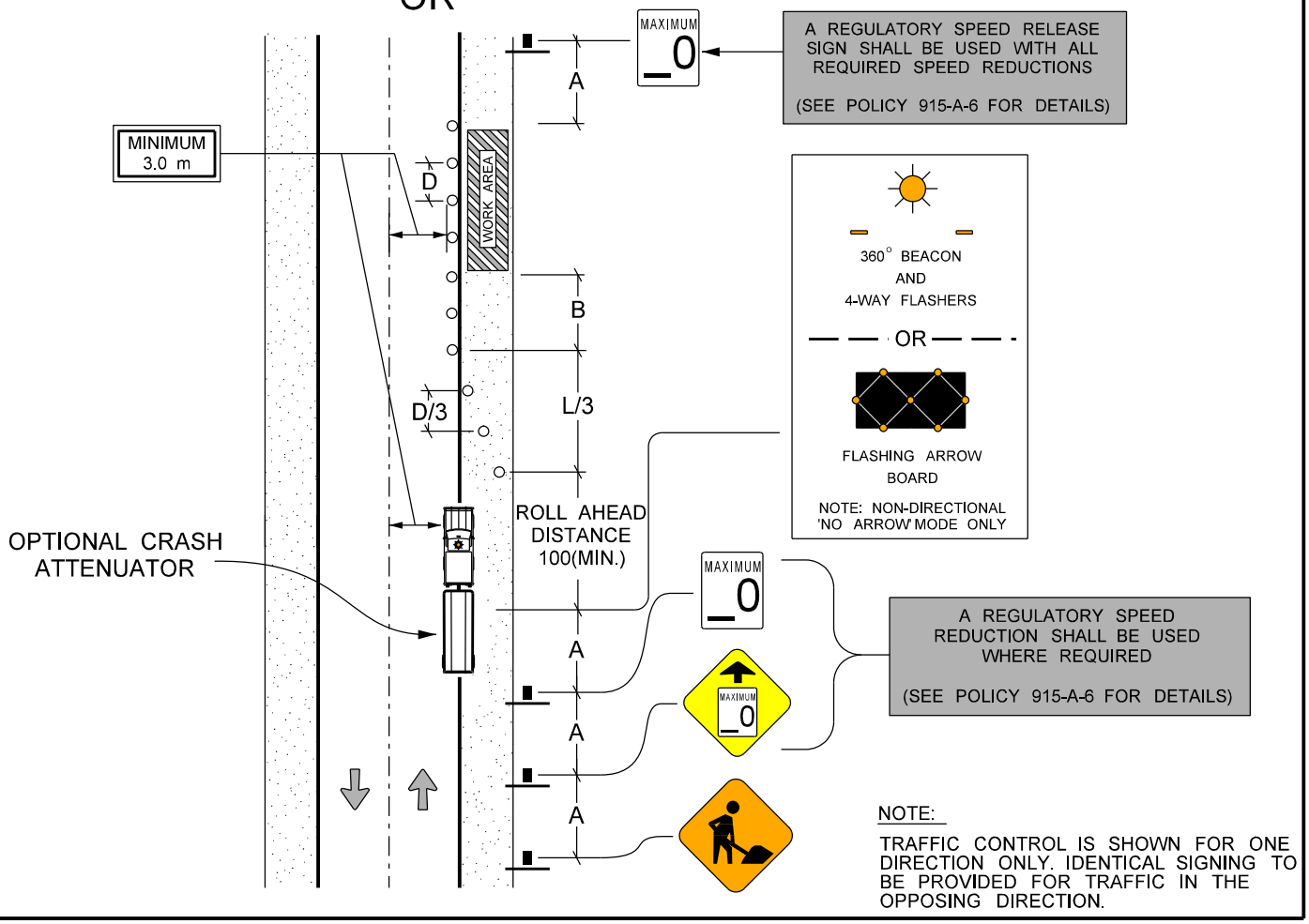


S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS

NOTE:
TRAFFIC CONTROL IS SHOWN FOR ONE DIRECTION ONLY. IDENTICAL SIGNING TO BE PROVIDED FOR TRAFFIC IN THE OPPOSING DIRECTION.

OR



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TMP-915-5

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

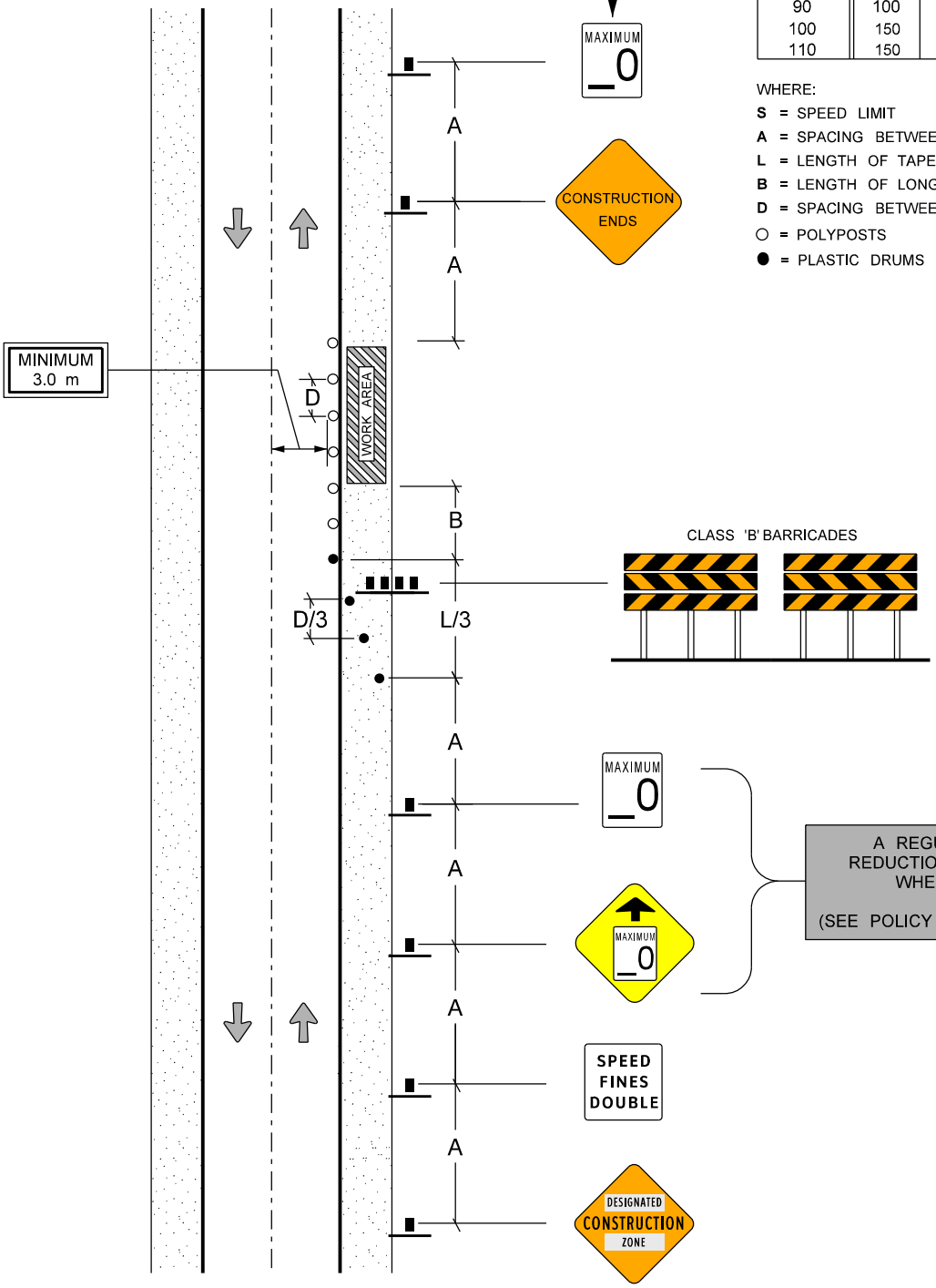
ENCROACHMENT IN RIGHT LANE

A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)

NOTE:

TRAFFIC CONTROL IS SHOWN FOR ONE DIRECTION ONLY. IDENTICAL SIGNING TO BE PROVIDED FOR TRAFFIC IN THE OPPOSING DIRECTION.

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TMP-915-6

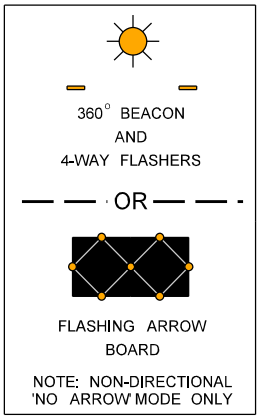
Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

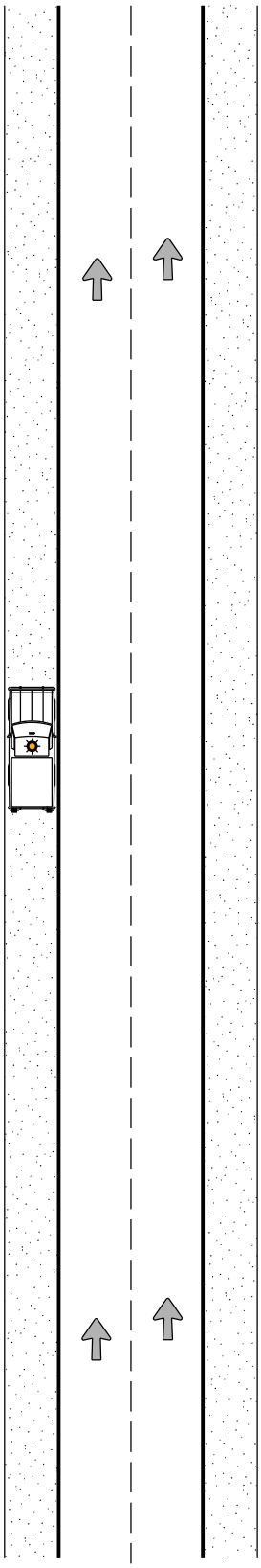
WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
MOBILE
(LESS THAN 5 MINUTES)
& FAST MOVING
(LESS THAN 10 MINUTES)

LEFT SHOULDER WORK





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TMP-915-7

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
SHORT DURATION
(LESS THAN 4 HOURS)

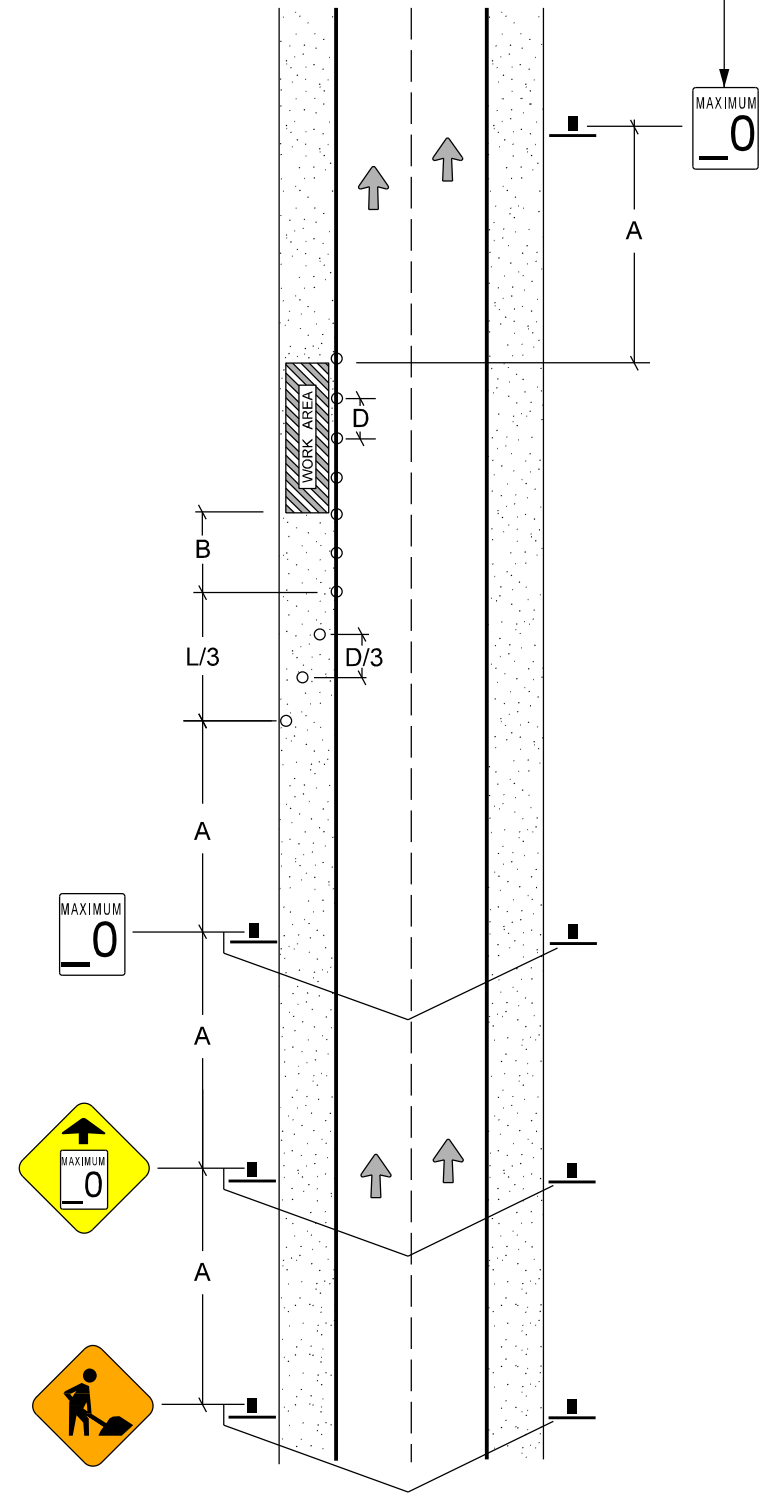
LEFT SHOULDER WORK

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS

A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)



A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)

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TMP-915-8

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

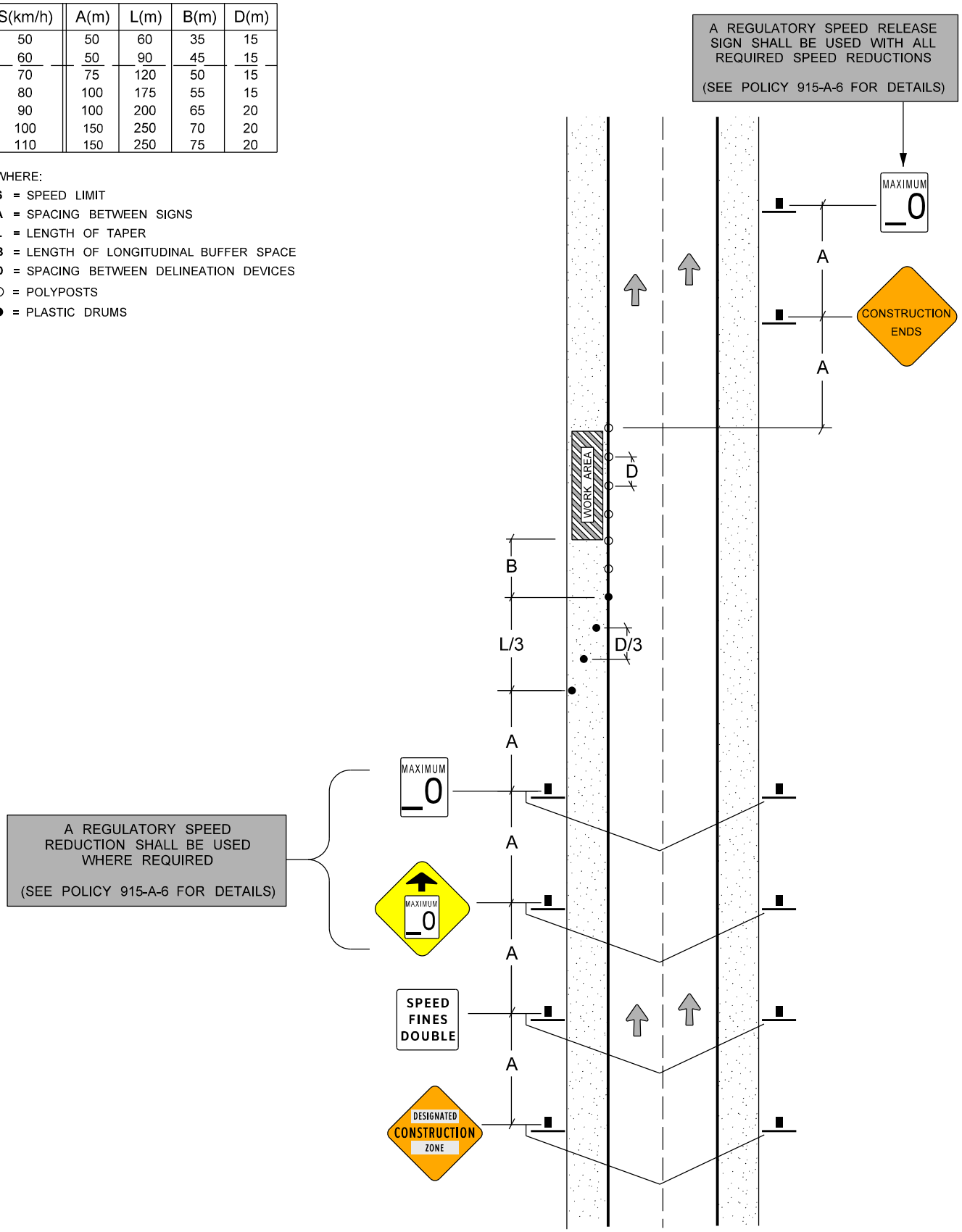
ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

LEFT SHOULDER WORK

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



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TMP-915-9

Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

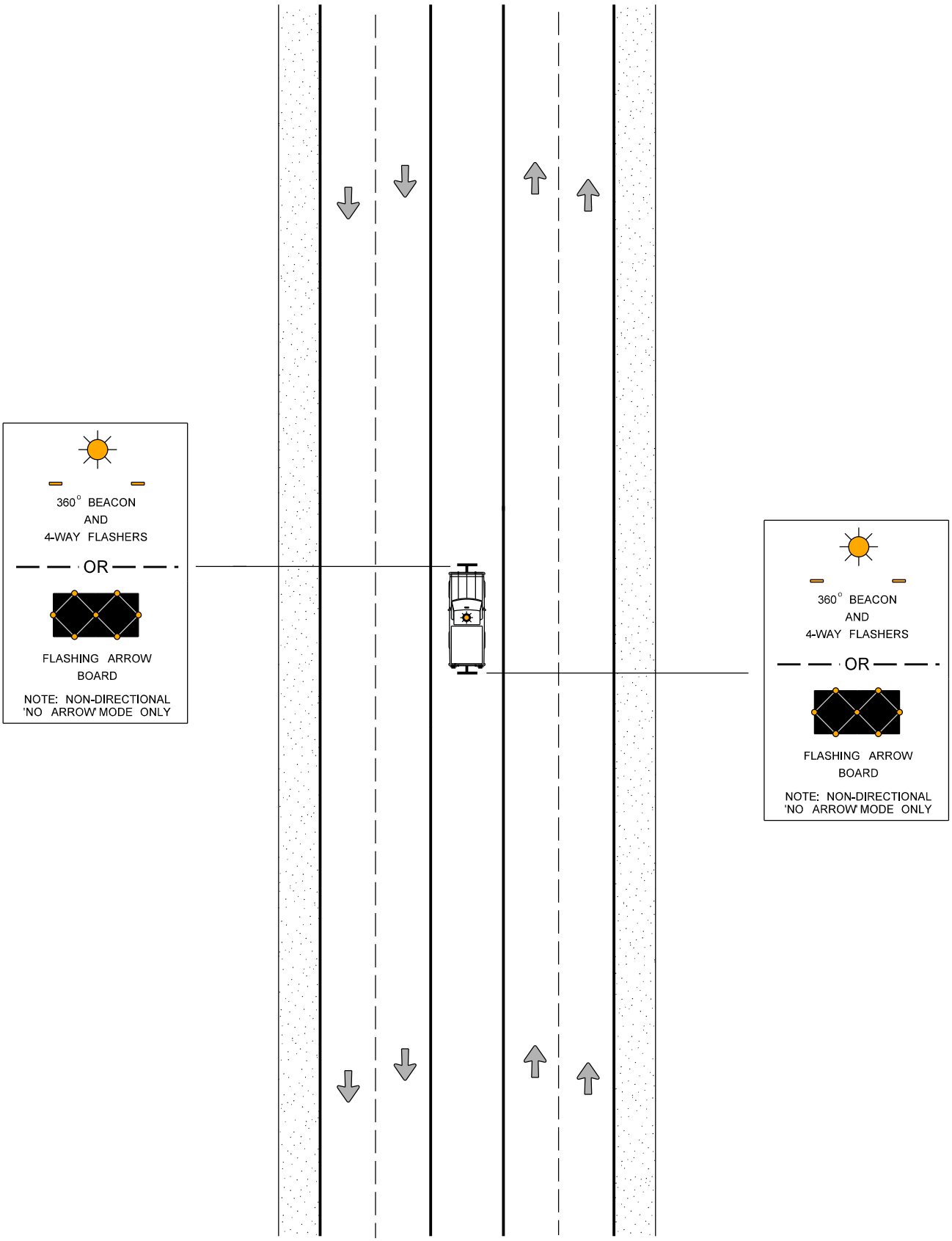
WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:

MOBILE WORK
(LESS THAN 5 MINUTES)

WORK IN MEDIAN



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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-10

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

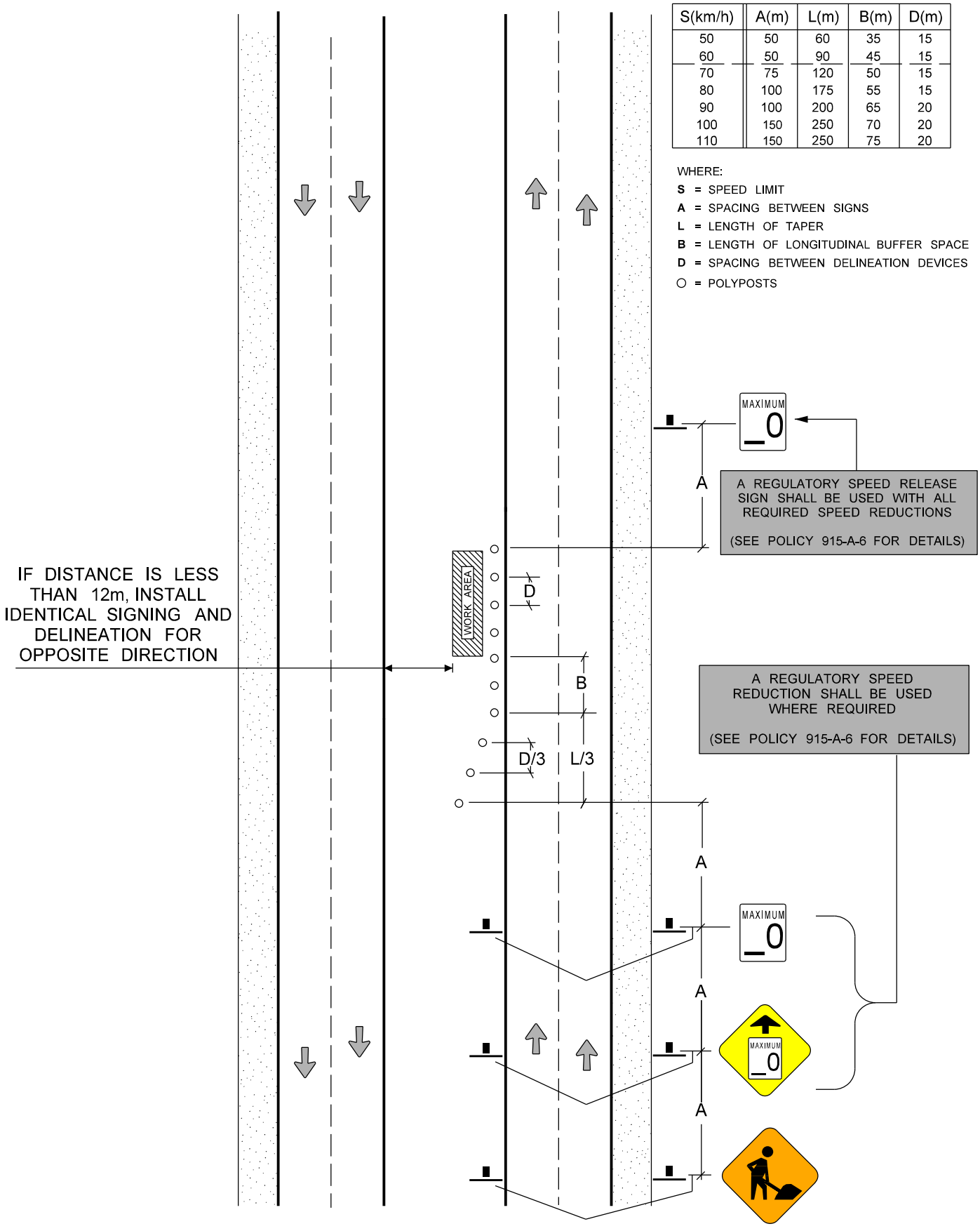
ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

WORK IN MEDIAN

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
○ = POLYPOSTS



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TMP-915-11

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

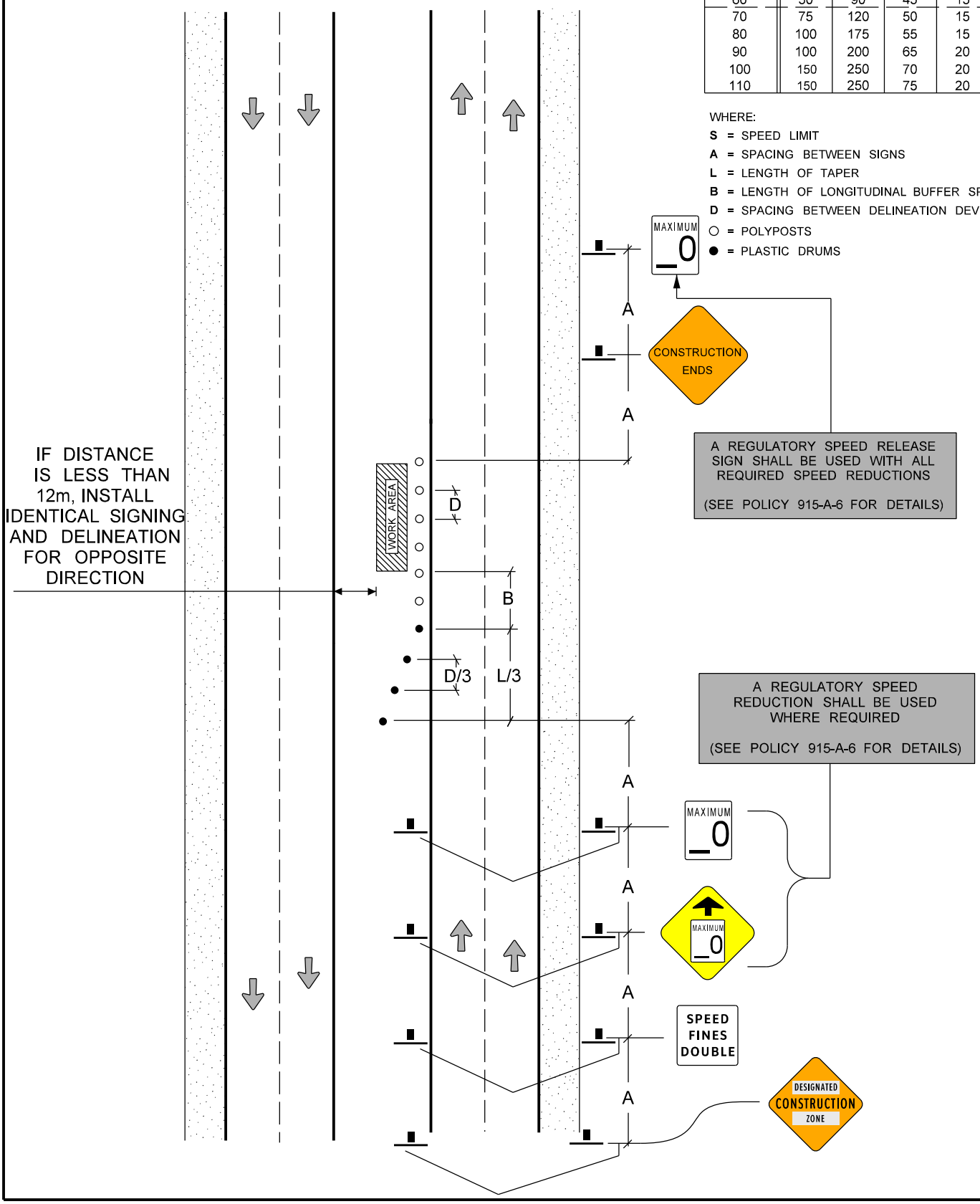
ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

WORK IN MEDIAN

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



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Glenn Cuthbertson P. Eng.
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Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

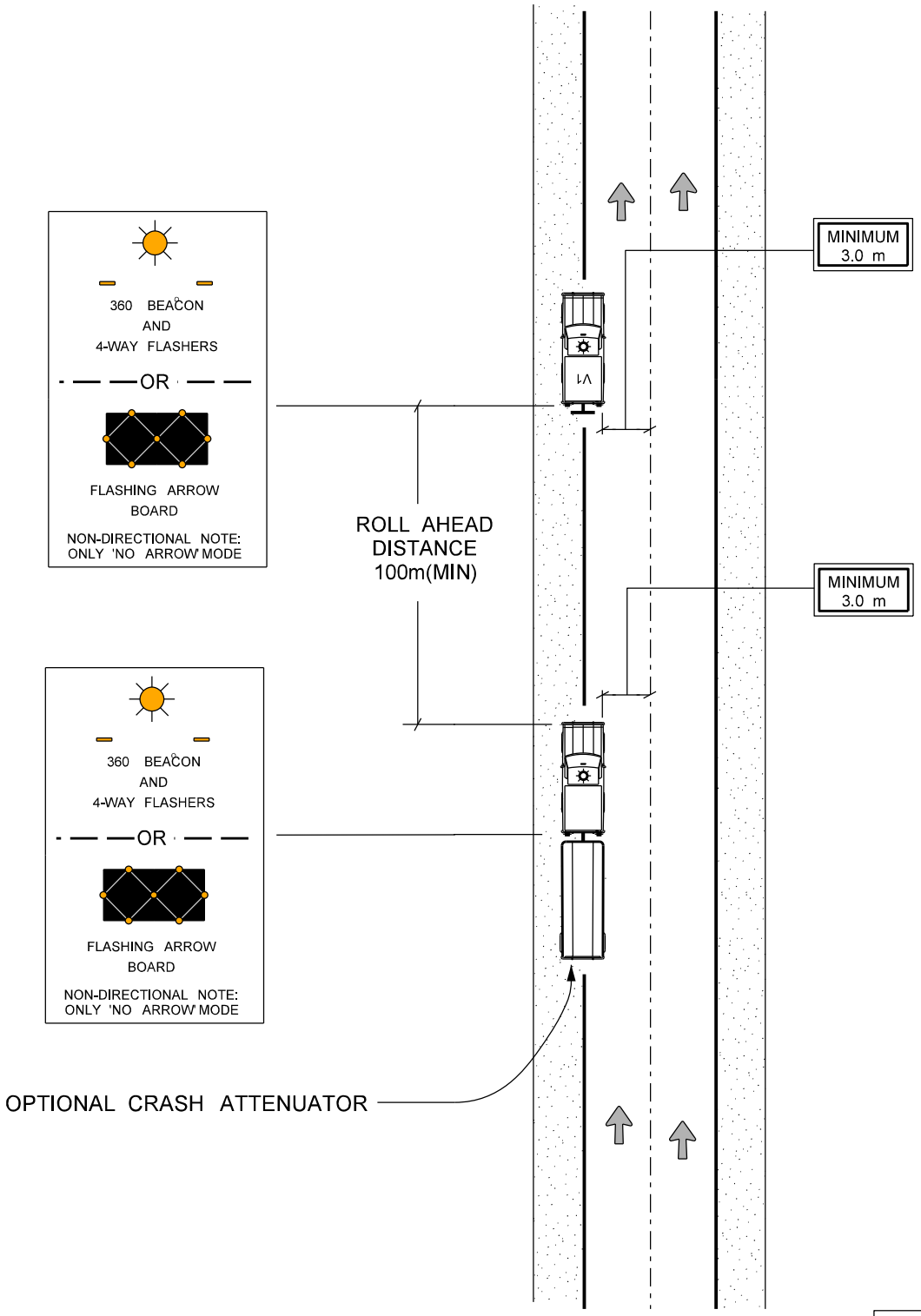
WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:

MOBILE WORK
(LESS THAN 5 MINUTES)

ENCROACHMENT IN LEFT LANE



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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-13

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

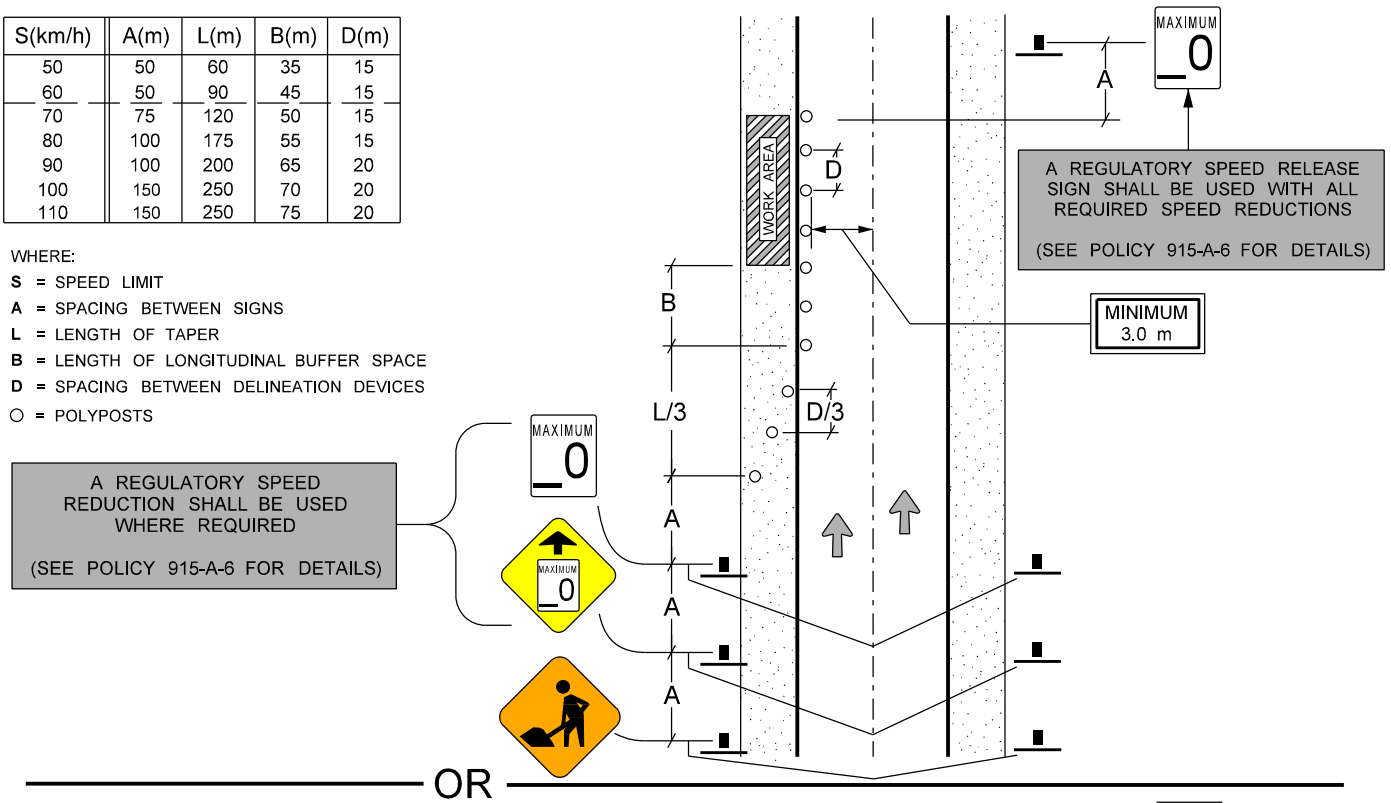
ENCROACHMENT IN LEFT LANE

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
○ = POLYPOSTS

A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)



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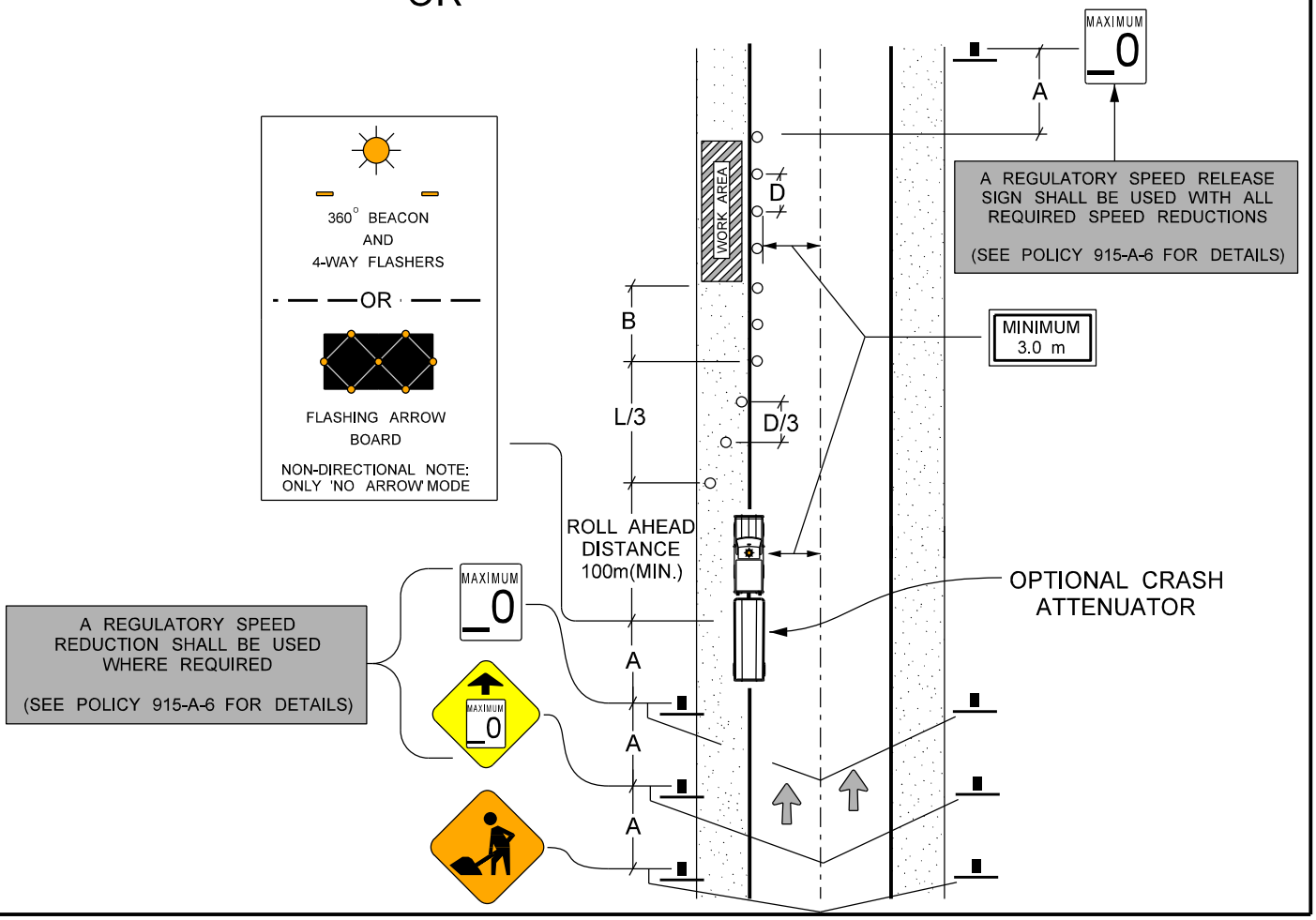

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-14

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

ROADSIDE WORK AND SHOULDER WORK ON A MULTI-LANE ROAD

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

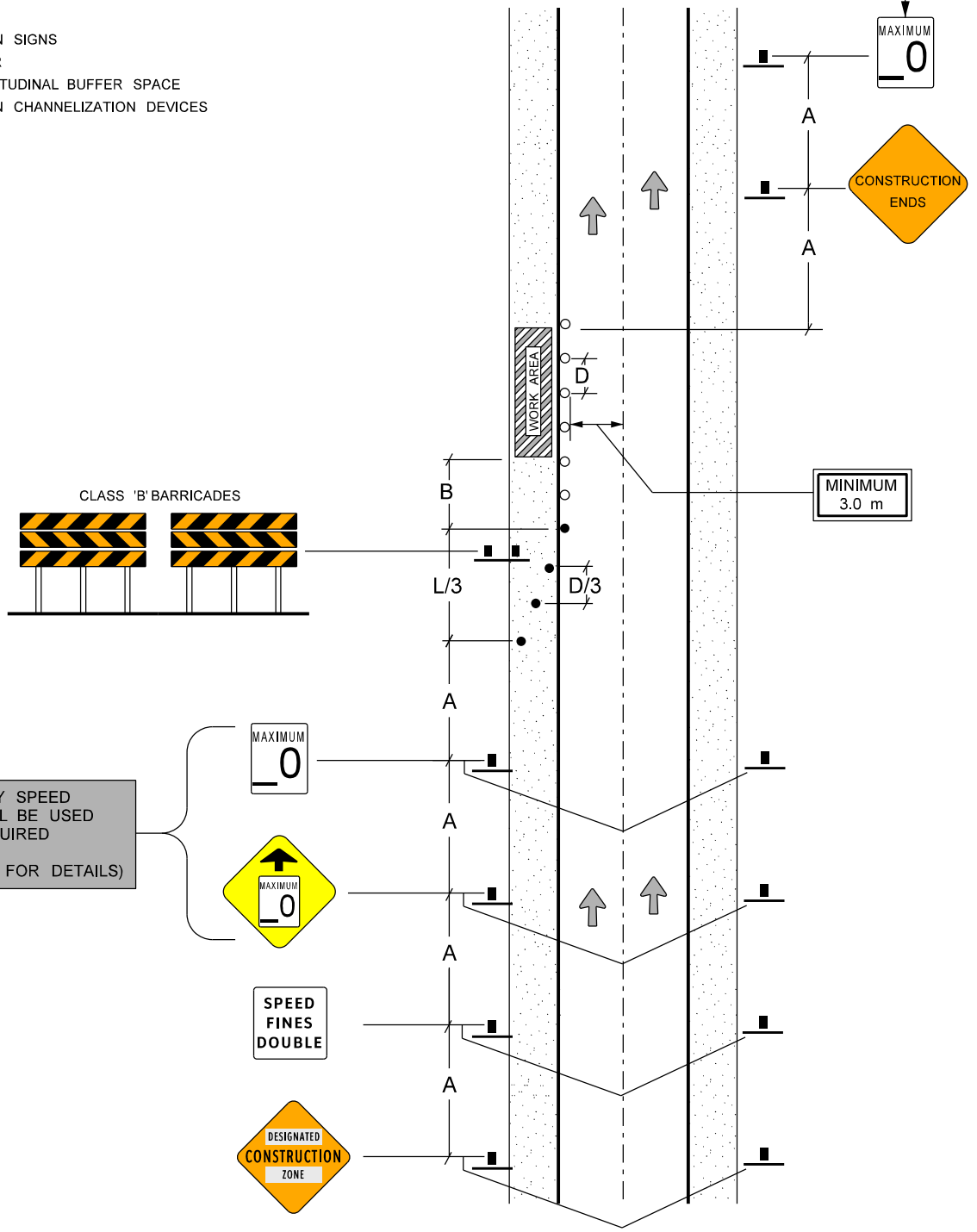
ENCROACHMENT IN LEFT LANE

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS

A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)



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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-15

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

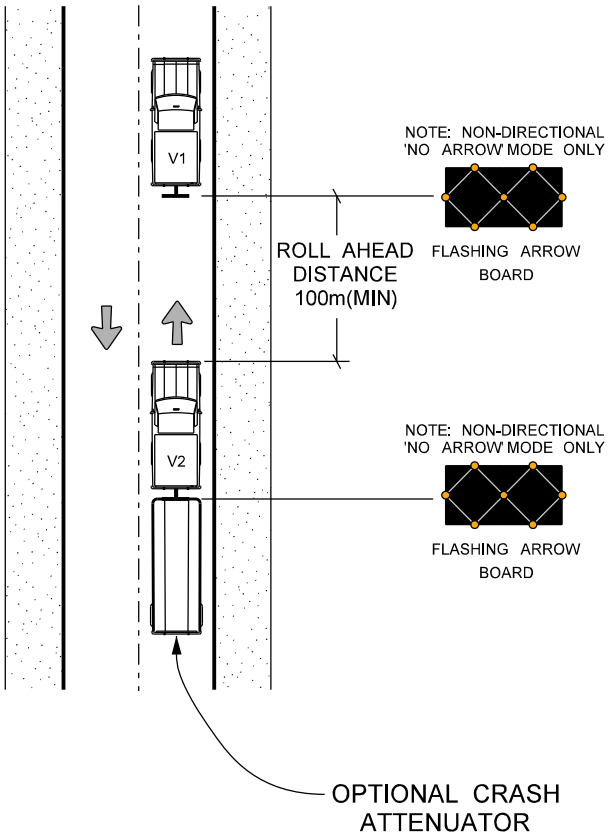
WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

TWO-LANE ROAD - RIGHT LANE CLOSED

THIS LAYOUT APPLIES TO:

MOBILE WORK
(LESS THAN 5 MINUTES)



LEGEND
V1 = WORK TRUCK
V2 = BUFFER TRUCK

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-16

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

TWO-LANE ROAD - YIELD TO ONCOMING TRAFFIC VOLUME < 500 AADT

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

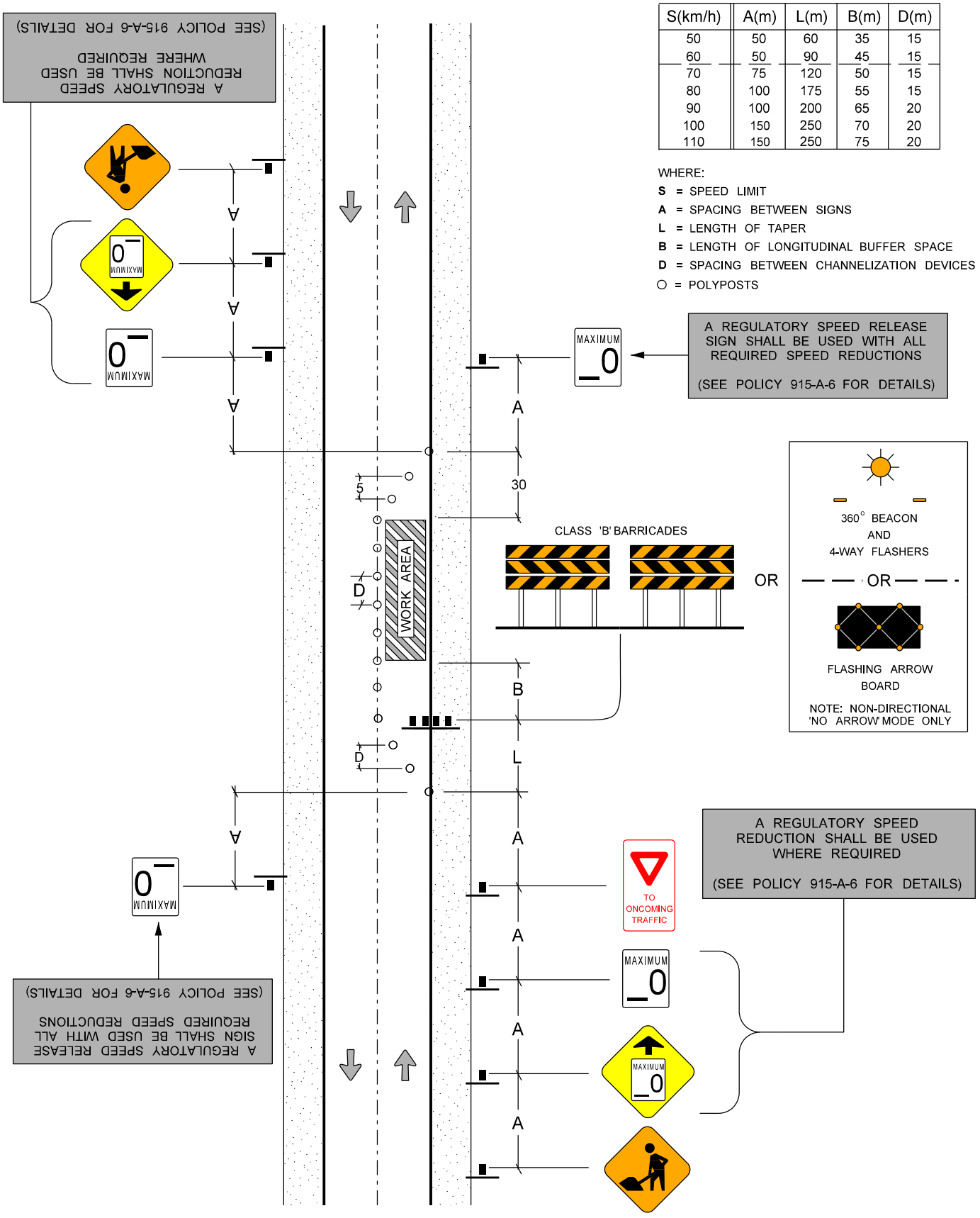
WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS

A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)



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APPROVED: Original Signed By
Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-17

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

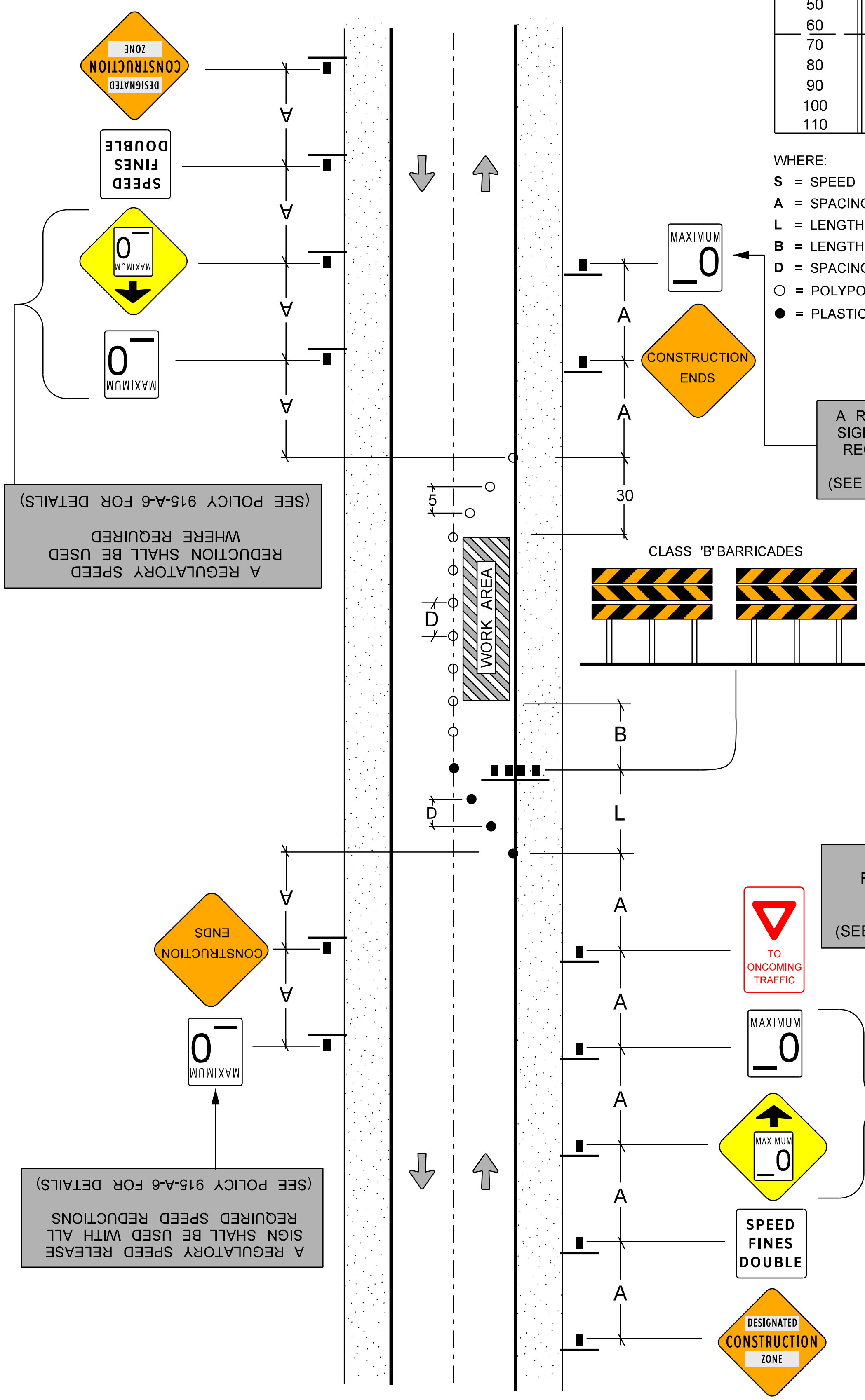
SINGLE LANE CLOSED

THIS LAYOUT APPLIES TO:
LONG DURATION (MORE THAN 4 HOURS)

TWO-LANE ROAD - YIELD TO ONCOMING TRAFFIC VOLUME < 500 AADT

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SHALL BE USED WHERE REQUIRED

(SEE POLICY 915-A-6 FOR DETAILS)

DATE OF ISSUE: 2015-05; REVISED:

http://www.gov.mb.ca/mit/contracts/workzone.html

APPROVED: Original Signed By **Glenn Cuthbertson P. Eng.**
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-18

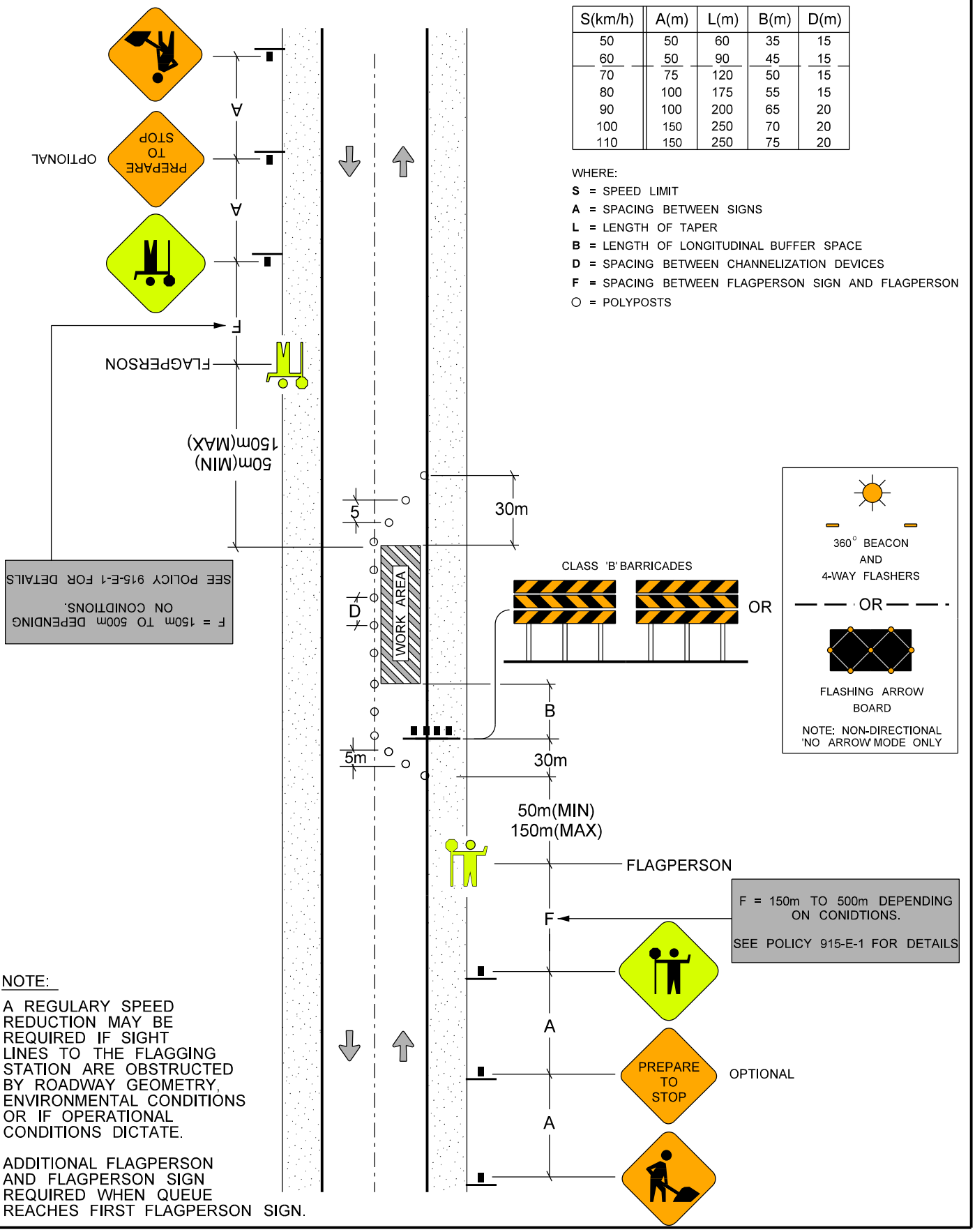
Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

TWO LANE ROAD - FLAGPERSON - VOLUME 500 - 1000 AADT



S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
F = SPACING BETWEEN FLAGPERSON SIGN AND FLAGPERSON
○ = POLYPOSTS

NOTE:

A REGULARY SPEED REDUCTION MAY BE REQUIRED IF SIGHT LINES TO THE FLAGGING STATION ARE OBSTRUCTED BY ROADWAY GEOMETRY, ENVIRONMENTAL CONDITIONS OR IF OPERATIONAL CONDITIONS DICTATE.

ADDITIONAL FLAGPERSON AND FLAGPERSON SIGN REQUIRED WHEN QUEUE REACHES FIRST FLAGPERSON SIGN.

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Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

TWO LANE ROAD - FLAGPERSON - VOLUME 500 - 1000 AADT

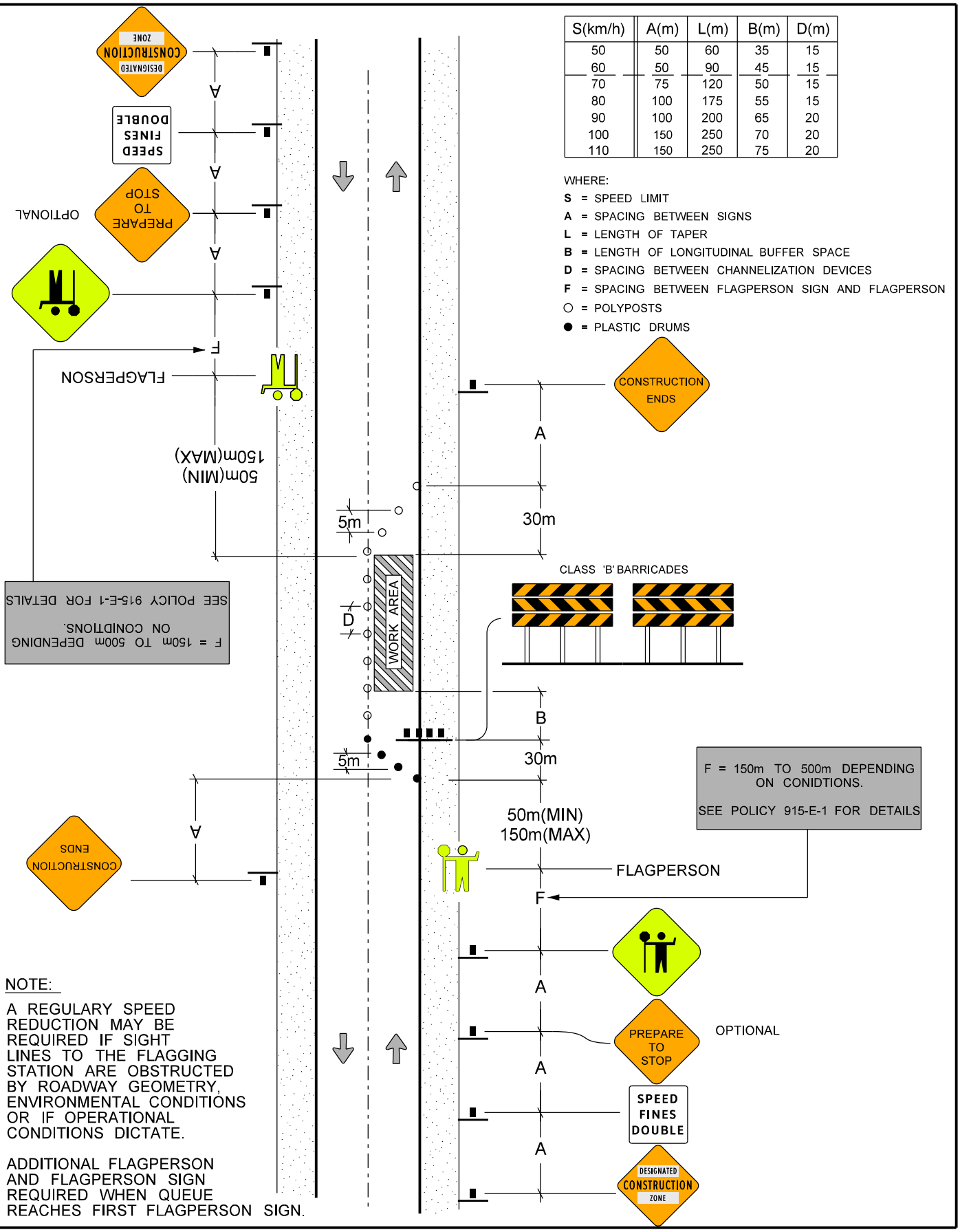
THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
F = SPACING BETWEEN FLAGPERSON SIGN AND FLAGPERSON
○ = POLYPOSTS
● = PLASTIC DRUMS



NOTE:

A REGULARY SPEED REDUCTION MAY BE REQUIRED IF SIGHT LINES TO THE FLAGGING STATION ARE OBSTRUCTED BY ROADWAY GEOMETRY, ENVIRONMENTAL CONDITIONS OR IF OPERATIONAL CONDITIONS DICTATE.

ADDITIONAL FLAGPERSON AND FLAGPERSON SIGN REQUIRED WHEN QUEUE REACHES FIRST FLAGPERSON SIGN.

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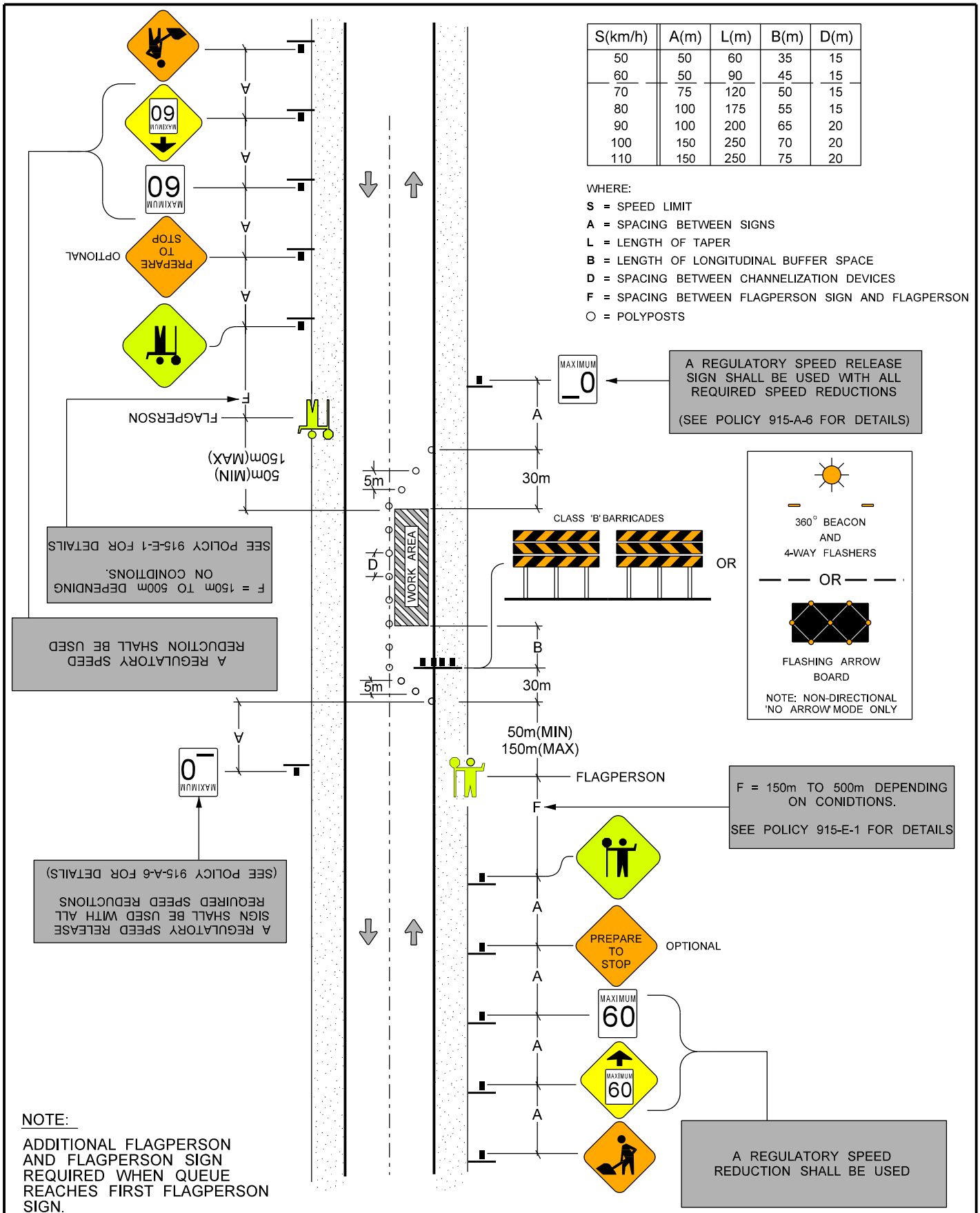
Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

TWO LANE ROAD - FLAGPERSON - VOLUME > 1000 AADT

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)



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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

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Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

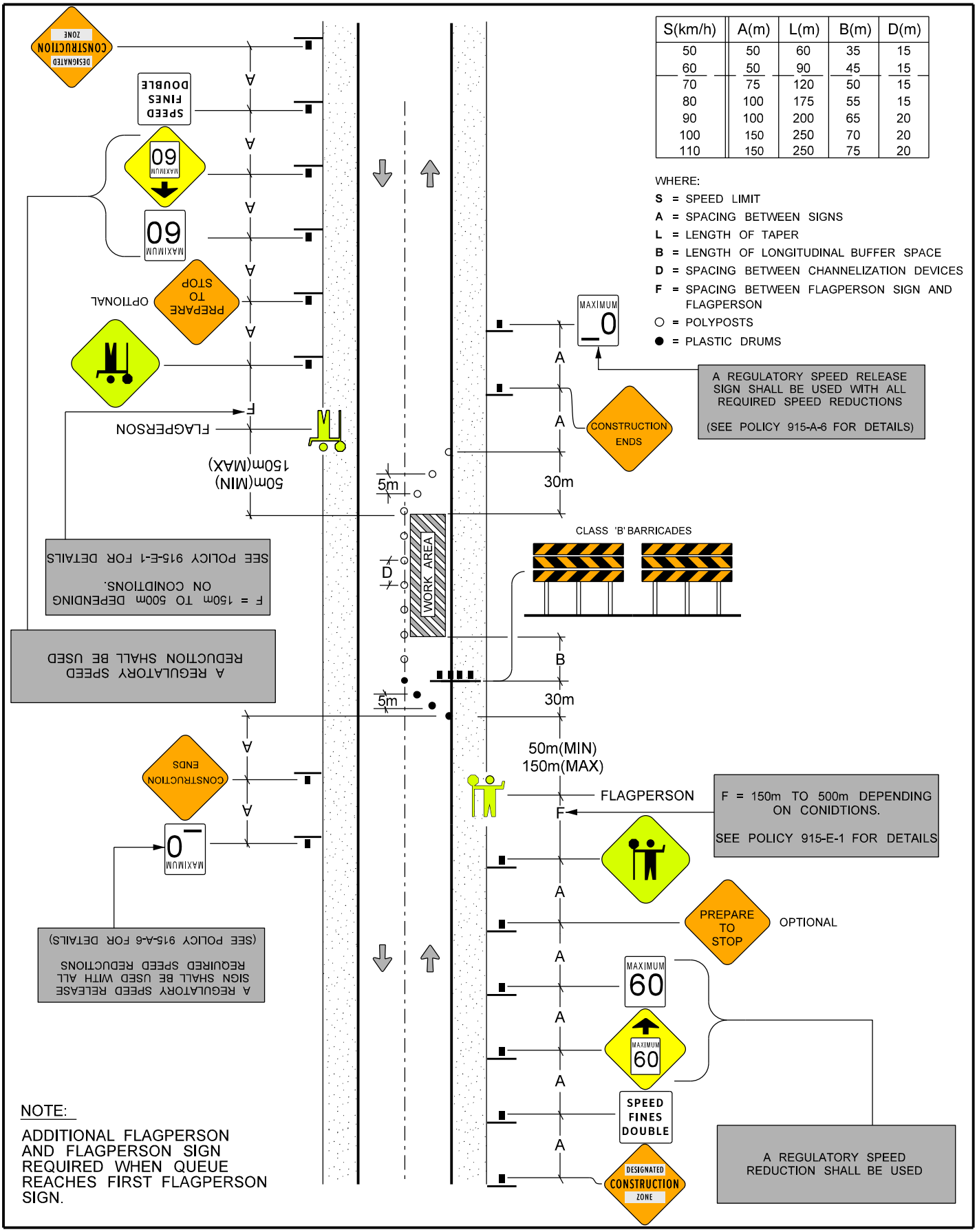
SINGLE LANE CLOSED

TWO LANE ROAD - FLAGPERSON - VOLUME > 1000 AADT

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
- **S** = SPEED LIMIT
- **A** = SPACING BETWEEN SIGNS
- **L** = LENGTH OF TAPER
- **B** = LENGTH OF LONGITUDINAL BUFFER SPACE
- **D** = SPACING BETWEEN CHANNELIZATION DEVICES
- **F** = SPACING BETWEEN FLAGPERSON SIGN AND FLAGPERSON
- ○ = POLYPOSTS
- ● = PLASTIC DRUMS



NOTE:

ADDITIONAL FLAGPERSON AND FLAGPERSON SIGN REQUIRED WHEN QUEUE REACHES FIRST FLAGPERSON SIGN.

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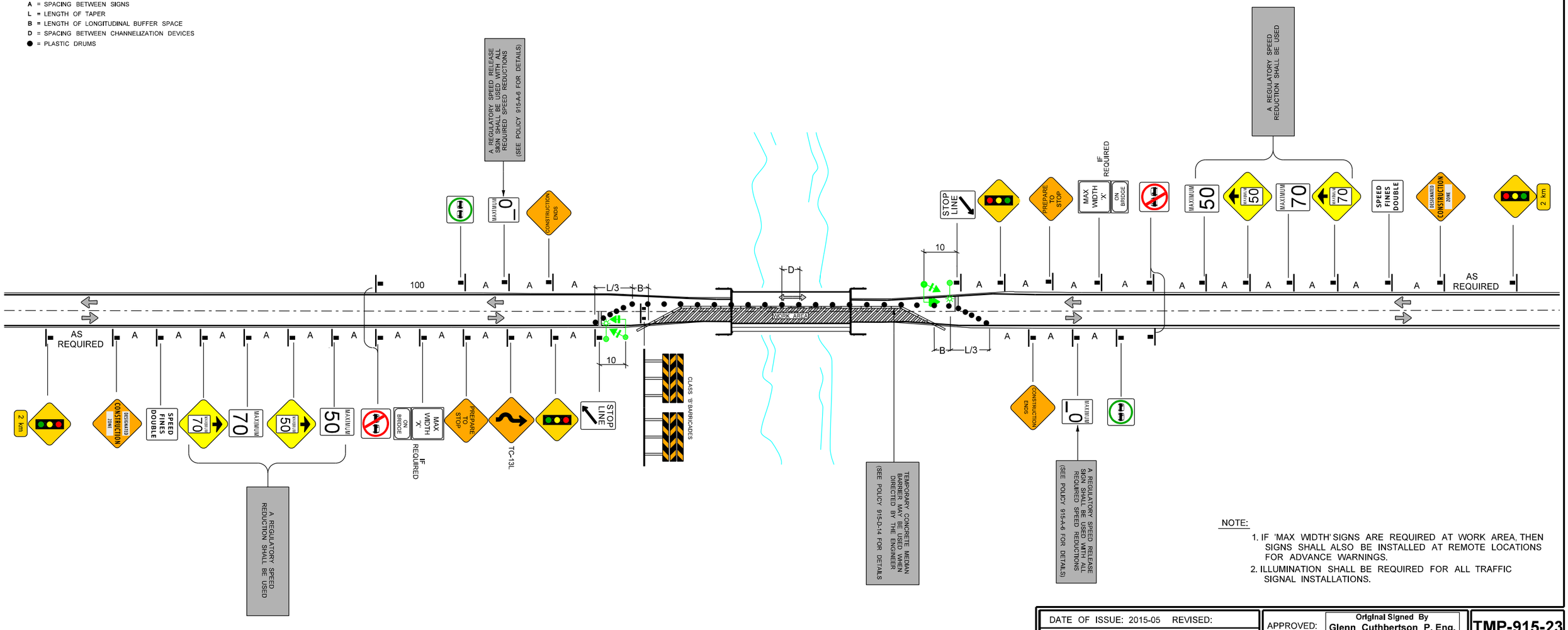
Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-22

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
● = PLASTIC DRUMS



NOTE:
1. IF 'MAX WIDTH' SIGNS ARE REQUIRED AT WORK AREA, THEN SIGNS SHALL ALSO BE INSTALLED AT REMOTE LOCATIONS FOR ADVANCE WARNINGS.
2. ILLUMINATION SHALL BE REQUIRED FOR ALL TRAFFIC SIGNAL INSTALLATIONS.

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

TEMPORARY TRAFFIC SIGNALS. (VOLUME > 60 VPH)

THIS LAYOUT APPLIES TO:
LONG DURATION (MORE THAN 4 HOURS)

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PATH: TESIGNS/Te-020.dgn

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TMP-915-23

Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

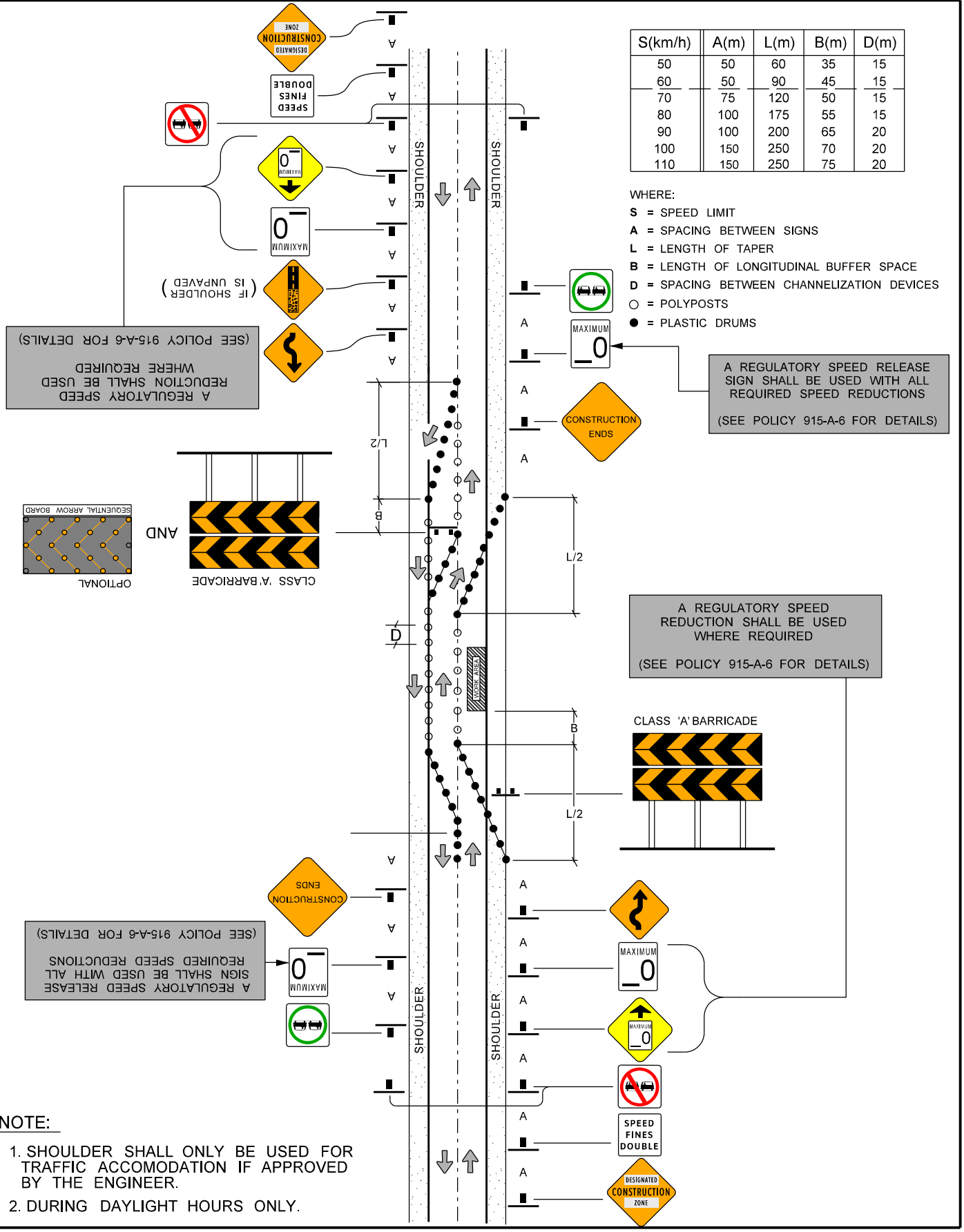
WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

USE SHOULDER

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)
DAYLIGHT HOURS ONLY



NOTE:

1. SHOULDER SHALL ONLY BE USED FOR TRAFFIC ACCOMODATION IF APPROVED BY THE ENGINEER.
2. DURING DAYLIGHT HOURS ONLY.

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DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-24

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

MULTI-LANE ROAD

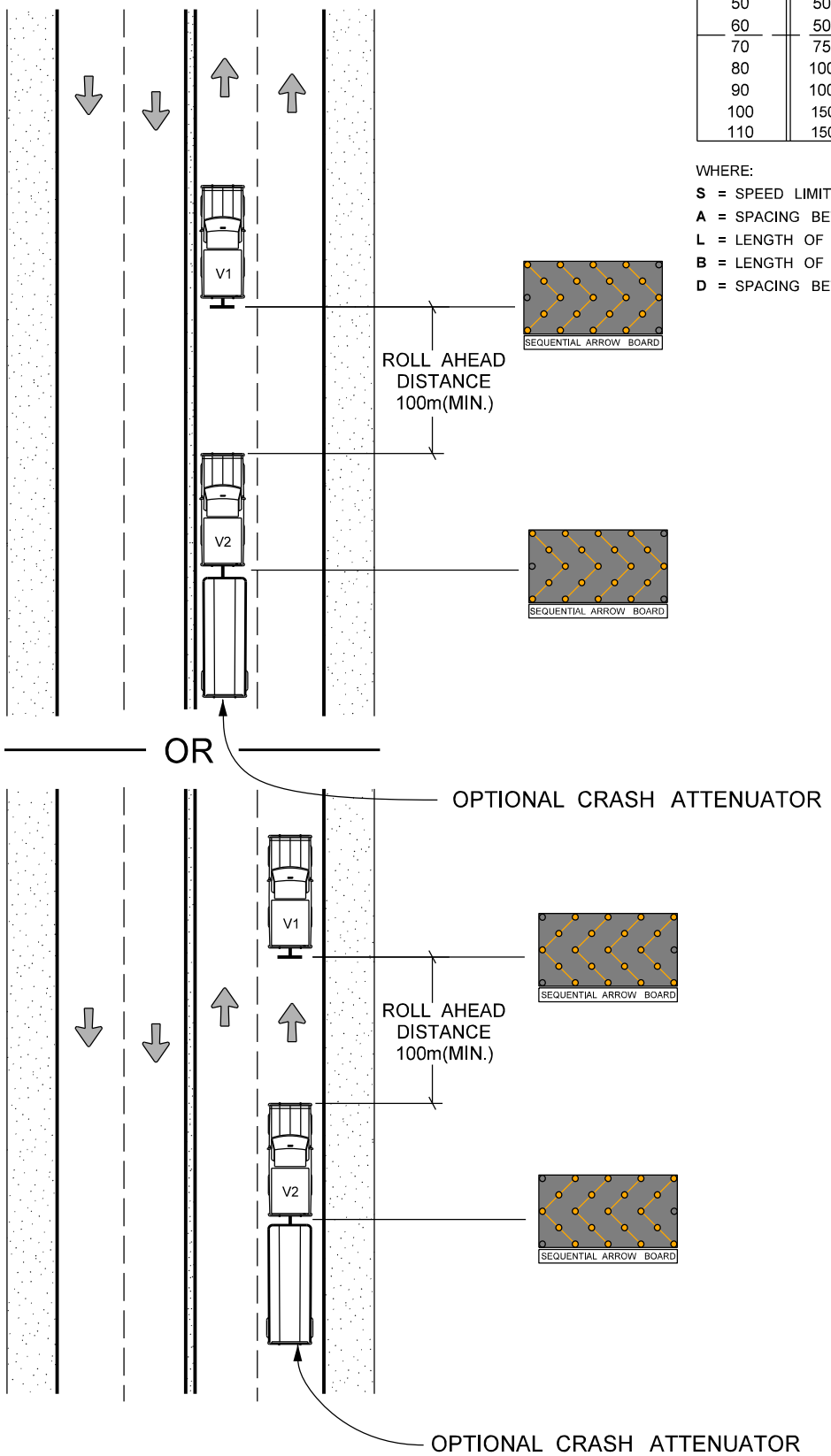
THIS LAYOUT APPLIES TO:

MOBILE WORK
(LESS THAN 5 MINUTES)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES



LEGEND
V1 = WORK TRUCK
V2 = BUFFER TRUCK

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DIRECTOR: TRAFFIC ENGINEERING BRANCH

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Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

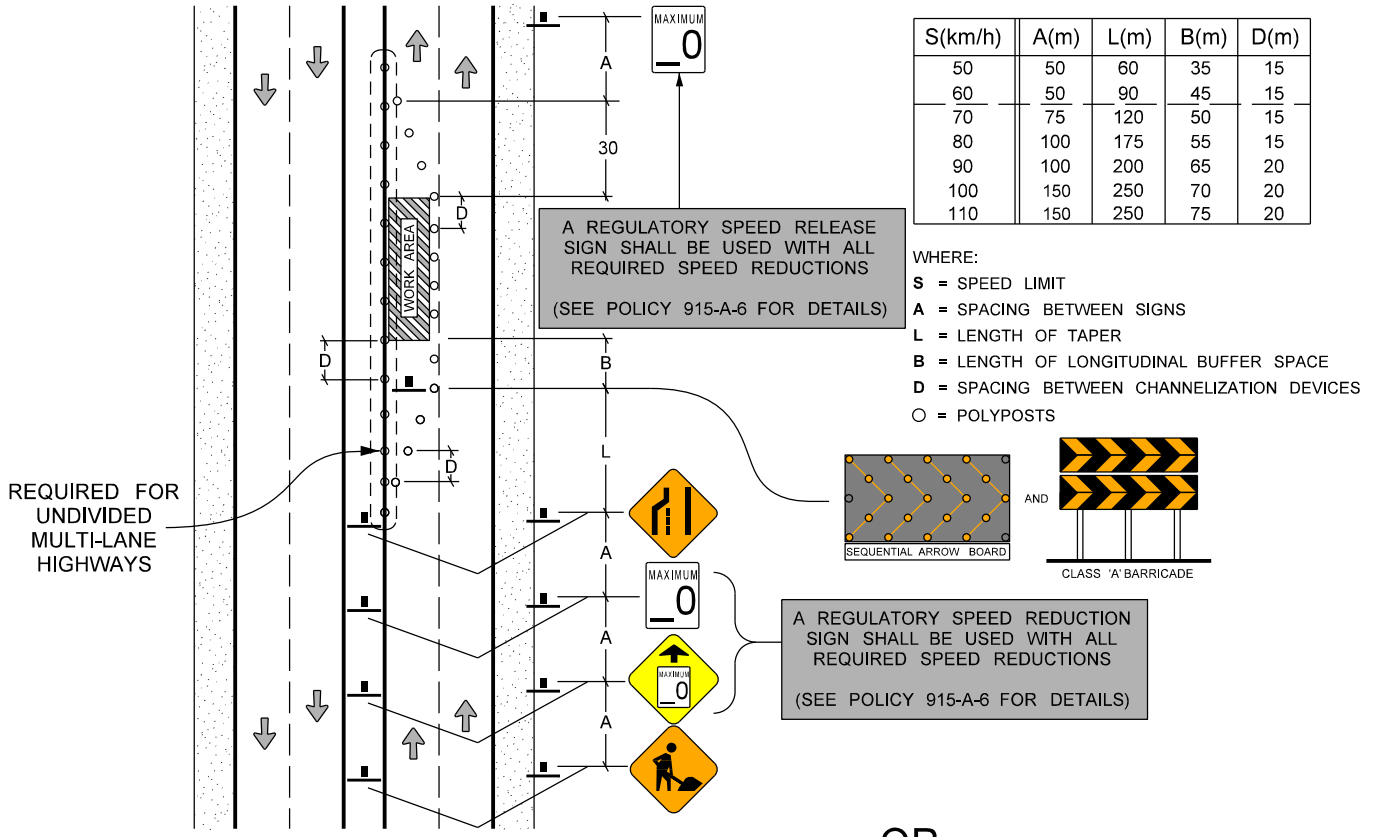
SINGLE LANE CLOSED

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

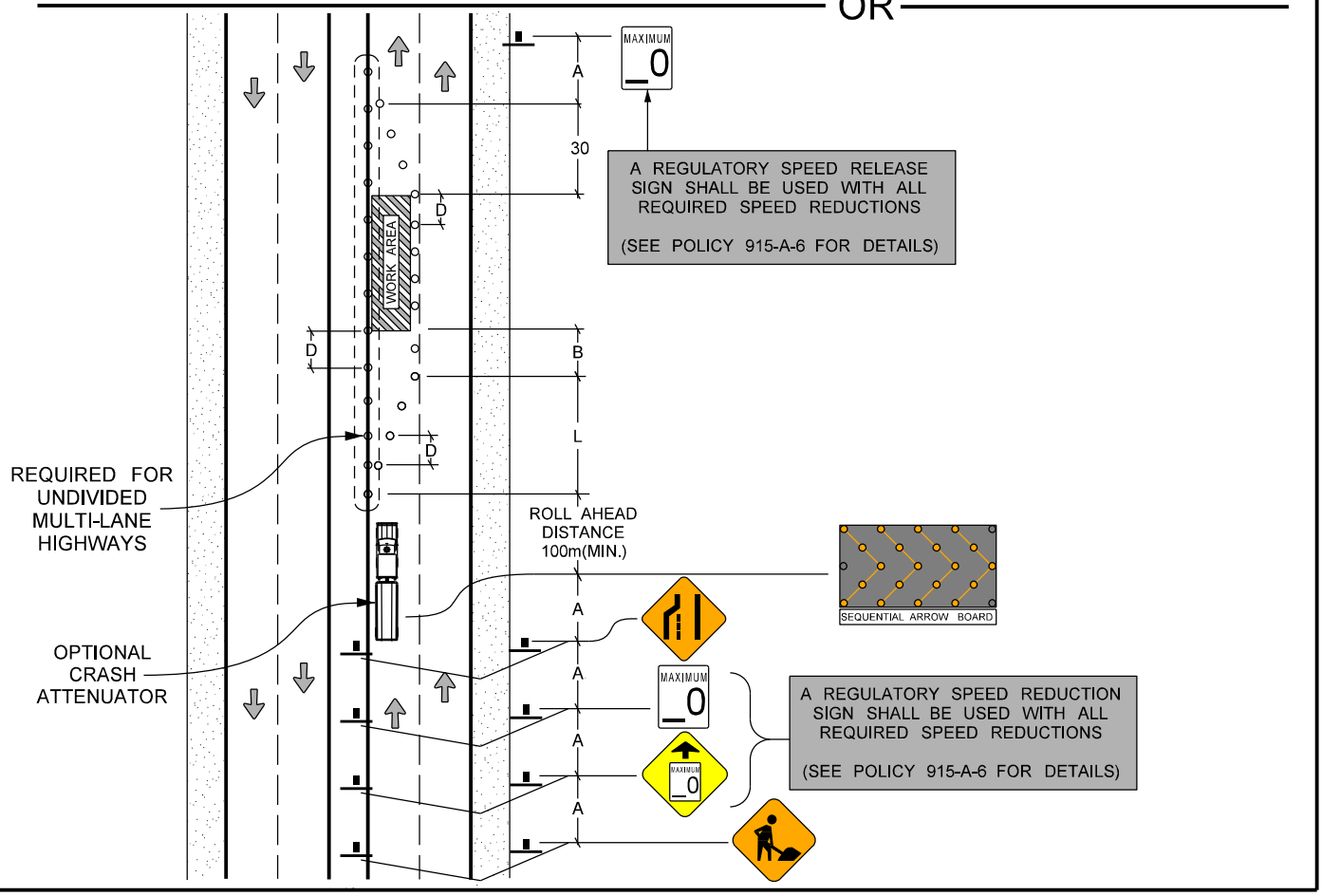
MULTI-LANE ROAD - LEFT LANE CLOSED

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS



OR



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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-26

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

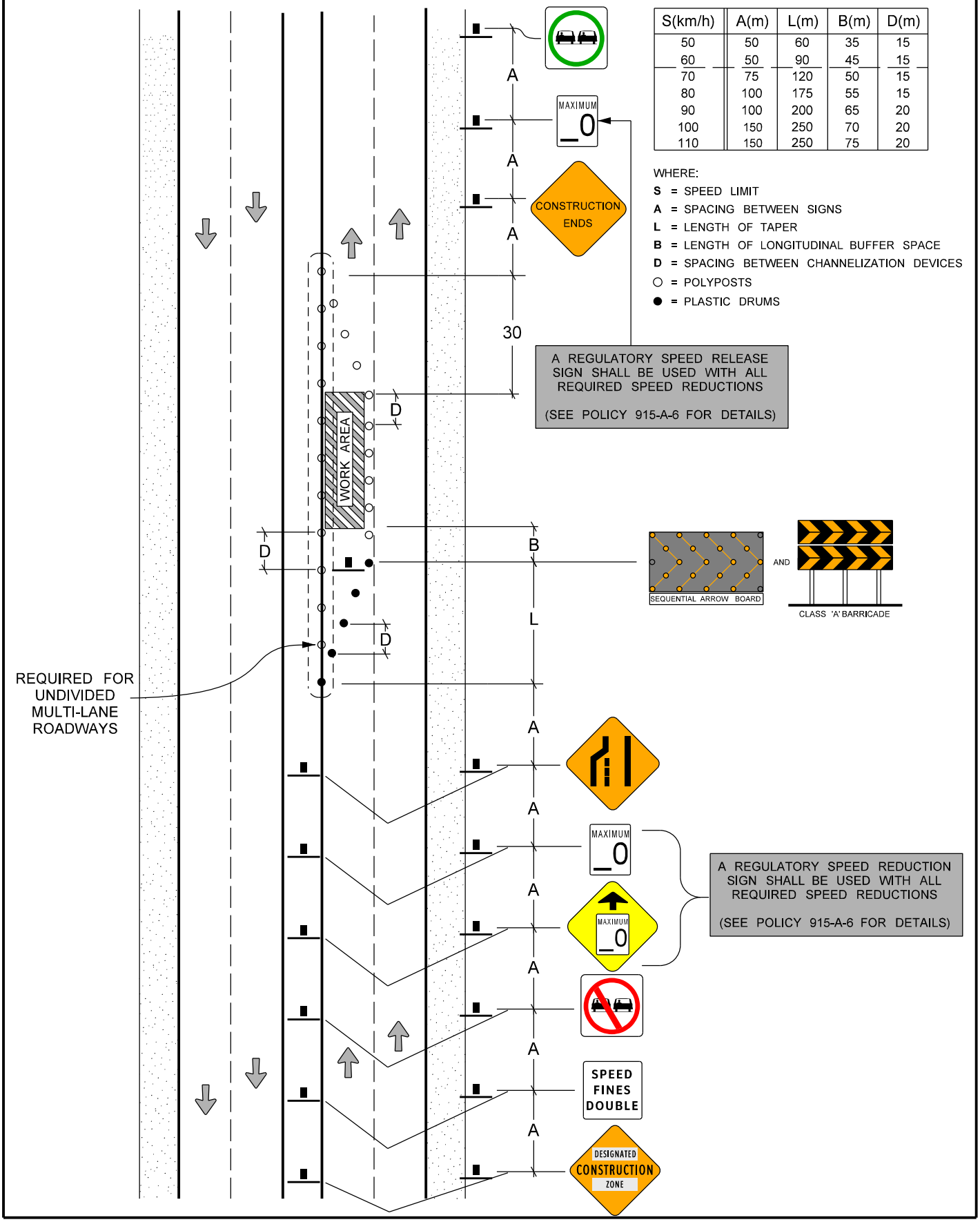
SINGLE LANE CLOSED

MULTI-LANE ROAD - LEFT LANE CLOSED

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-27

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

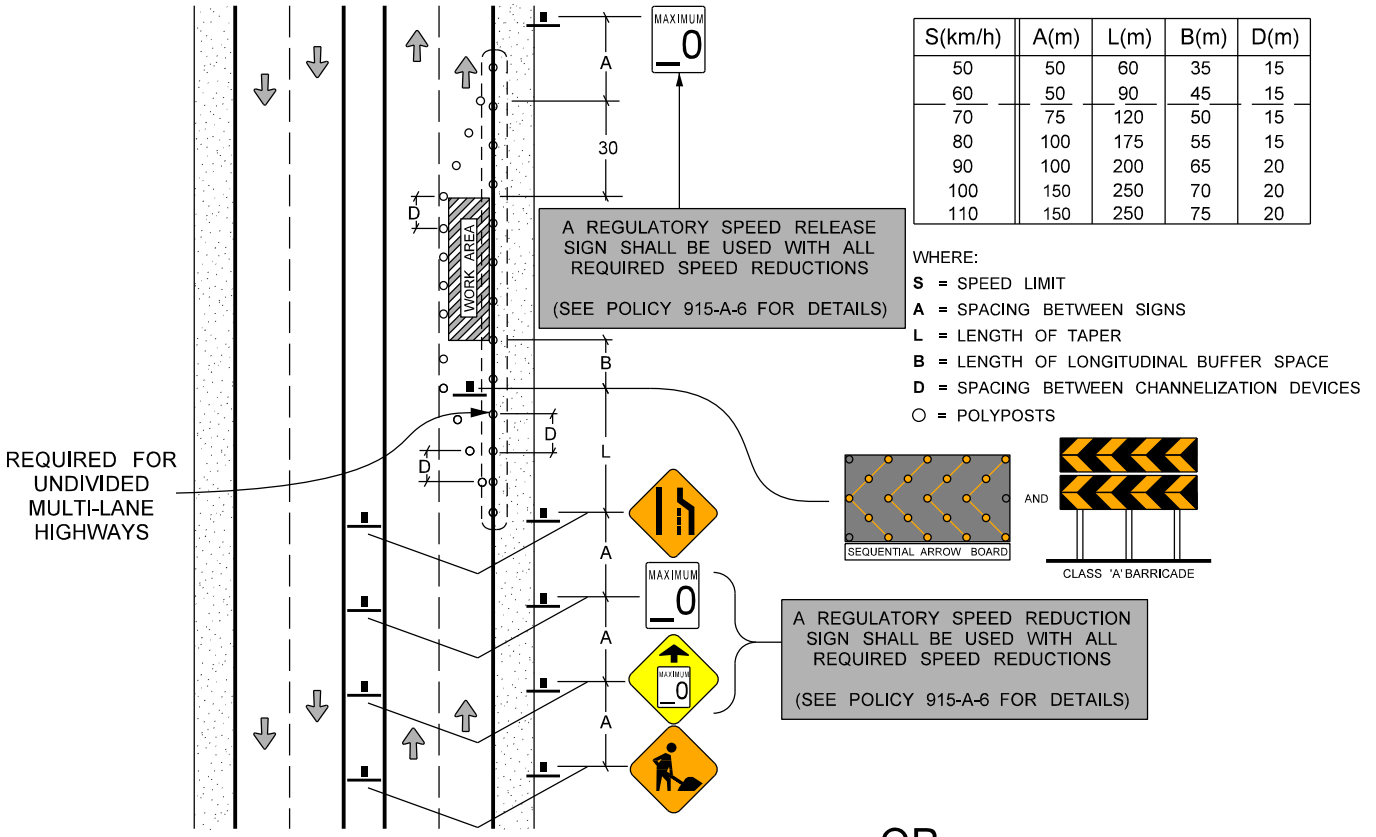
SINGLE LANE CLOSED

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

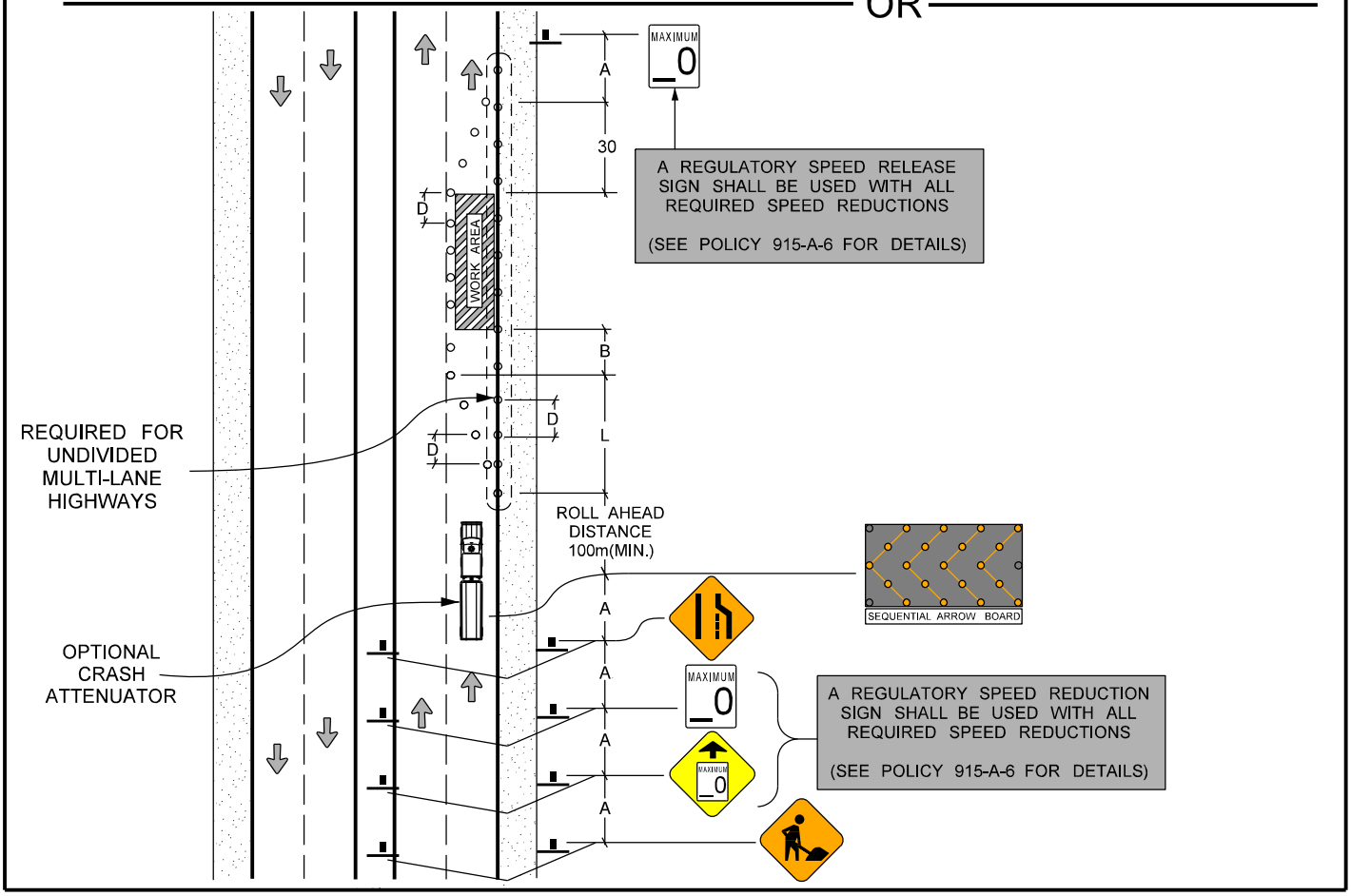
MULTI-LANE ROAD - RIGHT LANE CLOSED

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS



OR



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APPROVED: Original Signed By
Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-28

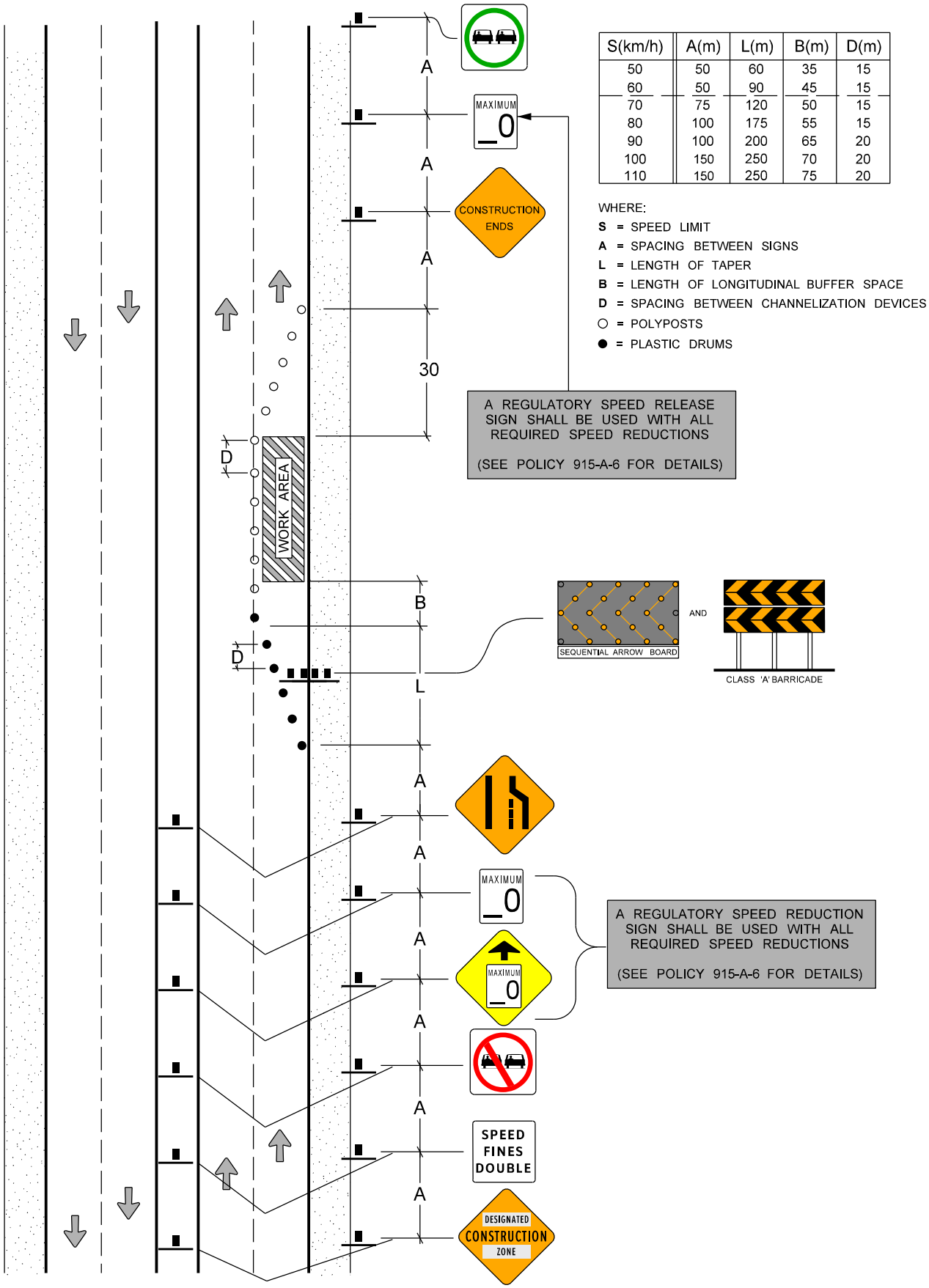
Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

SINGLE LANE CLOSED

MULTI-LANE ROAD - RIGHT LANE CLOSED

THIS LAYOUT APPLIES TO:
LONG DURATION
(MORE THAN 4 HOURS)



S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN CHANNELIZATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS

A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

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http://www.gov.mb.ca/mit/contracts/workzone.html

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-29

Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

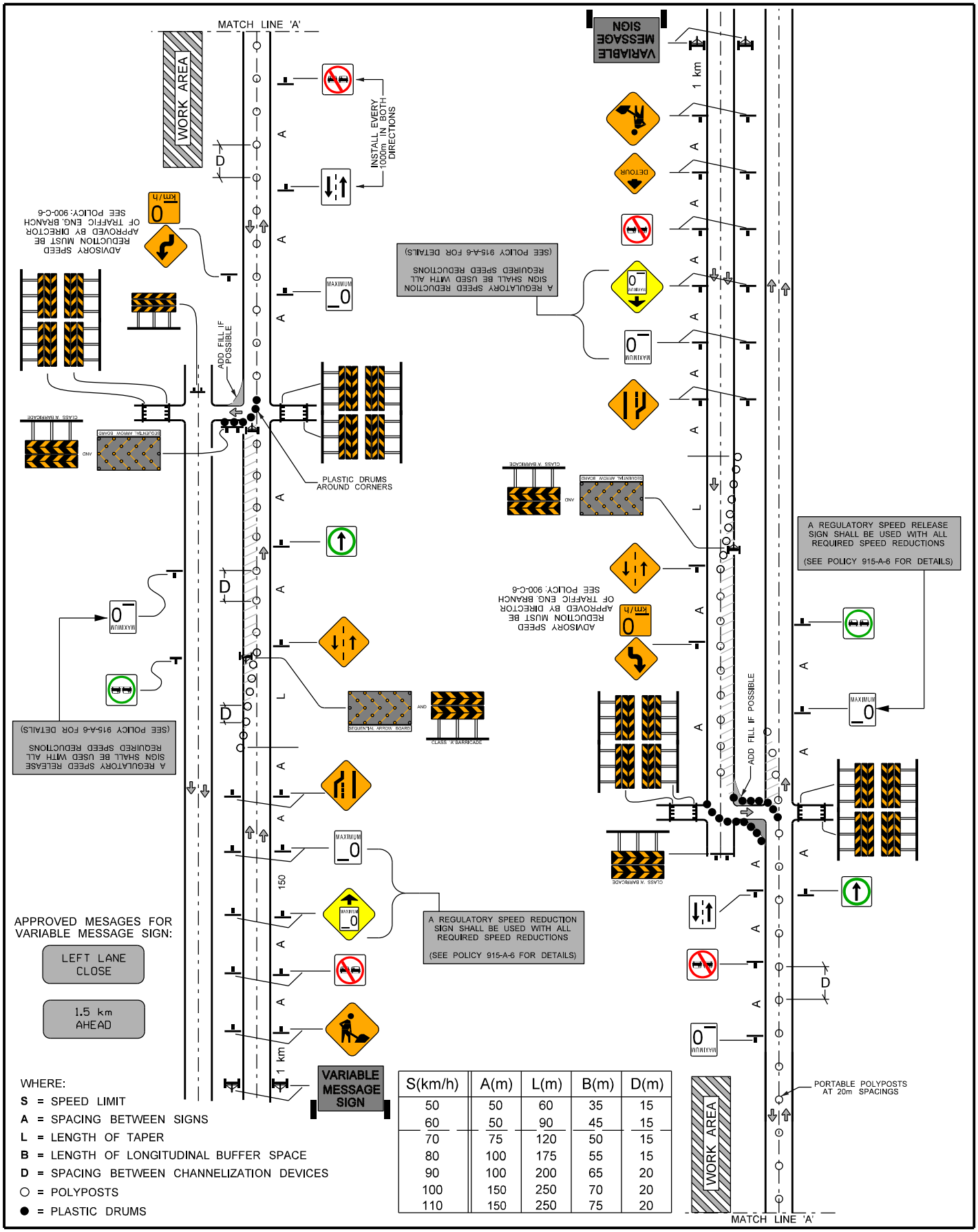
WORK ZONE TRAFFIC CONTROL MANUAL

MEDIAN CROSS-OVER

AT EXISTING INTERSECTION

THIS LAYOUT APPLIES TO:

SHORT DURATION
(LESS THAN 4 HOURS)



APPROVED MESAGES FOR VARIABLE MESSAGE SIGN:

- LEFT LANE CLOSE
- 1.5 km AHEAD

WHERE:

- **S** = SPEED LIMIT
- **A** = SPACING BETWEEN SIGNS
- **L** = LENGTH OF TAPER
- **B** = LENGTH OF LONGITUDINAL BUFFER SPACE
- **D** = SPACING BETWEEN CHANNELIZATION DEVICES
- ○ = POLYPOSTS
- ● = PLASTIC DRUMS

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

DATE OF ISSUE: 2015-05; REVISED:

http://www.gov.mb.ca/mit/contracts/workzone.html

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-30

Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

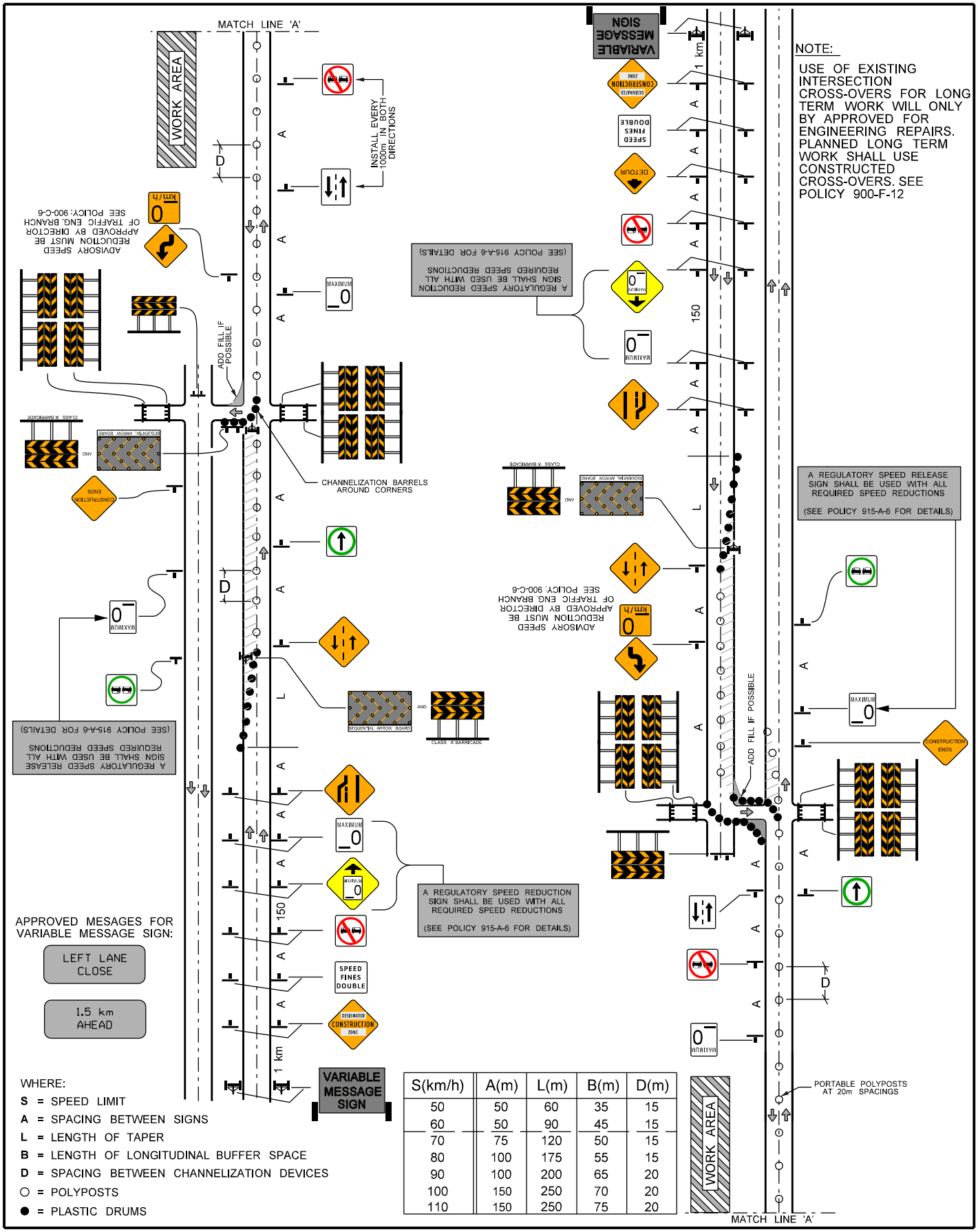
WORK ZONE TRAFFIC CONTROL MANUAL

MEDIAN CROSS-OVER

AT EXISTING INTERSECTION

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)



NOTE:

USE OF EXISTING INTERSECTION CROSS-OVERS FOR LONG TERM WORK WILL ONLY BY APPROVED FOR ENGINEERING REPAIRS. PLANNED LONG TERM WORK SHALL USE CONSTRUCTED CROSS-OVERS. SEE POLICY 900-F-12

APPROVED MESAGES FOR VARIABLE MESSAGE SIGN:

- LEFT LANE CLOSE
- 1.5 km AHEAD

WHERE:

- **S** = SPEED LIMIT
- **A** = SPACING BETWEEN SIGNS
- **L** = LENGTH OF TAPER
- **B** = LENGTH OF LONGITUDINAL BUFFER SPACE
- **D** = SPACING BETWEEN CHANNELIZATION DEVICES
- ○ = POLYPOSTS
- ● = PLASTIC DRUMS

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

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http://www.gov.mb.ca/mit/contracts/workzone.html

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-31

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

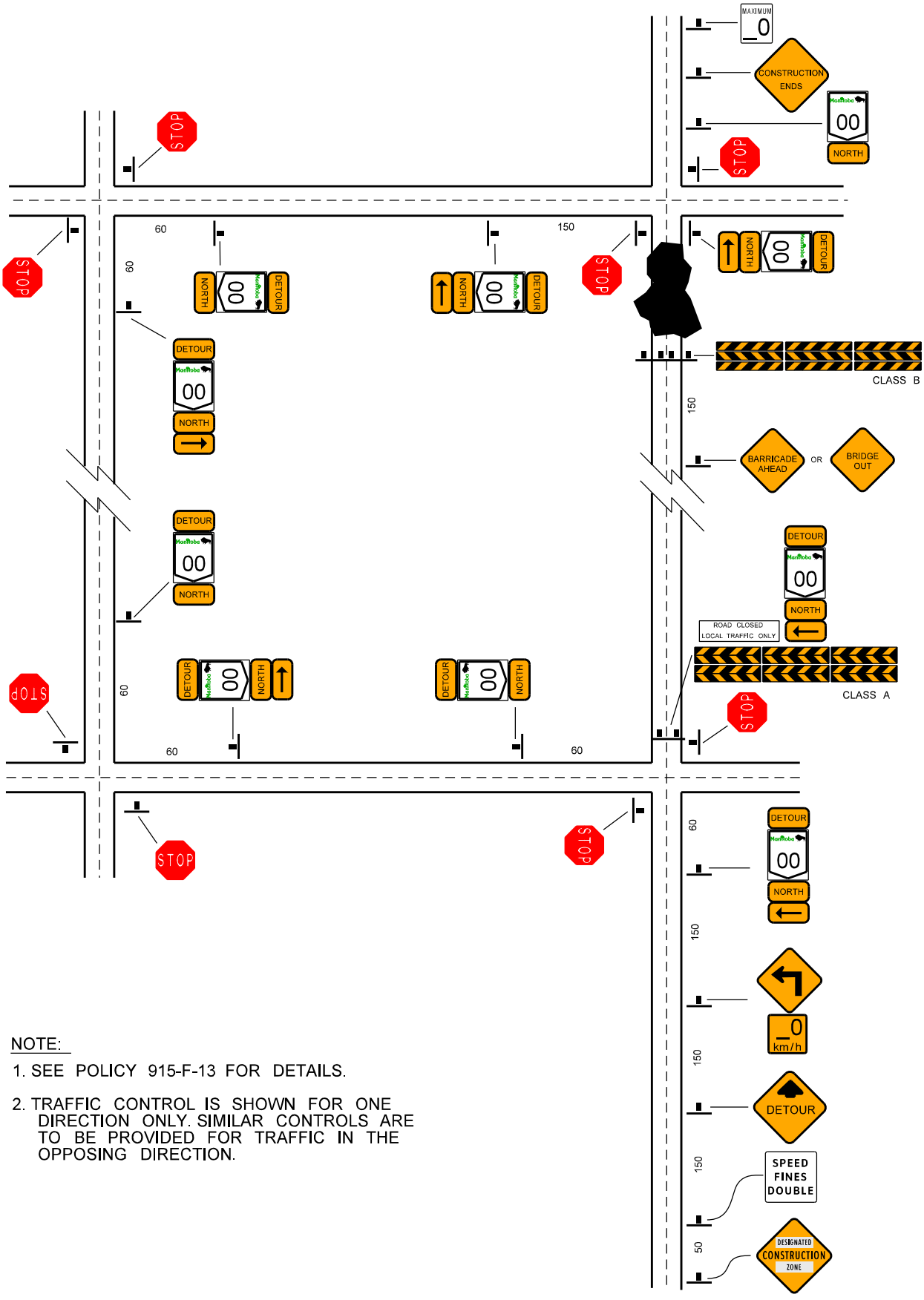
WORK ZONE TRAFFIC CONTROL MANUAL

DETOUR

ALTERNATIVE ROADS

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)



NOTE:

1. SEE POLICY 915-F-13 FOR DETAILS.
2. TRAFFIC CONTROL IS SHOWN FOR ONE DIRECTION ONLY. SIMILAR CONTROLS ARE TO BE PROVIDED FOR TRAFFIC IN THE OPPOSING DIRECTION.

DATE OF ISSUE: 2015-05 REVISED:

http://www.gov.mb.ca/mit/contracts/workzone.html

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Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-32

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

AREAS IN THE WORK ZONE

SHOOFLY DETOUR

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)

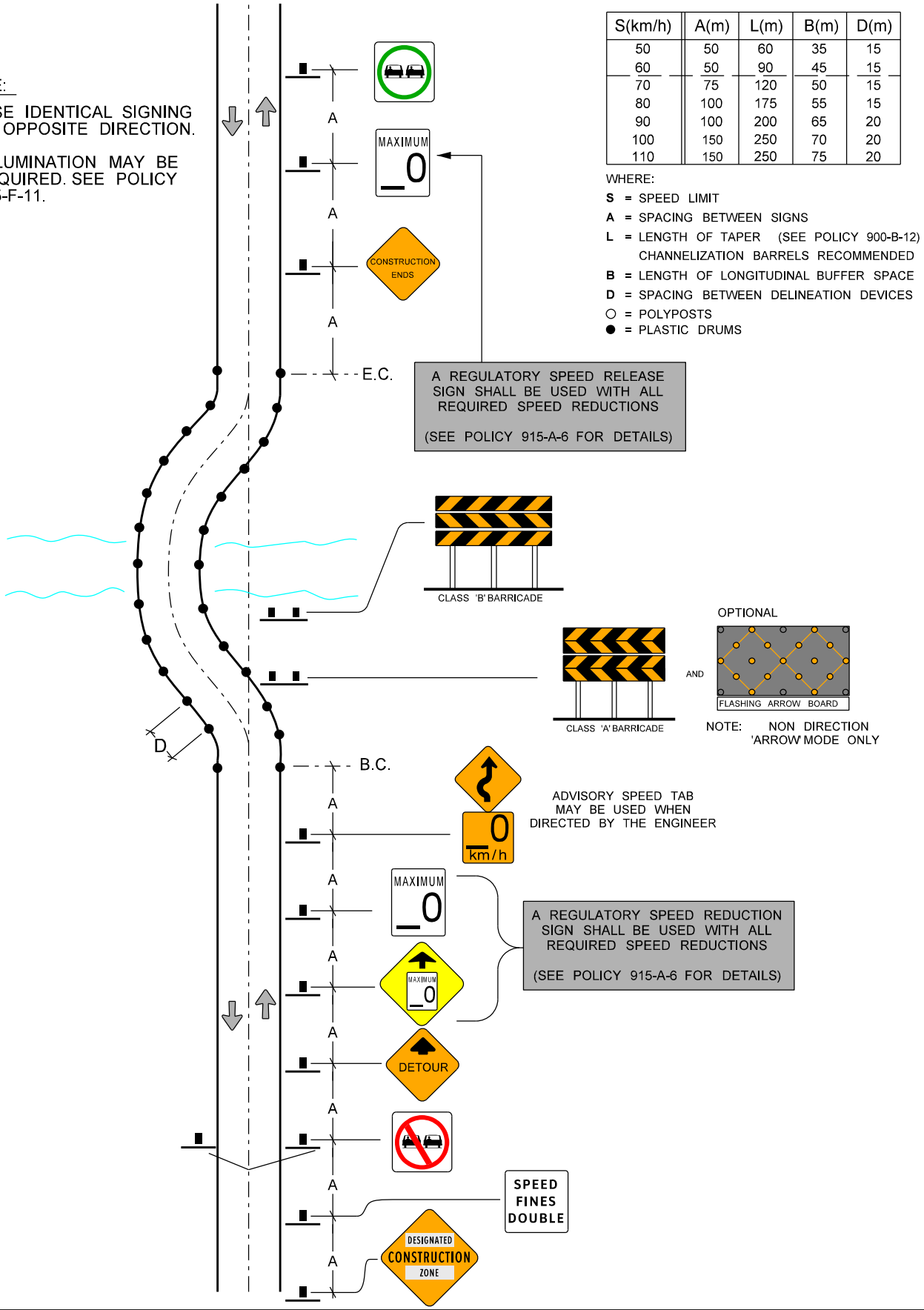
NOTE:

1. USE IDENTICAL SIGNING IN OPPOSITE DIRECTION.
2. ILLUMINATION MAY BE REQUIRED. SEE POLICY 915-F-11.

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:

S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER (SEE POLICY 900-B-12)
CHANNELIZATION BARRELS RECOMMENDED
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
○ = POLYPOSTS
● = PLASTIC DRUMS



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http://www.gov.mb.ca/mit/contracts/workzone.html

APPROVED: Original Signed By
Glenn Cuthbertson P. Eng.
DIRECTOR: TRAFFIC ENGINEERING BRANCH

TMP-915-33

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

LANE CLOSED AT INTERSECTION-2-LANE ROADS

THIS LAYOUT APPLIES TO:
FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

NEAR SIDE CLOSED

S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20
110	150	250	75	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER (SEE POLICY 900-B-12)
CHANNELIZATION BARRELS RECOMMENDED
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES
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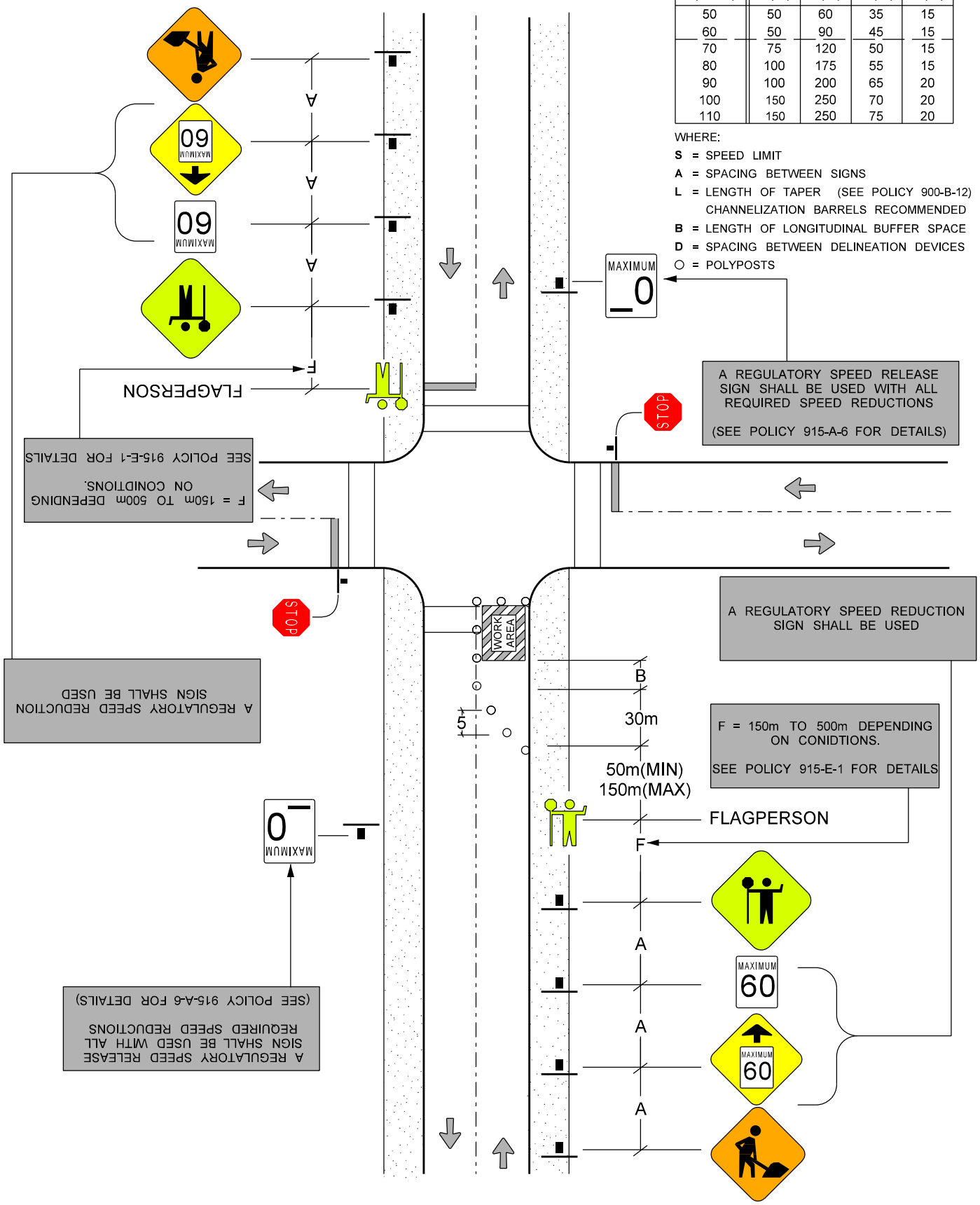

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Manitoba
Infrastructure and Transportation
TRAFFIC ENGINEERING

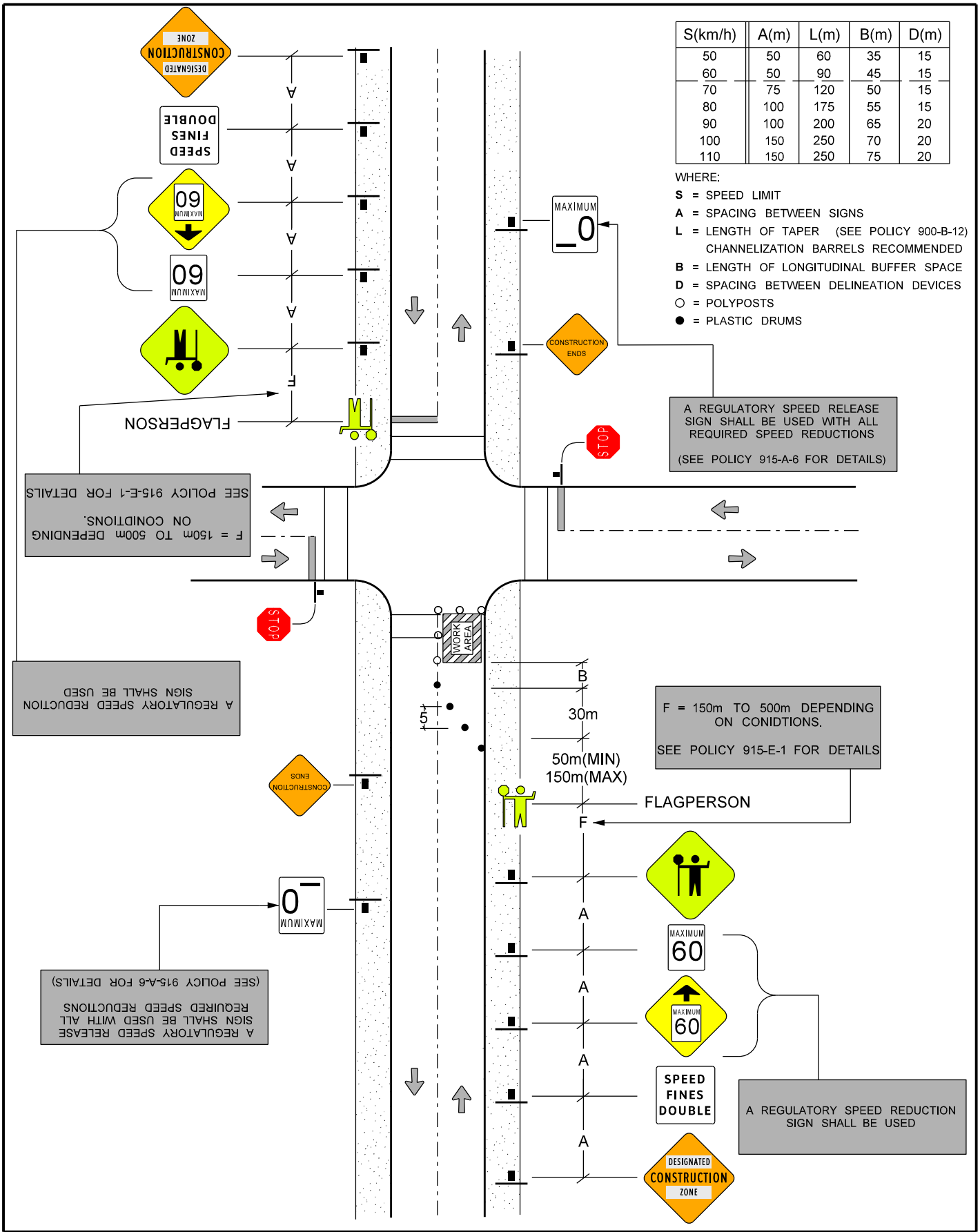
WORK ZONE TRAFFIC CONTROL MANUAL

LANE CLOSED AT INTERSECTION-2-LANE ROADS

NEAR SIDE CLOSED

THIS LAYOUT APPLIES TO:

LONG DURATION
(MORE THAN 4 HOURS)



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TMP-915-35

Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

LANE CLOSED AT INTERSECTION-2-LANE ROADS

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FAST MOVING
(LESS THAN 10 MINUTES)
& SHORT DURATION
(LESS THAN 4 HOURS)

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A REGULATORY SPEED RELEASE SIGN SHALL BE USED WITH ALL REQUIRED SPEED REDUCTIONS

(SEE POLICY 915-A-6 FOR DETAILS)

A REGULATORY SPEED REDUCTION SIGN SHALL BE USED

F = 150m TO 500m DEPENDING ON CONIDTIONS.

SEE POLICY 915-E-1 FOR DETAILS

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Manitoba Infrastructure and Transportation
TRAFFIC ENGINEERING

WORK ZONE TRAFFIC CONTROL MANUAL

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Associated Work Zone Policies

Manitoba Infrastructure

Work Zone Traffic Control Manual

Provincial Roads
and
Provincial Trunk Highways

Manitoba
Infrastructure
Traffic Engineering

rev. March 2011

INTRODUCTION

WORK ZONE TRAFFIC CONTROL MANUAL

This manual is intended to provide **minimum standards** for the protection of road users and workers during temporary works relating to highway maintenance and construction, including utility and other operations. This manual should provide a **single source** for traffic control standards for use on Manitoba's highways. Over 1000 "hard copies" of this manual were circulated since its initial printing in 2000. It has been available "on line" since March 2002.

Please contact the Traffic Engineering Branch at (204) 945-3781 for advice and recommendations on dealing with traffic control situations not included in this manual, or where the standards in the manual fail to adequately control traffic or protect workers.

The following revised standards are based on **best practices** in Manitoba and in other jurisdictions. They have been revised, refined and adjusted in actual field use. However, they are meant to be open to change and improvement, and we continue to welcome your suggestions, comments and criticisms.

Traffic controls for temporary conditions often represent a compromise between the time and cost to erect and maintain the necessary devices, and the need to get the job done. We hope this manual strikes a balance between those conflicting requirements, while providing the necessary protection to both workers and motorists.

This 2011 Revision incorporates a few changes and improvements.

_____

Director, Traffic Engineering Branch

WORK ZONE POLICIES
TABLE OF CONTENTS

A

900-A-1 Introduction
900-A-2 General Guidelines
900-A-3 Fundamental Principles
900-A-4 Worker Visibility on Roadway
900-A-5 Vehicle Visibility on Roadway
900-A-6 Survey Crew Traffic Control
900-A-7 Bilingual Traffic Signing (incl. Bilingual Signing Area Maps)

B

900-B-1 Work Zone Requirements
900-B-2 Flagpersons
900-B-3 Signs
900-B-4 Sign Placement
900-B-5 Portable Signs
900-B-6 Optional Sign Mounting Locations
900-B-7 Sign Spacing
900-B-8 Passing Restrictions
900-B-9 Barricades
900-B-10 Gateway Assembly
900-B-11 Hazard Markers
900-B-12 Channelizers and Delineators
900-B-13 Sign Reflectivity
900-B-14 Maintenance
900-B-15 Enhancement
900-B-16 Protection from Vehicular Traffic
900-B-17 Flagman for Stringline Person
900-B-18 Flagman for Worker Installing Temporary Overlay Marker
900-B-19 Working Near Railway Crossings
900-B-20 Traffic Control – Paving Operations
900-B-21 Temporary Storage of Objects in Right-of-Way

C

900-C-1 Traffic Management Plans
900-C-2 Traffic Control Coordinator
900-C-3 Work Zone Components
900-C-4 Transition Tapers
900-C-5 Installation and Removal of Traffic Control Devices
900-C-6 Speed Limits in Construction & Maintenance Areas
900-C-7 60 km/h When Passing Workers Sign
900-C-8 Pilot Vehicle Traffic Control

D

900-D-1 Traffic Control on Low Speed Roads

E

900-E-1 Off-Road Operations
900-E-2 Shoulder Work
900-E-3 Bridge Inspection

F

900-F-1 Mobile Operations
900-F-2 Fast Moving Operations - Benkelman Beam (Pavement Deflection)
900-F-3 Fast Moving Operations - Soil Drill Truck/Coring Vehicle
900-F-4 Fast Moving Operations - Profilograph Unit
900-F-5 Fast Moving Operations/Nuclear Density Testing
900-F-6 Fast Moving Operations – Hi-Low Vehicle
900-F-7 Fast Moving Operations - Self Propelled Asphalite Unit
900-F-8 Mobile Operations - Maintenance Gravelling
900-F-9 Traffic Signal Repairs
900-F-10 Pavement Marking Operations
900-F-11 Sealcoat Operations

G

900-G-1 Short Term Lane Closures
900-G-2 Daylight Detour - Flagpersons Required Continuously

H - Work Zone Traffic Management - Long Term

900-H-1 Traffic Diversion - Long Term
900-H-2 Four Lane Divided Highway - Conversion to 2L2W Operation
900-H-4 Route Detour Signing
900-H-5 Truck Entrance Signing
900-H-6 New 4-Lane Divided Highway Intersection Traffic Control
900-H-7 Overhead Wires

TMP Index – Sign Layout Drawings (Traffic Management Plan Series)

STMP Index – Sign Layout Drawings (Special Traffic Management Plan Series)

SS - Traffic Sign Schedule

SSB - Traffic Sign Schedule (Bilingual Signs)

WORK ZONE POLICIES
ALPHABETICAL INDEX

Apparel – Department Employees	900-A-4
Asphalite Unit – Fast Moving Operations	900-F-7
Barricades	900-B-9
Benkelman Beam – Fast Moving Operations	900-F-2
Bench Cuts	900-B-11
Bilingual Traffic Signing	900-A-7
Bridge Inspection	900-E-3
Channelizers - Types	900-B-12
Coordinator - Traffic Control	900-C-2
Detour – Daylight	900-G-2
Detour Signing	900-H-4
Devices – Basic Requirements	900-B-1
Devices – Enhanced Traffic Control	900-B-15
Devices – Maintenance	900-B-1
Devices – Removal	900-C-5
Drill Truck – Fast Moving Operations	900-F-3
Drums	900-B-12
Fast Moving Operations – Asphalite Unit	900-F-7
Fast Moving Operations – Benkelman Beam	900-F-2
Fast Moving Operations – Drill Truck/Coring Vehicle	900-F-3
Fast Moving Operations – Hi-Low Vehicle	900-F-6
Fast Moving Operations – Nuclear Density	900-F-5
Fast Moving Operations – Profilograph	900-F-4
Flagperson	900-B-2
Four-Lane Divided Highway Intersections (new locations)	900-H-6
Four-Lane to Two-Lane Two Way Conversion	900-H-2
Gateway Assembly	900-B-10
Gravel Windrows	900-B-11
Hazard Markers	900-B-11
Hi-Low Vehicle – Fast Moving Operations	900-F-6
Highway Traffic Act	900-A-1
Lane Closure – Long Term	900-H-1
Lane Closure – Short Term	900-G-1
Maintenance Gravelling – Mobile Operation	900-F-8
Mobile Operation – Maintenance Gravelling	900-F-8
Nuclear Density – Fast Moving Operations	900-F-5
Overhead Wires (signing)	900-H-7
Passing Restrictions	900-B-8
Pavement Edge Drop Off	900-B-11
Pavement Marking Operation	900-F-10
Pilot Vehicle Traffic Control	900-C-8
Plastic Drums	900-B-12
Poly Posts	900-B-12
Profilograph – Fast Moving Operations	900-F-4
Railways, Working Near	900-B-19
Retroreflectivity	900-B-13
Sealcoat Operations	900-F-11
Signs	900-B-3
Signs – Maintenance	900-B-14

Signs – Placement	900-B-4
Signs – Portable	900-B-5
Signs – Spacing	900-B-7
60 km/h When Passing Workers Signing	900-C-7
Speed Limits	900-C-6
Stringline Installation	900-B-17
Survey Crew Signing	900-A-6
Temporary Overlay Marker Installation	900-B-18
Temporary Storage of Objects in Right-of-Way	900-B-21
Traffic Control - Coordinator	900-C-2
Traffic Management Plans	900-C-1
Traffic Signal Repairs	900-F-9
Transition Tapers	900-C-4
Truck Entrance Signing	900-H-5
Vehicles - Visibility	900-A-5
Visibility - Clothing	900-B-16
Visibility - Vehicles	900-A-5
Work Zone - Components	900-C-3
Work Zone – Low Speed	900-D-1
Work Zone – Mobile	900-F-1
Work Zone – Off Road Work	900-E-1
Work Zone – Shoulder Work	900-E-2
Work Zone Areas - Activity	900-C-3
Work Zone Areas - Advance Warning	900-C-3
Work Zone Areas - Buffer	900-C-3
Work Zone Areas - Termination	900-C-3
Work Zone Areas - Transition	900-C-3

Purpose

The Manitoba Infrastructure and Transportation provides uniform policies and standards for traffic control devices in work zones on or adjacent to Provincial Trunk Highways and Provincial Roads. Traffic control devices include signs, delineators, channelizers, barricades, pavement markings, lighting devices, flagpersons/flagging equipment, and any other device placed upon a public roadway which warns motorists of changing conditions or provides for the safe movement of traffic. All organizations performing work on or adjacent to a highway are required to install and maintain such traffic control devices as identified in this policy/standard as necessary to provide a safe work environment and ensure safe passage for the travelling public.

Policy

All employees, contractors, and utilities doing work on or adjacent to Provincial Trunk Highways and Provincial Roads are required to implement and maintain a Work Zone Traffic Management Plan consistent with the Policies and Standards outlined herein.

Standard

The standards contained herein are minimum standards and may have to be increased to accommodate traffic safely.

Modifications must be approved by the Director of Traffic Engineering or his representative before plans are implemented in the field to ensure that the safety of workers and motorists is not compromised.

Driver Expectations

Primarily because of driver expectations, safety in construction and maintenance zones is difficult to achieve effectively. Although most motorists understand that unusual roadway conditions may be encountered, the general expectation is that evasive actions or significant reductions in vehicle speed will not be required.

While maintenance and construction activities can be unexpected, most maintenance and construction zones are relatively static, providing the traffic authority with the opportunity to provide effective warning or guidance through the zone.

Effectiveness of Traffic Control Devices

For the most part, this warning or guidance can be provided through the use of standard traffic control devices. To achieve optimum effectiveness, the traffic control at all maintenance and construction zones **must** be regularly reviewed and enhanced where required:

Motorist safety is generally most compromised in construction and maintenance zones during hours of darkness. Consequently, the adequacy of traffic controls in these areas, particularly detours, **must** be regularly reviewed, especially at night to ensure that the intended traffic control is not compromised. This review should include an assessment of:

- sign reflectivity
- sign lateral, longitudinal and vertical position
- relationships between other temporary or permanent traffic control devices

Only those temporary signs and devices that are approved by the Department may be used on the highway right-of-way. All signs and devices must be reflectorized to show the same colour by night as by day, and the reflectivity levels must be maintained by cleaning or replacing signs, etc. when necessary.

Special emphasis is required when a speed drop greater than 30 km/h is encountered, between the normal highway travel speed and the speed necessary to smoothly and safely traverse a detour or construction area.

Positive Guidance

Where possible, positive guidance (pavement markings, plastic drums, cones, delineation, etc.) must be provided through a work area or detour. Under all circumstances this positive guidance should always create a consistent visual image. This is created by ensuring both uniform spacing and uniform offsets of the delineators/channelizers. If uniform offsets are not possible, smooth transitions from one offset to another must be used to avoid abrupt changes in the visual roadway alignment.

As oncoming headlights may obscure the change in alignment, special emphasis such as illumination, positive guidance, or flashing arrow boards may be required at the transition from four-lane divided to a two-lane two-way (2L2W) highway where a change in alignment occurs.

To obtain adequate impact, under some circumstances, traffic control devices (signs, pavement markings, etc.) may be enhanced by:

- oversizing signs
- supplementing with fluorescent orange flags
- removing unnecessary existing signs (route markers, guide signs, etc.)
- roadway illumination

Under some circumstances, the existing speed limit signs in the work area should be removed or covered.

When one side of a divided highway is closed and the other side is used to carry two-lane, two-way (2L2W) traffic, the opposing traffic flows must be separated from each other by some form of a physical barrier such as cones, delineator posts, plastic drums or portable concrete barriers or plastic water-filled barriers.

Requirements of The Highway Traffic Act (HTA):

- Section 74 - "All contractors' and Department vehicles, unless physically engaged in maintaining or constructing a highway, must comply at all times with the rules of the road as established in The Highway Traffic Act."

- Section 77(7) - "The closest construction traffic control device shall not be further than 450 m from the start of the work area."

- Section 77(9) - "Construction traffic control devices shall be removed when the work is sufficiently completed to render it unnecessary for the devices to remain in place."

- Section 81 - Only those traffic control devices approved by the Highway Traffic Board or by the Director of Traffic Engineering may be used on provincial highways.

Lane Widths

Detours with travel speeds of 70 km/h or greater should have clear lane widths of at least 3.7 m, excluding shoulders.

Purpose

The Policies and Standards developed herein establish guidelines to be observed in developing Traffic Management Plans (TMP) for construction and maintenance work zones. These guidelines are directed to the safe and expeditious movement of traffic through construction and maintenance work zones and to the safety of the workforce performing the operations.

The Policies/Standards also sets forth guidelines pertaining to the use, installation, and maintenance of the various traffic control devices required for roadway construction, maintenance, and utility work, and prescribes standards where possible. These guidelines deal with signs, delineators, channelizers, barricades, pavement markings, lighting devices, and flagpersons/ flagging equipment. Several typical situations are included in the Policies/Standards that illustrate the proper application of standard traffic control devices.

Policy

The Policies and Standards developed herein must be used as the primary guide in developing Traffic Management Plans for construction and maintenance work zones. The requirements of future Departmental policy directives, statutory/regulatory provisions, and requirements detailed in specifications of work by contract will override these basic guidelines as applicable. The users of these Policies/Standards are responsible for being aware of any special considerations or requirements pertaining to particular situations.

Standard

Since it is not practical to prescribe detailed application standards for all situations that may arise, it is emphasized that **only minimum desirable standards for normal situations are presented**. When unusual or hazardous conditions prevail, Traffic Engineering Branch must be consulted before changes are made to Traffic Management Plans.

The general guidelines outlined in the Policies/Standards are applicable to all Provincial Trunk Highways and Provincial Roads. However, the traffic control devices guidelines must be interpreted with respect to the specific traffic characteristics of each location. The level of work zone protection should be based on roadway speed, traffic volume, available sight distance, duration of operation, and hazard exposure. Traffic conditions in urban areas are generally characterized by low speeds, wide ranges of traffic volume, limited manoeuvring room, frequent turns and cross movements, pedestrian traffic, and other obstructions. Rural highways are typically characterized by higher speeds, lower volumes, greater manoeuvring room and less interference from turning vehicles, pedestrians, and encroachments.

Although each situation must be dealt with individually, conformity with the general provisions established herein is required. Whenever possible, identical conditions should be similarly treated. Minor variations may be necessary due to field conditions or other governing factors. In such instances, engineering judgement must be used to select the most appropriate devices.

Purpose

Construction and maintenance work zones often present the motorist with unexpected or unusual situations. Consequently, special care must be taken when applying traffic management techniques to these areas. The following principles and procedures contribute to the safety of motorists and workers in construction and maintenance work zones.

Policy

All employees, contractors and utilities doing work on, or adjacent to, highways are required to follow this set of Fundamental Principles when establishing Work Zone Traffic Management Plans.

Standard

Traffic Safety

Traffic safety in work zones must be an integral and high priority element of every project from planning through to completion of the work. The safety of motorists, pedestrians, and workers must be kept in mind at all times.

The safety principles governing the design of permanent roadways should also govern the design of construction and maintenance sites. **The objective should be to route traffic through the work zone using geometry and traffic control devices comparable to those used in normal highway situations.**

A Traffic Management Plan (TMP), in sufficient detail to reflect the complexity of the work project, must be prepared, understood by all responsible parties, and put into operation before the site is occupied.

Construction equipment or vehicles must not be parked so as to obscure or in any way block motorists' view of traffic control devices. Vehicles may only be parked on the roadway if they are being used in the performance of the work.

The travelled way must be kept free of foreign objects such as spilled earth, rock, timber, and other items that may fall from construction vehicles. Materials spilled near or dropped along or across any public travelled roadway must be removed immediately.

Traffic must be channelized with pavement markings, traffic cones, flexible posts, breakaway posts, and other lightweight devices that yield when struck.

To accommodate errant vehicles or emergencies, construction equipment, material and debris must be stored so as to provide an unobstructed roadside recovery area, as wide as practicable.

Traffic Movement

To minimize the disruption of service, traffic movement through work zones should be inhibited as little as possible.

Reduced speed zoning should be avoided as much as possible and must be verified by a traffic engineering analysis.

Abrupt or frequent changes in geometry such as lane narrowing, dropped lanes or transitions that require rapid manoeuvres should be avoided. Except as specified in the TMP, the width and number of lanes available to traffic must not be reduced.

Construction time should be minimized to reduce motorist exposure to potential hazards.

Motorist Guidance

Motorists should be guided in a clear and understandable manner while approaching and traversing construction and maintenance work zones.

Adequate warning, delineation and channelization through the use of appropriate traffic control devices must be provided to assure the motorist of positive guidance throughout the work zone. The traffic control devices must be effective under varying conditions of light and weather to ensure traffic guidance is maintained at all times.

For both long and short duration construction and maintenance projects, inappropriate traffic control devices must be covered or removed to avoid misleading the motorist. On projects of less than several days duration, existing pavement markings may be left in place, but only if the intended vehicle paths can be properly delineated.

Flagging procedures, when used, provide positive guidance to the motorist when travelling through the work zone. The complexity of the work being performed and the TMP will dictate the use of flagpersons.

Operations

Work zones must be regularly monitored under varying conditions of traffic volume, light, and weather to ensure that traffic management measures are operating effectively and that all traffic control devices are clearly visible, clean, and in good repair.

Work zone accident records must be maintained and periodically analyzed to help identify conflicts and to guide officials in improving operations.

During periods of inactivity, including nights, weekends, and holidays, traffic control devices not required for traffic management must be covered or removed. All traffic control devices must be removed when no longer applicable.

Purpose

All Manitoba Infrastructure and Transportation workers who are on the highway or on the right-of-way are exposed to the dangers of traffic. The key to maximum safety while on the roadway is **visibility**.

Policy

All employees of the Department are required to wear Department approved high visibility clothing or approved flagperson's vest and hat whenever they may be exposed to traffic or construction equipment.

Standard

Every employee of the Department who is exposed to traffic will be provided with and wear high-visibility safety apparel that complies with the requirements of CSA Standard Z96-02 High-Visibility Safety Apparel.

This safety equipment must be worn **at all times** when employees are in a situation where they may be exposed to traffic.

Employees have the option to purchase other Department approved high visibility clothing.

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Purpose

All construction and maintenance vehicles that are parked on the highway or on the right-of-way create a hazard for motorists. The key to maximum safety while on the roadway is **visibility**.

Policy

All vehicles of the Manitoba Infrastructure and Transportation, contractors, consultants, or utility companies that are required to park on the road in order for the users to conduct operations on the highway must be equipped with visibility enhancing lighting as defined by Mechanical Equipment Services.

Standard

Every vehicle of the Department, contractors, or utility companies that may be exposed to traffic must be equipped with an approved lighting system. This safety equipment must be in use **at all times** when the vehicle is in a situation where it might pose a hazard to motorists.

Individual Regions or Branches may choose to provide vehicles with higher standard lighting systems for the vehicles in their fleet based on the frequency and nature of exposure.

Purpose

The nature of traditional surveying operations may require personnel to work anywhere outside or within the right-of-way, and for some operations, on the roadway surface or even down the centreline.

Motorists must be adequately warned and regulated for the protection of **workers**. (In many other highway work operations, protection of the **motorist** plays the major part in traffic control strategies.)

Policy

Survey crews must warn traffic by the use of the SURVEY CREW sign (TC-3), supplemented by MAXIMUM 60 WHEN PASSING WORKERS sign (MR-96), or FLAGMAN AHEAD sign (TC-21) as indicated by the following Table I.

Table I

SURVEY CREW SIGNING	
Location of Workers	**Required Traffic Control**
outside right-of-way	Nil
within right-of-way, off shoulder	TC-3
on shoulder, with infrequent highway crossing	TC-3 and MR-96
on roadway surface	TC-3 and TC-21, with flagperson***** per approach direction

***** Note that when flagperson is required (except for isolated, occasional flagging requirements) the FLAGMAN AHEAD sign may supplement OR REPLACE the MAXIMUM 60 WHEN PASSING WORKERS.

i.e. TC-3 and TC-21
OR
TC-3 **and** TC-21 **and** MR-96

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY:
Executive Director
Highway Engineering

Standard

This is a minimum standard. Unusual conditions such as high traffic volumes, high traffic speeds, geometric constraints, and sight restrictions (hills, curves, dust, etc.) may require additional signing.

Where signing is required, survey crews must always be visible to motorists from the nearest survey crew signing sequence, and in any case crews must work no further than 1.5 km away from nearest signing.

Survey crews on right-of-way must be properly attired in flagperson's vest or approved fluorescent orange jacket and approved headgear.

The flagperson should be positioned between 30 and 50 m in advance of personnel on the roadway.

The flagperson must be trained, and properly attired in flagperson's vest and approved headgear with approved flagperson's stop/slow paddle or fluorescent red flag.

Survey crew vehicles parked on shoulder must have four-way flashers operating. Amber flashers are required in construction areas. Where possible, the vehicle should be parked outside the shoulder line on an approach or service road. **In no case should the vehicle be parked adjacent to workers or a flagperson so that it blocks the escape route from an approaching errant vehicle**.

MAXIMUM 60 WHEN PASSING WORKERS signs are not to be used in areas with speed limits less than 60 km/h.

All signs should be placed no closer than 30 m from other **existing** signing, for maximum effectiveness of **all** signing.

Where more than one sign is required, i.e. SURVEY CREW and MAXIMUM 60 WHEN PASSING WORKERS or FLAGMAN AHEAD , these signs should normally be spaced 150 m apart on high speed highways, and 50 m in lower speed urban areas. Portable Speed Reporting signs may be used to supplement MAXIMUM 60 WHEN PASSING signs at the discretion of the Engineer.

Purpose

The province's French Language Services Policy includes a commitment to provide bilingual (English/French) traffic signing for motorists on specified provincial routes.

Policy

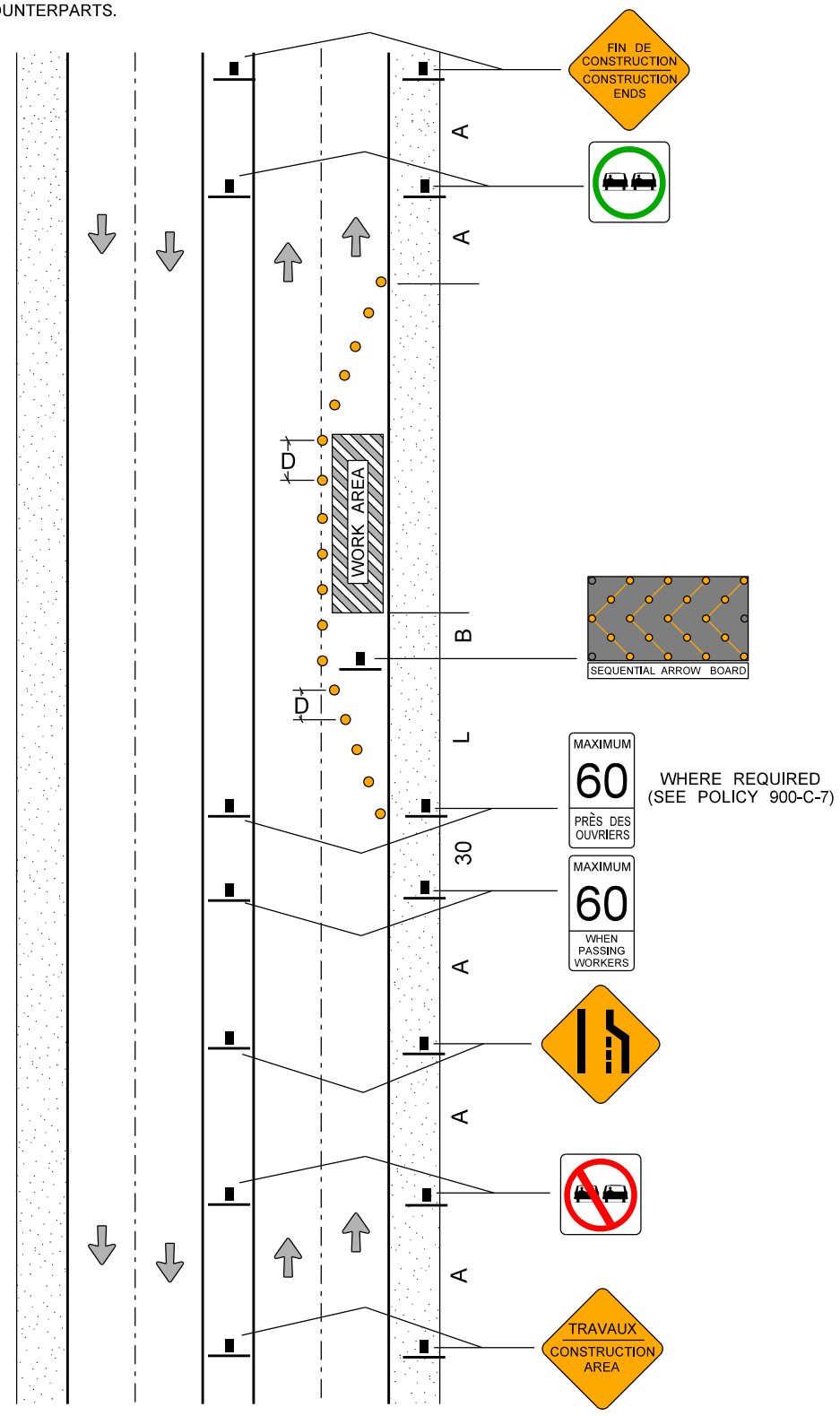
Department construction and maintenance projects will include the use of bilingual highway construction signs on all Provincial Trunk Highways and Provincial Roads that lie within the "Bilingual Traffic Signing area" in Manitoba.

Generally, all of the highway construction signs with verbal messages will be affected by this policy.

The French sign shall be installed behind the English sign, at a distance of approximately 30 m.

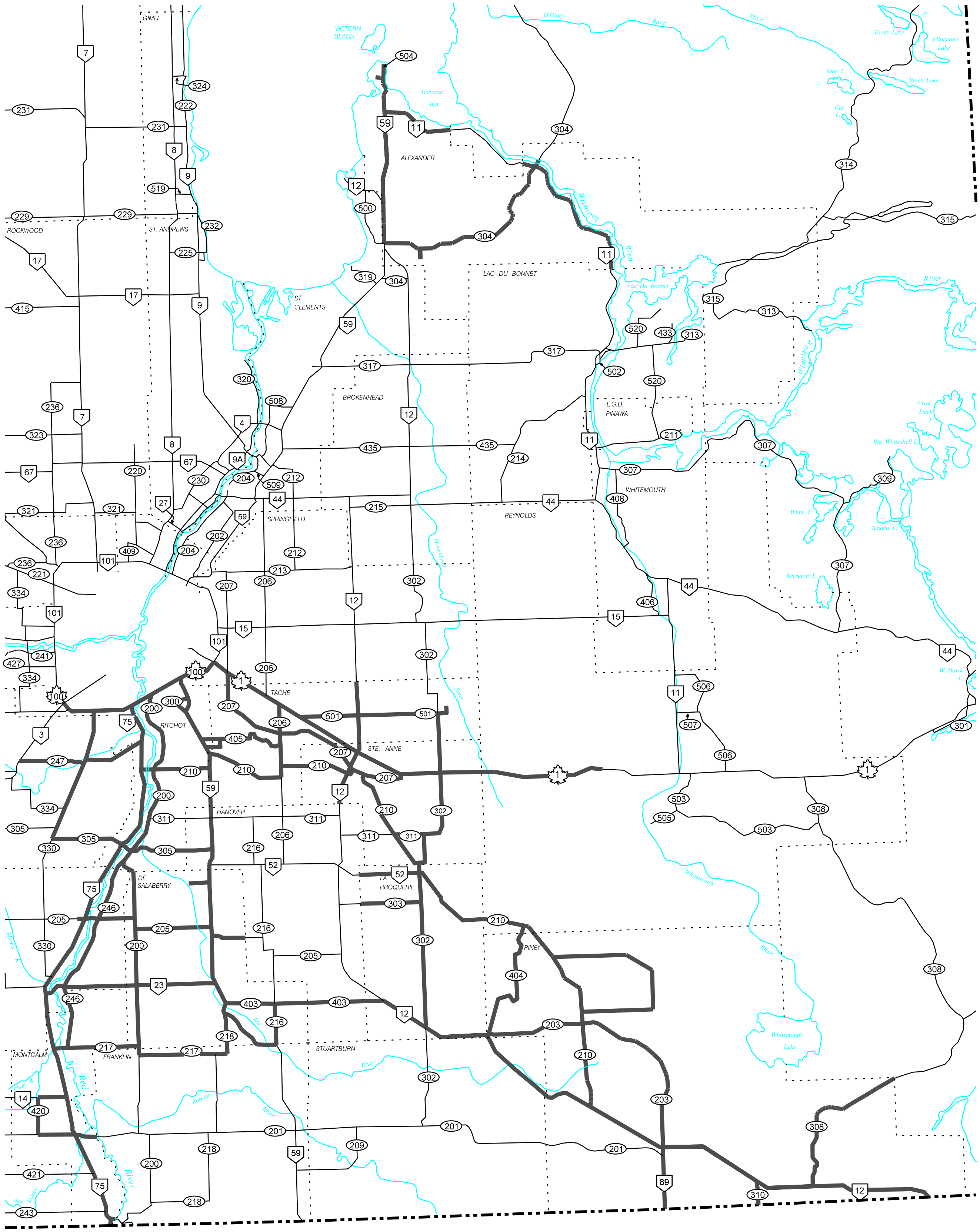
TYPICAL BILINGUAL TRAFFIC CONTROL PLAN

NOTE:
IN BILINGUAL TRAFFIC SIGNING AREAS, THE FRENCH SIGNS ARE TYPICALLY INSTALLED 30 m AFTER THEIR ENGLISH COUNTERPARTS.



S(km/h)	A(m)	L(m)	B(m)	D(m)
50	50	60	35	15
60	50	90	45	15
70	75	120	50	15
80	100	175	55	15
90	100	200	65	20
100	150	250	70	20

WHERE:
S = SPEED LIMIT
A = SPACING BETWEEN SIGNS
L = LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER SPACE
D = SPACING BETWEEN DELINEATION DEVICES



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ALEXANDER
ROCKWOOD
ST. ANDREWS
ST. CLEMENTS
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BROKENHEAD
L.G.D. PINAWA
WHITEMOUTH
SPRINGFIELD
REYNOLDS
TACHE
RITCHOT
STE. ANNE
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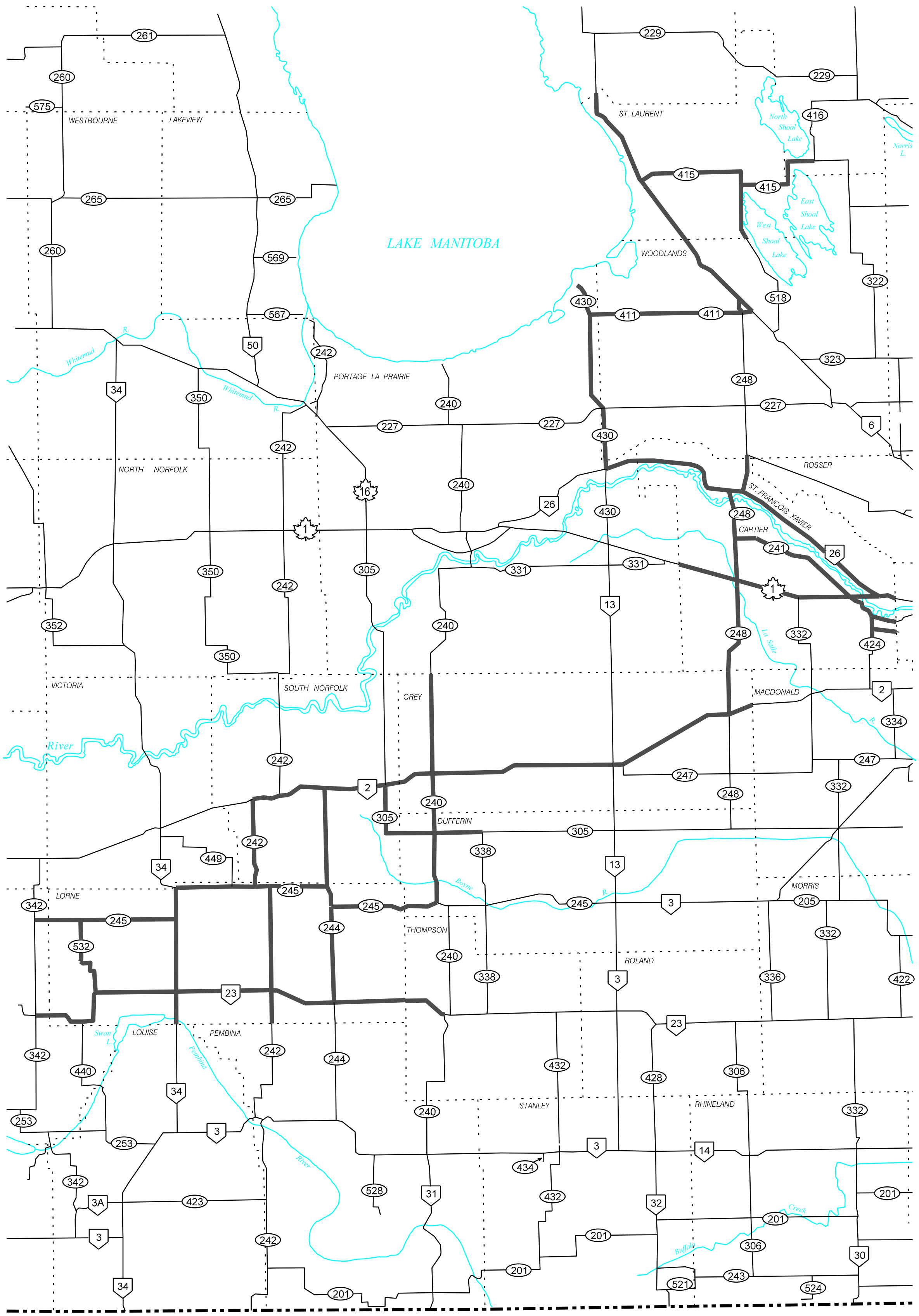
DE SALABERRY
LA BROQUERIE
PINEY
MONTCALM
FRANKLIN
STUARTBURN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LAKEVIEW
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East Shoal Lake
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NORTH NORFOLK
ROSSER
ST. FRANCOIS XAVIER
CARTIER
VICTORIA
SOUTH NORFOLK
GREY
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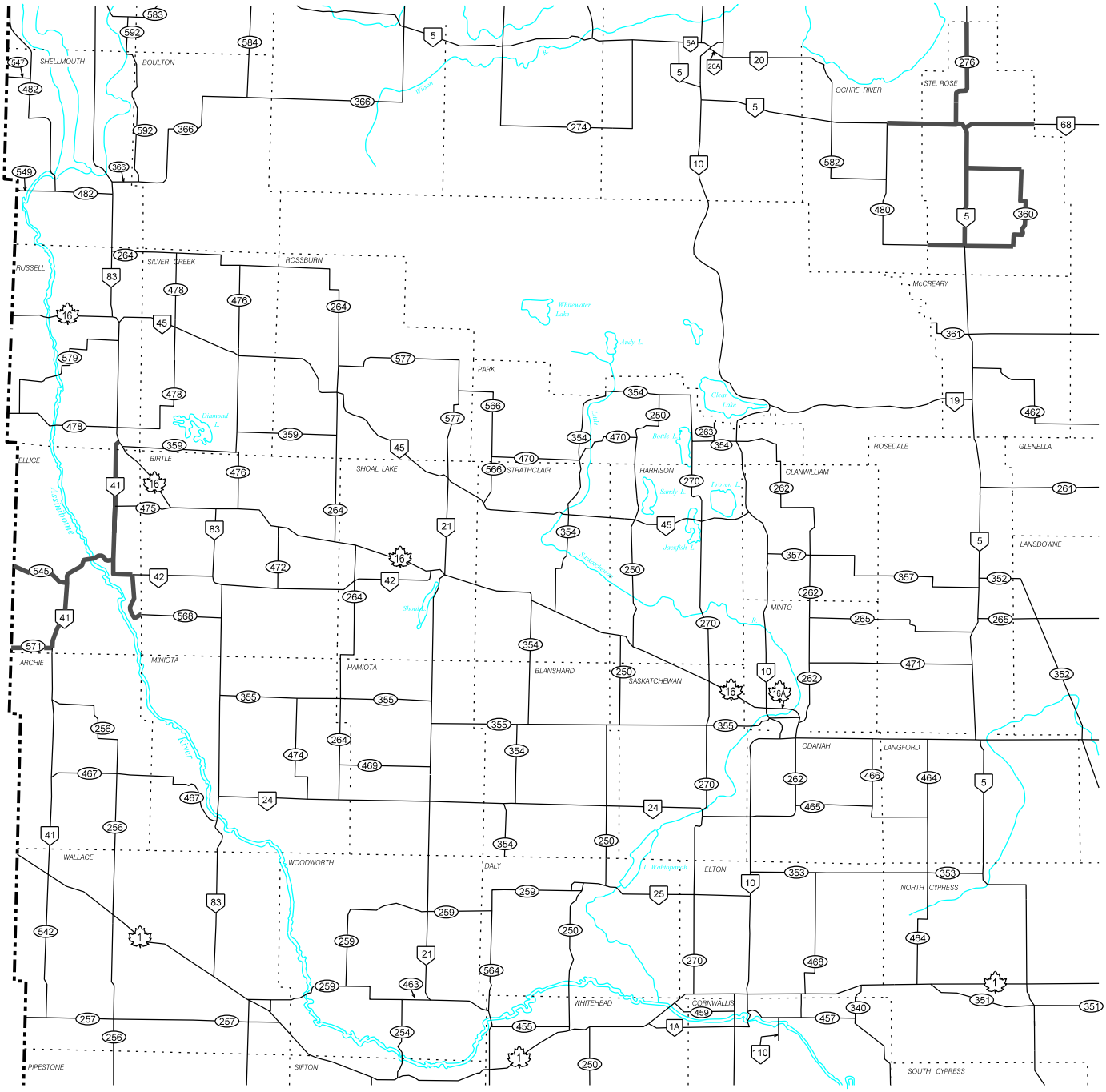
RHINELAND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PARK
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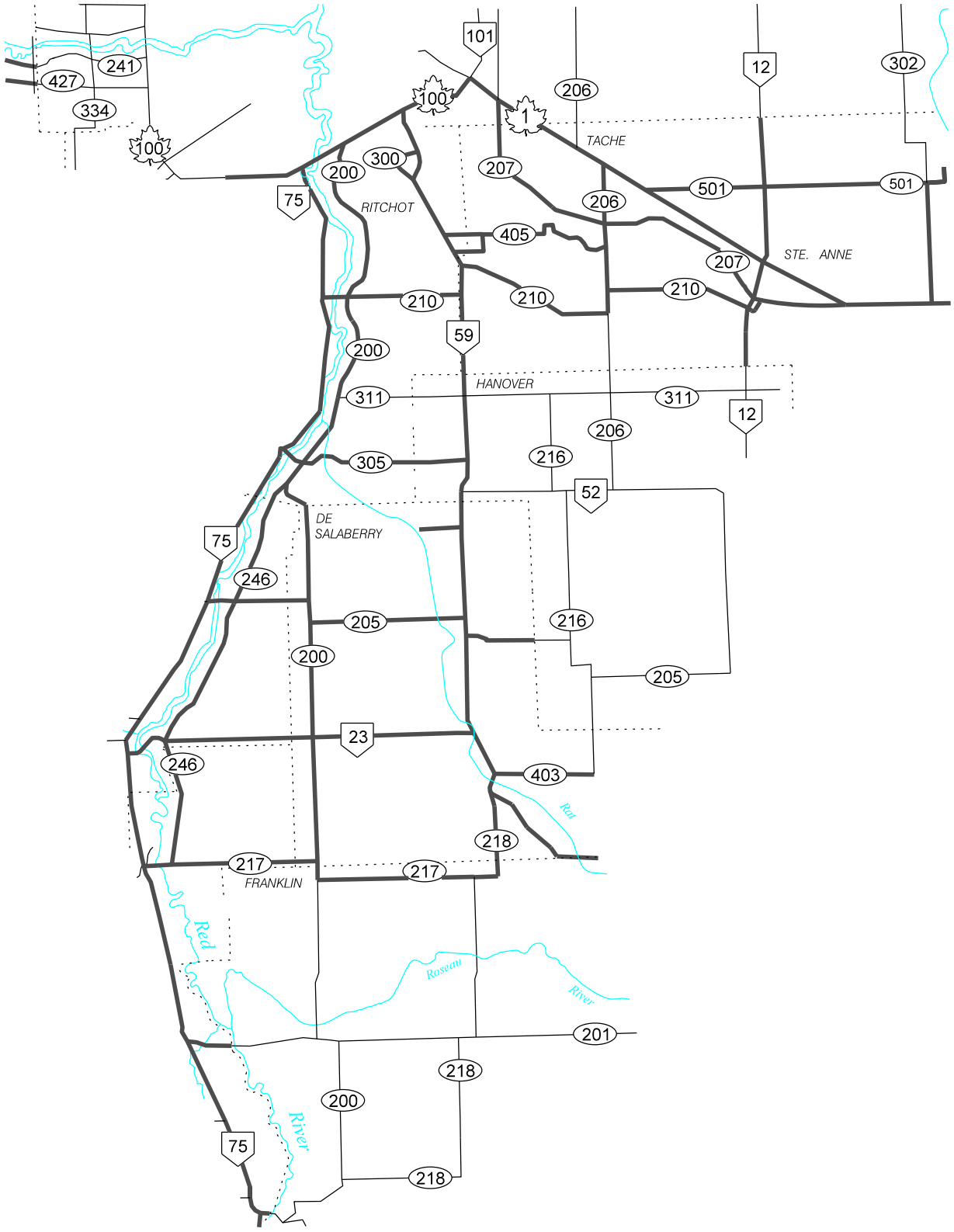
Andy L.
Clear Lake
Bottle L.
Diamond L.
ELLICE
BIRTLE
SHOAL LAKE
STRATHCLAIR
HARRISON
Sandy L.
Proven L.
Jackfish L.
CLANWILLIAM
ROSEDALE
GLENELLA
LANSDOWNE
MINTO
ARCHIE
MINIOTA
HAMIOTA
BLANSHARD
SASKATCHEWAN
ODANAH
LANGFORD
WALLACE
WOODWORTH
DALY
L. Wahtopanah
ELTON
NORTH CYPRESS
WHITEHEAD
CORNWALLIS
SOUTH CYPRESS
PIPESTONE
SIFTON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STE. ANNE
210
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HANOVER
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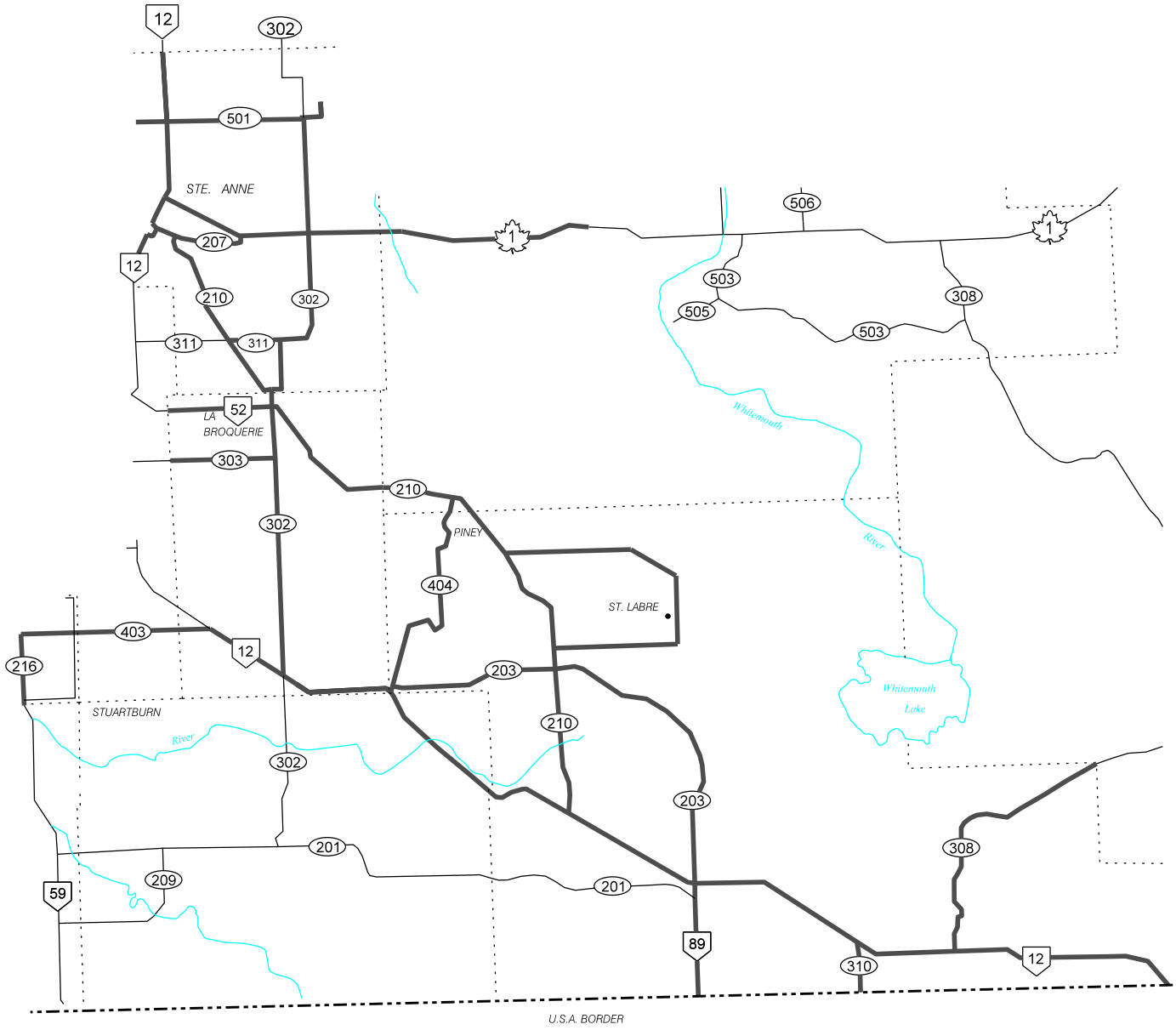
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PINEY
River
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ST. LABRE
403
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216
203
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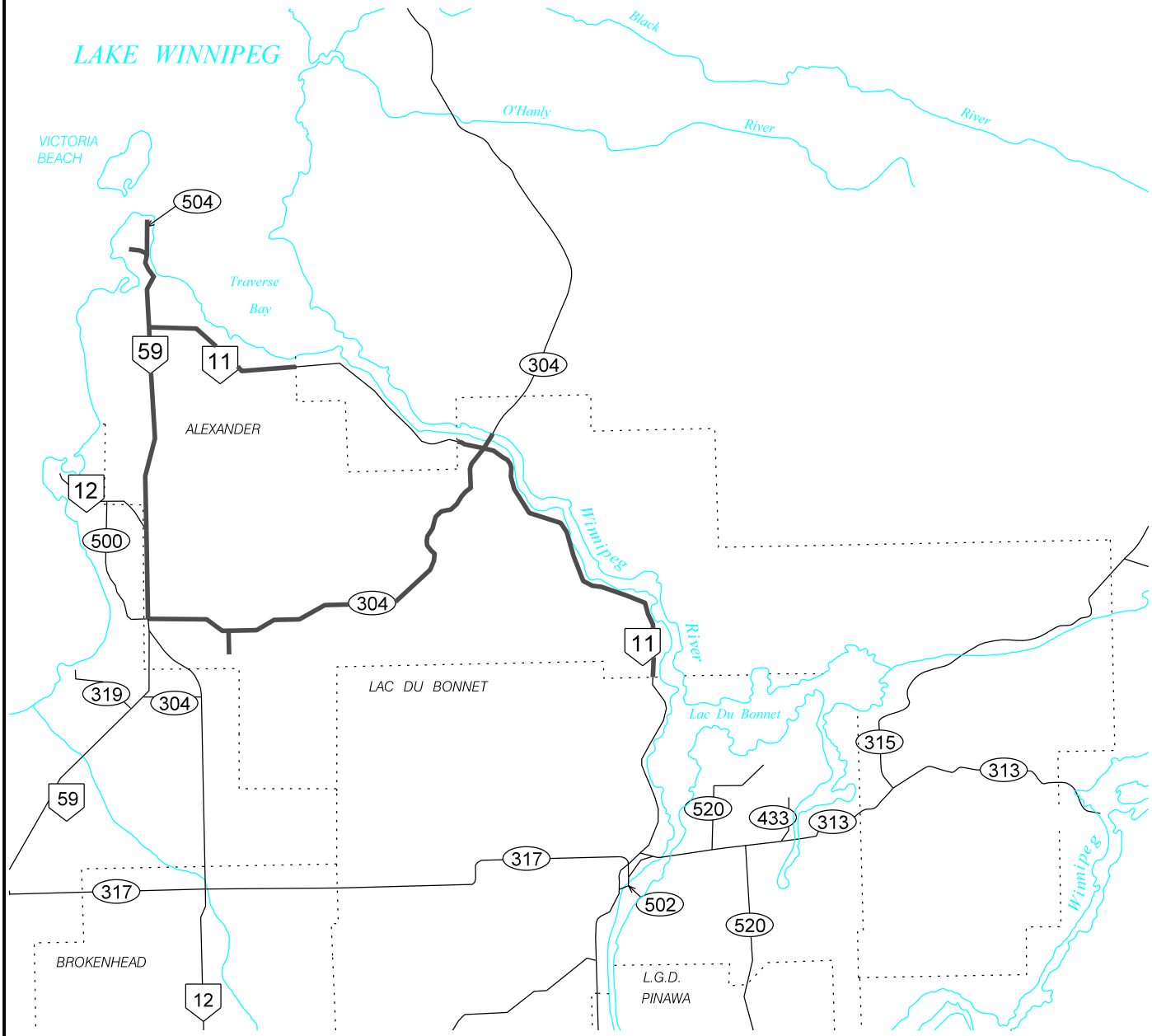
U.S.A. BORDER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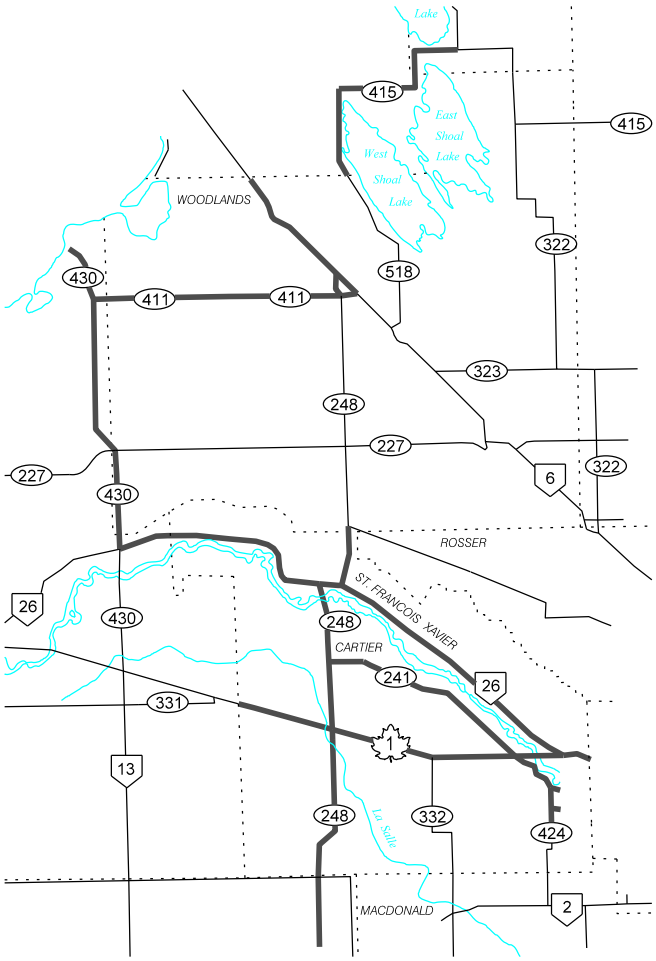
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ROSSER
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La Salle
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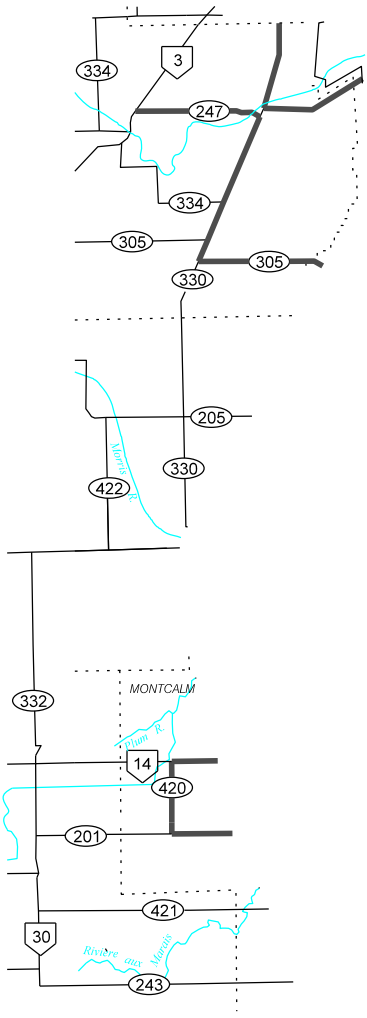
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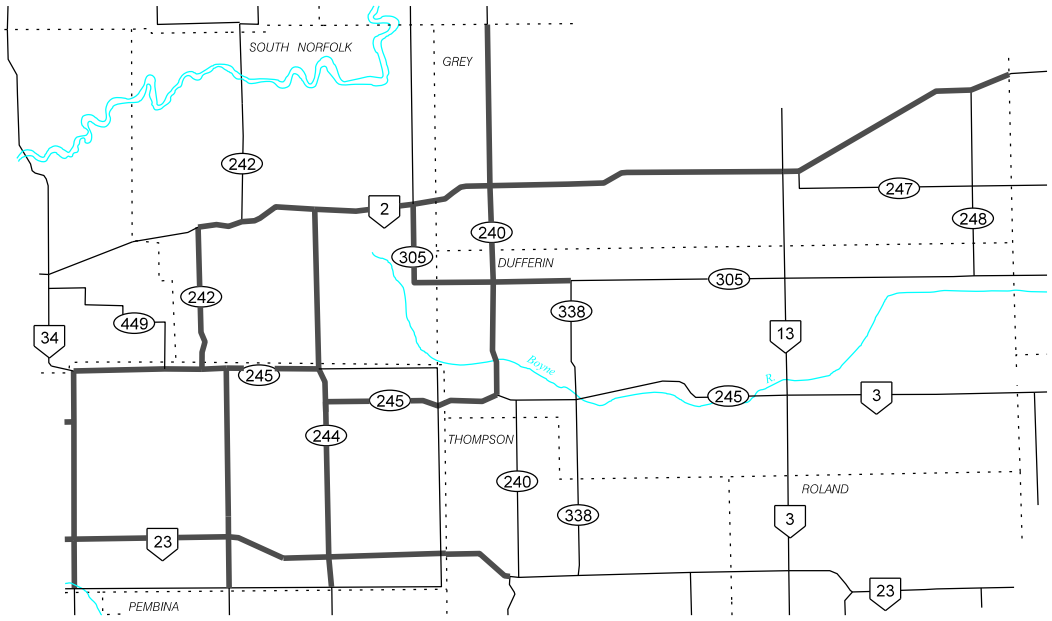
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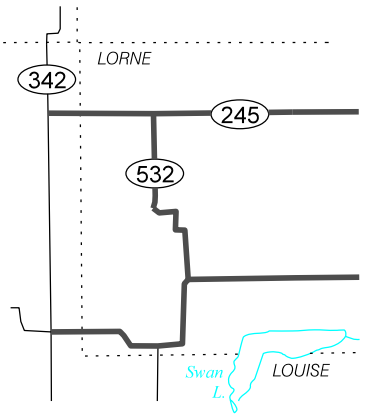
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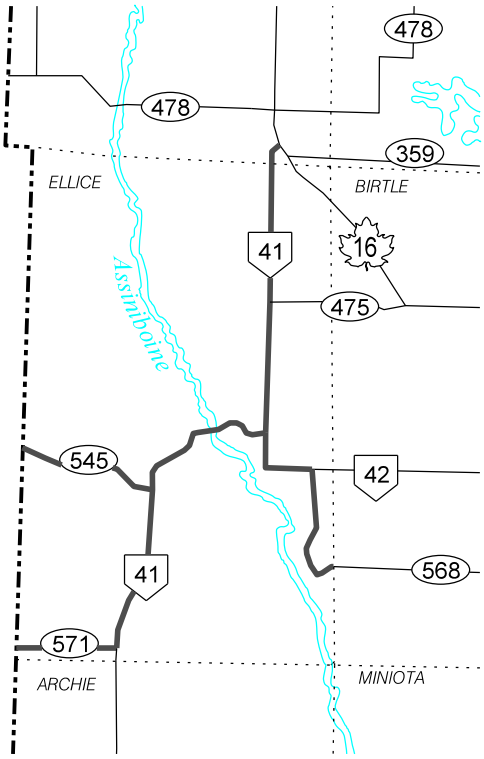
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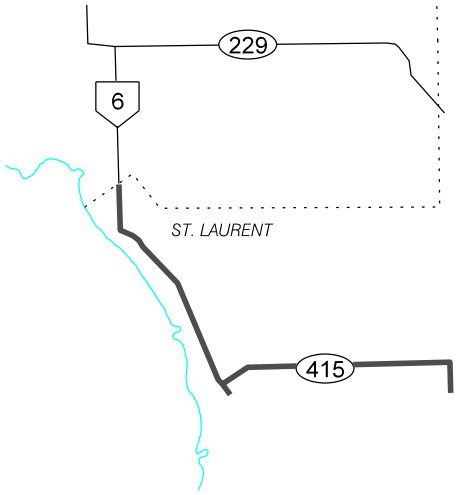
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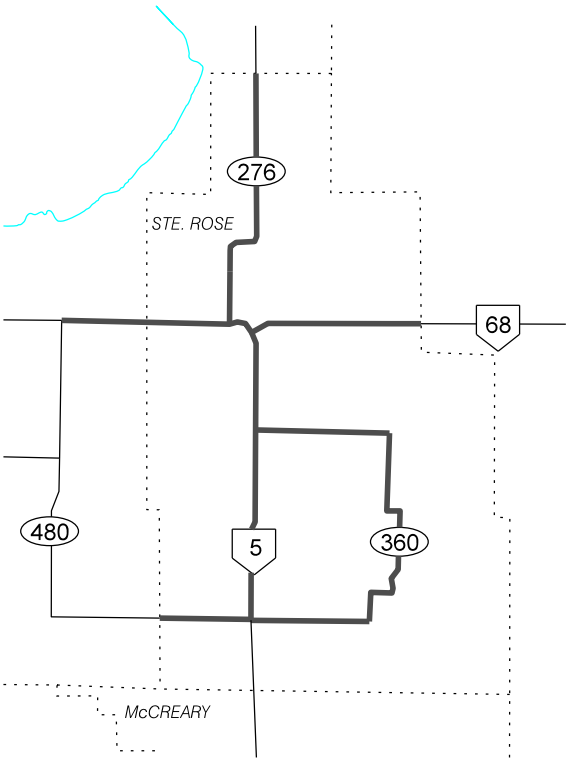
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360
McCREARY

Purpose

A traffic control device is any device placed upon, over or adjacent to a roadway that is intended to regulate, warn or guide motorists and provide for the orderly movement of traffic. In construction and maintenance work zones, traffic control devices are used to ensure safe passage for the travelling public through or around the work area, and to safeguard the personnel involved in the work. Traffic control devices include signs, delineators, channelizers, barricades, pavement markings, lighting devices, flagperson/flagging equipment, and any other device placed upon a public roadway which warns motorists of dangerous conditions or provide for the safe movement of traffic.

Policy

Only those devices that are approved by the Manitoba Infrastructure and Transportation may be used on provincial highway projects. Traffic Engineering Branch must be contacted before any non-standard traffic control device is placed on the road.

Standard

Basic Requirements

To be effective, a traffic control device must meet five basic requirements:

- fulfill a need
- command attention
- convey a clear, simple message
- command the respect of motorists
- give adequate time for proper response

Five basic considerations are employed to ensure that these requirements are met:

- device design
- uniformity
- placement
- application
- maintenance

Device Design

The following design elements must be considered when selecting traffic control devices:

- size
- shape
- colour(s)
- contrast
- composition
- reflectivity
- message simplicity
- message legibility

These design elements combine in various ways to influence how effectively a device meets the basic traffic control device requirements.

Device Uniformity

Traffic control device uniformity aids in recognition, interpretation and message comprehension, simplifying the task of the motorist. Uniformity applies not only to the design of traffic control devices but also to how the devices are used. A standard device used inappropriately is as objectionable as a non-standard device. Misuse can result in disrespect for the standard device at locations where it is needed. Uniformity also reduces the costs associated with device manufacture, installation, maintenance, and administration. Minor modifications of a specified device may be allowed due to necessity. However, the essential device characteristics must be maintained. The *Uniform Traffic Control Devices for Canada* (UTCD) manual should be used as a resource document to help ensure uniformity.

Device Placement

Traffic control devices should be placed within the cone of vision of the motorist (approximately 10 degrees from the roadway alignment) so that they command attention. Devices must be located with respect to the point, object or situation to which they apply to aid in conveying the proper meaning. Device location, combined with legibility, must allow for an adequate response time from motorists travelling at normal speeds. Traffic control devices must be spaced far enough apart to allow a motorist to respond correctly to each in turn, while avoiding rapid or sudden reactions which could cause loss of control.

Device Application

Device application should ensure that sufficient and applicable devices and related equipment are installed to meet the traffic requirements at any given location. The motorist must be guided into and through the work zone by a series of signs and devices which give the driver an opportunity to adjust to upcoming conditions. Devices must be installed only if they are necessary; unnecessary traffic control devices contribute to work zone "clutter" and detract from those that are needed.

Devices must be applied in a uniform and consistent manner. This uniformity allows motorists to anticipate traffic control situations similar to those previously experienced, and helps to ensure they respond properly.

Due to decreased visibility, motorist safety is compromised more at night than during the day. Therefore, traffic control in work zones, particularly detours with speed drops greater than 30 km/h, must be assessed at night as well as during the day to determine the adequacy of the traffic control devices.

The following factors influence how well a system of traffic control devices performs at night:

- device condition
- enhancements
- the "total effect"
- size
- longitudinal position
- reflectivity
- lateral position

The most important factor is the relationship between traffic control devices and other construction and/or permanent devices, i.e., the "total effect". A work zone where the traffic control is relatively straightforward during the day may become quite confusing to motorists at night. The clutter of reflectorized signs, delineators, and barricades can make it difficult to travel through a work zone safely. If work zone traffic control must be left in place overnight, any permanent or temporary devices that are not needed and may tend to confuse motorists must be covered or removed. Special emphasis involving positive guidance, illumination and/or sequential flashers may be required at transitions from four-lane divided highways to two-lane roadways.

Device Maintenance

Maintenance of traffic control devices can be divided into two types - Physical and Functional:

Physical Maintenance - All traffic control devices used in construction and maintenance work zones must be maintained to high standards to ensure that visibility and legibility are retained both day and night. Clean, legible, properly installed devices in good working condition command the respect of motorists. Traffic control devices must be monitored to ensure their satisfactory condition, and if necessary, must be immediately repaired or replaced.
If traffic control devices are left in place overnight, inspections must be performed periodically to ensure that nighttime reflective levels are adequate. Traffic control devices with inadequate reflective levels must be immediately replaced.

Functional Maintenance - Functional Maintenance involves adjusting traffic control devices to changes in work zone conditions. When operations cease due to darkness or a change in the sequence of the work, only those traffic control devices necessary to protect motorists must remain in place. Devices which are no longer applicable must be removed or replaced.
Functional maintenance includes ensuring that the system of traffic control devices operates as specified in the Traffic Management Plans. This includes making sure that only those traffic control devices approved by the Department are used and that no obsolete, inappropriate or otherwise objectionable devices are installed.

Purpose

Traffic signs are used to inform and guide motorists through construction and maintenance work zones. They can convey both general and specific messages through the use of words or symbols.

Policy

Only those signs approved for use in Manitoba may be installed in a construction and maintenance zone. Any existing or temporary signs that become redundant or contradictory because of work zone activities must be promptly removed.

Standard

Application and use of traffic signs are governed by the Highway Traffic Act, and its supporting regulations, and by Manitoba Infrastructure and Transportation policies (including Traffic Engineering Branch Policies 100-A-1 to 100-H-3). Refer to these sources for specific applications on the use of these signs.

In general only those signs listed and described herein may be used in work zones.

Purpose

Sign placement is critical for motorist recognition and legibility. Sign placement standardization cannot always be attained in practice because signs, in all cases, must be placed in the most advantageous position.

Policy

All traffic signs should be located in the most advantageous position for the motorist.

Standard

Notwithstanding that sign positions are dependent on many extraneous factors the following guidelines should be used when installing signs in work zones:

- Temporary signs in construction and maintenance work zones should normally be positioned on the right-hand side of the road. When two or more adjacent lanes accommodate traffic travelling in the same direction, and sufficient space is available on the median, signs must be positioned on both sides of the roadway.
- Signs must be positioned within the cone of vision of the motorist in a location where they will convey their message most effectively.
- On uncurbed roadways all signs, except those mounted on portable sign stands, must be positioned clear of the highway shoulder line by at least 1.0 m.
- On curbed roadways signs must be positioned clear of the curb edge by a minimum of 600 mm in rural areas and 400 mm in urban areas.
- All installations must be mounted so that the sign face is oriented towards oncoming traffic and must be constructed to yield upon impact, minimizing the hazard to motorists.
- For long duration construction and maintenance work, signs should be mounted on minimum 100 x 100 mm wood posts.

- Signs mounted on portable sign stands should be a minimum 600 mm above the surface of the road.
- Signs mounted on more permanent structures should be mounted at minimum 1.5 m above the surface of the road.

Purpose

Signs mounted on approved portable sign stands are suitable for short term projects, maintenance operations or to advise of temporary roadway conditions.

Policy

Portable signs must be installed prior to work commencing and should be moved and maintained as the work progresses. If a portable sign is used to identify a hazardous condition, the sign should remain in place until the hazard has been eliminated.

Standard

Sign stands should be placed on the shoulder, clear of normal vehicular traffic. They should stand vertically facing motorists and must be pinned, ballasted or so designed that wind gusts will not topple the sign. Portable signs should be offset from the adjacent travelled lane as much as the available shoulder width allows. Portable signs should be erected to a minimum height of 600 mm above the surface of the adjacent travelled lane. For enhanced visibility, fluorescent blaze orange flags may be attached to the sign stand.

The use of steel plates, tire rims and other non-approved devices as sign stand bases is strictly prohibited.

When a ballast is needed to keep the sign stands in place, that ballast must consist of loose free flowing granular material contained in a soft, durable bag (sand bag). Rocks, bricks, or any other solid object, must never be used as these can present a hazard to motorists.

The following sign stands are approved by Manitoba Infrastructure and Transportation:

- Flexmast Model PCC3648
- Quadra Flex Model QFVR
- Windmaster Model 4818
- Stellmaster Model 505M

Purpose

Occasionally it is desirable to locate signs in other than typical locations.

Policy

Subject to the approval of the Director of Traffic Engineering sign installations may be located in non-typical locations.

Standard

For specific operations, certain signs may be effectively mounted on the rear of a vehicle stationed upstream of the work or moving along with the work. This may be the working vehicle itself, or a trailing/buffer vehicle provided expressly for this purpose.

Signs should not normally be mounted on barricades. This does not include the CONSTRUCTION ENDS sign (TC-1) which is mounted on gateway assemblies and notes the outer limits of a construction area.

Purpose

The spacing of signs in construction and maintenance work zones must allow a motorist time to understand and respond to a given sign before coming upon the next. In work zones, sign spacing is largely dependent on the posted speed limit.

Policy

On roadways with a posted speed of 80 km/h or less, signs should normally be spaced at least 100 m apart. On roads with speed limits greater than 80 km/h, and on all four-lane divided highways, the sign spacing should normally be at least 150 m. The sign spacing may be adjusted if required by sight distance limitations, work zone conditions, or space constraints. In any case, signs should not be spaced less than 50 m apart.

Purpose

Pavement markings are an integral part of any traffic control system. In some cases they are used to supplement the operation of other traffic control devices such as signs or signals. However, in many instances they stand alone and must obtain results solely on their own merits. This is the case with those pavement markings that advise motorists that sections of roadway have limited sight distance, and that passing is prohibited.

As a consequence **it is imperative that passing restrictions due to limited sight distance be maintained at all times**. In construction and maintenance areas where pavement markings are obliterated, the only effective way of maintaining passing restrictions is through the use of appropriate signs.

Policy

In construction and maintenance areas when pavement markings are obliterated, the beginning and end of all passing restrictions which mark locations of limited sight distance should be identified with signs. These signs should be installed prior to the start of any activity that obliterates the existing pavement markings.

The beginning of passing restrictions should be identified by a PASSING PROHIBITED sign (RB-31), and the end of these passing restrictions identified by a PASSING PERMITTED sign (RB-32). When lengthy passing restrictions are obliterated, additional PASSING PROHIBITED signs should be used at minimum intervals of 1 km to provide ongoing positive warning of the continuing passing restrictions.

PASSING PROHIBITED and PASSING PERMITTED signs should be removed once the pavement markings have been reinstalled.

Purpose

A barricade is used to physically separate traffic from unusual situations created by construction and maintenance work activities or from objects on or near the travelled way.

Policy

A barricade or system of barricades should be used where a collision with an object would be more hazardous than a collision with a barricade. If barricades are found to be more hazardous, traffic cones, plastic drums or other traffic control devices should be used instead. Barricades can also be used to block off a portion or all of a lane or roadway where road closures become a necessity. Barricades must not be used to channelize traffic.

Standard

A barricade may be one of three types: Class A, Class B, or Class C. Each class of barricade consists of one to three barricade boards or rails attached to a frame constructed of wood or other approved lightweight material:

Class A barricade - Two 400 x 1800 mm barricade boards (H-317), spaced 200 mm apart, with a total height of 1500 mm.

Class B barricade - Three 200 x 1800 mm rails (H-316R/L), spaced 150 mm apart, with a total height of 1500 mm. A H-316L board is installed at the top and bottom of the barricade, and a H-316R is mounted in the middle.

Class C barricade - One 200 x 1800 mm barricade board (H-316R/L), with a height of 1000 mm.

Markings for barricade boards must be alternate 150 mm wide orange and black diagonal stripes, reflectorized to a level meeting or exceeding the requirements for Type IV (micro-prismatic) sheeting as described in the ASTM standard D 4956. The predominate colour of other barricade components should be either orange or white. Owner identification must not be imprinted on the reflectorized face of any board or rail, but may be imprinted on the supports or the rear face of the boards.

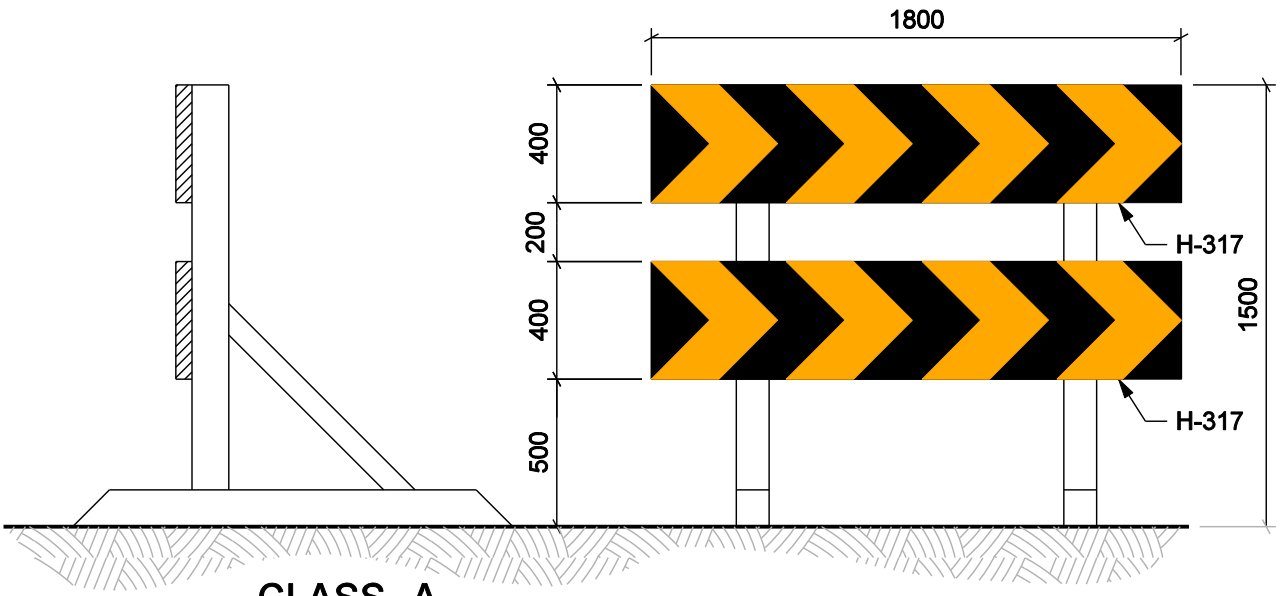
Barricade Applications

The three barricade classes are employed as follows:

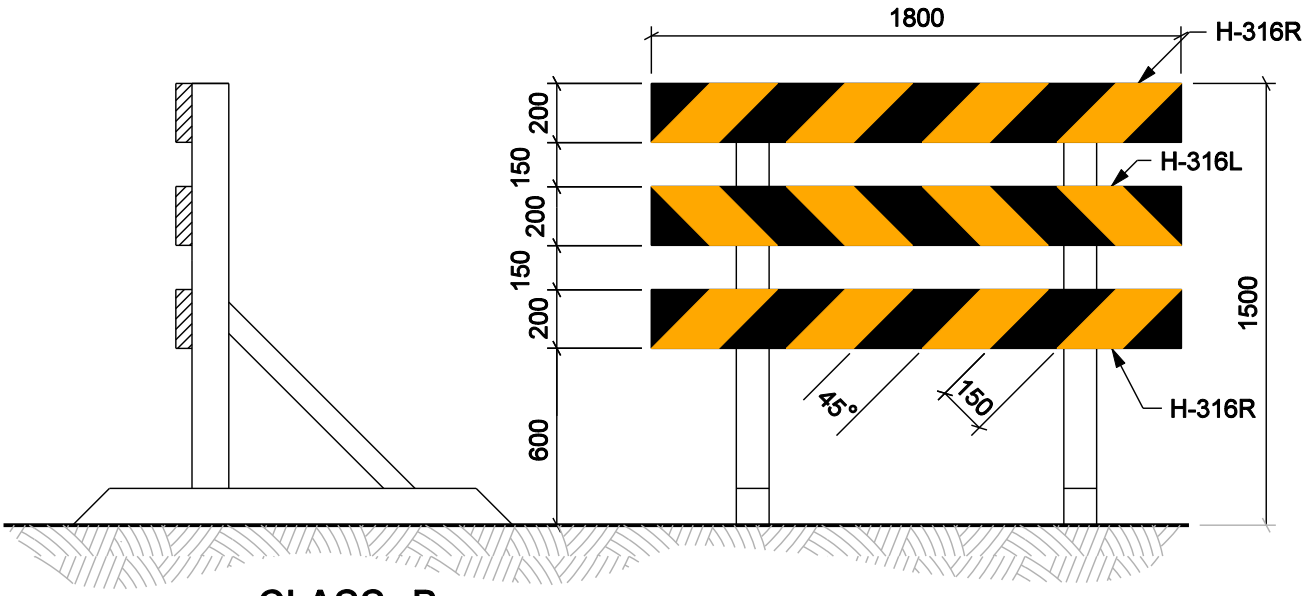
- Class A barricades are used to effect a **lane closure**. They are placed at the end of a transition taper and show the direction of the detour.
- Class B barricades are generally used to effect a **complete roadway closure**.
- Class C barricades may be placed at regular intervals within a work zone in order to **maintain a lane closure**.

Barricades may be used singly or in groups to mark hazards. They must be kept in good repair and cleaned or re-sheeted as necessary to maintain their appearance. A BARRICADE AHEAD sign (MC-4) should be installed to give motorists advance warning of a barricade.

BARRICADE ASSEMBLY DETAILS



CLASS A



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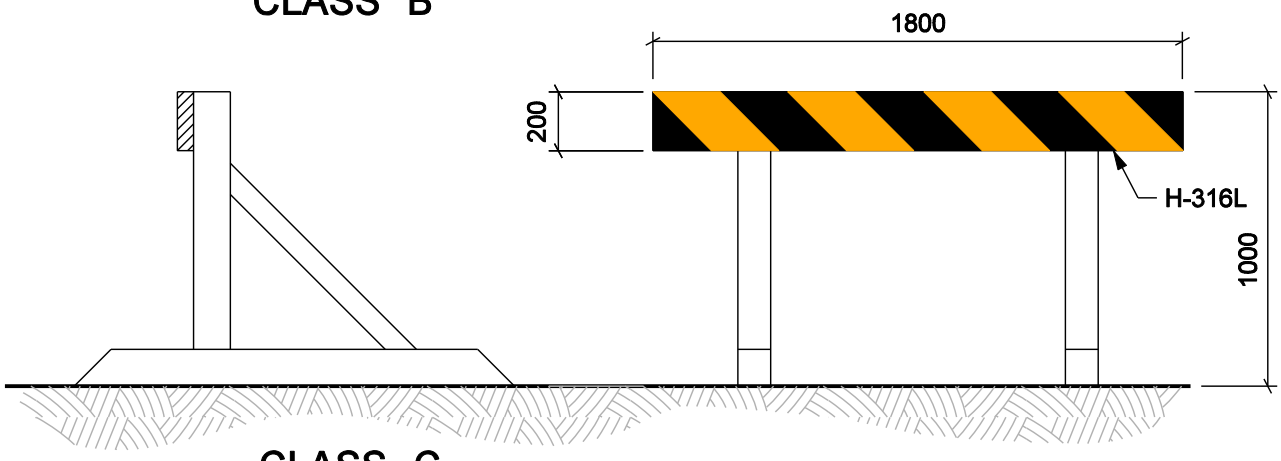


CLASS C

NOTES:
1. BARRICADE BOARDS SHALL BE ORANGE AND BLACK.
2. SUPPORT FRAMES SHALL BE WOODEN AND ANCHORED BY WEIGHTS OR PINS.
3. H-316L IS USED FOR LEFT LANE CLOSURE.
4. H-316R IS USED FOR RIGHT LANE CLOSURE.

Purpose

Gateway assemblies are special barricades used to denote the outer limits of a construction area.

Policy

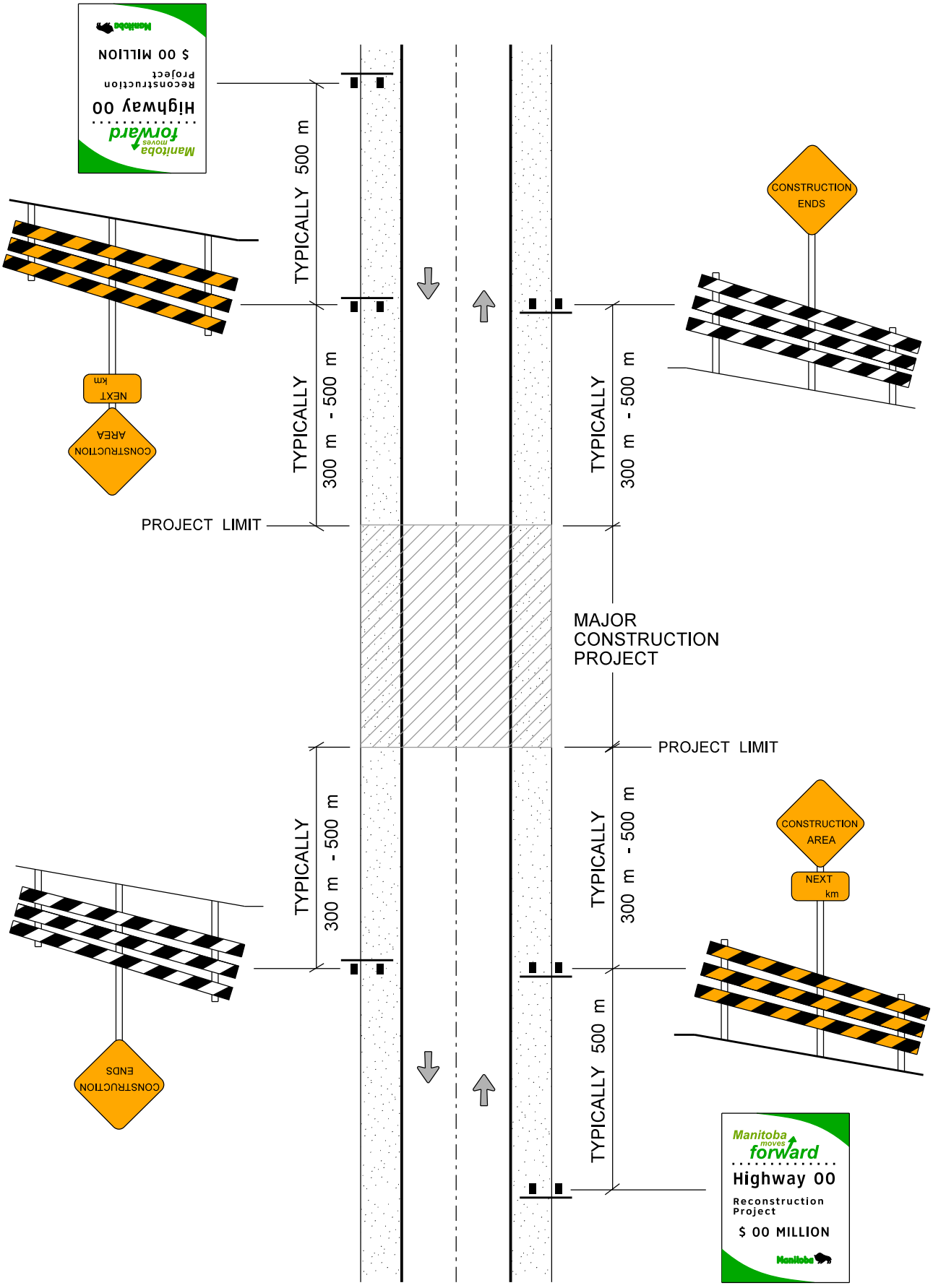
Gateway assemblies must be installed at the limits of a long term construction project as indicated in the Traffic Management Plan (TMP) for that project.

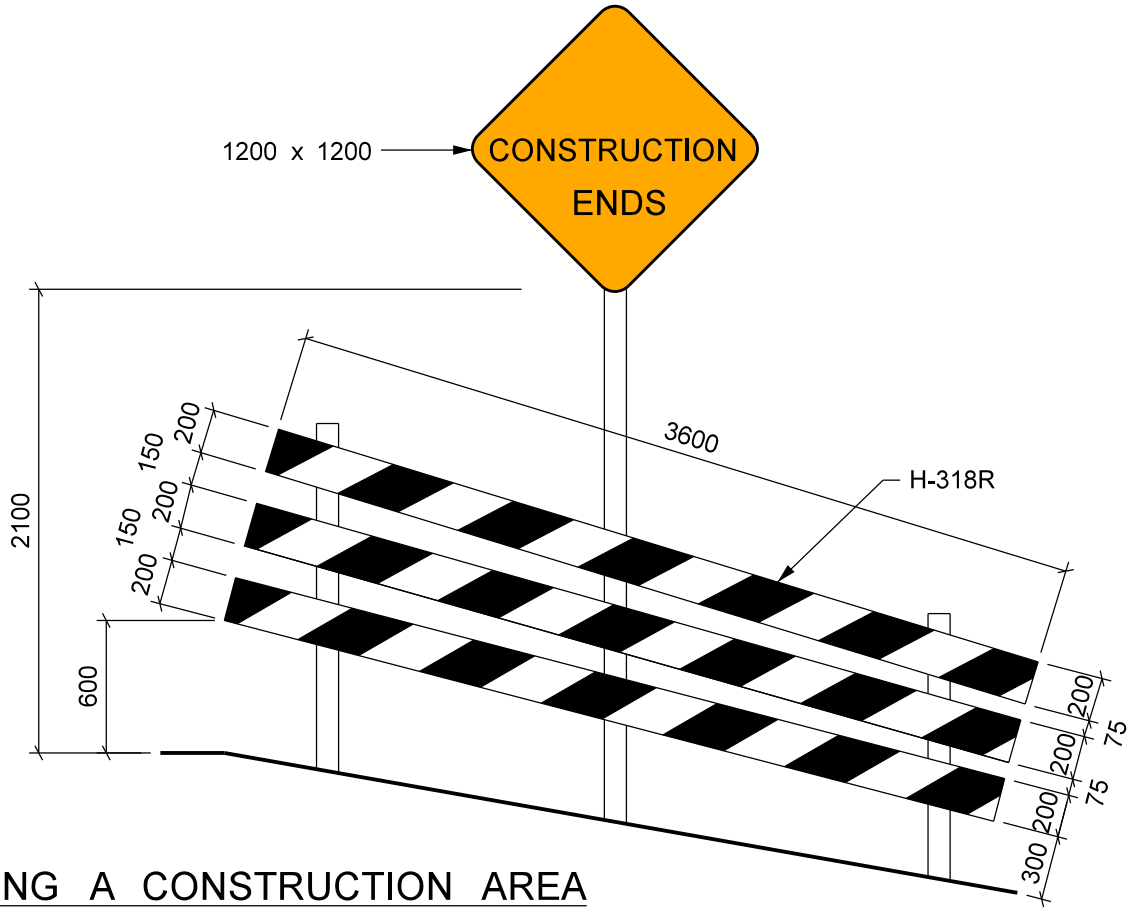
Standard

Gateway assemblies consist of three 200 x 3600 mm double-sided barricade boards (H-318R/L), mounted as shown on page 2. Each board is reflectorized to a level meeting or exceeding the requirements for Type IV (micro-prismatic) sheeting as described in the ASTM standard D 4956 and has 150 mm wide orange and black diagonal stripes on one side and 150 mm wide white and black diagonal stripes on the other. The barricade boards (H-318R)are installed on gateway assemblies placed to the right of traffic and the barricade boards (H-318L) are installed on those placed to the left. Each gateway assembly is equipped with either a CONSTRUCTION AREA sign (MC-1), with a sign tab (WA-28S (orange)) if necessary, or a CONSTRUCTION ENDS sign (TC-4).

A gateway assembly is installed at the break point of the shoulder on each side of the roadway. Gateways are oriented so that the CONSTRUCTION AREA sign and the orange and black side of the barricade boards (H-318R/L) are visible to oncoming traffic. Traffic leaving a construction area shall see a CONSTRUCTION ENDS sign and the white and black side of H-318R/L rails.

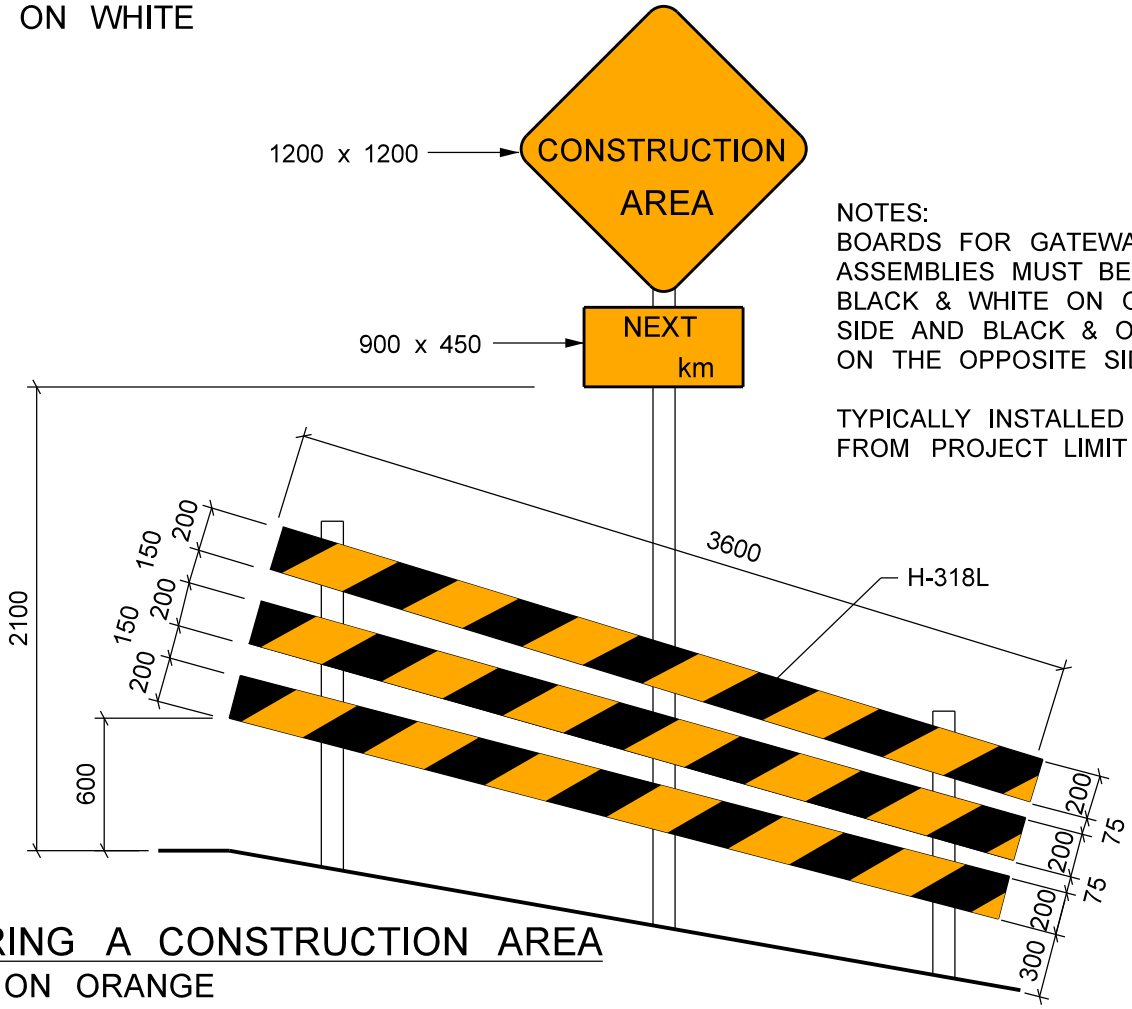
TYPICAL GATEWAY ASSEMBLY LAYOUT





LEAVING A CONSTRUCTION AREA

BLACK ON WHITE

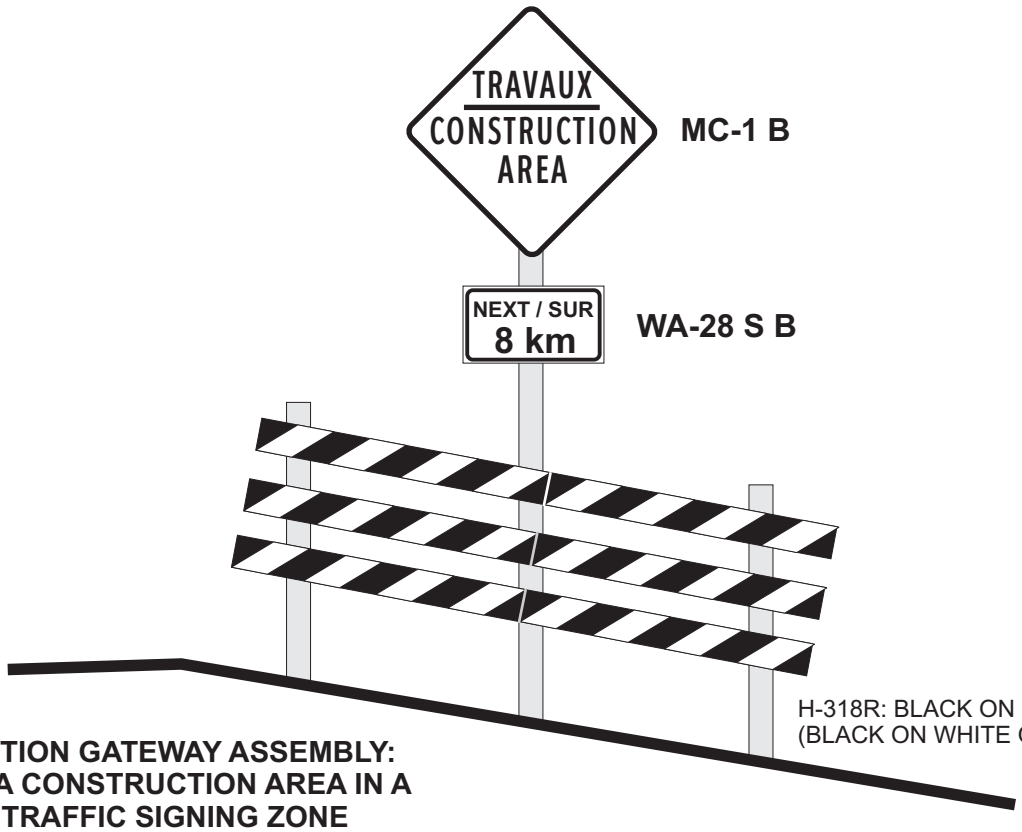


NOTES:
BOARDS FOR GATEWAY ASSEMBLIES MUST BE BLACK & WHITE ON ONE SIDE AND BLACK & ORANGE ON THE OPPOSITE SIDE

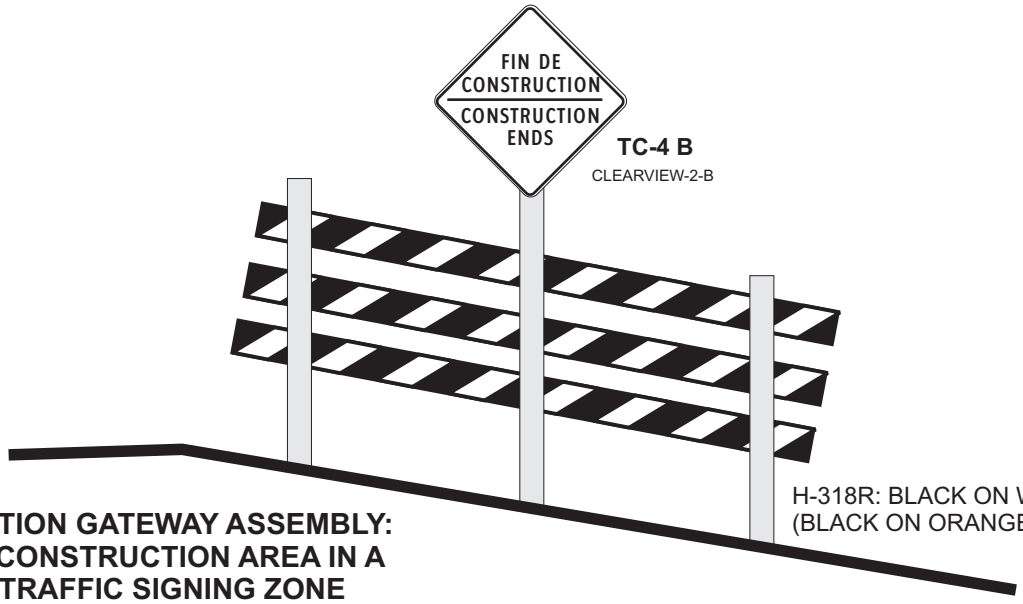
TYPICALLY INSTALLED 500 m FROM PROJECT LIMIT

ENTERING A CONSTRUCTION AREA

BLACK ON ORANGE

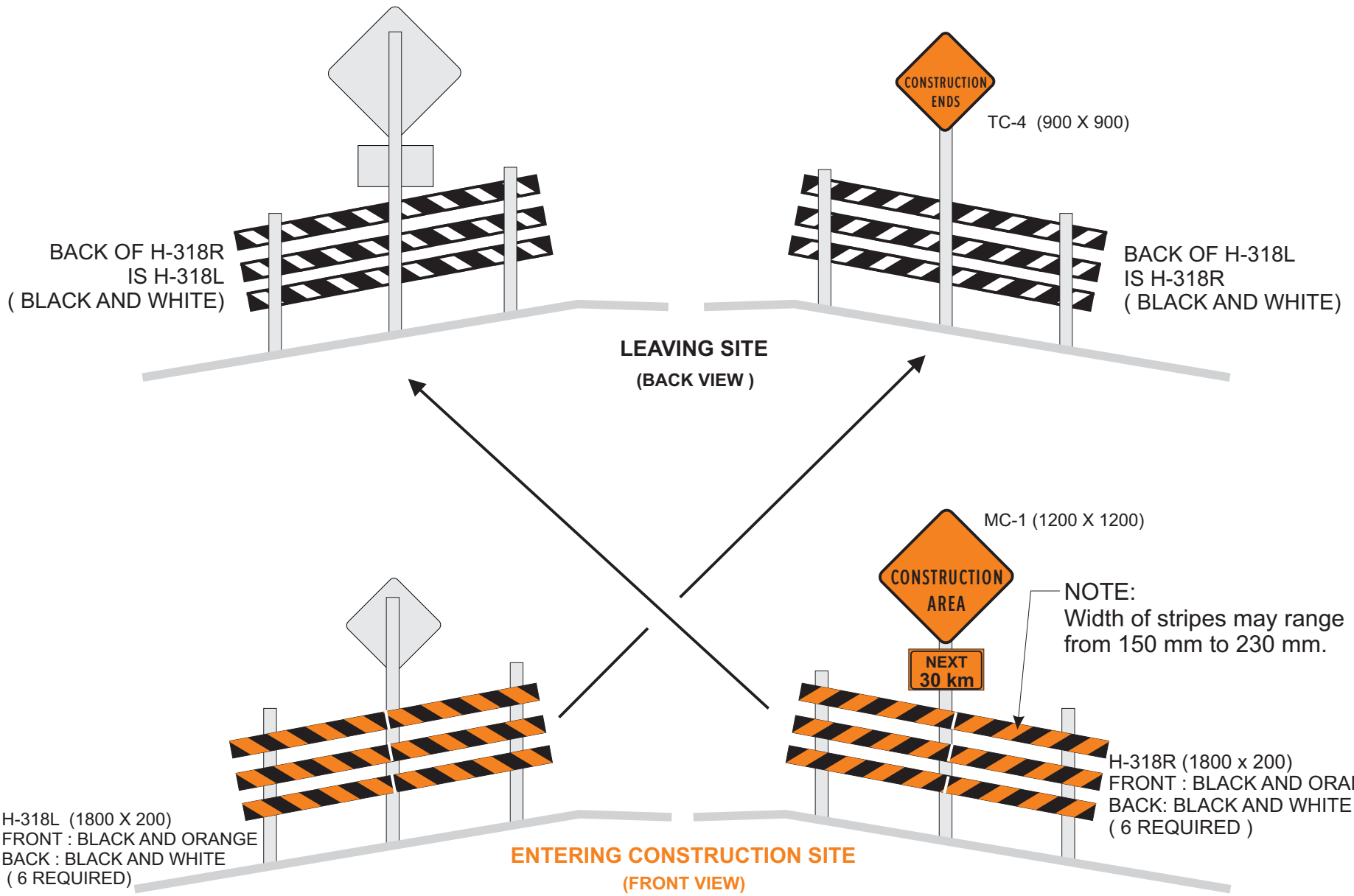


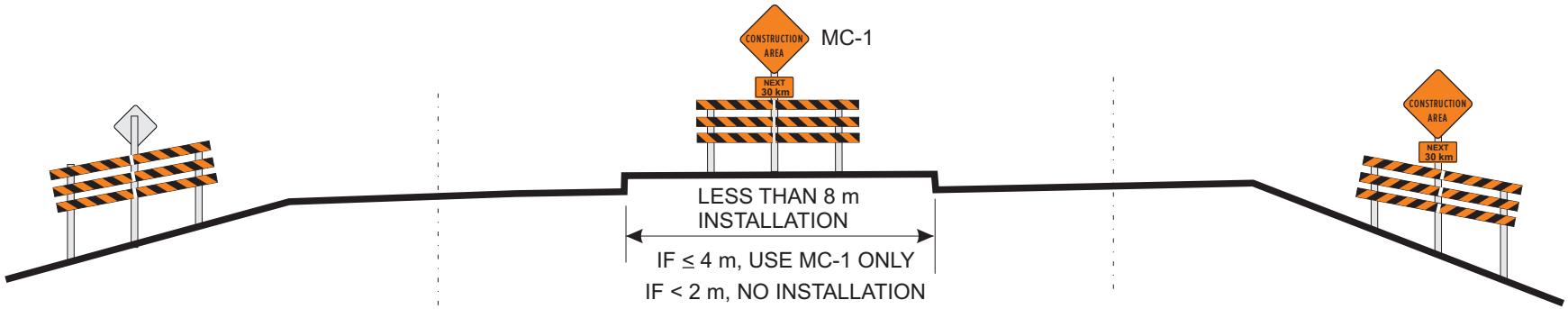
**CONSTRUCTION GATEWAY ASSEMBLY:
ENTERING A CONSTRUCTION AREA IN A
BILINGUAL TRAFFIC SIGNING ZONE**



**CONSTRUCTION GATEWAY ASSEMBLY:
LEAVING A CONSTRUCTION AREA IN A
BILINGUAL TRAFFIC SIGNING ZONE**

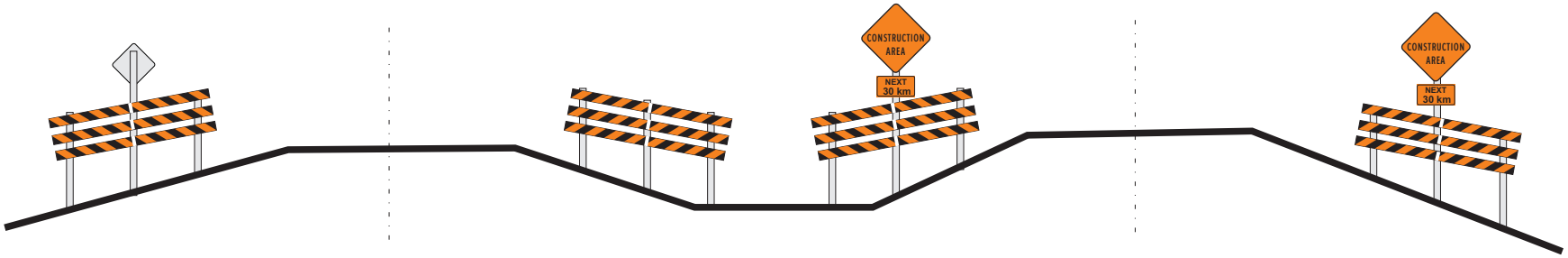
2-WAY TRAFFIC road





CONSTRUCTION GATE ASSEMBLIES
4-LANE DIVIDED HIGHWAY FORMAT

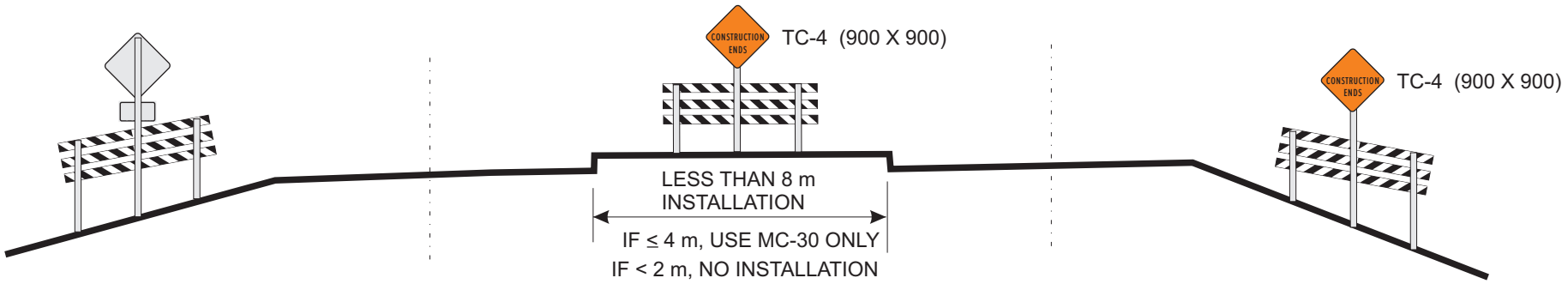
ENTERING CONSTRUCTION SITE
(FRONT VIEW)



CONSTRUCTION GATE ASSEMBLIES
4-LANE DIVIDED HIGHWAY FORMAT

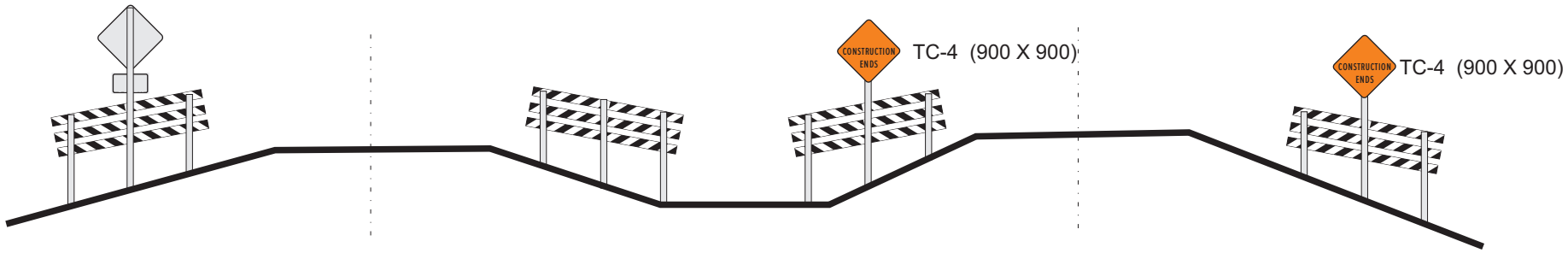
ENTERING CONSTRUCTION SITE
(FRONT VIEW)

4-LANE DIVIDED highway



CONSTRUCTION GATE ASSEMBLIES
4-LANE DIVIDED HIGHWAY FORMAT

LEAVING CONSTRUCTION SITE



CONSTRUCTION GATE ASSEMBLIES
4-LANE DIVIDED HIGHWAY FORMAT

LEAVING CONSTRUCTION SITE

Purpose

Delineation, channelization, and hazard markers warn and alert motorists to hazards associated with construction and maintenance work areas.

Policy

Objects within and adjacent to the roadway which constitute a hazard to traffic require uniform delineation to ensure motorists have sufficient warning to recognise the danger and make a proper response.

Area hazards that require delineation include:

- bridge ends
- excavation areas

Longitudinal hazards that require delineation include:

- gravel windrows
- bench cuts
- pavement edge drop-offs

Standard

Area hazards

Bridge ends and excavation areas must be delineated using either poly posts, drums (900-B-12), or construction markers (H-315T) to ensure motorists have sufficient warning to recognise the hazard and take appropriate action.

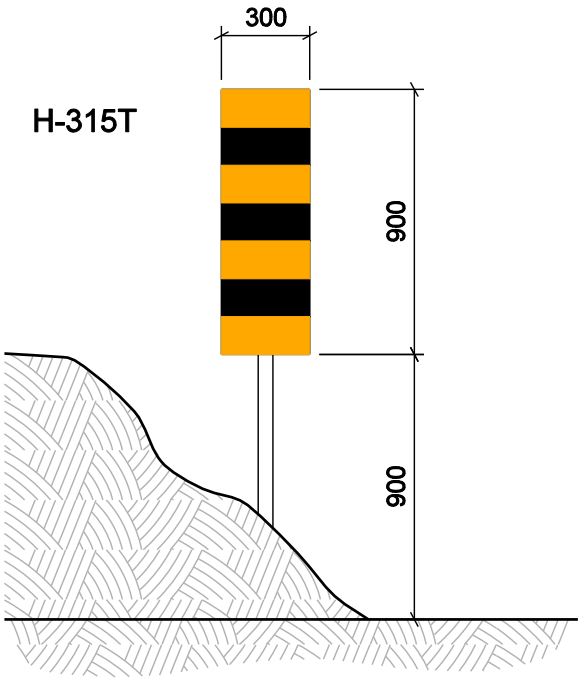
Longitudinal Hazards

Gravel windrows - Construction markers (H-315T) are to be used to delineate all gravel windrows and are to be spaced at 150 m intervals (see TMP-27).

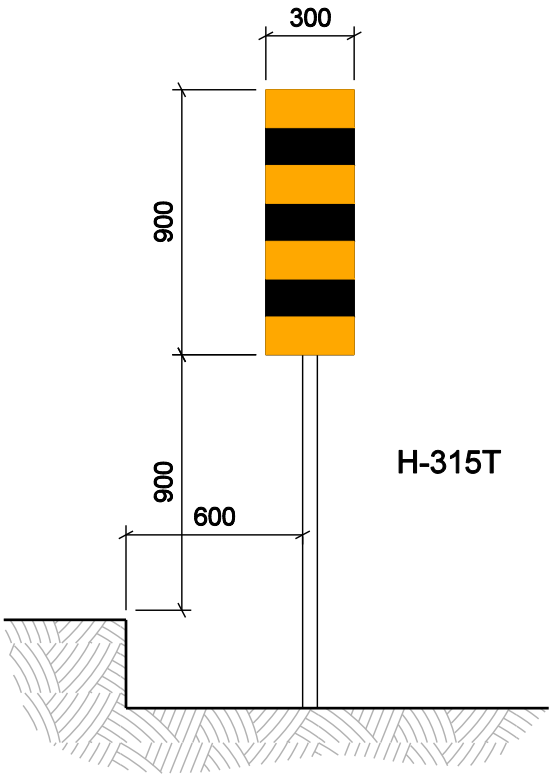
Bench cuts - Construction markers (H-315T) or Department approved reflective poly posts (900-B-12) are to be used to delineate all bench cuts and are to be spaced at 100 m intervals along tangent section of roadway and at 50 m intervals along curves.

Pavement edge drop-offs – Reflective delineators or Department approved reflective poly posts are to be used to delineate all pavement edge drop-offs greater than 50mm in depth and are to be spaced at 100 m intervals along tangent section of roadway and at 50 m intervals along curves.

All channelizers/construction markers are to be located within 600 mm of the drop-off or bench cut.



CONSTRUCTION MARKER DELINEATING A GRAVEL WINDROW



CONSTRUCTION MARKER DELINEATING A BENCH CUT

Purpose

There are several devices available which aid in the guidance of motorists through or around a hazardous area, or work zone.

Policy

All devices intended for delineation and channelization purposes must be approved by the Manitoba Infrastructure and Transportation. They must be designed to yield if struck by an errant vehicle, and must conform with the specifications described herein in terms of size, shape, colour, and reflectivity. Unless otherwise directed, only those delineators and channelizers specified in a Traffic Management Plan (TMP) may be installed in a construction and maintenance work zone. **Traffic cones are intended for daytime operations only and must not be used if the traffic control must be left in place overnight**.

Standard

The following devices are generally approved for delineation or channelization.

It is preferable to use plastic drums for lead in tapers.

Plastic Posts ("Polyposts")

Size:	50 mm diameter x 1000 mm, nominal
Shape:	Tubular
Colour:	Orange post with 200 mm wide white reflective sheeting, nominal
Reflectivity:	High Intensity (ASTM – Type III)

Plastic posts ("polyposts") are available in a variety of sizes and can be used as both delineators and channelizers. They can be implanted in the ground or fitted with bases that can be affixed to the pavement. Polyposts yield when struck by vehicles, are self-recovering and can usually withstand numerous impacts. Only approved polyposts may be used in construction and maintenance work zones.

Traffic Cones

Height: 700 mm, nominal
Shape: Conical with square broadened base
Colour: Orange
Reflectivity: None

Traffic cones are used to channelize traffic and are intended for daytime operations only. **Traffic cones are not reflectorized and must be replaced with different channelizing devices if traffic control is left in place overnight.** Only approved traffic cones may be used in construction and maintenance work zones.

Plastic Drums

Height: 900 mm, nominal
Shape: Rectangular, round or octagonal with square broadened base
Colour: Orange drum with alternate 100 mm wide white and fluorescent orange reflective stripes
Reflectivity: High Intensity (ASTM – Type III)

Plastic drums are generally used in work zones where channelization devices will remain in place for prolonged periods of time. Only approved plastic drums may be used in construction and maintenance work zones.

Concrete Median Barriers

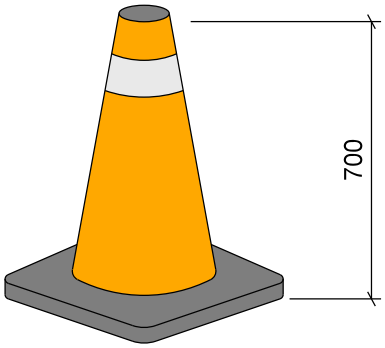
Size: 3 m x 0.5 m x 0.8 m
Shape: F-shaped concrete barriers
Colour: Grey
Reflectivity: None

Barrier ends must be adequate protected so as not to present a hazard to motorists.

Plastic Median Barriers (Triton Barriers)

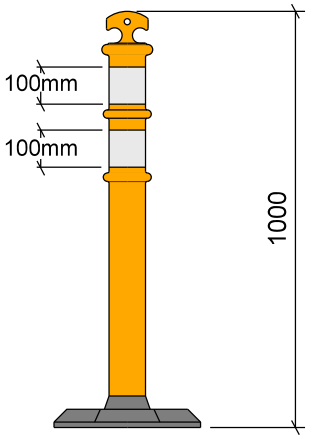
Size: 2 m x 0.5 m x 0.8 m
Shape: Rectangular
Colour: 2 Colours: Orange and White
Reflectivity: None

Barriers must be alternated by colour (i.e., orange, white, orange, white, etc.) Barrier ends must be adequately protected so as not to present a hazard to motorists.

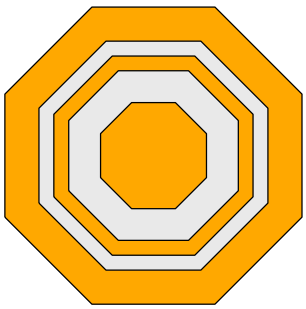


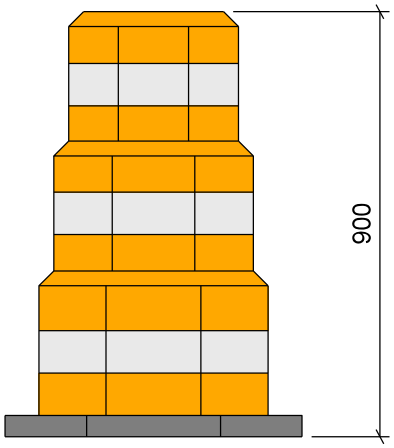
TRAFFIC CONE (MINIMUM DIMENSIONS)

Minimum Reflectivity Level of ASTM Type IV

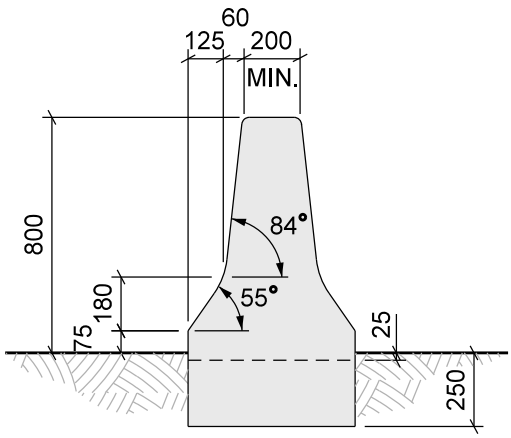


POLYPOST (WITH BASE)

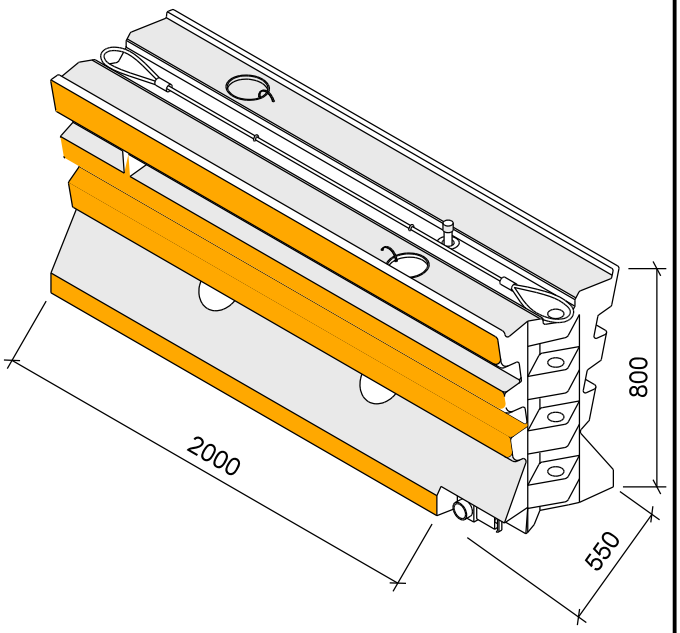




PLASTIC DRUM (MINIMUM DIMENSIONS)



CONRETE MEDIAN BARRIER



TRITON BARRIER (WATER FILLED)

Purpose

Retroreflectivity greatly increases the conspicuity of traffic control devices, particularly in low light and reduced visibility conditions.

Policy

Further to Section A1.6.7 of the TAC MUTCD, all signs and other devices used in construction and maintenance work zones must be reflectorized with a material that has a smooth, sealed outer surface which shows the device in approximately the same shape and colour both day and night.

Standard

The retroreflective sheeting material must be at a minimum high intensity grade ASTM D4556 Type III (or approved equivalent), specified. In situations where extra visibility is required, diamond grade retroreflective sheeting may be used, subject to Manitoba Infrastructure and Transportation approval. **Non-reflective fluorescent sheeting material must not be used**. The retroreflective surfaces must be cleaned or replaced as often as necessary to provide full retroreflectivity.

Purpose

Proper maintenance is essential for the desired performance of traffic control devices.

Policy

All signs and other traffic control devices must be monitored to ensure proper location, legibility and condition. If necessary, inadequate devices must be immediately repositioned, repaired or replaced.

Standard

Reflective surfaces must be kept clean at all times and should be checked at the end of each day. Nighttime inspections must be performed periodically to ensure reflective levels are adequate. Signs with inadequate reflective levels must be discarded and replaced.

If the traffic control is left in place overnight, only those signs necessary to protect motorists must remain in place. Non-applicable signs must be removed or covered.

Purpose

Under some circumstances traffic control devices should be enhanced to better draw the attention of motorists. This can be accomplished through several approved methods.

Policy

When conditions dictate, traffic control devices used in a Traffic Management Plan (TMP) may be enhanced to increase the conspicuity of the devices. Care must be taken not to overdo this process as motorist expectation may be effected. All enhancements require approval of Traffic Engineering Branch.

Standard

The following methods may be used, subject to approval, for the enhancement of traffic control devices:

- Oversizing - Increasing the size of temporary condition signs enhances visibility. However, care must be taken not to throw a group of signs out of balance by installing one that is disproportionately large.
- Flags - Fluorescent orange flags can be attached to temporary condition signs.
- Sequential Flashing Arrow Boards - Flasher units **are recommended** to better indicate a closed lane or merge direction. However, since flashers are susceptible to mechanical or electrical failure they must not be used as a primary device. The work zone must be fully controlled with or without the presence of a sequential flasher unit.
- Reposition Devices - Traffic control devices may be relocated laterally or longitudinally to increase their visibility or to enhance the "total effect" as long as they remain within a motorist's cone of vision.
- Illumination - External illumination may be used to increase nighttime visibility.
- Reduce "Clutter" - Existing signs or other traffic control devices that are not necessary to protect motorists should be removed.

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Purpose

For safety reasons, all workers exposed to vehicular traffic on a project site must be visible to motorists. (See Policy 900-A-4 “Worker Visibility on Roadway”) This includes anyone walking on or adjacent to any roadway that is open to vehicular traffic.

Policy

All workers, whether directly employed by the Manitoba Infrastructure and Transportation or by a contractor doing work on behalf of Manitoba Infrastructure and Transportation, exposed to the hazard of vehicular traffic on a project site on a street, highway, or other roadway, shall wear high-visibility safety apparel that complies with the requirements of CSA Standard Z96-02 High-Visibility Safety Apparel.

Purpose

During paving operations, the worker installing the stringline in front of the paver requires protection as he/she is continually exposed to the hazard of vehicular traffic.

Policy

A worker installing a stringline on a roadway open to vehicular traffic must be accompanied by at least one flagperson.

Standard

The flagperson should, at all times, be within 10 metres of the stringline person.

Traffic Control Device: **Work Zone**
Division: **Temporary Warning**
Subject: **Traffic Control-Temporary Overlay Markers (TOMs)**

Purpose

Workers installing temporary overlay markers (TOM's) require protection as they are continually exposed to the hazard of vehicular traffic.

Policy

A worker installing temporary overlay markers (TOM's) on a roadway open to vehicular traffic must be accompanied by at least one flagperson, unless the activity is already being controlled by existing flagpeople.

Standard

The flagperson should, at all times, be within 10 metres of the person installing the TOM's.

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Purpose

Working near highway-railway grade crossings presents a special set of traffic control problems. Protection of the travelling public, security of railway operations, and the safety of workers is paramount.

Policy

Whenever a road construction or maintenance activity is carried out **within 100 meters** of an at-grade railway crossing, the appropriate railway must be contacted regarding the operation of the trains to ensure the safety of the grade crossing during such work.

No work on the highway within the railway right-of-way may take place without specific approval of the railway (except for routine “through” operations such as highway snow clearing operations, road marking, etc.).

Standard

Notification should be given to the railway whenever possible, at least 72 hours prior to commencement of work, advising of the crossing location, and the nature and duration of the work.

Required temporary traffic control devices must be carefully placed so they do not detract from the visibility or impact of Railway Crossing signs (Crossbucks), Advance Railway Crossing signs, or Automatic Crossing Protection, if installed.

When Automatic Crossing Protection is in place, railway signals must never be operated manually by the rail authority to warn motorists that there is construction or maintenance taking place. Signals should only operate when a train causes them to operate, or during maintenance or construction **of the signals themselves**.

Parked equipment and vehicles should not be within 30 m of railway tracks and must not be parked as to obstruct the sightlines of warning signals or other traffic control devices.

When possible, the railway will put a “block” on the tracks in the area where roadwork is taking place. The “block” stops all trains from using the affected section of the tracks for the time allotted.

Where a track cannot be “blocked”, the railway must station "train" flagpeople, with appropriate training and regalia, at the grade crossing to ensure safe operation of the crossing. The cost of these flagpeople would normally be the Department’s responsibility.

No flagperson, whether directly employed by the Manitoba Infrastructure and Transportation or by a contractor doing work on behalf of the Manitoba Infrastructure and Transportation, is allowed to “flag” vehicles over any railway crossing. Where flaggers are in place, they should stop roadway traffic and advise drivers when they see a train approaching, **but should not tell them when it is safe to cross. Instead, they should advise the driver to cross when he/she feels it is safe to do so**. Drivers must make this decision themselves.

CONTACT LIST FOR RAILWAYS IN MANITOBA

CN RAILWAY:

AREA	NAME	CELL PHONE
BRANDON-SOUTH	HETHERINGTON, BRIAN	573-6281
ANOLA	SORENSON, JOHN	981-3036
WINNIPEG-NORTH	KOPP, KEVIN	771-5636
DAUPHIN	LAVALLEE, RAY	638-2467
STE. ANNE	SHORT, RICHARD	479-2036
WINNIPEG-SOUTH	KOPP, KEVIN	771-5636
BRANDON-NORTH	ANTUNES, ADELINO	729-5585

CP RAILWAY:

AREA	NAME	CELL PHONE
WINNIPEG -EAST	CHASSIE, VIC	807-467-4981
WINNIPEG-NORTH	MORDEN, DWIGHT	729-6938
WPG TO BRANDON	MORDEN, DWIGHT	729-6938
WINNIPEG - CENTRAL	REID, TERRY	771-0085
WINNIPEG-SOUTH	REID, TERRY	771-0085
MINNEDOSA	THEISEN, RON	729-5972
BRANDON -WEST	LOEWEN, GORD	725-9661
SOURIS/LARIVIERE	ANDERSON, NEIL	729-5008

Hudson Bay Railway – MARK WNDLING – 620-1876

Greater Winnipeg Water District (GWWD) –Dave Carr – 986-4884
(emergency number 986-4781)

Central Manitoba Railway – Jerry Blowatt - 794-6571

Prairie Dog Central – DOUG DILLON – 802-1582

Boundary Trail Railway Company – Travis Long - 242-4201

Purpose

During paving operations, workers on and alongside the paver require protection as they are continually exposed to the hazard of vehicular traffic.

Policy

One flagperson (see Policy 900-B-2 “Flagpersons”) must accompany the self-propelled mechanical paver whenever the paver is operating on a roadway open to vehicular traffic.

Standard

The flagperson should, at all times, be within 10 metres of the paver.

Purpose

Delineation of rigid construction materials, such as culverts and utility poles, temporarily stored in Department right-of-way is required to alert operators of off-road vehicles and motorists of the potential hazard.

Policy

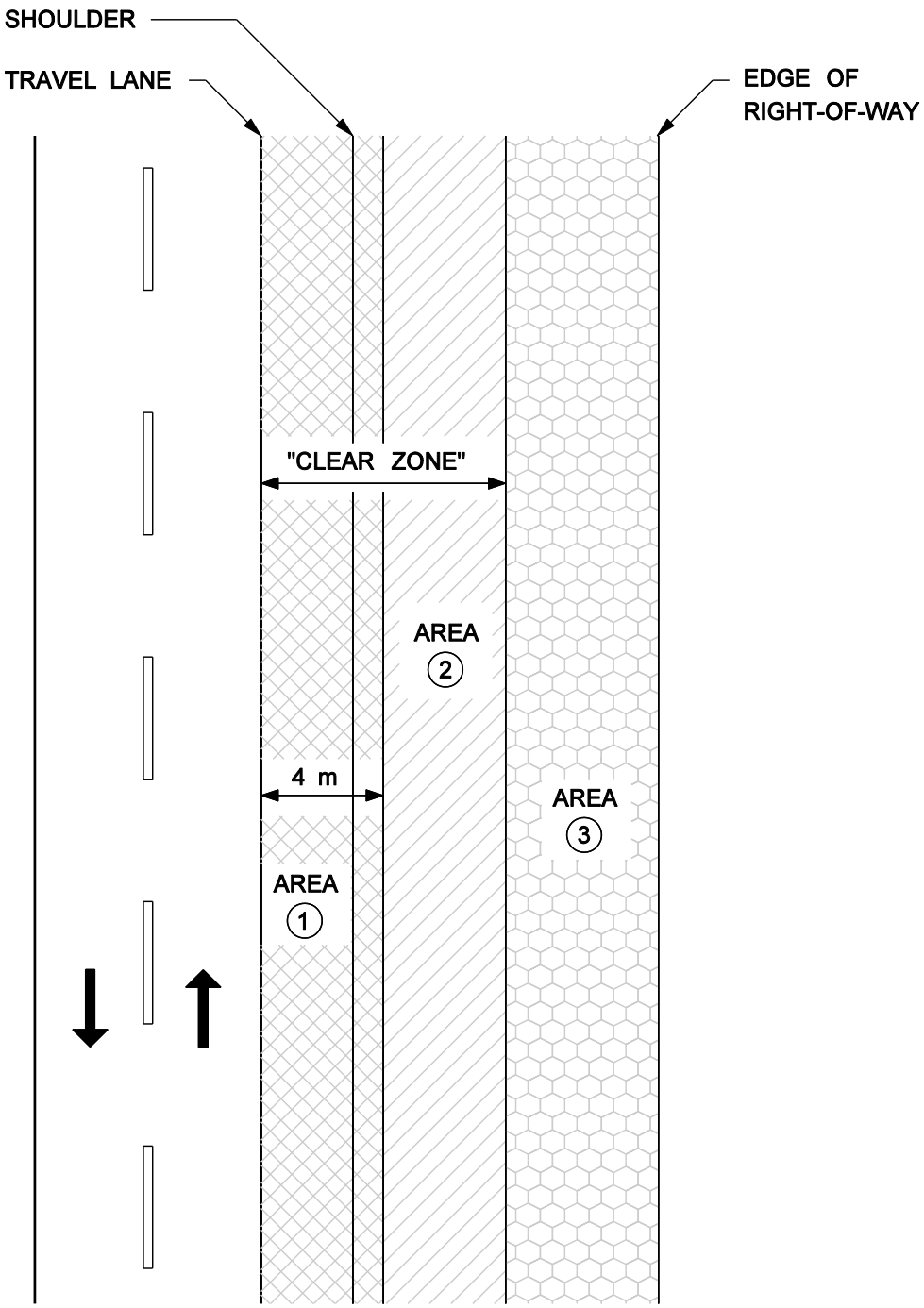
It is occasionally necessary to temporarily store rigid construction materials, such as culverts and utility poles, in Department right-of-way before installation proceeds. These objects should be stored as far from the roadway travel lane as practical, with the following requirements:

- Rigid materials should be stored in the right-of-way for as short a period as practical.
- Rigid materials must not be stored within 4 meters of the travel lane.
- Where rigid materials are temporarily stored within the roadway “Clear Zone” (12 metres from the edge of the travel lane), the area must be signed and delineated as a work zone. This would normally consist of a “construction area” sign with poly-posts or cones.
- Where rigid materials are temporarily stored outside the “Clear Zone” but within Department right-of-way, they must be delineated.

Standard

Poly-posts or cones with retroreflective sheeting should be used to delineate all rigid materials temporarily stored in Department right-of-way. Where poly-posts or cones are unavailable or impractical to use, a 75 mm x 75 mm (3 inch x 3 inch) fluorescent orange prismatic reflective material should be installed, at a minimum height of 600 mm (2 feet) above the ground surface.

TEMPORARY STORAGE OF POLES, CULVERTS, ETC. IN RIGHT-OF-WAY



AREA 1.
STORAGE NOT ALLOWED

AREA 2.
POLES, CULVERTS, ETC. STORED IN THIS AREA MUST BE SIGNED & DELINEATED

AREA 3.
POLES, CULVERTS, ETC. STORED IN THIS AREA MUST BE DELINEATED

Purpose

Traffic management and work activities must be coordinated in work zones to provide safe and expeditious movements of traffic while maintaining efficient work progress. Traffic controls in work zones warn of potential hazards, separate motorists from the work force and delineate a path for traffic to follow. Work zone traffic control devices are not normally used singly, but are applied as a system of devices. The development of a Traffic Management Plans (TMP) and the correct deployment of traffic control devices are key elements in achieving safe conditions within construction and maintenance work zones.

Policy

A TMP, in sufficient detail to reflect the complexity of the construction and maintenance work and traffic conditions, must be prepared and put into operation before the site is occupied.

Standard

A series of typical TMP have been developed to aid in the implementation of traffic management within work zones.

These typicals are minimum standards which can be enhanced to deal with local conditions. Refer to TMP drawings.

Purpose

The implementation of a Traffic Management Plan (TMP) requires dedicated staff trained in the appropriate principles and guidelines of the Traffic Management Plan.

Policy

One person on each traffic control project, hereafter designated as the "traffic control coordinator", must have overall responsibility for implementing the TMP and ensuring that the plan is functioning properly.

Standard

The duties and responsibilities of the traffic control coordinator include, but are not limited to:

- ensuring that only those traffic control devices approved by the Manitoba Infrastructure and Transportation and called for by the TMP are used in a work zone
- ensuring that the guidelines of the Policies/Standards are met
- installing, positioning, relocating or removing traffic control devices as conditions change
- maintaining traffic control devices and ensuring their reflective surfaces are clean
- training flagpersons
- organizing and supervising the development and relief of flagpersons
- ensuring that flagpersons are properly informed concerning road conditions and that they are relaying the proper information

Since traffic control coordinators' actions affect construction and maintenance work zone safety every traffic control coordinator should receive training appropriate to their position. Only those who are qualified by means of adequate training in safe traffic management practices, and have a basic understanding of the principles established by the applicable Policies/Standards may be appointed to supervise the selection, placement, and maintenance of traffic control devices and train flagpersons. Completion of a Manitoba Infrastructure and Transportation sanctioned training course is highly recommended for all traffic control coordinators.

Purpose

A work zone consists of the section of the roadway between the first advance warning sign and the point beyond the activity area where traffic is no longer affected. Most work zones can be divided into five areas as described below.

Policy

All work zone Traffic Management Plans (TMP) will be designed to include the five areas of a work zone traffic control zone.

- Advance Warning Area
- Transition Area
- Buffer Space
- Activity Area
- Termination Area

Standard

Advance Warning Area

An advance warning area is required for all work zones to alert motorists to the road work ahead. Motorists need enough time and distance to adjust to the altered conditions prior to reaching them. The warning area may vary from a single traffic control device, such as a ROAD WORK sign (TC-2), to a series of traffic control devices.

Transition Area

When redirection of the driver's normal path is required, traffic must be channelized from the normal path to a new path. This redirection is intended to occur at the beginning of the transition area. In mobile operations, this transition area moves with the work space. Transition areas usually involve strategic use of tapers, which (because of their importance) are described in Policy/Standard 900-C-4.

Buffer Space

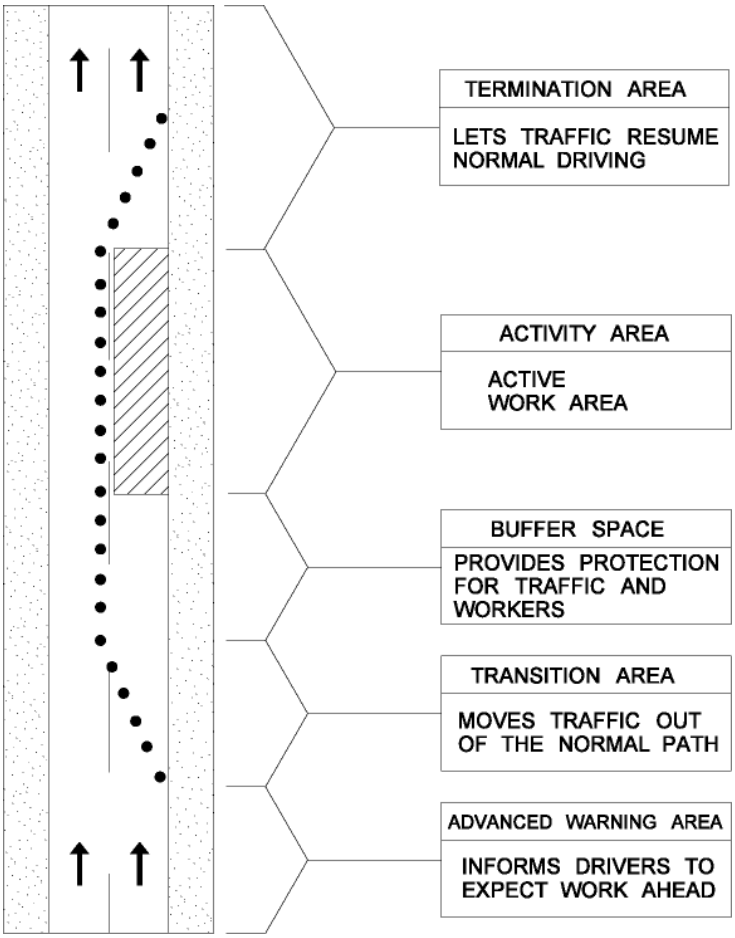
The buffer space is an open and unoccupied space between the transition area and the work area. The buffer space provides a margin of safety for both motorists and workers. It must be designed to provide adequate stopping sight distance from the middle of the lane closure taper to the beginning of the work area. The buffer space must be coned or otherwise channelled off at all times and free of workers, equipment, and material.

Activity Area

The activity area is that portion of the roadway closed to traffic and set aside for exclusive use by workers, equipment, and material. Activity areas may be in fixed locations or may move as the work progresses. In mobile operations, extra care must be taken to ensure that an adequate buffer space is left between the work area/vehicle and the trailing buffer vehicle.

Termination Area

The termination area provides the distance necessary for traffic to clear the work area and return to the normal traffic lanes. A downstream taper placed in the termination area indicates that vehicles can move back into the closed lane(s) and helps smooth the flow the traffic.



Purpose

The installation and removal of temporary traffic control zones creates a situation which is often far more hazardous than the operation of the completed zone. The workers placing these advance warning devices and channelizing devices must be on the roadway at these points of high conflict. Furthermore, the placement operation constitutes a more unexpected situation for the motorist than does the work zone itself. To minimize these hazards, it is essential that the installation proceed in an orderly fashion and be accomplished as quickly as possible.

Policy

Installation and removal of traffic control devices must be done in a manner which causes the least risk to traffic and which provides for the safety of workers installing or removing devices.

Standard

Installation Sequence

Devices are installed in the direction that traffic moves - this is, "downstream". The first device placed is the first advance warning sign, typically ROAD WORKS (TC-2). The installation then proceed with the:

- Advance Warning area
- Transition area
- Buffer area
- Activity area
- Termination area

Installation Procedure

The traffic control crew must disembark from their vehicles in a safe manner. All personnel must be attired properly to work on the roadway.

The vehicle being used to haul traffic control devices must be equipped with a minimum of a rotating beacon or strobe. (Higher level lighting is recommended on four-lane divided and high volume two-lane roads.) All lights must be turned on while on the road or shoulder. Four-way flashers and headlights are recommended at all times.

The devices truck or service vehicle acts as the advance warning device for the installation of the first devices and should be located upstream of the workers installing the first devices.

A second or shadow vehicle is recommended for high volume roads and all four-lane roads. This vehicle should be located 150 m upstream of the devices truck and have high level lighting such as sequential flashers on four-lane roads. When no shadow vehicle is used then a flagperson is required for the installation of the tapers.

Tapers are laid out in a straight line starting at the shoulder. Each device is installed in sequence moving downstream. The devices should be moved laterally out from the shoulder with the worker looking toward traffic as he or she moves out into the lane of traffic.

Sign Placement

All long term signs should be mounted on wood posts. The bottom of the sign must be 1.5 m above the pavement surface and two to four metres from the edge of the shoulder.

All temporary signs must be mounted on approved portable sign stands at a minimum height of 600 mm from the road surface to the bottom of the sign.

Signs should be erected with their face turned 0 to 5 degrees away from the road to reduce glare from reflected headlights.

Modification and Removal

When possible, temporary traffic control zones should be modified or removed in the reverse order of installation. This requires crews to move upstream or against traffic through the work zone. If using a vehicle to pick up devices, the vehicle must have its headlights on high beam and the crew must take extra care when turning the vehicle around.

Where there are no shoulders, or where room does not allow vehicles to move against traffic safely, the removal of advance warning signs should be made in the downstream direction. A shadow vehicle must be used in all situations where devices are picked up going in the downstream direction.

Purpose

The use of Pilot Vehicles through work areas can be effective where required due to sight restrictions, extended active work zones, hazardous construction activities, or other factors.

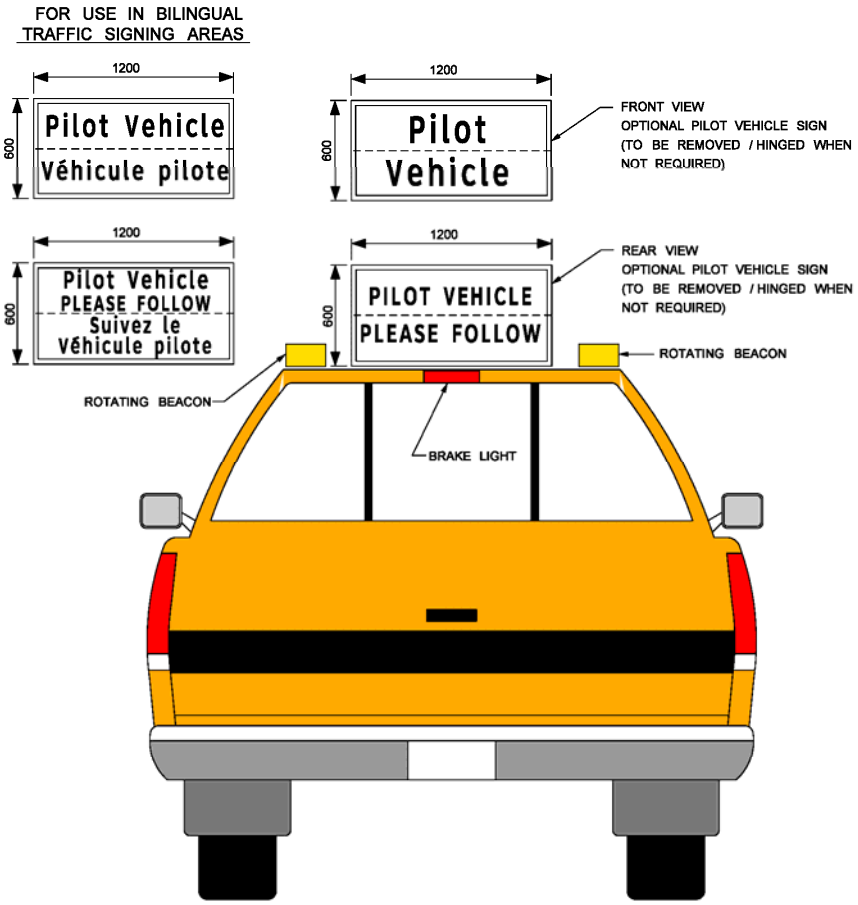
Policy

Pilot vehicle traffic control according to the following standards, may be appropriate when other less intrusive control is deemed to be inadequate or ineffectual. In order to be effective, the reasons for Pilot Vehicle traffic control need to be apparent to motorists passing through the work zone. Due to additional costs and inherent delays to traffic, Pilot Vehicle traffic control decisions demand careful scrutiny and review, and unless specified in the Work Zone Manual for certain activities, need to be considered on a case by case basis.

Standard

- See Work Zone TMP-26 for “Traffic Control Using a Pilot Vehicle” traffic control details.
- The numbers of Pilot Vehicles needs to be appropriate in order to limit queue build-ups and motorist delays, considering:
  - Length of Pilot Vehicle controlled area
  - Traffic volumes
  - Pilot Vehicle travel speeds.
- Where Pilot Vehicle traffic control is in place, approaching traffic volumes need to be continuously monitored to ensure vehicle queues do not “over-run” the required sequence of advance warning signs, flagger stations, etc. This may necessitate ongoing communications between flaggers, and between flaggers and project traffic control supervisor(s).
- Where queue lengths are expected to grow beyond one flagger’s abilities to control traffic flow, additional flagger(s) will be required. This needs to be anticipated so that stand-by flaggers are readily available.
- Additional advance signing will also be required if queues extend beyond the local initial traffic control area.

- The extent of the area under Pilot Vehicle traffic control must be limited in order to:
  - reduce queuing times and delays
  - reduce project costs (by limiting numbers of the required Pilot Vehicles)
  - reduce queuing hazards such as rear-end collisions
  - maintain motorist patience and “buy-in” for the attendant delays
- Variable Message Signs (VMS) should always be considered in order to provide additional “high level” advance warning to approaching traffic. The preferred message is “Prepare to Stop xx km.” Consult Traffic Engineering for other particular messages relating to local conditions or problems.
- Pilot Vehicle drivers must obey all rules of the road, and adhere to the directions of flaggers and all other work zone traffic controls, **including posted speed limits**.
- Pilot Vehicle drivers must tailor their accelerations and travel speeds according to the mix of traffic and to road conditions in order to avoid undesirable gaps in the vehicle platoon and subsequent overtaking and “catch up” speeding actions by following vehicles.
- For typical sign placement and lighting, see drawing below.



Purpose

Protection of the travelling public and the safety of workers is paramount. However these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices. Traffic control in low speed areas requires special consideration particularly at intersections and where a number of accesses are present.

Policy

Special traffic management strategies are required on Provincial Trunk Highways and Provincial Roads where posted speed limits are 60 km/h or lower when work is being done or in the vicinity of the road surface by Department staff, utilities, or contractors.

Standard

The Traffic Engineering Branch or the Regional Safety Training Facilitator should be contacted to discuss traffic control options.

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Purpose

Off-road operations include all activities which are done away from the surface of the road but within the right-of-way. The duration of the operation is typically greater than ten minutes. Safety of the motorist and workers requires that some form of advance warning be provided and maintained.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

Definition

Off Road Operations - Include any operation where **the activity is off the road surface but within the highway right-of-way.** Off-road operations include maintenance activities including culvert cleaning, sign installation, and any other activity including work done by utilities where workers are exposing the motorist to possible hazards off the road surface.

Policy

Where work using workers and/or equipment is being done on any Provincial Trunk Highway or Provincial Road, away from the road surface but within the highway right-of-way, and the duration of that work is greater than 10 minutes, a minimum level of traffic control must be established and maintained for the time that workers or equipment are present.

Standard

Traffic control must consist of at least the minimum installation as described in the following Traffic Management Plans (TMP): See Drawings TMP-1, TMP-2.

The work zone must be left in a safe condition prior to workers and equipment leaving the work site. All excavations must be closed or protected.

Purpose

When work activities are restricted to the shoulder of the road, the disruption to traffic flow may be decreased, but the motorist requires advance warning that men and equipment are in a position to be a potential hazard.

Protection of the travelling public and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

Policy

Where work is being done on any Provincial Trunk Highway or Provincial Road on the shoulder of the road or in the median of a divided road, a minimum level of traffic control must be established and maintained for the duration of the time that workers or equipment are present.

Standard

Traffic control must consist of at least the minimum installation as described in the following Traffic Management Plans (TMP):

TMP-2
TMP-3
TMP-4
TMP-5
TMP-6
TMP-7
TMP-7A
TMP-8

Purpose

Bridge and culvert inspection activities causing disruption to traffic flow may be similar to work on the surface of the road, or off the road. A work zone located on the surface of a bridge may create an extraordinary hazard to workers and to the travelling public as the confined spaces of the bridge eliminate any possible escape routes. The motorist, however, may not typically require enhanced warning of potential hazards.

Protection of the travelling public and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

Policy

Where routine inspections are being done on the surface of any bridge on any Provincial Trunk Highway or Provincial Road, a minimum level of traffic control must be established and maintained for the duration of the time that workers or equipment are present. Standard traffic management plans are sufficient in most situations. Where unusual conditions are anticipated, preplanning and discussions with the Traffic Operations Engineer are required.

Standard

Traffic control must consist of at least the minimum installation as described in the appropriate Traffic Management Plans (TMP). The following table will provide additional guidelines for the implementation of traffic control on bridge inspection projects. Additional enhancements may be considered when traffic conditions warrant.

INSPECTION TYPE	ROAD TYPE	TRAFFIC VOLUME (VEH/HR)	BRIDGE OR CULVERT	REQUIRED TRAFFIC MANAGEMENT PLAN	MODIFICATIONS TO EXISTING TMP'S TO SUIT BRIDGE INSPECTIONS
BRIDGE INSPECTION TRAFFIC CONTROL					
	LEVEL 1				
	All Roads	All	All	TMP 1	None required
	LEVEL 2				
	Two Lane Road	< 60	C	TMP 1	None required
			B	TMP 3	Install signs in both directions
		> 60	C	TMP 3	Install signs in both directions
			B	TMP 6	Install signs in both directions, cones not required
	Multi-Lane Road	All	C	TMP 4	None required
			B	TMP4	Also install MR-96
	LEVEL 3				
	All Roads	All	All	as required	As required
	UNDERBRIDGE				
	Two Lane Road	< 60	All	TMP 12	Also install MC-6 and MR-96, all signs installed in both directions. Use one flagperson only
		> 60	All	TMP 12	Also install MC-6 and MR-96, all signs installed in both directions
	Multi-Lane Road	All	All	TMP 13	None required

DEFINITIONS

Bridge	Any bridge or culvert structure
TMP	Traffic Management Plan as defined in the Work Zone Traffic Control Manual
B	Bridge structure
C	Culvert structure

INSPECTION TYPES

Level 1	Maintenance inspections
Level 2	Detailed visual inspections
Level 3	Condition assessment inspections
Underbridge	Inspections using the underbridge crane unit

SIGN DESCRIPTIONS

MC-6	One Lane Traffic
MR-96	Maximum 60 When Passing Workers
WA-33R/L	Right/Left Lane Cutoff
TC-2	Men Working
TC-21	Flagman Ahead
C-44	Flagperson Paddle

SIGN SEQUENCES (EXTENDING OUT FROM WORK AREA)

TMP 1	none
TMP 3	TC-2
TMP 4	MR-96x2; TC-2x2
TMP 6	MR-96; TC-2
TMP 12	Class 'B'; TC-21; MR-96; TC-2
TMP 13	sequencer; MR-96; WA-33R/L; TC-2

Purpose

Mobile operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

The speed of the operation and the duration at any one work location makes the signing of the work site using standard techniques difficult and hard to justify from a cost perspective. However, safety of the motorist and workers requires that some form of advance warning be provided and maintained.

Definition

Mobile Operations - Include any operation where the maximum duration of any activity on or near the road surface is less than 5 minutes for any 30 m length of work zone. Mobile operations include maintenance activities which are of very short duration, including “Pitch and Run”, “Sign Washing”, and any other activity where workers are exposed to traffic for short periods of time.

Policy

Whenever a construction and maintenance activity can be identified as a mobile operation, a minimum level of traffic control must be established and maintained for the duration of the work. This policy/standard is limited to “daylight hours” only.

Whenever mobile operations must occur during hours of darkness, a Traffic Management Plan (TMP) must be approved by the Director of Traffic Engineering or designate.

RECOMMENDED: “ORIGINAL SIGNED BY”
Director, Traffic Engineering

APPROVED: “ORIGINAL SIGNED BY”
Executive Director
Highway Engineering

Standard

Traffic control must consist of one of the following drawings: TMP-5, TMP-9, TMP-10

- A buffer vehicle located a distance from the work zone (distance determined by travelling speeds). The buffer vehicle must be equipped with warning lights and rear facing sign, **or on four-lane roads only**, a sequential flasher indicating required motorist action. In situations with limited sight distance the buffer vehicle should remain at the most visible location available. In extreme cases, such as restricted visibility conditions, or during high traffic flows, the work should be rescheduled. Where this is not possible, a TMP approved by the Director of Traffic Engineering or designate must be implemented and maintained.

- A ROAD WORKS sign (TC-2) which must be located within sight of the work zone, is required when traffic flow levels during the periods of work are greater than **60 vehicles per hour**.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with installing and removing the necessary traffic control devices.

The lateral position of the flagperson, i.e. distance away from the relative safety of the shoulder, also must weigh personal safety against the flagperson's ability to adequately control and warn traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

This standard covers Benkelman beam (pavement deflection) only. Due to variations in their operations, other fast moving operations such as B-30 soil drill truck, nuclear density testing, coring unit, profilometer and "hi-lo" measurements have similar complimentary standards.

Policy

This standard covers the self-propelled Benkelman beam operation only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle and equipment mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

Traffic control should consist of at least the following (see drawing S-TMP-1):

- Symbolic FLAGMAN sign (TC-21) or rectangular fluorescent orange warning sign FREQUENT STOPS mounted on rear of trailing flagman's vehicle (1/2 ton or van).

- Flagpersons stationed **in the closed lane**, approximately 1 m from roadway centreline, **at the front of the flagperson's vehicle** (no closer than 15 m to the vehicle) to allow a clear "escape route" for the flagperson, and to provide refuge from a possible errant vehicle.

- Five-ton "deflection unit" vehicle with the following warning devices operating: front and rear facing "wig-wag" amber flashers, high beam headlamps, and four-way flashers.

- A rectangular fluorescent orange warning sign FREQUENT STOPS and fluorescent orange/black hazard marker signs should be mounted on the rear of the five-ton deflection unit. (Signs should be removed or covered during travel to and from the highway under measurement.)

- The five-ton deflection unit vehicle is required to be parked in the closed lane during pavement deflection measurements.

- Flagperson must be in position **before** Benkelman beam operator proceeds onto roadway surface.

- For urban areas with speed limits under 60 km/h, traffic controls may be compressed to 50 m overall (sign to deflection unit vehicle). Additional care should be exercised to ensure accesses from driveways, etc. are considered.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the costs and time involved with installing and removing the necessary traffic control devices.

The lateral position of the flagperson, i.e. distance away from the relative safety of the shoulder, also must weigh personal safety against the flagperson's ability to adequately control and warn traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

This standard covers B-30 soil drill truck and coring vehicle operations only. Due to variations in their operations, other fast moving operations such as nuclear density testing, Benkelman beam testing and "hi-lo" measurements have similar complimentary standards.

Policy

This standard covers the B-30 soils drill truck and coring vehicle operations only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle and equipment mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

Traffic control shall consist of at least the following (see drawing S-TMP-2):

- Symbolic Flagman sign (TC-21) on portable sign stand or sign trailer.
- Flagperson stationed in the closed lane, approximately 1 m from roadway centreline.
- Symbolic Road Work sign (TC-2) on two-way roadways for traffic in opposite direction.
- Ten traffic cones; 5 required for tapered lane closure, 5 recommended on tangent as shown on S-TMP-2.
- When required, the technicians truck shall park on the shoulder behind the soil drill truck/coring vehicle. This vehicle shall have a rotating beacon operating.
- The drill truck/coring unit is to be parked in the closed lane.
- Signs shall be supplemented by fluorescent red flags. Flags are also highly desirable on the soils drill truck/coring unit.
- This is a minimum standard. Where traffic volumes or sight restrictions create a problem, a second Flagman sign and a second flagperson for traffic in the opposite direction will be required on two-way roadways. The distance to the flagperson and sign will be 70 m and 150 m respectively, from the soils drill truck.
- For urban areas with speed limits under 60 km/h, traffic controls may be compressed to 50 m overall (sign to soil drill truck/coring unit). Additional care should be exercised to ensure accesses from driveways, etc. are considered.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. Every reasonable effort must be taken to enhance the visibility of slow-moving equipment where its unexpected presence and slow speed may otherwise demand drastic avoidance manoeuvres by highway traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which travels continuously or stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

Policy

This standard covers the self-propelled profilograph unit only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle and equipment mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

- The profilograph operation effectively closes the lane being evaluated/measured. Traffic must find its way around the operation on two-lane two-way (2L2W) highways by choosing appropriate available gaps in the oncoming traffic stream.

- For traffic safety reasons the profilograph unit must restrict its operation to daylight hours only. Late season operation must be evaluated to determine that low sunlight angles do not obscure equipment visibility.

Traffic control shall consist of at least the following (see drawing S-TMP-3):

- A trailing vehicle comprising a suitable vehicle towing the profilograph trailer, following approximately 15 m behind the self propelled profilograph unit and equipped with the following:
    - a special black on fluorescent reflective orange rearward facing hinged sign “Yield To Approaching Traffic”
    - highly visible black/fluorescent orange diagonal cross-hatched markings on the back of the trailer unit
    - extremely bright flashing yellow strobe lights (Whelen model 97 or equivalent) facing front and rear, mounted as high as possible on the trailing vehicle trailer
    - a rear-facing sequential flashing "arrow board" - the arrow board should flash in the non-directional "diamond" or four-corner mode during operation on 2L2W roadways, and indicate the direction for following traffic to pass (left or right as applicable) only on multi-lane roadways
    - fluorescent orange flags (in specially constructed flagholders) at the rear of the trailing vehicle trailer unit
    - headlights and forward facing strobe lights on the profilograph tractor unit (similar to those on the trailing vehicle trailer)
    - fluorescent orange pennant mounted at the front and rear of the profilograph beam
- Where traffic volumes, highway geometry, or other conditions dictate, (and the operation cannot reasonably be rescheduled), an additional **trailing vehicle** may be necessary. This vehicle operating **on the shoulder** should be equipped with flashing or rotating amber warning lights, a special black-on-fluorescent orange sign SLOW MOVING EQUIPMENT AHEAD (see sketch), and should follow the first trailing vehicle at a distance of approximately 300 m.
- As with other fast moving operations, profilograph operators must continually evaluate traffic conditions and be prepared to discontinue operations to allow following traffic queues to pass, or to abandon operations until conditions improve.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with installing and removing the necessary traffic control devices.

The lateral position of the flagperson, i.e. distance away from the relative safety of the shoulder, also must weigh personal safety against the flagperson's ability to adequately control and warn traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

This standard covers nuclear density testing only. Due to variations in their operations, other fast moving operations such as B-30 soil drill truck, coring unit, Benkelman beam testing, profilometer, and "hi-lo" measurements have similar complementary standards.

Policy

This standard covers nuclear density testing only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle and equipment mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads and all surfacing and grading projects open to traffic.

Traffic control should consist of at least the following (see drawing S-TMP-4):

- Symbolic FLAGMAN sign (TC-21) on portable sign stand, sign trailer or shadow vehicle.
- Flagperson stationed **in the closed lane**, approximately 1 m from roadway centerline.
- Ten traffic cones; 5 **required** for tapered lane closure, 5 **recommended** on tangent as shown on S-TMP-4.
- Density inspector's vehicle equipped with the following warning devices: approved rotating beacon or strobe, rear-facing "wig-wag" amber flashers, **and headlights on high beam**. If headlights and "wig-wag" amber flashers are operating, use of rotating beacon or strobe is optional.

  The density inspector's vehicle is to be parked in the closed lane. The density inspector's vehicle must be capable of carrying all signs, lights and cones required to create the work zone as per the standard.
- Signs must be supplemented by fluorescent red flags. Flags are also highly desirable on the density inspector's vehicle.
- This is a minimum standard. Where traffic volumes or sight restrictions create a problem, a second sign and a second flagperson for traffic in the opposite direction will be required on two-way roadways. The distance to the flagperson and sign will be 70 m and 150 m respectively, from the density inspector's vehicle.
- Visibility (to the motorist) of the nuclear density testing operation is an ongoing problem. Extra care must be taken to ensure that all traffic control devices are in good condition, clean, and placed properly. All warning lights must be clean and operating effectively. All workers must be attired in clean, highly visible department approved safety vest and head wear.
- The flagperson may be located up to 500 m from the symbolic FLAGMAN AHEAD sign **only where the flagperson is visible from the sign location, and no major accesses or intersections exist in the area between sign and flagperson**.
- For urban areas with speed limits under 60 km/h, traffic controls may be compressed to 50 m overall (sign to density inspector's vehicle). In certain circumstances, i.e. parallel or diagonal parking, sign use may be impractical. Accesses from driveways, etc. may have to be taken into consideration in determining locations of cones and flagpersons. (Crews are expected to base their decisions regarding sign use in urban areas, on experience and common sense to ensure worker and public safety is not compromised.)

- Where a shadow vehicle is used (recommended on high volume two-lane roadways) the shadow vehicle should be located half on the shoulder, half on the travel lane. The shadow vehicle must be equipped with rear-facing "wig wag" amber flashers. The flagman ahead sign must be mounted on the right hand rear of the shadow vehicle

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. Every reasonable effort must be taken to enhance the visibility of slow-moving equipment where its unexpected presence and slow speed may otherwise demand drastic avoidance manoeuvres by highway traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which travels continuously or stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

Policy

This standard covers the Hi-Low Vehicle only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

- The Hi-Low operation effectively closes the lane being evaluated/measured. Traffic must find its way around the operation on two-lane two-way (2L2W) highways by choosing appropriate available gaps in the oncoming traffic stream.

- For traffic safety reasons the Hi-Low vehicle must restrict its operation to daylight hours only. Late season operation must be evaluated to determine that low sunlight angles do not obscure equipment visibility.

Traffic control shall consist of at least the following (see drawing S-TMP-5):

- A Hi-Low Vehicle equipped with the following:
    - a black on fluorescent reflective orange rearward facing sign PASS WITH CARE
    - extremely bright flashing yellow strobe light (Whelen model 97 or equivalent) facing front and rear,
    - a rear-facing sequential flashing arrow board - the arrow board should flash in the non-directional “diamond” or four-corner mode during operation on 2L2W roadways, and indicate the direction for following traffic to pass (left or right as applicable) only on multi-lane roadways
    - fluorescent orange flags at the front and rear of the Hi-Low vehicle
- As with other fast moving operations, Hi-Low vehicles must continually evaluate traffic conditions and be prepared to discontinue operations to allow following traffic queues to pass, or to abandon operations until conditions improve.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. Every reasonable effort must be taken to enhance the visibility of slow-moving equipment where its unexpected presence and slow speed may otherwise demand drastic avoidance manoeuvres by highway traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which travels continuously or stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

Policy

This standard covers the self-propelled Asphalite unit only.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

- The Asphalite operation effectively closes the lane being worked on. Traffic must find its way around the operation on two-lane two-way (2L2W) highways by choosing appropriate available gaps in the oncoming traffic stream.

- For traffic safety reasons the Asphalite unit must restrict its operation to daylight hours only. Late season operation must also be evaluated to determine that low sunlight angles do not obscure equipment visibility.

RECOMMENDED: "ORIGINAL SIGNED BY"
Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
Executive Director
Highway Engineering

Traffic control shall consist of at least the following (see drawing S-TMP-7):

- A trailing vehicle, following approximately 40 m behind the self propelled Asphalite unit and equipped with the following:
    - a special black on reflective white rearward facing sign PASS WITH CARE.
    - rotating beacon, mounted as high as possible
- A rear-facing sequential flashing "arrow board" must be equipped on either the Asphalite unit or the trailing vehicle. The arrow board should flash in the non-directional "diamond" or four-corner mode during operation on 2L2W roadways, and indicate the direction for following traffic to pass (left or right as applicable) only on multi-lane roadways.
- The Asphalite unit must operate with rotating beacon and headlights on high beam.
- Flying Stones signs (MW-94) should be installed, spaced not more than 5 km apart facing both directions of traffic and shall be left in place for a period of at least 24 hours after work is completed, or longer as required.
- As with other fast moving operations, Asphalite operators must continually evaluate traffic and visibility conditions and be prepared to discontinue operations to allow following traffic queues to pass, or to abandon operations until conditions improve.
- When working in low-speed urban areas or low volume rural areas, the trailing vehicle is recommended but not required, provided the Asphalite unit is equipped with a flashing arrow board.

Purpose

Mobile operations present a special set of traffic control.

Protection of the travelling public and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

The speed of the operation and the duration at any one work location makes the signing of the work site using standard techniques difficult and hard to justify from a cost perspective. However, safety of the motorist and workers requires that some form of advance warning be provided and maintained.

Definition

Mobile Operations - Include any operation where the maximum duration of any activity on or near the road surface is less than 5 minutes for any 30 m length of work zone. Mobile operations include maintenance activities which are of very short duration, including “Pitch and Run”, “Sign Washing”, and any other activity where workers are exposed to traffic for short periods of time.

Policy

This standard covers the maintenance gravelling of gravel roads. This policy/standard is limited to “daylight hours” only.

Standard

Traffic control must consist of the following (see drawing S-TMP-8):

- ROAD WORKS signs (TC-2) or “Truck Gravelling” sign placed at both ends of the work zone.
- The Work Zone length must not be greater than 10 km.
- All “gravel trucks” must have headlights on when gravelling.

Purpose

Traffic control during signal maintenance, construction and repair is necessary to ensure the safety of all motorists, pedestrians and workers.

Policy

This policy applies to all intersections where traffic signals will be temporarily inoperative or where signal displays may be blocked or otherwise affected by the work in progress, or motorists may be distracted or confused by the presence of workers or signal vehicles.

Standard

The following standards are applicable to planned traffic signal maintenance, construction and repairs:

1. For **all** planned work except minor inspections or non-intrusive activities such as controller adjustments, the TC-2 (Men Working) sign should be placed on all affected approaches (refer to S-TMP-3 and S-TMP-4).

   For urban areas where signing on the right hand side may be obscured by parked vehicles, signs may be more effective if placed in the median of a divided street or roadway.

2. For all planned work where traffic signals will be temporarily inoperative (i.e. cutovers, controller replacement, etc.), the TC-2 (men working sign) and MW-121 (signals under repair ahead sign) should be placed on all approaches (refer to S-TMP-9 and S-TMP-10).

3. Additional traffic control for planned traffic signal repairs with signals inoperative should be as follows:

   - For lower speed (<70 km/h) – Lower Volume intersections (i.e. Gimli, Dauphin, The Pas) (refer to S-TMP-9): Traffic should normally be controlled with 4-way stop signs with advance stop ahead signs. The signal crew should be mindful and watchful of traffic and pedestrians, and if necessary, aid pedestrians who wish to cross the roadway.

- Low Speed-High Volume on Main Road, Low Volume on cross road intersections (i.e. PTH 9 at Riverglenn, 1st/Rosser (Brandon), etc.) (refer to S-TMP-10): Traffic would normally be controlled with 2-way stop signs, flagman ahead signs and Department flagpeople.

- Low Speed-High Volume on all approaches (i.e. Richmond/18th Street, 18th Street/Park, etc.) (refer to S-TMP-10): Traffic would normally be controlled with 2-way stop signs, flagman ahead signs and Police (City or RCMP).

- High Speed-High Volume (i.e. 100/St. Mary's, 1/16, etc.) (refer to S-TMP-10): Traffic would normally be controlled with 2-way stop signs, flagman ahead signs and Police (City or RCMP).

- High Speed-Lower Volume (i.e. 1/Blumberg, 1/Odeon, etc.): To be reviewed and approved by the Traffic Operations Engineer on a site-by-site basis.

Purpose

Fast moving operations present a special set of traffic control problems.

Protection of the travelling public and the safety of workers is paramount. Every reasonable effort must be taken to enhance the visibility of slow-moving equipment where its unexpected presence and slow speed may otherwise demand avoidance manoeuvres by highway traffic.

Definition

Fast Moving Operations will generally be considered to include any operation which travels continuously or stops on the travelled surface of the road for a period not exceeding 10 minutes in daylight hours only.

Policy

This standard covers the pavement marking truck and paint supply truck only. Due to the continuous mobile nature of this operation, static advance signing is not feasible. Vehicle and equipment mounted signs and lights must provide adequate warning.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

Traffic control should consist of at least the following (see drawings S-TMP-11 and S-TMP-12):

- A trailing vehicle, following approximately 400 m behind the pavement marking vehicle and equipped with the following:
    - A rearward facing " WET PAINT" sign
    - Rotating beacon
    - Rear-facing sequential flashing arrow

- Pavement Marking Vehicle equipped with the following warning devices:
    - Rotating beacon
    - Front and rear-facing warning lights
    - Rear-facing “Pass With Care” sign
    - Optional - rear-facing sequential flashing arrow
- Paint Supply / Sweeper Vehicle operating 1-5 km in front of the Pavement Marking Vehicle equipped with the following warning devices:
    - Rotating beacon
    - Front and rear-facing warning lights

Purpose

Sealcoat operations present a special set of traffic control problems.

Protection of the travelling public and the safety of workers is paramount. However, these must be weighed against the cost and time involved with installing and removing the necessary traffic control devices.

Sealcoat projects are unique in that vehicles are at a greater risk of damage by stones from passing vehicles than would normally be expected on a surfaced roadway. Most drivers are unaware of the details of sealcoat operations and must be given additional information to ensure they are aware of the potential hazards.

Policy

This standard covers the sealcoat operation only.

Prior to commencing a sealcoat operation over a paved surface, the start and end of all passing restrictions must be signed using the “No Passing” (RB-31) sign and the “Passing Permitted” (RB-32) sign.

- Windshield Hazard signs (MW-94) should be installed at the beginning of all sealcoat projects over 3 km in length. Windshield Hazard signs are normally not required where the sealcoat work is being done as part of a large construction project where project boards and gates are in place.

Traffic control should consist of at least the following in addition to standard work-zone signing(see drawing TMP-29):

- Symbolic “Flying Stones” sign (MW-94), “No Passing” sign (RB-31) and **regulatory** “Maximum 40 When Meeting Traffic” sign (MR-136) repeated at minimum 3 km intervals throughout the length of the project. These signs should be maintained as necessary during and immediately after the sealcoating operation until the “flying stones” hazard has been minimized.

- Flagperson stationed at each end of the active work area where sealcoating is in progress.

- Optional Pilot Vehicle and additional flagpeople, as required, based on traffic volume and road geometry. See Policy/Standard 900-C-8 for Pilot Vehicle Traffic Control.

- Portable radar-based Speed Reader Boards may be used at both ends of all rural sealcoat operations when the “flying stone” hazard is present, to provide motorists with additional travel speed reminders. Reader Board use should also be considered on an as-required basis for urban sealcoat operations.

Purpose

Protection of the travelling public and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

Short term lane closures are required to allow workers to accomplish their activities in a safe and efficient manner. These lane closures must be installed whenever work activities disrupt the normal flow of traffic.

Definition

Short Term means a lane closure that is installed and removed on the same day, and is applicable during daylight periods only.

Policy

Whenever construction and maintenance activities disrupt the normal flow of traffic on Provincial Trunk Highways or Provincial Roads, or cause workers or motorists to be in a hazardous situation on these roads, a Traffic Management Plan (TMP) must be developed, installed, and maintained for the duration of the disruption or condition. When the condition will be returned to normal during one daylight period “short term” traffic control methods may be used.

Standard

Traffic control should consist of one of the following Traffic Management Plans:

TMP-11 - Two-Lane Road - Yield to Oncoming Traffic (<60 vehicles per hour)
TMP-12 - Single Lane Closed on Two-Lane Road (Volume > 60 vehicles per hour)
TMP-13 - Right Lane Closed on Four-Lane Divided Road
TMP-14 - Left Lane Closed on Four-Lane Divided Road

RECOMMENDED: “ORIGINAL SIGNED BY”
Director, Traffic Engineering

APPROVED: “ORIGINAL SIGNED BY”
Executive Director
Highway Engineering

Purpose

Short term detours present a special set of traffic control problems.

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with installing and removing the necessary traffic control devices.

Flagpersons, used effectively, can be expected to substitute for some other traffic control devices. However, heavy traffic volumes, limited sight distances, or poor visibility conditions may require additional measures to ensure motorist and worker safety.

Definition

Daylight detours will be considered to include any shoo-fly (minor deviation) type of detour which will be in place for daylight hours only.

Policy

Whenever a construction and maintenance activity or other situation causes the requirement for a "daylight hours" only detour to be required the following special Traffic Management Plan (TMP) must be implemented and maintained. This policy applies to all Provincial Trunk Highways and Provincial Roads and during daylight hours only.

Standard

Traffic control should consist of at least the following (see drawing TMP-23):

- DETOUR AHEAD (TC-10) and FLAGMAN AHEAD (TC-21) signs placed as shown for traffic in both directions.
- Signs mounted as shown. (Department approved portable sign stands acceptable.)

- Two flagpersons, (properly attired), one for traffic in each direction. Flagpersons should be in radio (preferred) or visual contact, and should allow traffic to proceed from one direction at a time. Refer to Policy/Standard 900-B-2 “Flagpersons”.
- Class A "directional" barricades required in the closed lanes for traffic in both directions.
- Class B barricades **recommended where space is available**.
- Reflectorized orange delineator posts (50 mm x 1200 mm) at 15 m spacing, placed on left and right side of detour.

NOTE: Project Supervisors must assess each situation **individually**; based on experience and good judgement implement additional measures as necessary to ensure the safety of motorists and workers.

Purpose

Protection of the travelling public, and the safety of workers is paramount. However, these must be weighed against the cost and time involved with the installation and removal of the necessary traffic control devices.

Long term traffic diversions are required when the nature of work activities extend the disruption of traffic beyond a single day. The traffic diversions are typically designed to a higher level than short term lane closures to limit the manpower required for flagging operations.

Definition

Long Term means a traffic diversion that is installed for any period through the hours of darkness.

Policy

Whenever a construction and maintenance activity or other situation causes the requirement for a traffic diversion that will extend beyond a single day (i.e. overnight or longer) a special Traffic Management Plan (TMP) must be designed, implemented, and maintained.

This policy applies to all Provincial Trunk Highways and Provincial Roads.

Standard

Traffic Control should consist of one of the following Traffic Management Plans:

TMP-15 - Left Lane Drop - Four-Lane Divided Highway
TMP-16 - Right Lane Drop - Four-Lane Divided Highway

Purpose

Occasionally it is necessary to operate a four-lane divided highway as a two-lane two-way (2L2W) highway to accommodate construction or maintenance activities, or emergencies. However, these operations can be exceptionally dangerous, particularly over longer stretches of road where there is considerable risk of head-on collisions.

Policy

Before implementing any 2L2W operation the use of any adjacent service roads should be considered as an alternate route.

Because of the risks associated with 2L2W operation, the opposing traffic flows must be physically separated. The most desirable method of providing this separation is by the use of the portable concrete median barrier (CMB) or water filled plastic median barrier, supplemented by reflective delineators.

However, for projects of considerable length, short term projects, or where sufficient clear roadway width is not available (bridge decks, etc.), it may not be practical to utilize CMB's. Under these conditions other devices as noted may be used.

Standard

To prohibit passing on the 2L2W section, either flexible, highly visible fluorescent orange reflectorized marker posts at 10 m spacing, or portable concrete or plastic water-filled median barriers should be used to separate opposing traffic flows. These devices should be supplemented by barrier delineators or by a pair of yellow temporary overlay markers (TOM) at 10 m intervals when the orange marker posts are used. When CMB's are used, care must be taken to orient the end units such that the unprotected ends are not exposed to oncoming traffic.

Under normal conditions it will be necessary to reduce the prevailing speed limit on the 2L2W section. Refer to Policy/Standard 900-C-6. In addition, speed reductions (advisory or regulatory) may be necessary through the crossover areas. (For an example see drawing TMP-25)

At least one set of DO NOT PASS (RB-31) and TWO WAY TRAFFIC (RB-24) signs should be installed. They should be repeated at a minimum interval of 1 km, in each direction when applicable, and following Provincial Trunk Highway or Provincial Road intersections.

A minimum clear lane width of 3.7 m including shoulders should normally be maintained at all times. Reduced widths may be approved by the Director of Traffic Engineering. However, special signing, and notification of the Road Information/Permits section will also be required for reduced widths.

The 2L2W section should be re-striped with pavement markings of the appropriate colour and configuration. For this purpose either semi-permanent materials or paint may be used.

During winter months when 2L2W operations are in effect and markings are obliterated or obscured, every effort must be made to maintain the flexible orange marker posts.

All conversions to two-lane two-way operations require approval by Traffic Engineering Branch.

Purpose

Route detours should always be considered whenever a detour will provide the best service to through (as distinct from local) traffic. It may be necessary or desirable to allow local traffic on the "closed" roadway.

In many cases the route that is used to detour highway through traffic is under the jurisdiction of some other authority (municipality, town, local government district). Normally these roads are not used as through routes, particularly to the detour destination. In addition to the basic requirement of safely detouring traffic at the intersection(s) of the detour route and the highway, it is also necessary to provide directional guidance at appropriate intervals, and to control all intersections in a manner that protects the detoured traffic. Route detour notification including all closure information must be given to all affected stakeholders, i.e. rural municipalities, EMS, schools, and R.C.M.P.

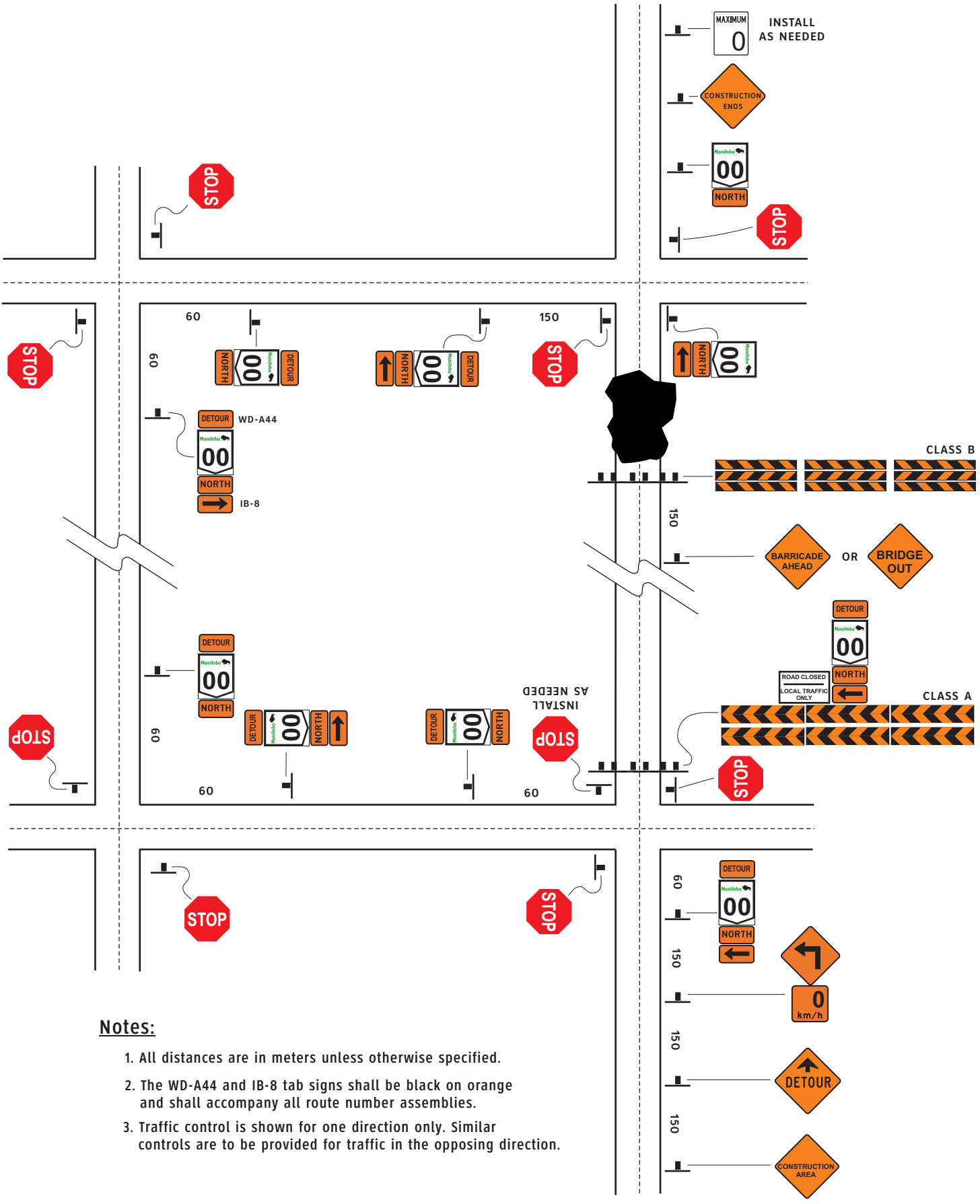
Policy/Standard

Agreement must be reached between the local traffic authority and the Department regarding the authority to control intersections as required on the detour route. In general, all intersections along a detour route will be controlled with stop signs on either the east/west or north/south approach, favouring the detour route when feasible.

If either end of a route detour falls at a location that requires a construction gate assembly as specified in a contract, the gate assembly should be placed or moved so that it does not interfere with or detract from the barricade assemblies or signing required for the route detour. This may require that the construction gate assembly is located a considerable distance upstream from the barricade assembly or signing.

Detour highway route marker assemblies should be installed and maintained at all intersections where the detour route changes direction, and at other locations as required to maintain a maximum interval of 2 km between route markers.

ROUTE DETOUR SIGNING



Notes:

1. All distances are in meters unless otherwise specified.
2. The WD-A44 and IB-8 tab signs shall be black on orange and shall accompany all route number assemblies.
3. Traffic control is shown for one direction only. Similar controls are to be provided for traffic in the opposing direction.

Purpose

Under some conditions it may be necessary or desirable to indicate the location where trucks are entering or crossing the main highway in order to minimize potential conflicts between high speed through traffic and slow moving trucks.

Policy

Orange symbolic TRUCK ENTRANCE signs (TC-54R) should be installed when **any one** of the following warranting conditions is met:

- An entering truck stopped at the entering roadway stop sign is not visible to approaching traffic on the main highway from **at least the stopping sight distance**. See Table 1.

- Chronic blowing dust or blowing snow on the main highway or haul road restricts the visibility of trucks to approaching traffic on the main highway. (Dust conditions should be treated where feasible with calcium chloride, water, etc. to alleviate this condition, and the continuance of truck haul operations closely monitored during dusty or snowy conditions to ensure that traffic safety is not compromised.)

- Trucks are entering a haul road reserved lane, typically as part of a four-lane divided highway, which is coned or delineated to separate it from the through traffic lane. Signs are not necessary if trucks do not cross or otherwise conflict with through traffic.

- A recorded incidence of entering truck/through traffic conflicts or collisions. Signs in this instance may be installed only with the approval of the Director of Traffic Engineering.

> **Note:** Where feasible haul road approaches should be located/relocated with consideration to providing maximum approach visibility for highway traffic.

To limit the proliferation of unnecessary signs and to preserve the impact of necessary signs, **TRUCK ENTRANCE signs should only be installed where and when strictly warranted.**

Standard

Signs should normally be located 150 m in advance of the crossing. Where necessary, due to extreme sight restrictions or approach geometry, **a second sign** up to 1 km in advance may be installed, and must include an appropriate orange distance tab xx m (WB-4T).

Signs must be removed or covered when the truck haul/truck entrance is not active, even if the truck entrance is in use for only part of the day. e.g. remove or cover signs at night if truck haul is daytime only.

Entering or crossing truck traffic must always be controlled by stop signs (or yield signs where a properly developed acceleration lane is in place for right-turning trucks).

When high traffic speeds and traffic volumes on the highway create problems or where it is not feasible for haul trucks to stop when approaching the main highway, due to steep approach gradient or extremely wet, soft grade, **traffic on the main highway must be controlled by flagmen and FLAGMAN AHEAD signs (TC-21), NOT TRUCK ENTRANCE signs.**

For truck hauls as part of a construction project, whether or not TRUCK ENTRANCE signs are warranted, Project Supervisors should point out to contractors that **truck drivers and other vehicle and equipment operators must obey all rules of the road, entering or crossing the main highway after stopping and only when this can be done safely and with minimum impact to the general highway user.**

Where TRUCK ENTRANCE signs are warranted, the appropriate right facing or left facing version of the sign should be installed to indicate to traffic on the main route the direction of approach of the entering trucks.

TABLE 1 - Minimum Stopping Sight Distance (SSD), Level Road [1]

Operating Speed [2] (km/h)	SSD [3] (m)
60	85
70	100
80	140
90	170
100	200
110	220

1. contact Traffic Engineering Branch for approach downgrade SSD
2. where 85th percentile speed is unknown use posted speed limit plus 10 km/h
3. from the (RTAC) (TAC) *Geometric Design Guide for Canadian Roads*, 1999

Purpose

To limit the probability of wrong way movements on **newly opened** rural sections of 4-lane divided highways by enhancing some intersection traffic controls.

Policy

Intersection Traffic Controls on newly opened sections of rural 4-lane divided highways should be enhanced for a short time following opening of the new facility. This should include all PTH, PR, and higher volume (500 + AADT) municipal road intersections.

Standard

- Two temporary, yellow symbolic DIVIDED HIGHWAY AHEAD warning signs (WA-34) with verbal DIVIDED HIGHWAY tabs should be installed, where feasible, at approximately 200 in advance of the stop sign for a minimum three month period. These signs should be enhanced by **permanent** reflectorized fluorescent orange metal flags.

- Temporary pavement arrows should be placed at the throat of the intersection.

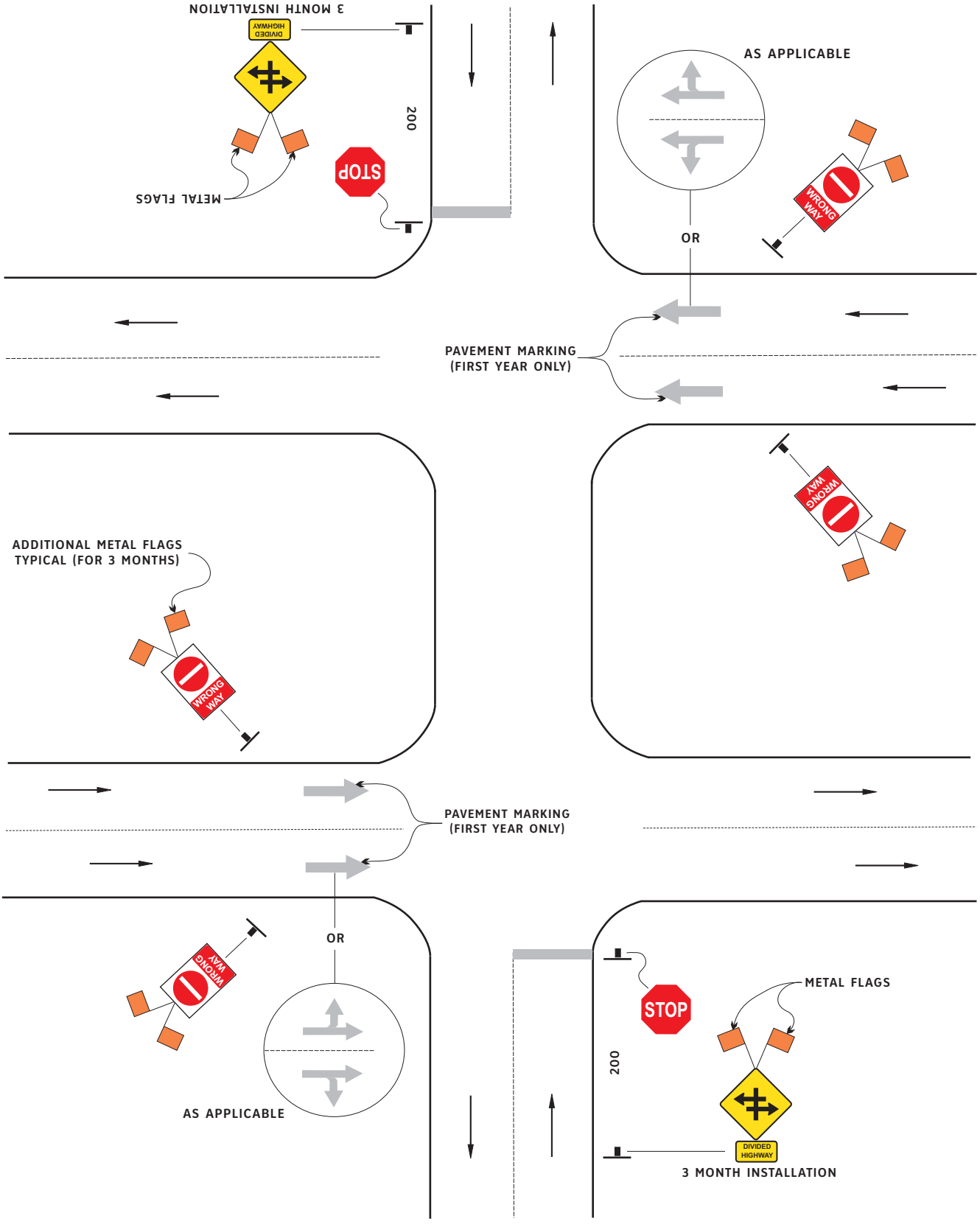
- Pavement lane lines should be extended as far as possible into the intersection.

- Permanent WRONG-WAY signs should be enhanced by the installation of temporary reflectorized fluorescent orange metal flags, which should be removed after a three month period. These flags should not remain permanently but may be retained for up to 6 months depending on the continued occurrence of wrong-way movements.

- **Continuous flagging operations** at primary intersections should be provided for the first 24 to 48 hours following opening, and daytime flagging for the next 2 days, extended or reduced depending on the incidence of observed wrong-way movements, entering traffic volumes, and the nature of the entering traffic (local, commuter, recreational, long distance, etc.).

- All standard 4-lane intersection signing should be in place. Refer to Policy Standard 100-C-12 for wrong way signing policy, and to Section SA-8 of the *Traffic Signing Manual* for wrong way signing installation details.

TRAFFIC CONTROL AT NEW 4-LANE DIVIDED HIGHWAYS



REFER TO SA-8 IN THE 'TRAFFIC SIGNING MANUAL' FOR SIGNING STANDARD AT DIVIDED HIGHWAY INTERSECTIONS

Traffic Control Device: **Work Zone**
Division: **Temporary Warning**
Subject: **Overhead Wires**

Purpose

Signs warning of overhead wires may be beneficial in warning contractors' equipment operators of a potential hazard.

Policy

Orange symbolic OVERHEAD WIRES warning signs (MC-48) may be installed on construction or maintenance projects where equipment extended in the working position (e.g., trucks dumping) may contact overhead wires.

The installation and maintenance of the signs will normally be the responsibility of the contractor.

Standard

When used, the symbolic OVERHEAD WIRES sign and OVERHEAD WIRES tab (MC-48T) should be placed adjacent to the right edge of the road approximately 50 m in advance of the wire crossing. It should be removed when equipment is no longer working in the area. It must be installed on an approved support and be a minimum of 0.60 m above the road surface.

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Director, Traffic Engineering

APPROVED: "ORIGINAL SIGNED BY"
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Highway Engineering

Manitoba
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WORK ZONE
TRAFFIC SIGN SCHEDULE

Provincial Roads
and
Provincial Trunk Highways

2010

Manitoba
Infrastructure and Transportation
Traffic Engineering

WORK ZONE SIGN SCHEDULE

MINIMUM SIGN AND TEXT SIZES

GROUP 1

180 mm text

MC-1

1200 x 1200

TC-2

900 x 900

125 mm text

WA-28S

900 x 450

TC-10

900 x 900

GROUP 2

125 mm text

MC-4

175 mm text

MC-37

WA-22

125 mm text

MC-55

125 mm text

MC-6

125 mm text

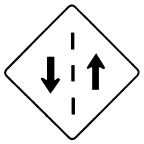
MW-87

WA-23

TC-47

125 mm text

MW-90



WB-3

175 mm text

MC-32

125 mm text

MC-33

TC-49

NOTES:

- Sign and text sizes are shown in millimetres.
- The minimum size of the signs shall be 900 x 900 unless otherwise shown.
- Specifications for sign reflectivity can be found in Section 3.5 at this Internet Site:
  http://www.gov.mb.ca/mit/contracts/pdf/manual/200.pdf

WORK ZONE SIGN SCHEDULE

MINIMUM SIGN AND TEXT SIZES

GROUP 3

TC-5 R

WC-5

RB-25

600 X 750

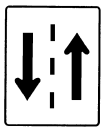
RB-31

900 X 900

TC-21

WA-7 S

600 X 600



RB-24

600 X 750

MR-96

750 X 1200

GROUP 4

RB-32

900 X 900

TC-4

900 X 900

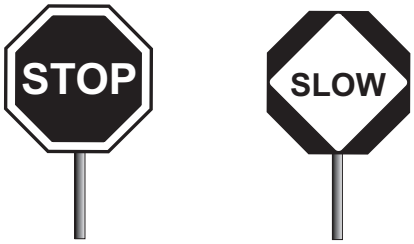
SPECIAL

FRONT: 200 mm text

BACK: 150 mm text

MC-42

1200 X 600



MC-44 (450 x 450)

FLAG-PERSON PADDLE

NOTES:

- Sign and text sizes are shown in millimetres.
- The minimum size of the signs shall be 900 x 900 unless otherwise shown.
- Specifications for sign reflectivity can be found in Section 3.5 at this Internet Site:

http://www.gov.mb.ca/mit/contracts/pdf/manual/200.pdf

Manitoba
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WORK ZONE
TRAFFIC SIGN SCHEDULE :

BILINGUAL SIGNAGE

Provincial Roads
and
Provincial Trunk Highways

2010

MR-96

MR-96 F

MR-136

MR-136 F

TC-17

TC-17 F

MC-41

MC-41 F

MC-41 B

MC-9

MC-9 F

MC-9 B

MC-1
1200 X 1200

MC-1 F
1200 X 1200

MC-1 B
1200 X 1200

MC-4

MC-4 F

MC-4 B

MC-32

MC-32 F

MC-6

MC-6 F

MC-44 B (450 x 450)
FLAG-PERSON PADDLE

MW-82

MW-82 F

MW-87

MW-87 F

MW-86

MW-86 F

MC-37

MC-37 F

MC-36

MC-36 F

MC-36 B

TC-4

TC-4 F

TC-4 B

CLEARVIEW-2-B

MW-90

MW-90 F

MC-33 (bilingual)

TC-10

MC-51

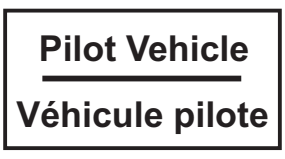
MC-51 F

MC-55

MC-55 F

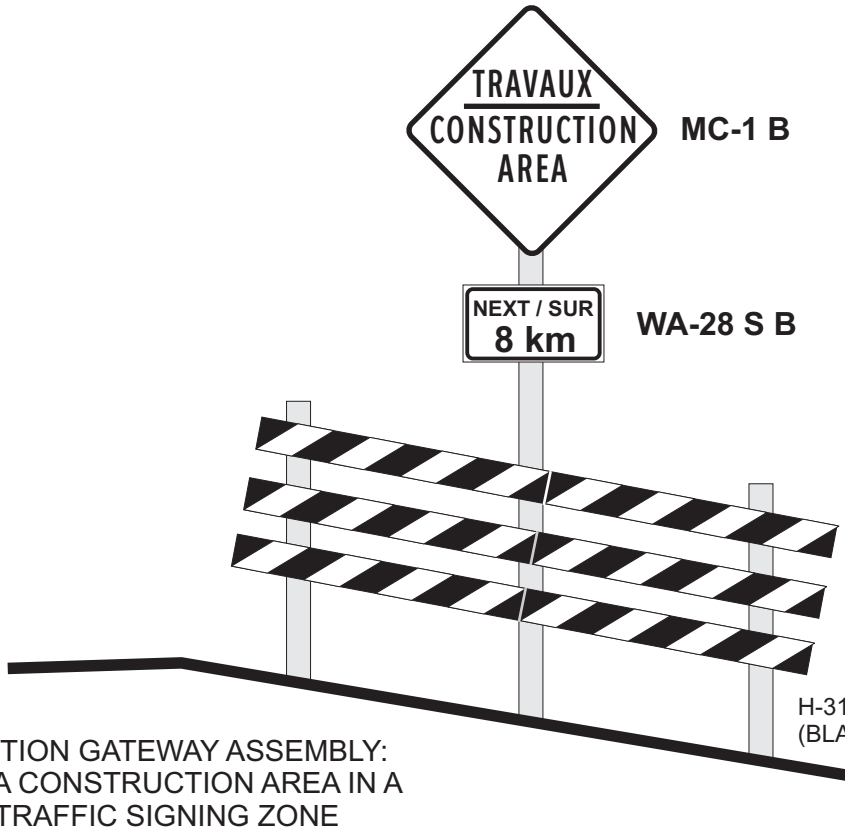
WA-28S

WA-28S F

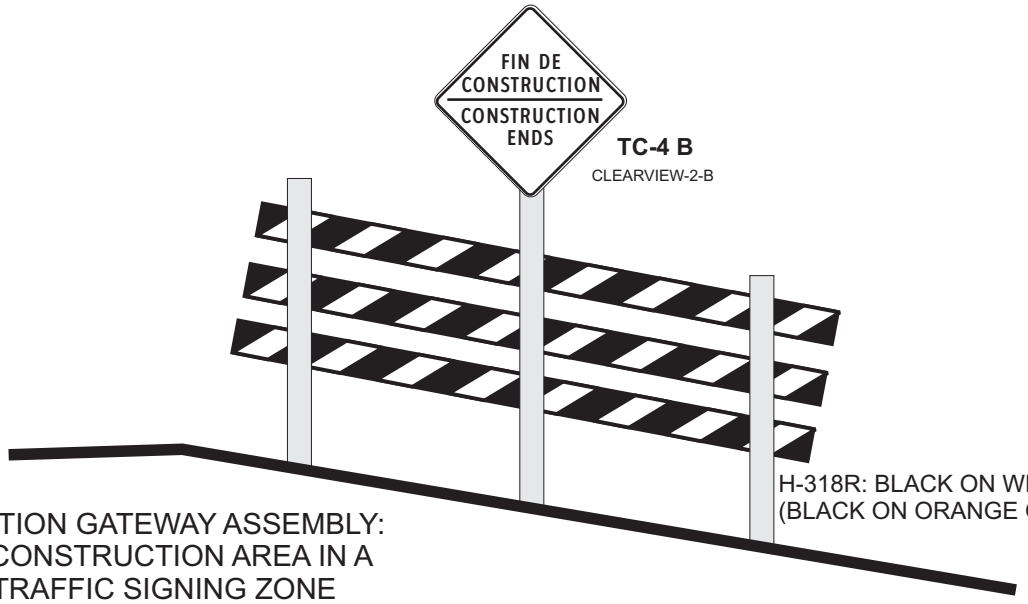


MC-42 B (FRONT)

MC-42 B (BACK)



CONSTRUCTION GATEWAY ASSEMBLY:
ENTERING A CONSTRUCTION AREA IN A
BILINGUAL TRAFFIC SIGNING ZONE



CONSTRUCTION GATEWAY ASSEMBLY:
LEAVING A CONSTRUCTION AREA IN A
BILINGUAL TRAFFIC SIGNING ZONE

INDEX FOR
SPECIFICATIONS FOR TRAFFIC CONTROL

Page

200. 1. SCOPE....3

200. 2. DEFINITIONS
2.1 Work Zone Traffic Control Manual....3
2.2 Work Zone....3
2.3 Work Area....3
2.4 Traffic Control Device....3
2.5 Traffic Control Level....3
2.6 Traffic Management Plan....3
2.7 Designated Construction Zone....4

200. 3. GENERAL
3.1 Interference with Traffic....4
3.2 Traffic Management Plans....4
3.3 Regulatory Speed Reductions....4
3.4 Placement of Traffic Control Devices....5
3.5 Maintenance of Traffic Control Devices....5
3.6 Reflectivity....5
3.7 Department Traffic Control Devices....5
3.8 Limitations on Lane Closures....6

200. 4. TRAFFIC CONTROL DEVICES
4.1 Gateway Assembly....6
4.2 Signs....6
4.2.1 Designated Construction Zone Signage....7
4.2.2 Construction Area Sign....7
4.2.3 Temporary Sign Stands....7
4.3 Barricades....8
4.4 Channelization Devices....8
4.4.1 Construction Markers....8
4.4.2 Polyposts....8
4.4.3 Drums....8
4.4.4 Traffic Cones....8
4.4.5 Sequential Flashers....9
4.4.6 Rigid Channelization Devices....9

4.5 Other Devices
4.5.1 Equipment Warning Lights....9
4.5.2 Pavement Markers....9
4.5.3 Pilot Vehicles....10
4.5.4 Variable Message Signs....10

200. 5. WORK FORCE
5.1 Watchperson....10
5.2 Flagperson....11
5.2.1 Relief Flagpersons....11
5.2.2 Flagging for Temporary Overlay Marker Installation....11
5.2.3 Flagging for String line Installation....11
5.2.4 Flagging Adjacent to Paving Operations....12
5.2.5 Flagging Adjacent to Milling Operations....12
5.2.6 Flagging Adjacent to Shoulder Operations....12
5.2.7 Flagperson Ahead Sign....12
5.3 Traffic Control Coordinator....12

5.4 Personal Protective Equipment……13

200. 6. DETOURS
6.1 General 13
6.2 Roadside Detours 13
6.3 Route Detours....13

200. 7. LEVELS OF TRAFFIC CONTROL....13

200. 8. ENFORCEMENT 14

200. 9. BASIS OF PAYMENT
9.1 Traffic Control....14
9.2 Pavement Markers....15
9.3 Pilot Vehicle 15
9.4 Flagperson 15
9.5 Installation and Removal of Triton Barriers……15
9.6 Installation and Removal of Concrete Median Barriers……15

SPECIFICATIONS FOR TRAFFIC CONTROL

200. 1. SCOPE

These Specifications and the Work Zone Traffic Control Manual govern operations pertaining to the regulation and guidance of traffic safely through or around the work.

200. 2. DEFINITIONS

2.1 Work Zone Traffic Control Manual

The Department's Traffic Engineering Branch has developed a manual intended to provide a single source for traffic control standards for use on Manitoba's highways. All references in this Specification to signs, sign schedules and drawings shall be interpreted to mean those shown in the Work Zone Traffic Control Manual or any amendment to the Work Zone Traffic Control Manual issued by the Traffic Engineering Branch.

2.2 Work Zone

A work zone is an area of the highway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign or flashing lights on a vehicle to the "Construction Ends" sign or the last temporary traffic control device. A work zone may be for short or long durations and may include stationary and mobile activities.

2.3 Work Area

A work area is located within a work zone and is defined as any portion of the highway on which the Contractor's staff and equipment are performing work and/or where a construction related hazard exists. There may be multiple work areas within a single work zone. Two or more work areas separated by less than one kilometre will be considered as a single work area.

2.4 Traffic Control Device

A traffic control device is any approved gateway assembly, sign, barricade, channelization device or other device placed upon, over or adjacent to a roadway, which is intended to regulate, warn, or guide road users.

2.5 Traffic Control Level

A traffic control level will specify the type and application of traffic control devices and workforce necessary to regulate traffic having regard to traffic volume, geometrics and type of work on the project.

Traffic control required on the project will be determined by the Engineer and identified in the bid items as Level I, II, III or IV.

2.6 Traffic Management Plan (TMP)

A Traffic Management Plan (TMP) is a detailed plan for the placement of all traffic control devices within the work zone. The typical TMP templates included in the Work Zone Traffic Control Manual shall be used as the basis for a project TMP on simple traffic control projects. For complex traffic control projects, a site specific TMP must be developed.

2.7 Designated Construction Zone

A Designated Construction Zone (DCZ) is a work zone where The Highway Traffic Act authorizes double fines for speeding whether or not there are workers/equipment present and whether or not there is a reduction in the maximum speed within the DCZ.

Traffic authorities and contractors working on their behalf establish and identify a DCZ by using the signage prescribed in the Designated Construction Zones Regulation.

200. 3. GENERAL

3.1 Interference with Traffic

The Contractor shall not close the highway or reduce the width or number of traffic lanes available for traffic except as specified in the Contract or approved by the Engineer.

The Contractor shall at all times carry on the work in a manner that will create the least interference with traffic, consistent with the performance of the work.

Construction equipment shall not be parked in such a manner as to obscure or in any way block the road users' view of traffic control devices. Employees' vehicles may only be parked on the roadway if they are being used in the performance of the work.

The Contractor shall keep the travelled way free of foreign objects such as spilled earth, rock, timber and other items that may fall from his transporting vehicles. Materials spilled by or dropped along or across any public travelled roadway, both within and outside the contract limits, shall be removed immediately.

The Contractor shall provide and maintain reasonable access to property fronting or in the vicinity of the work. Where temporary disruption of access is authorized by the Engineer, the Contractor shall make adequate arrangements with the affected property owners.

3.2 Traffic Management Plans

The Contractor shall prepare and submit a separate Traffic Management Plan (TMP) for each stage of planned construction operations. All TMP's shall be reviewed and approved by the Engineer prior to the commencement of the project. The contractor shall ensure that copies of the TMP's are available on site at all times.

Should planned construction operations change after the commencement of the project, the contractor shall prepare a new TMP reflecting the change. The new TMP shall be reviewed and approved by the Engineer prior to the commencement of that stage of work.

3.3 Regulatory Speed Reductions

Traffic Management Plans may include regulatory speed reductions within the work zone when a risk analysis indicates that they are required for the safety of workers and/or road users. Longer work zones may have multiple reduced speed areas coinciding with individual work areas of the project.

Where a risk analysis supports the need for a speed reduction, the Director of Traffic Engineering has granted blanket pre-approval for regulatory speed reductions for the following common work zone conditions and hazards. The Contractor shall seek the approval of the Engineer prior to introducing a regulatory speed reduction authorized under the blanket pre-approval.

All other conditions requiring a speed reduction must be approved by the Director of Traffic Engineering.

WORK ZONE CONDITION / HAZZARD	PRE-APPROVED MINIMUM SPEED LIMIT	APPROVED EXTENT OF REDUCED SPEED ZONE
Workers are located in close proximity to traffic (up to a maximum of 12m from an open traffic lane)	60 Km/h	500m in advance of area where workers are active to 300m beyond area where workers are active
A significant unprotected roadside hazard (e.g. excavation area) is located within the clear zone	70 Km/h	500m in advance of roadside hazard to 300m beyond roadside hazard
The conversion of a 4-lane divided highway to 2 lane/2 way operation	80 Km/h	500m in advance of 2 lane/2 way operation to 300m beyond 2 lane/2 way operation

3.4 Placement of Traffic Control Devices

All Traffic control devices shall be placed in accordance with the approved Traffic Management Plan.

Non-portable signs and other fixed traffic control devices shall be installed prior to commencing work.

Portable signs and other temporary traffic control devices shall be positioned prior to commencing work in each work area and they shall be moved and maintained as the work progresses.

3.5 Maintenance of Traffic Control Devices

When the Contractor ceases operations due to darkness, weekends or weather conditions, or changes the method or sequence of operation, traffic control devices shall be checked and only those necessary to protect road users shall remain in place. During periods when they are not applicable, portable devices shall be removed from the roadway; non-portable devices shall be covered or removed.

Traffic control devices shall be monitored to ensure proper location, legibility and condition, and if necessary, shall immediately be properly repositioned, repaired or replaced.

3.6 Reflectivity

Signs, barricades and channelization devices shall be reflectorized to show the same colour and shape by night as by day. The reflective surfaces shall be cleaned or replaced as frequently as necessary to provide full reflectivity. Reflectorized signs will be acceptable if they are clearly visible when illuminated with normal vehicle lights on high beam from a distance of 150 metres.

Reflectivity must meet or exceed ASTM Type IV except for the Flagperson Ahead Sign (MC-64) and the Flagperson paddle (MC-44A and MC-44B) which must meet or exceed ASTM Type XI – Fluorescent.

3.7 Department Traffic Control Devices

Standard traffic control devices existing on the project prior to construction may have to be moved to facilitate the work or to comply with the approved Traffic Management Plan. The Contractor, on instruction from the Engineer, shall remove the devices and stockpile them carefully at an approved site.

Traffic control devices, when supplied to the Contractor by the Department, shall be returned in good condition when the work is completed.

The replacement cost of any traffic control device owned by the Department and which has been damaged or lost during handling by the Contractor shall be deducted from amounts payable to the Contractor.

3.8 Limitations on Lane Closures

Lane closures on highways shall be limited to the distances listed below unless otherwise identified in the Special Provisions.

On multi-lane divided highways, any single lane closure shall be restricted to 10km in length, unless otherwise approved by the Engineer.

On two-lane two-way highways, any single lane closure length shall be limited based on a maximum queue wait time of eight (8) minutes. At no time, shall any single lane closure exceed a length of 5km, unless otherwise approved by the Engineer.

Individual lane closures shall be separated by a minimum of 5km unless otherwise approved by the Engineer.

The Contractor shall, at their own cost, supply appropriate work zone traffic control including additional signs and flag persons at each intersecting roadway when lane closures encompass those intersections.

200. 4. TRAFFIC CONTROL DEVICES

4.1 Gateway Assembly

Each end of the project shall be identified by a gateway assembly which shall be supplied, installed and maintained by the Contractor. The location of each gateway assembly will be in accordance with the approved Traffic Management Plan.

When gateway assemblies are not required or additional assemblies are required the number and location will be identified in the Special Provisions.

Unless otherwise directed, the Contractor shall remove the gateway assembly if work is discontinued for the winter.

4.2 Signs

The Contractor shall provide signs as shown on the approved Traffic Management Plan. All signs used shall be in accordance with the Work Zone Traffic Control Manual, the Manual of Uniform Traffic Control Devices for Canada or Provincial Regulations.

Department construction and maintenance projects will include the use of bilingual highway construction signs (English/French) on all Provincial Trunk Highways and Provincial Roads that lie within the "Bilingual Signing Area" in Manitoba. Generally, all highway construction signs with verbal messages will be affected. Where applicable, bilingual signing requirements will be identified in the Special Provisions of the tender document.

Portable signs shall be placed on the roadway clear of normal vehicular traffic, stand vertically and be pinned or anchored so that wind gusts will not topple the sign. The bottom of the sign shall be at least 600mm above the surface of the road.

The bottom of non-portable signs shall be at least 1,500mm above the surface of the road. With the exception of Gateway Assemblies, the edge of signs shall be clear of the highway shoulder line

by at least one metre, and shall be clear of the edge of curbed roadways by at least 300mm in urban areas and 600mm in rural areas.

Non-portable sign posts shall be wooden, capable of supporting the sign firmly at the required height and shall have a minimum nominal size of 100mm x 100mm.

In general, signs shall be positioned on the right-hand side of the road. When two or more adjacent lanes accommodate traffic travelling in the same direction, both non-portable and portable signs shall be positioned on both sides of the roadway.

Where bilingual signing is a requirement, the French sign shall be installed behind the English sign at a distance of approximately 30m.

4.2.1 Designated Construction Zone Signage

All projects on provincial highways lasting longer than four hours shall be signed as a Designated Construction Zone (DCZ).

The beginning of the DCZ shall be identified with the 'Designated Construction Zone' sign. This sign shall be affixed to the gateway assembly located at the start of the work zone unless otherwise directed by the Engineer. The sign shall be located so that drivers have an unimpeded view of the sign.

The end of a DCZ shall be marked with the 'Construction Ends' sign. This sign shall be affixed to the gateway assembly located at the end of the work zone unless otherwise directed by the Engineer. The sign shall be located so that drivers have an unimpeded view of the sign.

At least one 'Speed Fines Double' sign must be placed within a DCZ and be no more than 150m after the 'Designated Construction Zone' sign which marks the beginning of the DCZ.

Additional 'Speed Fines Double' signs may be placed within the DCZ to heighten driver awareness. The sign may also be used to mark a portion of road within the DCZ that intersects with another roadway.

Bilingual Traffic Signing Areas shall be signed in both official languages.

4.2.2 Construction Area Sign

The Construction Area sign shall be used in advance of work areas which are separated by more than 5 km from the Gateway Assembly or from other work areas.

For all projects with traffic control level II, III or IV, Construction Area signs are to be installed at the intersection of every Provincial Trunk Highway or Provincial Road. Construction Area signs may be required at other intersecting roadways that enter onto the project. These other roadways will be identified in the Special Provisions.

4.2.3 Temporary Sign Stands

Temporary sign stands, when required, shall be supplied by the Contractor from the following recommended group:

- Flexmast Model PCC3648
- Quadra Flex Model QFVR
- Windmaster Model 4818
- Stellmaster Model 505M

Other acceptable equivalent sign stands will be permitted providing they meet the Specifications and are approved by the Safety Advisor in the Region in consultation with the Department's Traffic Engineering Branch.

4.3 Barricades

A barricade shall consist of one or more similar barricade assemblies placed end to end. When required, barricades shall be reflectorized on both sides.

Class "A" Barricade Assemblies will generally be used to effect a lane or roadway closure and to signify the direction of the detour.

Class "B" Barricade Assemblies will generally be used to effect a complete lane or roadway closure.

Class "C" Barricade Assemblies will generally be used to taper a lane closure and to maintain a lane closure.

4.4 Channelization Devices

Channelization devices shall be used when the traffic flow is impeded as a result of obstructions, work areas, or a reduction in the effective width of the roadway. They shall be used to supplement signs and barricades.

All channelization devices will be approved by the Department. They shall be designed to yield if struck by an errant vehicle, and shall conform to the specifications described herein in terms of size, shape, colour and reflectivity. Unless otherwise directed, only those delineators and channelizers specified in the Department's Work Zone Traffic Control Manual may be installed in a work zone.

4.4.1 Construction Markers

Construction markers may be used to delineate obstructions above the ground, such as gravel windrows, and to delineate excavation areas below the ground level, such as bench cuts.

They shall be mounted on suitable supports, with the bottom of the marker being approximately 900mm above the road surface. They shall be spaced in accordance with the approved Traffic Management Plan.

4.4.2 Polyposts

Polyposts may be used for separating opposing lanes of traffic or for protecting a work area that is parallel to the road. They shall be spaced in accordance with the approved Traffic Management Plan.

4.4.3 Drums

Reflectorized plastic drums may be used to delineate a merging taper or a shoulder taper or to maintain a lane closure.

The Contractor shall provide ballast to prevent movement of the drums by the wind. Drums shall be spaced in accordance with the approved Traffic Management Plan.

4.4.4 Traffic Cones

Traffic cones, when approved by the Engineer, may be used during daylight hours to guide or channel traffic through a work area.

4.4.5 Sequential Flashers

A sequential flashing traffic control device (sequential flasher) shall be used in conjunction with other traffic control devices to close a single lane on a multi-lane highway. The Department will supply the sequential flasher for these lane closures.

The use of sequential flashers for any purpose other than lane closures on multi-lane highways is subject to the approval of the Engineer.

Sequential flashers approved for a use other than lane closures on multi-lane highways shall be supplied by the Contractor and shall be equivalent in size and visibility to the sequential flashers used by the Department.

Sequential flashers shall be located as shown on the approved Traffic Management Plan. In the event that a sequential flasher becomes inoperative, the Contractor shall ensure that adequate traffic control is maintained.

The Contractor shall place, move and maintain all sequential flashers in accordance with written instructions of the Department or supplier as the case may be.

4.4.6 Rigid Channelization Devices

Rigid channelization devices such as concrete median barriers and Triton barriers may be required by the Engineer to channelize or separate traffic. When these types of devices are required, they will be supplied by the Department.

These devices shall be installed as shown on the approved Traffic Management Plan and in accordance with guidelines contained in the Work Zone Traffic Control Manual.

When “Triton” barriers are required to be in use during freezing temperatures, they shall be filled with a brine mixture (normally a 20% sodium chloride (salt), 80% water mixture). Where a brine mixture is required, the Department will supply the sodium chloride.

The Contractor shall notify the Engineer 48 hours in advance of the intended pick-up and delivery time of rigid channelization devices.

4.5 Other Devices

4.5.1 Equipment Warning Lights

Equipment warning lights shall be installed on construction equipment and vehicles required to work or stop on the roadway, including service vehicles. Trucks hauling aggregate and earth moving equipment are exempted from this requirement.

The warning light flash shall be visible in daylight under normal atmospheric conditions for a distance of one kilometre. The light shall flash between 50 and 70 times per minute.

No direct payment will be made for providing equipment warning lights as the cost will be considered as being included in Contract bid items.

4.5.2 Pavement Markers

Flexible vertical tabs called "temporary overlay markers" shall be used to delineate lanes of fresh pavement. The tabs shall be applied 100mm from centreline, at the following intervals:

a) Other than top lift		30m
b) On top lift	-tangents	20m
	-curves	10m

The markers shall be applied accurately with reference to a string line or other suitable offset line, and always on the same side of centreline on top lift.

The markers shall be applied by the Contractor immediately after final rolling.

Markers shall be removed by the Contractor in advance of placing a new lift of pavement thereon. The markers shall be removed, collected and disposed of in a manner approved by the Engineer.

The markers shall be supplied by the Contractor and will be pre-approved by the Department prior to use.

4.5.3 Pilot Vehicles

Pilot Vehicles, when listed as a bid item, shall be supplied by the Contractor.

Signs identifying the pilot vehicle shall be mounted above the roof of the vehicle, at least two metres above the ground, and clearly visible by road users from both the front and the back. The signs shall be illuminated during hours of darkness.

At least one equipment warning light shall be mounted to be clearly visible from all directions. It shall be in operation at all times that the vehicle is on duty.

Pilot vehicles shall be operated only at times and locations permitted by the Engineer.

4.5.4 Variable Message Signs

A variable message sign (VMS) may be used as an enhancement to the other traffic control devices within the work zone. If the use of a VMS is required by the Engineer, the Department will supply the VMS.

Where not required by the engineer, the contractor may propose to use VMS as an enhancement to their Traffic Management Plan (TMP). In these cases, the contractor shall supply and operate the VMS device which shall be equivalent in size and visibility to the VMS used by the Department.

The VMS shall be located as shown on the approved TMP.

200. 5. WORK FORCE

5.1 Watchperson

The Contractor shall supply a watchperson who shall be available after traffic control devices have been positioned. When equipment is working the Contractor shall delegate one person to assume the duties of the watchperson. When the equipment is shut down the watchperson shall periodically patrol the work to ensure that traffic control devices are properly positioned, in good condition and that the roadway is in a safe condition for road users.

If required, specific inspection frequencies for watchpersons will be listed in the Special Provisions.

In the event that the unsafe condition cannot be physically repaired, the watchperson shall immediately make arrangements to correct the situation.

The Contractor shall register, with the local police force, the name and phone number of the watchpersons who can be contacted in the event of an emergency situation.

5.2 Flagperson

Each flagperson shall be trained, certified, and equipped in accordance with The Workplace Safety and Health Act (Manitoba) and associated regulations.

Unless otherwise permitted by the Engineer, the provision of Flagpersons are required under the following circumstances and will be considered incidental to the Contractor's lump sum price for the applicable Level of Traffic Control:

- For Level I and Level II Traffic Control where the contractor's operations cause the need for a Flagperson,
- For Level II Traffic Control where the work includes installing or removing through grade culverts or the operation of earth bridges,
- **For Level III and Level IV Traffic Control two flagpersons are required at each end of a work area where traffic will be stopped, including situations involving pilot vehicles:**
    - **One flagperson shall stop and hold the traffic.**
    - **A second flagperson shall provide advanced warning of any accumulating traffic queue (advanced warning flagperson).**
    - **For low traffic volumes, the requirement for advanced warning flagpersons may be waived which will be identified in the Contract Special Provisions, otherwise the requirement is in force.**
    - **Reasonable alternatives to the advanced warning flagperson requirement may be permitted at the sole discretion of the Engineer.**
- For activities and flagpersons identified in Sections **200.3.8,** 200.5.2.2, 200.5.2.3, 200.5.2.4 and 200.5.2.5, or;
- For specific locations identified in the contract Special Provisions.

Flagpersons may also be required at other areas which, in the opinion of the Engineer, are not adequately protected by traffic control devices. In these instances, Flagpersons will be paid for based on the Flagperson bid item (if available), or by Extra Work.

5.2.1 Relief Flagpersons

The Contractor shall provide relief flagpersons at meal times and where ever necessary to give regular flagpersons relief from duty and prevent flagperson fatigue, in accordance with the Contractor's Workplace Safety and Health Program.

5.2.2 Flagging for Temporary Overlay Marker Installation

A worker installing temporary overlay markers (TOMS) must be accompanied by at least one flagperson, unless the activity is already being controlled by existing flagpersons.

When required the flagperson should, at all times, be within 10 metres of the person installing the TOMS.

5.2.3 Flagging for String line Installation

A worker installing a string line shall be accompanied by at least one flagperson, **unless the activity is already being controlled by existing flagpersons.**

The flagperson should, at all times, be within 10 metres of the person installing the string line.

5.2.4 Flagging Adjacent to Paving Operations

The Contractor shall provide a flagperson to accompany any self-propelled paver when it is operating on a **lane of the** roadway **which** is open to vehicular traffic. **Where the paver is operating in a closed lane, the flagperson will not be required.** The flagperson shall at all times be within 10 metres of the paver.

5.2.5 Flagging Adjacent to Milling Operations

The Contractor shall provide a flagperson to accompany any milling equipment when it is operating on a **lane of the** roadway **which is** open to vehicular traffic. **Where the milling equipment is operating in a closed lane, the flagperson will not be required.** The flagperson shall at all times be within 10 metres of the milling equipment.

5.2.6 Flagging Adjacent to Shoulder Operations

The Contractor shall provide a flagperson to accompany any hopper equipped mechanical spreader when it is operating on a **lane of the** roadway **which is** open to vehicular traffic**. Where the spreader is operating in a closed lane, the flagperson will not be required.** The flagperson shall at all times be within 10 metres of the mechanical spreader.

5.2.7 Flagperson Ahead Sign

A Flagperson Ahead sign (MC-64) shall be placed in advance of any stationary flagperson.

The back of the Flagperson Ahead sign shall be visible to the flagperson at all times and should not be more than 500 metres from the flagperson.

5.3 Traffic Control Coordinator

On Traffic Control, Levels IV the Contractor shall supply a Traffic Control Coordinator who has been certified in accordance with the Manitoba Heavy Construction Association's Traffic Control Coordinator Training Course or an equivalent training course.

The Traffic Control Coordinator shall not be assigned to duties other than Traffic Control and shall be responsible for:

- planning and coordinating traffic control with the Engineer
- organizing and supervising the movement and relief of flagpersons
- ensuring that flagpersons are properly informed with regard to changes in construction activities and road conditions and are relaying the proper information to road users and project staff
- installing and positioning traffic control devices, and moving or removing them as conditions change
- maintaining traffic control devices and ensuring that their reflective surfaces are clean

The Contractor shall have on site at least one vehicle containing a complete set of extra signs, wooden posts, a posthole auger and other necessary tools and supplies to enable the Traffic Control Coordinator to carry out these duties.

The Contractor shall provide mobile communication between the Traffic Control Coordinator's vehicle and a station or vehicle designated by the Engineer.

5.4 Personal Protective Equipment

Every worker exposed to the hazard of vehicular traffic on a project site on a street, highway, or other roadway, shall be equipped with Personal Protective Equipment as required by the Workplace Safety and Health Act (Manitoba) and associated regulations, where applicable.

200. 6. DETOURS

6.1 General

On all detours the Contractor shall supply, erect and maintain traffic control devices in accordance with the approved Traffic Management Plan.

If the Contractor requests and the Engineer approves the construction of a detour which is not specifically required by the Contract, all costs involved in constructing, signing, maintaining and removing the detour shall be at the expense of the Contractor.
The Contractor shall not move or remove any traffic control device relating to detours without the permission of the Engineer. The Contractor shall supply flagpersons as required until traffic control devices moved or removed by the Contractor have been restored.

6.2 Roadside Detours

Roadside detours around bridge projects will be constructed and traffic control devices will be installed by the Department prior to the Bridge Contractor commencing work. The Contractor shall maintain all traffic control devices for the duration of the Contract. The Department will maintain the road surface.

When the Contract requires a roadside detour it shall be constructed at applicable unit prices. The Contractor shall maintain it. Traffic control devices shall be supplied, installed and maintained by the Contractor. The removal of the detour, if required, will be paid for as Extra Work.

6.3 Route Detours

The Department will maintain traffic control devices which it has installed on route detours.

The portion of the highway included within the construction limits shall be closed to traffic except that the Contractor shall provide safe and adequate means of access to adjacent property. The Contractor shall maintain devices which he has installed.

200. 7. LEVELS OF TRAFFIC CONTROL

The bid item for Traffic Control will specify which Level of Traffic Control is applicable. The following summarizes the minimum requirements for each individual Level.

<u>Level I</u>

In accordance with the approved Traffic Management Plan, the Department will supply necessary traffic control devices and install non-portable signs. The Contractor shall erect portable signs, maintain all traffic control devices and provide;

- a watchperson

When detours are associated with the work, the Contractor shall barricade the area, as specified in Section 6.1.

Level II

In accordance with the approved Traffic Management Plan, the Contractor shall supply, install and maintain applicable signs, barricades and channelization devices and provide:

- gateway assemblies
- a watchperson

Level III

In accordance with the approved Traffic Management Plan, the Contractor shall supply, install and maintain applicable signs, barricades and channelization devices and provide:

- flagpersons
- gateway assemblies
- a watchperson

Level IV

In accordance with the approved Traffic Management Plan, the Contractor shall supply, install and maintain applicable signs, barricades and channelization devices and provide:

- a traffic control coordinator
- flagpersons
- gateway assemblies
- a watchperson

200. 8. ENFORCEMENT

The Contractor shall provide for the safe passage and control of traffic within the limits of the project.

If the Contractor fails to provide for the safe passage and control of traffic or fails to correct forthwith an unsatisfactory condition upon being so directed, the Engineer will suspend the work immediately. The Contractor shall not resume work until the Engineer is satisfied that the situation has been rectified and is safe for the road user.

If immediate action is required, the Engineer may correct the unsatisfactory condition and take such other action as he deems necessary to provide for the safe passage and control of traffic.

The Department will deduct, from progress payments, any cost or expense incurred by the Department as a result of taking corrective action. No act, or failure to act on the part of the Engineer, shall relieve the Contractor from his responsibilities.

200. 9. BASIS OF PAYMENT

9.1 Traffic Control

The lump sum price for providing the required level of traffic control will be compensation in full for performing all work and providing all items necessary or incidental thereto (including the provision of Flagpersons and bilingual signage as required by the Specification or the Special Provisions of the contract).

Forty percent of the lump sum price for Traffic Control will be paid on the first progress payment; thereafter payments will be made in increments of twenty percent when 50%, 75% and 100% of the contract work has been performed.

Traffic control devices or workforce required by the Engineer, in addition to those prescribed in the specific Level of Traffic Control, will be paid for on the basis of Extra Work.

9.2 Pavement Markers

The unit price for each "Temporary Overlay Marker" will be payment in full for supplying and installing each marker and performing all work necessary or incidental thereto.

9.3 Pilot Vehicle

The unit price for "Pilot Vehicle" will be the total amount paid to the Contractor for each hour a vehicle is operated and shall include the cost of supplying the vehicle, providing operators and flagmen, and supplying fuel, oil, grease and repairs necessary to keep the pilot vehicles operating in a safe and efficient manner.

9.4 Flagperson

The unit price per hour for "Flagperson" will be payment in full for providing each flagperson when requested by the Engineer, including Personal Protective Equipment, training, all wages (including work breaks and other like employee benefits and payroll costs) and all operations necessary or incidental thereto for directing traffic safely through a hazardous area.

9.5 Installation and Removal of “Triton” Barriers

“Installing and Removing “Triton” Barriers” will be paid on a linear metre basis of “Triton” barrier installed. This will be payment in full for loading, transporting, unloading, positioning, pinning together, filling with water and emptying the “Triton” Barriers as directed by the Engineer. When the barriers are no longer required, the Contractor shall return the barriers to their original location.

9.6 Installation and Removal of Concrete Median Barriers

“Installing and Removing Concrete Median Barriers” will be paid on a linear metre basis of barrier installed. This will be payment in full for loading, transporting, unloading positioning and pinning together as directed by the Engineer. When the barriers are no longer required, the Contractor shall return the barriers to their original location.