Republic of the Philippines

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Highway Safety Design Standards

Part 2:

Road Signs and Pavement Markings Manual



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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
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MESSAGE

The delivery of quality and safer roads is a formidable challenge to the Department of Public Works and Highways. It takes a whole community to accomplish this goal.

Over the years, statistics on road crashes and accidents have increased tremendously involving not only the motorists but also the pedestrians as victims. Time has come that we have to take a closer look into the factors causing these road-related deaths and injuries.

We have taken the first step — the assessment of 3,130.00 kilometers of national roads. We have thousands of kilometers of national roads more to assess and correspondingly, we shall implement their systematic safety upgrading. And for local roads, we enjoin our partners in the Local Government to do their part so that the country's total road network shall comply with safety standards.

To address the engineering aspect, the DPWH has prepared the *DPWH Highway Safety Design Standards Manual* aimed at establishing and maintaining standardized safe road design principles and standards for roads in the Philippines.

I, therefore, enjoin every road builder, both in the public and private sectors, to comply with the safety design principles laid out in this Manual — in terms of road planning, roadworks project management and traffic management.

Also, in partnership with other stakeholders and in addition to engineering, we shall endeavor to execute the education and enforcement aspects of road safety.

Let us then work together for quality and safer roads — dedicated to saving lives.

ROGELIO L. SINGSON
Secretary

FOREWORD

The first edition of the Road Signs and Pavement Markings Manual was developed in 2004 as part of the Capacity Building Component of the ADB-assisted Road Infrastructure Safety Project with the assistance of the DPWH staff from the Project Evaluation Division of the Planning Service and the Traffic Engineering Center. The manual includes standards and guidance for the installation and use of regulatory signs, guide signs (including direction signs, tourist signs and street names), expressway signs, traffic instruction signs, hazard markers and pavement markings.

The Department of Public Works and Highways issued this second edition (updated version) of the Road Signs and Pavement Markings Manual to establish and maintain a standardized system of signs and pavement markings on all roads in the Philippines by incorporating internationally accepted new standards and practices. The manual is one of the two parts of the DPWH Highway Safety Design Standards Manual as follows:

Part 1: Road Safety Design Manual

Part 2: Road Signs and Pavement Markings Manual

The Road Signs and Pavement Markings Manual shall be used as the primary reference for the design and installation of road signs and pavement markings on national and local roads. To maximize safety and provide credible instructions to drivers, it is essential to maintain a consistent standard for signs and pavement markings. In the interest of uniformity, Local Government Units, traffic management and enforcing authorities, project managers and consultants must apply the requirements of this manual on all road projects or road maintenance activities under their control.

The principles contained in this manual should also be used in the training of personnel from the DPWH and other traffic management offices in the government and private sectors who are involved in the design, maintenance and construction of roads. This will enable all future road signs and pavement markings to be consistent and uniform standard.

This manual supersedes the previous Road Signs and Pavement Markings Manual published in 2004.

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PART A: ROAD SIGNS

1 INTRODUCTION

1.1 Background

This manual is prepared and issued by the Department of Public Works and Highways (DPWH) to provide guidance in design and installation of standard signs on all roads throughout the Philippines, including those under the care and management of local governments.

A standardized road traffic system is essential to ensure that drivers acquire the information necessary to enable them to comply with road regulations and to navigate their way around the road system in a safe and efficient manner.

As in the case of any other type of traffic control devices, road signs should be used only when these are necessary and where their use has been justified by field studies.

Road signs contain instructions that the road user is required to obey. They warn the road user of hazards that may not be self-evident. They also give information about routes, directions, destinations, and places of interests. Since road signs are essential part of the road traffic system, their message should be concise, meaningful, consistent, and their design and placement must be coordinated with the road geometric design.

1.2 The Scope of the Manual

This manual describes the different types of road signs and pavement markings signs and prescribes their standard and the conditions under which each must be used. The standards set forth in this manual are primarily designed for the streets and highways that constitute the basic road system. Special signs for expressways are also included in this revised edition. However, signs for road works have been omitted from this manual. These signs are included in a separate "Road Works Safety Manual".

1.3 Authority for Installation

Traffic signs shall be installed only upon approval of the Secretary of the DPWH or his delegated authority, having the necessary jurisdiction, for the purpose of regulating, warning, or guiding traffic. No traffic signs shall bear any advertising or commercial message, or any other message that is not essential to traffic control.

The placement of unauthorized traffic signs on the highway right-of-way or adjacent to the road by a private organization or individual is not allowed. The display of unofficial, non standard and non-essential sign is not permitted.

1.7.6 Use of Symbols

The use of symbols on signs to convey all or part of a message may reduce reading time and extend legibility distance. Common standard symbols, including arrows, symbolic representation of legends and location destinations, are included in this manual. Where a new symbol is warranted, the design must be acceptable in accordance with international practice and meet relevant requirements of a standard procedure. See also Section 8 of Appendix A for sign design with symbols.

1.7.7 Sign Face Design

Standard drawings of most commonly used sign types are included in Appendix A. These drawings show standard spacing with respect to positions between elements such as arrows, symbols and destination descriptions. They also provide standard horizontal and vertical clearances between various sign elements and detail of chevrons for G2 type of signs.

It should be noted that when all the sign rules have been followed, some visual judgment must be exercised in adjusting sign elements. The following general rules are to be applied when designing the sign face:

- Cramping of legend is to be avoided;
- Avoid large areas of blank panel, particularly blank areas not symmetrically disposed across the panel;
- If there are two list of legends side by side (e.g., as on Reassurance Signs) it is necessary to left justify the left list and right justify the right list; and,
- Elements such as arrows and symbols may sometimes have to be larger than the principal legend would normally require. For example, an arrow relates to several lines of legends on a direction sign.

Sign face shall show sufficient details to be manufactured. The following are minimum features required:

- Legend type and size, e.g., 160 E Mod (160mm E Modified); 80 DN (80mm D Narrow);
- Details of arrows, diagrammatic symbols and any future route markers (e.g., by reference to standard drawings);
- Overall dimension of all elements and spacing between these elements;
- Distances defining the position of each letter and numeral on the sign face relation to one edge of the sign;
- Details of border width, edge strips, and corner radii; and,
- Class and color of sign face materials.

1.7.8 Use of Pilipino Worded Signs

This manual includes some signs using Pilipino words for areas where the Pilipino is more explicit to the road users. Generally, signs with Pilipino

1.4 Definition of Terms

- **Traffic Signs** – device mounted on a fixed support (permanent signs) or portable support (temporary signs) whereby a specific message is conveyed by means of words or symbols placed or erected for the purpose of regulating, warning or guiding traffic.
- **Regulatory Signs** - signs that inform road users of traffic laws and regulations which, if disregarded, will constitute an offense.
- **Special Instruction Signs** - signs that instruct road users to meet certain traffic rule requirements or road condition.
- **Warning Signs** – warn road users of condition on or adjacent to the road that may be unexpected or hazardous.
- **Guide Signs (Informative Signs)** – inform and advise road users of directions, distances, routes, the location of services for road users, and points of interest.
- **Roadwork Signs** – warn or advise of temporary hazardous conditions that could endanger road users or the men and equipment engaged on roadwork.
- **Overhead Signs** – signs which provide means of displaying essential traffic information on wide multi-lane roads, where some degree of lane use control is required, or where side-of-road clearance is insufficient to accommodate a road side sign.
- **Barriers** - highway appurtenances designed to prevent vehicular penetration from the travel way to areas behind the barrier such as to minimize damage to impacting vehicles and their occupants, and to reduce the risk of injuries to pedestrians and workers.
- **Flashing Lamps** – warning devices used to supplement other controls and devices necessary to alert motorists of construction and maintenance activities or obstructions in the roadway.
- **Delineators** – light retro-reflecting devices mounted at the side of the roadway, in series, to indicate the roadway alignment.
- **Traffic Cones** – devices which may be conical in shape or tubular-shaped capable of performing channelization of traffic which may be set on the surface of the roadway or rigidly attached for continued use.
- **Temporary Curbing** – roadwork devices consisting of pre-cast concrete sections, sandbag, and others which, may be used to guide traffic at the construction site.
- **Flexible Post or Bollard** – device used in place of rigid barrier posts or traffic cones with a minimum of 450mm by 50mm wide with alternate bands of contrasting color as seen by approaching traffic for delineation of traffic.

1.5 Classification of Signs

Signs are classified in the following groups according to their use.

- Regulatory Signs (Type R);
- Warning Signs (Type W);
- Guide Signs or Informative Sign (Type G);
- Signs for Expressways (Type GE);
- Signs for Special Purposes (Type S); and,
- Hazard Markers (Type HM).

1.6 Standard Application

Uniformity of application is as important as standardization with respect to design and placement. Identical conditions should always be treated with the same type of signs so that road users can readily anticipate the course of action required.

To be effective, the road sign should meet the five basic requirements:

- Fulfill a need;
- Command attention;
- Convey a clear, simple message;
- Command respect; and,
- Give adequate time for proper response.

Each standard sign shall be displayed only for the specific purpose prescribed for in this Manual. Before any new highway, detour, or temporary route is opened to traffic, all necessary signs shall be in place.

Signs required by road conditions or restrictions shall be removed immediately after those conditions ceased to exist or the restrictions are withdrawn.

This manual provides criteria for the application of signs and where applicable, includes warrants or guides for use.

The designs of most commonly used signs are included in Appendix B of this manual.

1.7 Design

Uniformity in the design of signs facilitates identification by the road user. Standardization of shape, color, dimensions, legends and illumination or reflectorization is important so that various classes of signs can be easily recognized. The following general design principles have evolved:

- The driver should not be unduly distracted from his task of driving by reading a traffic sign.

legends tend to be larger due to lengths of equivalent words. Pilipino legends are not generally recommended unless it is absolutely necessary and useful.

1.8 Uniformity of Location

Signs are normally located on the right side of the road. In special circumstances, which are specified herein, signs may be duplicated on the left side or mounted over the road. If the sign is located at an exposed position, consideration may need to be given to the use of a frangible or breakaway type of construction, or other means of safety protection for the road user at the sign supports.

1.8.1 Longitudinal Placement

The longitudinal placement of certain signs is fixed by the nature of their message or their characteristic use. Special care is required in the sitting of such signs to ensure that they are prominently displayed to approaching drivers. Signs that give advance warning or information should be located sufficiently in advance to enable the driver to react appropriately.

Generally, there should not be more than one signs of a particular type on each post, except where one sign supplements another, or where route or directional signs must be grouped. Where it becomes necessary to convey two or more different messages at one location, separate signs located at a minimum of 0.6Vm apart (where V is the 85th percentile speed in kph) should be used. For guide signs on expressways and other high speed roads considerable greater distance may be required. Such signs should nor obscure or detract from one another.

1.8.2 Lateral Placement and Height

The following subsections are the general rules for the lateral location of roadside signs and for the mounting heights on roadside. The lateral placement is measured from the edge of the sign nearest the road and the height from the underside of the lowest sign.

The rules apply to permanent signs and include signs for roadwork and special purposes where these are mounted on posts set into the ground. Any variation in these rules for a particular sign is given in the rule relating to that sign.

There are, however, be exceptions where conditions do not permit these rules to be applied. In these cases, the placement or height is adjusted to meet these special conditions e.g., the height of a sign may be increased or decreased to avoid obstructing sight distance at an intersection.

a) Rural Areas

Lateral Placement: On uncurbed roads in the rural areas, the sign should be at least 600mm clear of the outer edge of the road shoulder, the line of the guideposts or face of guardrail. The clearance should not be less than 2m nor more than 5m from the edge of the traveled way, except for large guide signs on expressways where great clearances may be required.

- A traffic sign should be perceived and understood by the driver traveling at the 85% percentile speed of the traffic on the road, in sufficient time for him to safely take any action necessary.

1.7.1 Shape

Standard sign shapes are:

- The octagon is reserved exclusively for the STOP sign;
- The equilateral triangle, with one point vertically downward is reserved for the GIVE WAY Sign;
- The circle symbol is mainly used for regulatory signs;
- The circle symbol may sometimes be mounted on a rectangular base either for easy recognition or for additional information;
- The equilateral triangle with one point vertically upward is used for warning signs;
- The rectangle, usually with long axis horizontal is used for directional signs, service signs, road work signs, signs for special purposes, and supplementary plates for warning signs;
- The rectangle, usually with long axis vertical is generally used for facility information signs, instruction signs, guide signs, and destinations of point of interest; and,
- The pentagon, with point up is used only for pedestrian and school crossing sign.

1.7.2 Size

Minimum dimensions depend upon applications. Larger sizes are required for wider roadways and on high-speed facilities (See letter size selection in Section1.7.5).

1.7.3 Color

The standard colors for signs are as follows:

Red is used as a background for STOP signs, as border color on GIVE WAY signs, warning signs and prohibitive signs in the regulatory type.

Black is used as legend color for signs having white, yellow, orange, fluorescent orange, fluorescent yellow green background and as chevron for hazard markers.

Yellow is used as background color for roadwork signs.

White is the background color for most signs and legends for some colored background.

Fluorescent yellow green is used as background color for signs related to pedestrian movement, school zones, and road work hazard markers to give additional emphasis and guidance to vehicle operators.

Fluorescent orange is used as background color for roadwork signs whose legends relate to personnel working.

Green is used as background color for direction signs.

Blue is used as background color for service signs.

Brown is reserved as background color for all tourist facility directional and information signs.

1.7.4 Letter Series

There are six series of letters and numerals, ranging from the narrow series A to the broad series F. In addition, the modified series E (E mod), which is mainly used in Directional Signs, is also included in this manual in Appendix A of the Standard Specification for Road Signs.

Series A and B letters are not used on signs which, have to be used for moving vehicles as the legibility distances are small. Series C is only used in special cases. Series D and E (E mod) are commonly used as they provide the best legibility and aesthetics. Series F is not often used on large signs due to the wide space required.

Standard letter tables given in Appendix D for capital letters comprise 3 steps of spacing: ***narrow; medium;*** and, ***wide***. Wider spacing is always used for lower-case letters. In the size tables given in the manual for each standard sign, the abbreviation following the letter size indicates the alphabet series A to F or LC and the spacing as follows:

- **N** = narrow spacing;
- **M** = medium spacing;
- **W** = wide spacing; and,

Example:

- 160 DM would mean 160mm series D letters at medium spacing.
- 90 LC would mean 90mm lower case letters that are always at wide spacing

1.7.5 Letter Size Selection

Recommended sign and/or letter sizes for most commonly used standard signs for use in various conditions are given in this manual, the relevant chapters describing those signs. However, in design of special signs, particularly used for major highways and expressways, and those used in special conditions, refer to Section 7 of Appendix A, Guidelines for Design of Made-to Measure Guide Signs.

Height: In rural areas, roadside signs should be mounted clear of roadside vegetation and clearly visible under headlight illumination by night. The height of the sign should normally be between 1m and 1.5m above the nearest edge of traveled way. For fingerboards and intersection direction signs, the height should be increased to 2m.

b) Urban Areas

Lateral placement: On curbed roads, signs should be located back from the face of the curb not less than 300mm nor more than 1m. Where mountable or semi-mountable curbs are used e.g., on traffic islands, the minimum clearance should be 500mm. On uncurbed roads or on certain arterial roads designed for high speed traffic movement, the distance given in Rural Areas shall be used.

Height: On curbed roads, the signs should be set at a minimum of 2m above the top of the curb to prevent obstruction to pedestrians. Where neither pedestrians nor parked vehicles have to be considered, e.g., on a traffic island or median, the height given for rural areas shall be used. Signs that overhang a footway should have height of 2.5m with a minimum height of 2m above the level of the footway.

The recommended lateral positioning of road side signs are shown in Figure 1.1.

1.9 Overhead Signs

The operational requirements of our highways and expressways are such that overhead signs will have to be provided at many locations.

The following conditions should be considered in the erection of overhead sign displays:

- Traffic volume at or near capacity;
- Complex or closely spaced interchanges;
- Three or more lanes in each direction;
- Restricted sight distance;
- Multi-lane exits;
- Large percentage of trucks;
- Street lighting background;
- High speed traffic;
- Consistency of sign message location through a series of interchanges; and,
- Insufficient space for ground mounted signs.

Overhead signs are generally of the directional and lane control types, and are generally supported on cantilever, butterfly or gantry structures. (See Chapter 4)

Signs should be mounted at a minimum of 5.5m above the highest level of the carriageway. This is particularly important if there is no alternative route for occasional high load. The height may be reduced to 5.0m (minimum) if the sign projects over a shoulder or lane, which is used only for parking or emergency stopping. The greater height is preferred where possible.

1.10 Reflectorization and Illumination

Signs that are intended to convey message during dark periods need to be reflectorized or illuminated for greater visibility of colors and shapes. High-grade reflective or illuminated materials shall be required on overhead signs and for road signs in areas with street lighting of high intensity.

1.10.1 Means of Illumination

Illumination may be by means of:

- Light within or behind the sign face illuminating the main message or symbols, or the sign background, or both, through a translucent material; and,
- An attached or independently mounted light source designed to direct essential illumination over the entire face of the sign.

1.10.2 Means of Reflectorization

Reflectorization is achieved by the use of retro-reflective materials on legends, letters, borders and background of the sign.

1.11 Installation

Signs should be mounted approximately at right angles to the direction of and facing the traffic they are intended to serve. At curve alignments, the angle of placement should be determined by the course of approaching traffic rather than by the roadway edge at the point where the sign is located.

To eliminate possible and undesirable reflection from the surface of the sign, it should be turned about 5 degrees away from the normal to the headlight beam. After signs are installed, it is good practice to test them by trial approach runs in a motor vehicle both by day and night.

1.12 Excessive Use

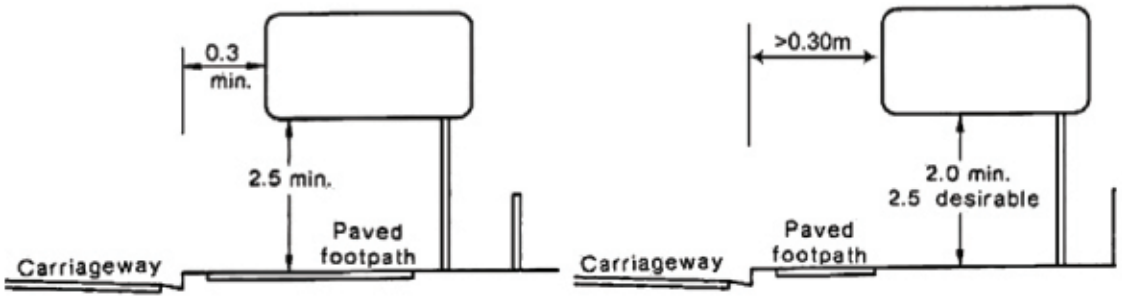
The use of regulatory and warning signs should be restricted to the minimum consistent with their particular requirements, as signs tend to lose their effectiveness if used unnecessarily or too frequently.

1.13 Maintenance

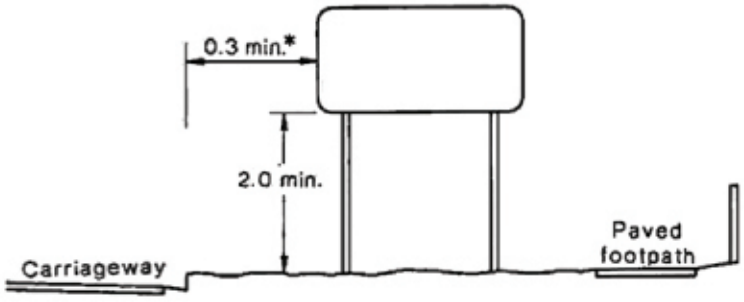
All traffic signs should be kept in proper position, clean and legible at all times. Damaged signs should be replaced without undue delay.

To assure adequate maintenance, a suitable schedule for inspection, cleaning and replacement of signs should be established. Employees of the DPWH and other government agencies whose duties require that they travel on the highways should be encouraged to report any damaged or obscured signs at the first opportunity.

Special attention and necessary action should be taken to see that weeds, trees, shrubs, and construction materials do not obscure the face of any sign.

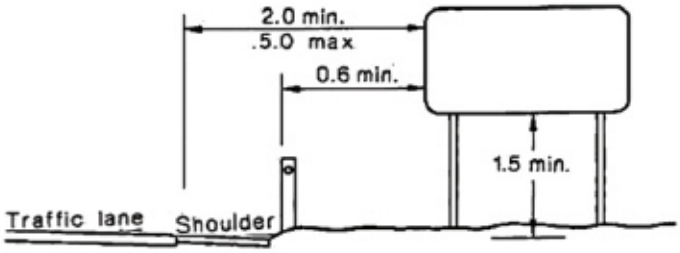


(a) Single Post Support Signs - Urban Area

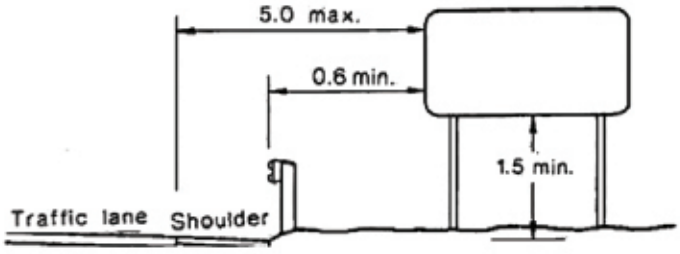


*0.5 min. if located in a median or traffic island

(b) Two-Post Support Signs - Urban Area



(c) Normal Two-Post Support Sign - Rural Area



(d) Rural Locations with Guard Rail

Figure 1.1: Lateral Positioning of Road Side Signs

2 REGULATORY SIGNS (TYPE R)

2.1 General

The signs in this chapter are those which require driver's compliance. Regulatory signs indicate the application of legal or statutory requirements, e.g., obligation to give way at intersections, speed limits, prohibition of movements at intersections and control of parking of vehicles.

Regulatory signs and devices NOT included in this chapter are as follows:

- Regulatory signs applicable exclusively to Expressways (see Section 5);
- Regulatory pavement markings (see Section B – Pavement Markings); and,
- Traffic Control Signals.

There are other Type R signs which also give traffic instructions and are called special Traffic Instruction signs. These signs inform or warn motorists of their obligation to obey traffic rules. These signs are included in Chapter 6 Special Traffic instruction Signs (Type S).

2.2 Purpose and Application

Most regulatory signs are rectangular in shape, with either red or black legend on a generally white background. The notable exceptions to this are STOP signs (octagonal), GIVE WAY (triangular) and some manually operated banner used in road works.

Regulatory signs shall be erected only with the approval of the Secretary of the DPWH or delegated authority on national roads and their intersecting roads or local government authority having the necessary jurisdiction, and shall be removed promptly if the legal requirements of the signs become inconsistent with the prevailing conditions.

Included in this classification are those signs that indicate the removal of a legal restriction imposed by a preceding regulatory sign. An example is the Speed De-restriction sign (R4-2).

Regulations may apply to a considerable length of road and repeater signs may be required. However, unnecessary signs should be avoided if the situations can be adequately catered for by the basic traffic rules.

2.3 Location

No specific rules can be applied to exact location of regulatory signs as their position varies with the purpose of the sign.

Most regulatory signs are usually located on the right side of the carriageway to face the approaching traffic as close as possible to the position where regulatory action is required. On wide carriageways with median island, these signs may be erected on both sides of the carriageway to ensure visibility.

The KEEP RIGHT or KEEP LEFT signs are installed where a physical obstruction exists, e.g., a traffic island in channelized intersections and on the median island at the start of a divided road.

The regulatory pedestrian crossing (circular sign with fluorescent yellow green background) sign is located at or in the vicinity of the authorized marked crossings (zebras). Control of parking may be required to ensure visibility of pedestrians.

2.4 Classification

Regulatory Signs	Section:
▪ Priority Signs (R1)	2.6
▪ Direction Signs (R2)	2.7
▪ Prohibitive or Restrictive Signs (R3)	2.8
▪ Speed Signs (R4)	2.9
▪ Parking Signs (R5)	2.10
▪ Miscellaneous Signs (R6)	2.11

The design and use of each of these classifications are described in the sections referred to above.

2.5 Sign Sizes

There are generally four sizes for regulatory signs:

- Size A for urban low speed roads;
- Size B for rural roads with speed limits between 60 and 70kph;
- Size C for high speed rural highways; multi-lane urban roads
- Size D for Expressways.

2.6 Priority Signs (R1)

2.6.1 Stop (R1-1)

Reflectorized white legend and border
Reflectorized red background

Table 2.1: STOP Signs

Sign No.	Size (mm)
R1-1A	450 X 450
R1-1B	600 X 600
R1-1C	750 X 750
R1-1D	900 X 900



R1-1

The STOP sign is used to ensure caution before entering an intersection and shall be used where a complete stop is required by law for safety. It is intended to ensure that drivers have sufficient time in which to assess the degree of hazard prevailing before entering an intersection.

The sign is normally located on the right side of a two-way road facing approaching traffic and at, or as close as practicable to the point where approaching vehicles are required to stop. On one-way roads, however, STOP signs should be erected on both sides facing approaching traffic. Wherever practicable, a stop line shall be used in addition to the STOP sign to indicate the required stopping point more precisely.

At intersections, the signs shall be erected as close as practicable to and not more than 9m from the edge of the intersecting carriageway. Where a sign-controlled road intersects at an acute angle, the sign should be placed so that its face is not visible in the view of traffic on the through road.

The STOP sign is also used at railway level crossings and in conjunction with movable gates or barriers as, for example, at vehicular ferries.

Requirements for Installation of STOP signs

The following is a description of *Sight Distance* requirements for determining whether a STOP sign should be installed on any approach to an intersection on which a driver is required to stop and give way. Where these conditions are met, a STOP shall be used regardless whether a GIVE WAY sign would have otherwise been installed.

A STOP sign shall be used when, for minor road traffic, the distance Y, in either direction along the major or uncontrolled road as shown in Figure 2.1 is less than the distance given for the corresponding major road speed.

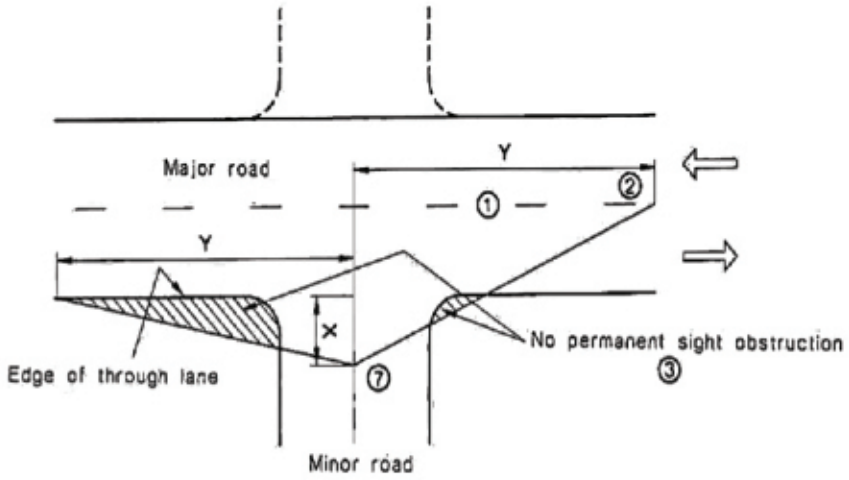


Figure 2.1: Installation of STOP Sign

Major Road Speed (Kph) See Note 4	Distance along minor road: X (m) See Note 5	Distance along major road: Y (m) See Note 6
40	3	20
50	3	30
60	3	40
70	3	55
80	3	65
90	3	80
100	3	95
110	3	115
120	3	140

Notes:

1. Separation line or center line (undivided road); left hand edge of carriageway (divided lane).
2. A check to the right is not required if there is a wide median to shelter a crossing vehicle.
3. Where visibility is limited due to some removable obstruction, attempt should be made to remove the obstruction rather than to install a STOP sign.
4. The posted speed limit is used unless the 85th percentile speed is significantly higher.
5. Where the minor road is an arterial road, use X = 4.5m
6. When checking sight distance, the height of both the observer's eye and the object is 1.2m.
7. If the safety of the observer is likely to be a problem, sighting may be taken from the curb in the minor road with appropriate adjustment to the sight triangle.

2.6.2 Give Way (R1-2)

Black legend reflectorized red border.
Reflectorized white background.

Table 2.2: Give Way Sign

Sign No	Size (mm)
R1-2A	600
R1-2B	750
R1-2C	900



R1-2

The GIVE WAY sign is used at locations where safe and efficient traffic control requires the give-way-to-the-right rule to be modified or there is a need to resolve uncertainty as to which traffic stream is required to give way to another.

It may also be used:

- For the control of traffic at locations such as channelized intersections, median openings on divided roads, and at roundabout; and,
- At one end of short sections of one-lane road including one-lane bridges, and in similar situations.



R1-2P

GIVE WAY signs should be erected on both sides facing approaching traffic. Except on unsealed roads, it should be supplemented by transverse holding lines to indicate the safe holding position in the side street.

The R1-2P is only used where an explanation in Pilipino is required. It shall be rectangular in shape and not less than 640 mm x 900 mm in size with long axis vertical.

2.6.3 Left Turner Must Give Way (R1-3)



R1-3

The LEFT TURNER MUST GIVE WAY sign shall be rectangular in shape and not less than 500mm and 750mm in size with long axis vertical. They shall have white reflectorized background and black letters and borders.

Table 2.3: R1-3 Signs

Location	Sign No	Size (mm)	Letter Size (mm) and Series	
			Turner	Other
Signalized Intersections	R1-3	500 X 750	80 DN	80 EN

The sign is used at a signalized intersection where left turn movement is allowed in gaps or spacing. This sign is to enforce the rule that left turner must always give way to through movements, even though it is permitted to filter.

2.7 Direction Signs (R2)

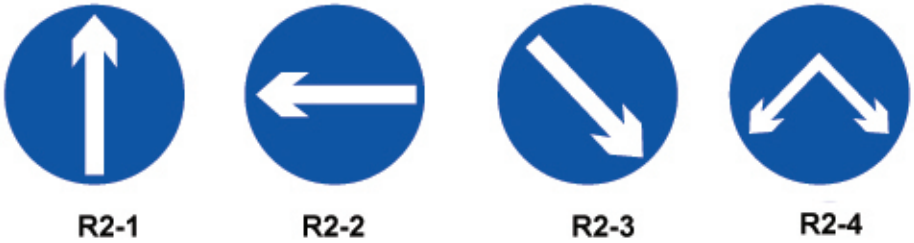
2.7.1 Direction to be Followed (R2-1 to R2-7)

a) Disc Type

Reflectorized Blue Background
Reflectorized White arrow.

Table 2.4: Direction Signs, Disk Type

Sign No	Size (mm)
R2-1A to R2-7A	450
R2-1B to R2-7B	600
R2-1C to R2-7C	750



R2-1 R2-2 R2-3 R2-4



R2-5 R2-6 R2-7

b) Plate Type

Black Legend. Reflectorized white background on plate Reflectorized Blue background on disc
Reflectorized white arrow symbols.

Table 2.5: Direction Signs, Plate Type

Sign No.	Disc Size (mm dia.)	Plate Size (mm)	Letter Size (mm) and Series Lines 1 and 2	
			1st Line	2nd Line
R2-1PA	400	450 X 750	80 DM	80 EN
R2-2PA	400	450 X 750	80 DM	80 DM
R2-3PA	400	450 X 750	80 EN	80 EN
R2-5PA	400	450 X 750	80 EN	80 CN
R2-6PA	400	450 X 750	80 CN	80 CN

These signs indicate the only direction(s) in which the motorist is obliged to follow. They are normally used in conjunction with islands at channelized intersections. The disc signs can be incorporated on rectangular plate with legends to supplement their meanings. Where necessary 750mm diameter discs can be used to give greater visual impact to the motorist. **The plate type is only used in urban areas**.



R2-1P



R2-2P



R2-3P



R2-5P



R2-6P

2.7.2 Other Directional Signs

a) TWO WAY (R2-7)

Black legend, arrows and border
Reflectorized white background

Table 2.6: TWO WAY Signs

Sign No	Size (mm)	Letter Size (mm) and Series Lines 1 and 2
R2-7PA	450 X 750	80 DM
R2-7S	900 X 700	160 CN



R2-7P



R2-7S

The TWO WAY sign shall be used as follows:

- On carriageway such as roads where traffic laws and regulations would normally prescribe that such roads are designed as one-way but may be operated as two way;
- Where a single carriageway designed or normally used for one-way traffic is being operated for two-way traffic;

- As a temporary measure where a carriageway designed or normally used for one-way traffic is being used for two-way traffic; and,
- On any other roads where, because of the road conditions, it is not clear whether a particular carriageway carries traffic in one or both directions.

The TWO WAY sign should be placed along the road on the departure side of every intersection along the TWO WAY route

In case of a one-way street reverting to a two-way street, additional signs should be located on the approach to every intersection facing the entering traffic.

b) LEFT LANE MUST TURN LEFT and RIGHT LANE MUST TURN RIGHT (R2-8)

Back legend and border
Reflectorized white background

Table 2.7: R2-8 Signs

Sign No	Size (mm)	Letter Size (mm) and Series Lines 1 and 2
R2-8A (L) or (R)	450 X 750	100 EM
R2-8B (L) or (R)	600 X 1000	140 EM



R2-8R



R2-8L

The LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) signs are used alongside a marked lane which is reserved exclusively for vehicles turning left (right) at the next intersection.

The sign may be used alone or in conjunction with arrows or words marked on the surface of the lane.

As pavement markings can be obscured by vehicles ahead, and this is most likely to occur where traffic is heavy that there is need to provide an exclusive turning lane, LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) signs are useful as a means of designating such lanes.

2.8 Prohibitive or Restrictive Signs (R3)

2.8.1 No Entry for All Vehicles (R3-1 and R3-1P)

Reflectorized red disc symbol
Reflectorized white bar
Reflectorized white plate background (R3-1P) only
Black legend and border (R3-1P) only

Table 2.8: No Entry for All Vehicles Signs

Sign No	Size (mm)			Letter Size (mm)	
	Disc	Bar	Plate	Line 1	Line 2
R3-1A	600	480X120			
R3-1B	750	600X150			
R3-1PA	300	250X50	400X600	75 DM	75 DN
R3-1PB	450	375X75	600X900	120 DM	120 DN
R3-1PC	600	500X100	800X1200	160 DM	160 DN



R3-1



R3-1P

The NO ENTRY sign shall be used at the termination of a one-way carriageway to prohibit access of all vehicles from the wrong direction.

At one-way street exits, NO ENTRY signs shall be erected on both sides of the street at the intersection facing in the opposite direction to the one-way flow. The signs may need to be located a short distance into the one-way street if there is a possibility of drivers becoming confused as to which street is closed for entry. Sufficient signs shall be erected to ensure that at least one is clearly visible to drivers approaching from any direction, and some signs may have to be set at an angle to achieve this purpose.

2.8.2 No Entry for Specific Type of Road Users (R3-2 to R3-12)

Reflectorized red border and bar.
Reflectorized white background, and Black Symbol.

Table 2.9: No Entry for Specific Type of Road Users Signs

Sign No	Size (mm)	Size of Border and Bar (mm)
R3-2A to R3-12A	450	40
R3-2B to R3-12B	600	50
R3-2C to R3-12C	750	60

These signs include NO ENTRY for Cars (R3-2), Jeepneys (R3-3); Bicycles (R3-4); Motorcycles (R3-5); Tricycles (R3-6); Buses (R3-7); Trucks (R3-8); Vehicles with Trailer (R3-9); Pedestrians (R3-10); Animal Drawn Vehicles (R3-11); Pushcarts (R3-12).



2.8.3 Pedestrian Prohibition Signs (R3-10P1; R3-10P2)

The NO PEDESTRIAN CROSSING sign (R3-10) can be used in conjunction with a supplementary plate in the Special Instruction Sign series such as USE OVERPASS (S1-1) or USE PED XING (S1-2) or alternatively use R3-10P1 or R3-10P2. These signs are only to be used where there are pedestrian facilities nearby. The sign sizes are shown in table below:

Table 2.10: Pedestrian Prohibition Signs

Sign No	Size (mm)		Legend	
	Plate	Disc	L 1	L 2
R3-10P1	450X600	30	80 DM	80 DM
R3-10P2	450X600	30	80 CN	80 CN



R3-10P1



R3-10P2

2.8.4 Bawal Tumawid Gamitin Ang Overpass (R3-10P3)



R3-10P3

This is a Pilipino worded sign, alternative to R3-10P1 exclusively for prohibiting pedestrians from crossing a particular road with the presence of an overpass. This sign shall be rectangular in shape and is 300mm x 350mm in size with the long axis vertical. They shall have reflectorized white background, reflectorized red border and letters for prohibitive messages.

2.8.5 Turning Prohibition (R3-13; R3-14; R3-15)

Reflectorized red border and bar
Reflectorized white background

Table 2.11: Turning Prohibition Signs

Sign No.	Size (mm))			Letter Size
	Symbol	Plate	Border & Bar	
No Right Turn				
R3-13A	600		50	
R3-13B	900		70	
R3-13 PA	350	450 X 750	40	75 BM
R3-13 PB	450	600 X 1000	50	100 BM
No Left Turn				
R3-14A	600		50	
R3-14B	900		70	
R3-14 PA	350	450 X 750	40	75 BM
R3-14 PB	450	600 X 1000	50	100 BM
No U Turn				
R3-15A	600		50	
R3-15B	900		70	
R3-15 PA	350	450 X 750	40	75 BM
R3-15 PB	450	600 X 1000	50	100 BM

The NO RIGHT TURN or NO LEFT TURN sign shall be used at intersections where vehicles are forbidden to make a turn to the right or left, respectively

The NO U TURN sign shall be used where vehicles are forbidden to make a turn to reverse the direction of travel.

Separate plates bearing messages such as "FOR PUJ'S", "FOR PUB'S" or "FOR TRUCKS", and others, can be used to supplement the messages intended. Such plates will be of white reflectorized background with black legend.



R3-13



R3-14



R3-15



R3-13P



R3-14P



R3-15P

2.8.6 Prohibition of Overtaking (R3-16)

Reflectorized red border and bar
Reflectorized white background
Black symbol on right, red symbol on left.

Table 2.12: Prohibition of Overtaking Signs

Sign No	Size (mm))			Letter Size
	Symbol	Plate	Border & Bar	
R3-16A	600		50	
R3-16B	900		70	
R3-16 PA	490	600 X 900	40	100 CN
R3-16 PB	600	750 X 1000	50	120 CN

The NO OVERTAKING sign may be used to supplement the double yellow lane marking in forbidding overtaking in No Overtaking Zones.

It may be used to control traffic movements on narrow bridges and short sections of one lane carriageway having a width between curbs or vertical obstructions of less than 5.0m. It may also be used where width is less than 5.5m if commercial vehicles constitute more than one-third of the traffic, or if the alignment is poor.



R3-16



R3-16P

2.9 Speed Signs (R4)

2.9.1 Speed Restriction (Maximum) (R4-1)

Black numerals.
Reflectorized red annular symbol.
Reflectorized white background.

Table 2.13: Speed Restriction Signs

Sign No	Size (mm Dia.)	No of Numerals	Numeral Size (mm) and Series
R4-1A	450	2	200 DN
R4-1B	600	2	240 DN
		3	240 DN
R4-1C	900	2	400 DN
		3	320 DN



R4-1 (60)



R4-1 (100)

2.9.2 Speed De-restriction (R4-2; R4-12P)

Black diagonal bar and annular symbol.
Reflectorized white background

Table 2.14: Speed De-Restriction Signs

Sign No.	Plate Size (mm)	Size of Border / Bar (mm)
R4-2A	450 X 450	50 / 70
R4-2B	600 X 600	60 / 80
		Legend **END**
R4-2PA	450 X 750	120 EM
R4-2PB	600 X 1000	160 EM
R4-2PC	800 X 1334	200 EM



R4-2



R4-2P (60)

2.9.3 Speed Restriction (Minimum) (R4-3)

Reflectorized Blue Background.
Reflectorized White Numeral & Legend

Disc Size: 900mm diameter.
Numeral Size: 320 DN



R4-3 (40)

The minimum speed restriction sign is used exclusively on suitable sections of expressways only.

2.10 Parking Signs (R5)

The wording required on parking control signs will depend upon the applicable traffic laws and regulations.

Signs should generally be mounted on their own individual posts, but where a number of separate instructions apply to the same length of curb space; these should be included on one sign where practicable.

Although parking control signs are not required to be fully legible from moving vehicle, the simplest wording should always be used and suitable abbreviations assist in this objective.

Where parking or standing restrictions relate only to specific periods, such periods shall be shown on the signs.

Where symbol/s or word/s is used to indicate the method of parking to be adopted, the method shall also be stated on the signs.

Where arrows are used to indicate the direction in which the restrictions apply, their size shall be small enough to avoid confusion with the arrow used for controlling the direction of moving traffic.

2.10.1 No Parking Signs (R5-1, R5-2, R5-3)

Black letter 'P'
Reflectorized Red annular symbol and bar
Reflectorized Red legend and Red arrow

Table 2.15: No Parking Signs

Sign No	Size (mm)		Legend (mm)	
	Symbol	Plate	Line 1	Line 2
No Parking Disc				
R5-1SA	450			
R5-1SB	600			
No Parking Plate (Pilipino Worded)				
R5-1PA	250	450 X 750	50 DM	50 BN
R5-1PC	400	600 X 1000	80 DM	80 BN
No Parking – Loading Only				
R5-2PA	250	450 X 750	50 CN	50 DM
R5-2PB	375	600 X 1000	75 EN	75 EM
No Parking – Anytime				
R5-3PA	250	450 X 750	50 DM	40 CN
R5-3PB	375	600 X 1000	75 EM	60 DN
No Parking – Tow Away				
R5-3CA		450 X 750		
R5-3CB		600 X 1000		

No Parking signs are used at locations where partial or total parking is prohibited. The **No Parking** disc can be used in conjunction with other legend plates for additional information.



R5-1S R5-1P R5-2P R5-3P R5-3C

2.10.2 Restricted Parking and Loading Signs (R5-4; R5-4A; R5-4B; R5-4C)

Restricted parking signs shall be rectangular in shape and normally not less than 450mm X 750mm in size with the long axis vertical. They shall have reflectorized white background, green reflectorized borderline and legends for permissive messages such as 2 HOUR PARKING, METER PARKING; and, LOADING AND UNLOADING ZONE.

The LOADING ZONE sign should also be used in conjunction with the NO PARKING disc. Parking control signs need not be reflectorized unless street lighting is inadequate or the message has special night time significance.

The LOADING AND UNLOADING ZONE sign shall be rectangular in shape and not less than 450mm X 750mm in size, with the long axis vertical.

These signs shall be used at designated loading and unloading zones for passengers and goods along a route or at a minimum of 30.0m before and after an intersection.



R5-4 R5-4A R5-4B R5-4C

2.10.3 No Waiting Signs (R5-5; R5-5A; R5-5B)

The NO WAITING sign shall be rectangular in shape and not less than 450mm X 750mm in size with the long axis vertical. They shall have reflectorized white background, reflectorized red borderline and legends for prohibitive messages and times of restriction.



R5-5



R5-5A



R5-5B

2.10.4 No Loading and Unloading Signs (R5-6; R5-6A)

The NO LOADING and UNLOADING Signs shall be rectangular in shape, 450mm x 750mm in size with long axis vertical. They shall have reflectorized white background, reflectorized red border and legend for prohibitive messages and times of restriction. These signs are used exclusively for prohibiting loading and unloading of goods and passengers. Left and right arrows should be drawn at the bottom of the road sign.

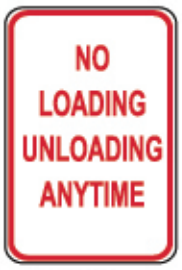


R5-6



R5-6 A

2.10.5 No Loading / Unloading Within Red-Painted Curb (R5-7)



R5-7

The NO LOADING/UNLOADING ANYTIME within red-painted curb shall be rectangular in shape and not less than 450mm and 750mm in size with the long axis vertical. They shall have reflectorized red letters and borders on white reflectorized background. These signs shall be erected at locations to supplement pavement markings to prohibit loading and unloading activities.

2.10.6 No Stopping Anytime (R5-8)



R5-8

The NO STOPPING ANYTIME sign shall be rectangular in shape and not less than 450mm X 750mm in size with long axis vertical. They shall have reflectorized white background, reflectorized red borderline and symbol, red letters, and reflectorized red arrow and bar for prohibitive messages and times of restriction.

2.10.7 No Parking or Stopping Signs – PUV Stop Area (R5-9A; R5-9B; R5-9C)

Reflectorized black letters.
Black Vehicle Symbol.
Reflectorized Red annular symbol, arrow and bar.
Reflectorized Red border

The BUS STOP sign is used exclusively for bus passenger loading and unloading. It shall be rectangular in shape and not less than 400mm X 900mm in size. The NO PARKING symbol should be used in conjunction with this sign where total parking is prohibited.

The PUJ STOP signs are used exclusively for jeepney passenger loading and unloading. It shall be rectangular in shape and not less than 400mm x 900mm in size. The NO PARKING symbol should be used in conjunction with this sign where total parking is prohibited.

The BUS-PUJ STOP signs are used exclusively for bus and jeepney loading and unloading of passengers and goods. It shall be rectangular in shape and not less than 400mm x 900mm in size. The NO PARKING symbol should be used in conjunction with this sign where total parking is prohibited.



R5-9A R5-9B R5-9C

2.10.8 Do Not Block Intersection (R5-10)



R5-10

The DO NOT BLOCK INTERSECTION sign shall be rectangular in shape and not less than 400 X 600mm in size with long axis vertical. It shall have black letters on white reflectorized background and reflectorized yellow legend on black reflectorized background.

These signs are used at intersections particularly at signalized locations where yellow box lane markings have been provided. These should be installed at or near the designated stop line in the intersection to warn motorists of clearing the yellow box zone.

2.10.9 Right Turners Cross at Broken White Lines (R5-11)



R5-11

The RIGHT TURNER CROSS AT BROKEN LINES shall be rectangular in shape and not less than 450mm and 600mm in size. They shall have black letters and border on white reflectorized background. These signs shall be used alongside broken white line markings at Bus/PUJ lane which allows vehicles to turn right at the next intersection.

2.11 Miscellaneous Signs (R6)

Signs covered in this series are not included in other categories.

2.11.1 Prohibition on Use of Audible Warning Device – No Blowing of Horns Sign (R6-1)

Reflectorized red annular border and bar
Black symbol
Reflectorized white background



R6-1

Use of audible warning device is prohibited, where this sign is used, except to avoid an accident or those vehicles that are authorized to use warning devices in case of emergency. The No Blowing of Horns sign is usually erected in the vicinity of hospitals, schools, libraries, and churches. The diameter of the disk is 600mm.

2.11.2 Load and Dimension Restriction Signs (R6-2 to R6-6)

Reflectorized red annular border.
Black symbol and legend.

Table 2.16: Load and Dimension Restriction Signs

Sign No	Size (dia. mm)	Numeral
R6-2	600	240 DN
R6-3	600	240/120 DN
R6-4	600	260 DN
R6-5	600	160 DN
R6-6	600	80 DN

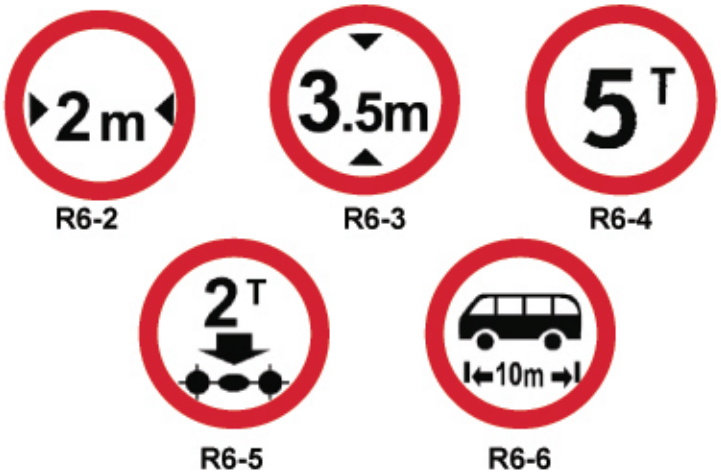
Sign R6-2 shall be used to prohibit entry for vehicles having overall width exceeding the dimension shown.

Sign R6-3 shall be used to prohibit entry for vehicles having overall height exceeding the dimension shown.

Sign R6-4 shall be used to indicate the maximum permitted gross load in tons on any section of road and shall be erected on the immediate approaches to the restricted section.

Sign R6-5 shall be used to prohibit entry of vehicles with gross axle load exceeding the limit shown.

Sign R6-6 shall be used to prohibit entry of vehicles with overall length exceeding the limit shown.



R6-2 R6-3 R6-4 R6-5 R6-6

2.11.3 Use Seat Belt Sign (R6-7)

Black seatbelt on white man symbol and blue background
Reflectorized black letters and red borders on white background

Table 2.17: Use Seat Belt Sign

Sign No	Size (mm)	Symbol	Legend
R6-7	450 X 675	200mm X 200mm	80 CN



R6-7

The Use Seat Belt signs are used pursuant to RA8750, the Seat Belt Law.

2.11.4 Pedestrians Crossing (R6-8)

Black symbol and border circular disc
Reflectorized fluorescent yellow green background

Table 2.18: Pedestrians Crossing Sign

Sign No	Size (dia. mm)
R6–8A	450mm
R6–8B	600mm
R6–8C	750mm



R6-8

Unlike the pedestrian Warning sign (W6-1) which is placed in advance in accordance with appropriate distances recommended, R6-8 is a regulatory sign to be placed at the stop lines or at the approaches to a zebra pedestrian crossing.

2.11.5 School Children Crossing (R6-9)

Black symbol, legend and border
Reflectorized fluorescent yellow green background

Table 2.19: School Children Crossing Sign

Sign No	Size (dia. mm)
R6–9A	450mm
R6–9B	600mm
R6–9C	750mm



R6-9

Unlike the Children Warning sign (W6-2) which is placed in advance in accordance with distances recommended (see Table 3.1) R6-9 is a regulatory sign to be placed at the stop lines on the approaches to a marked School Children crossing.

2.11.6 Bike Lane (R6-10)

Black symbol, legend and border.
Reflectorized fluorescent yellow green background.

Table 2.20: Bike Lane Signs

Sign No	Size (dia. mm)
R6–10A	450mm
R6–10B	600mm
R6–10C	750mm



R6-10

The BIKE LANE sign is used where a stretch of roadway is dedicated to a bike lane for bicycle use only and to protect cyclists who may not be perceptible to motorists. This is a regulatory sign and requires cyclists to use the Bike Lane only.

2.11.7 Wheel Chair Crossing (R6-11)

Black symbol, legend and border.
Reflectorized fluorescent yellow green background.

Table 2.21: Wheel Chair Crossing Signs

Sign No	Size (dia. mm)
R6–11A	450mm
R6–11B	600mm
R6–11C	750mm



R6-11

vThe WHEEL CHAIR CROSSING SIGN is a regulatory sign to be placed at the stop lines on the approaches to a marked wheel chair ramp near or at intersections, buildings, hospitals, parks, malls and other public places.

3 WARNING SIGNS (TYPE W)

3.1 Application of Warning Signs

Warning Signs are used to warn motorists of potentially hazardous conditions on or adjacent to the road. The Warning Signs advise motorists of road conditions that require caution and may call for a reduction in speed, in the interest of safety and that of other road users.

Warning signs tend to lose their effectiveness if used unnecessarily or too frequently. Their use should be restricted to the minimum, consistent with safety. **A warning sign should not be used when drivers can observe and appreciate the potential hazard ahead under normal conditions.**

The particular sign to be applied to a specific condition shall be selected in accordance with the criteria set out in this Section. The standard warning signs listed in this manual cover most conditions that are likely to be met. If other warning signs are needed, the signs shall be of the standard shape and color for warning signs, and the symbol used must be self-explanatory.

To avoid ambiguity, supplementary messages can sometimes be used. Some of the commonly used messages are also listed in this category under the Auxiliary series.

3.2 Classification of Warning Signs

Warning sign classifications:	Section
▪ Horizontal Alignment Signs (W1)	3.5
▪ Intersection and Junction Signs (W2)	3.6
▪ Advance Warning of Traffic Control Device Signs (W3)	3.7
▪ Road Width Signs (W4)	3.8
▪ Road Obstacle Signs (W5)	3.9
▪ Pedestrian and School Signs (W6)	3.10
▪ Railway Level Crossing (W7)	3.11
▪ Supplementary Signs (W8)	3.12
▪ Other Warning Signs (W9)	3.13

Warning signs at road construction and maintenance sites are separately dealt with in the ***Road Works Safety Manual.***

3.3 Design

A standard sign shall be selected when choosing a sign for a particular purpose. If no standard sign meets the conditions encountered, a special sign may be used, provided it is designed in accordance with the same principles as the standard signs in the appropriate classification.

In general, warning signs are triangular in shape (with one angle vertical), with a black symbol, reflectorized red border on a retro-reflective white, or fluorescent yellow green background. Other exceptions to this general rule are specified in the text.

The size of a warning sign should be suited to the conditions for which it is required. Traffic volumes, speed, road conditions, background lighting and other factors will all influence the choice of the appropriate size.

Where conditions require greater visual impact or emphasis, the larger size signs should be used with a correspondingly larger symbol or legend. By referring to the letter sizes for any sign and equating these to the required sight distances and legibility requirements, the most suitable sign can be selected for any particular condition.

The size of one side of the equilateral triangular shaped signs shall not be less than 600mm. For high-speed expressways, larger signs (up to 1200mm) are usually adopted.

Sizes of special signs with other shapes can sometimes be selected to give comparable warning to drivers if the standard sign is found inadequate. Some of these special signs are included in this manual (see Chapter 6).

3.4 Location

As warning signs are placed primarily for the protection of the driver who is not familiar with the road, it is very important that their location and installation must be undertaken with care. Although guidelines for their positioning are given below there will be instances where local conditions require different treatment. **Test runs should be made by day and by night from both directions to check the location and mounting of each installation**.

A warning sign should generally be installed on the right side of the road and be positioned so that it will convey its message most effectively without restricting lateral clearance or sight distance. However, in special circumstances the sign or a duplicate sign may be erected on the left side of the road. Duplicate signs on the left side will usually be required on one-way roads.

Lateral placement and height of warning signs shall be in accordance with Section 1.8.2.

In urban areas advance warning signs should be placed at not less than 30.0m or more than 100.0m in advance of the hazardous area, while in rural areas the signs should be placed at not less than 75.0m nor more than 225.0m in advance of the hazardous area. The actual advance warning

distances, determined by factors such as nature of the hazard, reaction time, prevailing and desired speeds are shown in Table 3.1.

Table 3.1: Advance Warning Signs Distance (In Meters)

Approach Speed (kph)	Desired Speed (kph)			
	Stop	**20**	**30**	**40**
50	75	60	45	30
60	100	90	75	60
70	160	150	140	120
80	225	200	190	170

For hazards requiring reduction in speed, an advisory speed as described in Section 3.12, may be used in conjunction with the corresponding hazard warning sign.

Where it is desired to warn of more than one potential hazard at the same location, the signs shall be installed on separate posts placed at a distance not less than 0.6Vm apart, where V is the 85th percentile speed in kph.

Signs indicating conditions that are temporary or intermittent in occurrence should be mounted so that they can be set up and removed easily as required. If necessary, folding signs may be used such that the message may be displayed only when actually required.

3.5 Horizontal Alignment Signs (W1)

These signs are used to indicate the type of road curve ahead of the motorist. Basically, the following types are considered: the **sharp turn**; the **reverse turn**; the **curve turn**; the **reverse curve**; the **winding road** and the **hairpin curve**. An advisory speed plate can be used to supplement the intention of these signs (see W8-1).

There are three general sizes for this series. Size A is usually for use in urban low speed roads; Size B for rural roads with speed limits between 60 and 70kph. Size C for high speed rural highways.

Sign sizes of the alignment series are shown in the following table:

Table 3.2: Horizontal Alignment Signs

Sign	Sign No	Size (mm)
Sharp Turn	W1-1A (L or R) W1-1B W1-1C	600 750 900
Reverse Turn	W1-2A (L or R) W1-2B W1-2C	600 750 900
Curve	W1-3A (L or R) W1-3B W1-3C	600 750 900
Reverse Curve	W1-4A (L or R) W1-4B W1-4C	600 750 900
Winding Road	W1-5A (L or R) W1-5B	600 750
Hairpin	W1-6A (L or R) W1-6B	600 750

3.5.1 Sharp Turn (W1-1)



W1-1

The Sharp Turn sign is used in advance of a sharp curve where motorists are required to slow down substantially because of the road geometry.

3.5.2 Reverse Turn (W1-2)



W1-2

The Reverse Turn sign is used where two curves in opposite direction each warrants a Turn Sign (W1-1) and are separated by a tangent length of less than 120.0m. The sign may also be used where one of the two curves warrants a Curve sign (W1-3) only and if it is impractical to sign each curve separately. The Advisory Speed plate (W8-1) should be used to indicate the lower speed value of the two curves.

3.5.3 Curve (W1-3)



W1-3

The curve sign is used in advance of a substandard curve or a curve that may not be evident to the motorist in the course of his travel along a reasonable straight section of the road.

3.5.4 Reverse Curve (W1-4)



W1-4

The reverse curve sign is used where two curves in opposite directions, one or both of which is substandard, are separated by a tangent length of less than 120.0m. The Advisory Speed plate (W8-1) should be used to indicate the lower speed value of the two curves.

3.5.5 Winding Road (W1-5)



W1-5

The winding road sign is used where there is a series of closely spaced curves, some or all of which warrant the use of Turn (W1-1) or Curve (W1-3) signs. The shape of the arrow shall indicate the direction of the first curve approach. A distance plate can be used in conjunction with this sign to indicate the approximate distance of the substandard curves. (see W8-3 and W8-4)

3.5.6 Hairpin Bend (W1-6)



W1-6

The hairpin bend sign is used to warn motorists of an approaching curve with an almost 180-degree bend.

3.6 Intersection and Junction Signs (W2)

Signs in the intersection and junction series are used where the sight distance on the approach to an intersection or junction is less than the safe stopping distance or where drivers may have difficulty in appreciating the presence or configuration of an intersection ahead. However, there may be unusual situations where a special design will be required to describe the intersection configuration more accurately. Such a design must comply with the general standard of warning sign series.

Signs in this series shall **not** be used on an approach where the regulatory signs STOP (R1-1), GIVE WAY (R1-2), or traffic signals are installed.

Signs that may be used in advance of intersections are listed in the table:

Table 3.3: Intersection and Junction Signs

Sign	Sign No	Size (mm)
Cross Road	W2-1A W2-1B W2-1C W2-1D	450 600 750 900
Staggered Side Road Junction	W2-2A (L or R) W2-2B W2-2C W2-2D	450 600 750 900
Skewed Intersection	W2-3A W2-3B W2-3C	600 750 900
T-junction	W2-4A W2-4B W2-4C W2-4D	450 600 750 900
Y-junction	W2-5A (or 5a) W2-5B (or 5a) W2-5C (or 5a) W2-5D (or 5a)	450 600 750 900
Side Road Junction	W2-6A (L or R) W2-6B W2-6C W2-6D	450 600 750 900
Roundabout Ahead	W2-7A W2-7B W2-7C	450 600 750
Priority Junction	W2-8B W2-8C W2-8D	600 750 900
Priority Merging	W2-9B W2-9C W2-9D	600 750 900
Priority Cross	W2-10A W2-10B W2-10C W2-10D	450 600 750 900

3.6.1 Cross Road (W2-1)



W2-1

The Cross Road sign is used in advance of an intersection where two roads cross at a common point. This sign shall not be used on a side road approach to a controlled intersection.

3.6.2 Other Cross Roads (W2-2; W2-3)

These Cross Road Signs are used in advance of intersections that bear the resemblance of the configurations as indicated in the inscription of the signs.



W2-2



W2-3

3.6.3 T and Y Junctions (W2-4; W2-5; W2-6)

The T-Junction sign (W2-4) is used in advance of a T-junction of the road that forms the stem of the T, and Y Junction sign (W2-5) is used in advanced of a road path on that approach which forms the stem of the Y. Where the junction road meets the through road at an angle greater than 45 degrees, a Side Road Junction sign (W2-5A) is more appropriate.

The side road junction sign (W2-6) is used to warn road users that a side road has a fairly large volume of traffic entering or crossing the through route.



W2-4



W2-5



W2–5A



W2-6

3.6.4 Roundabout (Rotunda) (W2-7)



W2-7

The Roundabout (Rotunda) sign is used on all approaches to a rotunda. It should not be used where a diagrammatic Advance Direction sign (G1-5) is used on the approach.

3.6.5 Priority Road (W2-8; W2-9; W2-10)

These signs inform the motorist that the road he travels on is a priority road with the junction intersection in front of him being controlled either by a STOP or GIVE WAY sign. These signs should not be used unless the side roads are positively controlled in order to avoid creating a false sense of security to the motorist on the main road.



W2-8



W2-9



W2-10

3.7 Advance Warning of Traffic Control Device Signs (W3)

3.7.1 Signals Ahead (W3-1)

Table 3.4: Signals Ahead Signs

Sign No	Size (mm)
W3-1A	600
W3-1B	750
W3-1C	900
W3-1D	1200



W3-1

The Signal Ahead sign (W3-1) is used in advance of a signalized intersection, where the signal is not visible from a distance of 120.0m, or at any unexpected signal installation where the prevailing approach speeds or conditions of visibility are such as to require a warning.

(W3-1D) is used on the approach of a high speed road (expressway) warning motorists of an approaching signalized intersection ahead.

The circles in the signal symbol are shown in the three colors of the lights that they represent and shall be reflectorized.

3.7.2 Stop and Give Way Sign Ahead (W3-2; W3-3)

Table 3.5: STOP and GIVE WAY Signs

Sign No	Size (mm)
W3-2 to 3 A	450
W3-2 to 3 B	600
W3-2 to 3 C	750

These warning signs are only used to warn the presence of a STOP or GIVEWAY sign at the intersection ahead which may not be conspicuous to the motorist when approaching the intersection. The arrow direction may vary to indicate the location of the STOP or GIVEWAY sign concerned.



W3-2



W3-3

3.8 Road Width Signs (W4)

This warning sign is used at a sudden change of road width either narrowing or widening of carriageways. The types and sizes of these signs are shown in the table.

Table 3.6: Road Width Signs

Sign	Sign No	Size (mm)	Letter Size (mm) and Series Lines 1 and 2
Narrow Bridge	W4-1A W4-1B W4-1C W4-1PA W4-1PB W4-1PC	450 600 750 450 X 700 600 X 900 750 X 1200	 60 DN; 60 DN 75 DN; 75 DN 90 DN; 90 DN
Road Narrows	W4-2A W4-2B W4-2C W4-2PA W4-2PB W4-2PC	450 600 750 450 X 700 600 X 900 750 X 1200	 75 DN 60 CN 90 DN; 75 CN 120 DN; 90 CN
Divided Road	W4-3A W4-3B W4-3C W4-3D	450 600 750 900	
End Divided Road	W4-4A W4-4B W4-4C W4-4D	450 600 750 900	

3.8.1 Narrow Bridge (W4-1)

The Narrow Bridge Sign is used on the approaches to all road bridges having a width between curbs of:

- 5.5m or less;
- between 5.5m and 6.0m in exceptional cases of high speed sections of roads with heavy traffic volumes; or,
- less than that of the approach pavement regardless of its width.



W4-1



W4-1P

3.8.2 Road Narrows (W4-2)

The Road Narrows sign is used where a reduction of the pavement width may constitute a hazard. Specific conditions for its use are shown below:

(a) On a two-lane road

- there is a reduction in pavement width of 1.2m or more; or,
- the travel lane is reduced in width by 600mm or more; or,
- The overall pavement width is reduced to 5.5m or less.

(b) On a multi-lane road, including one carriageway of a divided road

- there is a reduction in the number of lanes.



W4-2



W4-2P

3.8.3 Divided Road (W4-3)



W4-3

The Divided Road sign is used to warn motorists of the approach to a divided road when the median island is more than 300.0m in length.

3.8.4 End Divided Road (W4-4)



W4-4

The End Divided Road sign is used at the end of a section of divided road as a warning of two-way traffic ahead.

3.9 Road Obstacle Signs (W5)

These signs include those which warn motorists of unexpected road features such as change in road pavement surface and infrastructure, hazards due to weather conditions and environment.

Sign numbers and sizes of these signs are shown in the following table:

Table 3.7: Road Obstacle Signs

Sign	Sign No	Size (mm) (Plate Size)
Opening Bridge	W5-1B W5-1C	600 750
Uneven Road	W5-2A W5-2B W5-2C W5-2D	450 600 750 900
Hump	W5-3A W5-3B W5-3C W5-3D	450 600 750 900
Steep Decent	W5-4B W5-4C W5-4D	600 750 900
Steep Climb	W5-5A W5-5B W5-5C	450 600 750
Ford	W5-6A W5-6B W5-6C W5-6D	450 600 750 900
Flood	W5-7A W5-7B W5-7C W5-7D	450 600 750 900
Falling or Fallen Rocks (L or R)	W5-8B W5-8C W5-8D	600 750 900
Slippery Road	W5-9A W5-9B W5-9C W5-9D W5-9PA W5-9PB W5-9PC	450 600 750 900 (450X700) (600X900) (750X1200)
Cattle Crossing	W5-10B W5-10C W5-10D	600 750 900
Aircraft	W5-11A W5-11B W5-11C W5-11D	450 600 750 900

3.9.1 Opening Bridge (W5-1)



W5-1

The sign is used to warn motorists of an opening bridge ahead.

3.9.2 Uneven Road (W5-2)



W5-2

The sign is used to warn motorists of humps and dips of a road section ahead.

3.9.3 Hump (W5-3)



W5-3

This sign is used to warn motorists of a road hump ahead.

3.9.4 Steep Descent (W5-4) and Steep Climb (W5-5)

The Steep Descent sign (W5-4) is used in advance of downgrade where vehicle speeds are likely to increase to an extent that would make a vehicle difficult to control. The TRUCKS USE LOW GEAR sign (S1-3) should be used in conjunction with this sign on the same post. (see Section 6.3.2)

The Steep Climb sign (W5-5) is used in advance of long steep upgrades of 10% or more.



W5-4



W5-5

3.9.5 Spill Way (W5-6)

The SPILL WAY sign is used where water flows across a roadway at most times of the year, except during a prolonged dry season.



W5-6

3.9.6 Flood (W5-7)



W5-7

The FLOOD sign is used to give warning of depressions in the road that may carry flood water for short periods during wet seasons.

3.9.7 Falling Rocks (W5-8)



W5-8

The Falling Rocks sign is used to warn motorists of a road section on which there is possibility of falling rocks or the consequence of it. The symbol may be reversed.

3.9.8 Slippery (W5-9)

The Slippery sign is used to warn traffic of sections of road where the pavement may become slippery.

Slippery conditions should be indicated by a plate mounted beneath the sign bearing the sign WHEN WET (W8-5), or WHEN FROSTY (W8-6). (see Section 3.12.4)

The sign should be repeated at intervals of not more than 3km on long sections of such roads.



W5-9



W5-9P

3.9.9 Animal Crossing (W5-10)



W5-10

The Cattle Crossing sign is used to warn motorists of sections of road by which animals may cross.

3.9.10 Aircraft (W5-11)



W5-11

The Aircraft sign is used in the vicinity of an airfield to warn that aircraft may fly over the road at a low altitude.

3.10 Pedestrian and School Signs (W6)

The pedestrian and school signs have been included to replace the traditional triangle warning signs for pedestrians, school children, handicapped persons and bicycle users. The sign will have different shapes and fluorescent yellow green background to provide more conspicuity and visibility of these signs.

Elements of sign design and sizes are shown as follows:

Table 3.8: W6 Signs

Sign	Sign No	Size (mm)	Legend
Pedestrian Crossing Ahead	W6-1B W6-1C	600 750	
Slow Down Pedestrian Crossing Ahead	W6-1P	450X750	80 DN
Children Crossing	W6-2B W6-2C	600 750	
Cross Only At Ped Xing	W6-3	300X450	60 DN
Wheel Chair Crossing	W6-4A W6-4B W6-4C	450 600 750	
Bike Lane Ahead	W6-5A W6-5B	400X600 600X900	60 DN

3.10.1 Pedestrians (W6-1) and Slow Down Pedestrian Ahead (W6-1P)

These signs are interchangeable and used to warn motorists of the presence of pedestrians who may be crossing the road ahead regardless whether there is a designated crossing. For a designated Zebra Crossing use R6-8 sign. (See Section 2.11.5)



W6-1



W6-1P

3.10.2 Children (W6-2)



W6-2

This sign is used to warn motorists of the presence of school children, who may be crossing the road ahead regardless of whether there is a designated school crossing.

3.10.3 Cross Only At Ped Xing (W6-3)



W6-3

The CROSS ONLY AT PED XING sign may only be used, where crosswalks are clearly defined, to discourage jaywalking or unauthorized crossing. The normal regulatory sign for prohibiting pedestrian crossing is R3-10 together with supplementary instruction sign plates such as USE OVERPASS (S1-1).

3.10.4 Wheel Chair Crossing (W6-4)



W6-4

This sign is used to warn motorists of wheel chair crossing such as near hospitals, shopping centers.

3.10.5 Bike Lane Ahead (W6-5)



W6-5

This sign is used to warn the motorist of the approaching Bike Lane which may not be visible on the road. This is a warning sign and should be placed at an appropriate distance ahead of the bike lane. For a regulatory sign to a designated bike lane, use R6-10 sign.

3.11 Railway Level Crossing Signs (W7)

3.11.1 Railroad Crossing Position (W7-1; W7-4)



W7-1

The Railway Crossing Position sign is used at every railway level crossing in combination with STOP or GIVE WAY signs, signals or gates.

Where increased conspicuity is required, the alternative position sign W7-4 may be used.

3.11.2 Railway Crossing Advance Warning (W7-2; W7-3)

The Railway Crossing sign is used in advance of the railway crossing to warn the motorist of the presence of the level crossing ahead where the railway level crossing is located on a side road. If the normal distance requirement for placement of the sign cannot be met, the sign is erected on the through road and supplemented by ON SIDE ROAD sign (W8-2).

W7-2 is used for railway crossings without signal control and W7-3 for those with signal control.

The following sizes are applicable:

Table 3.9: Railway Crossing Advance Warning Signs

Sign Number	Size (mm)
W7-2B W7-2C W7-2D	600 750 900
W7-3B W7-3C W7-3D	600 750 900



W7-2



W7-3

3.11.3 Alternative Railway Crossing Position (W7-4)



W7-4

This sign is used where increased conspicuity is required instead of the normal Railroad Crossing Position sign (W7-1). This sign has a red plate background and is no less than 700mm X 900mm in size.

3.12 Supplementary Signs (W8)

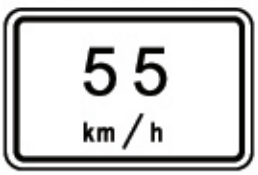
Supplementary signs shall not be installed by themselves as individual signs but only as a plate beneath an appropriate warning sign. For example, an advisory speed plate may only be installed with a curve or bend, or a road hump warning sign.

These signs are erected on the same post, and below the warning sign with which it is associated. These signs have black legend on white background. The sizes for these signs are shown as follows:

Table 3.10: Supplementary Signs

Sign	Sign Number	Size (mm)
Advisory Speed	W8-1A W8-1B W8-1C	600X400 750X500 900X600
On Side Road	W8-2A W8-2B W8-2C	600X400 750X500 900X600
Distance … m	W8-3A W8-3B W8-3C	600X200 750X250 900X300
Distance … km	W8-4A W8-4B W8-4C	600X200 750X250 900X300
When Wet	W8-5A W8-5B W8-5C	600X400 750X500 900X600
Blind	W8-6A W8-6B W8-6C	600X200 750X250 900X300
Aged	W8-7A W8-7B W8-7C	600X200 750X250 900X300
Playground	W8-8A W8-8B W8-8C	600X400 750X500 900X600
School	W8-9A W8-9B W8-9C	600X200 750X250 900X300
Disabled	W8-10A W8-10B W8-10C	600X200 750X250 900X300

3.12.1 Advisory Speed (W8-1)



W8-1

The Advisory Speed sign is used only in conjunction with another warning sign to indicate the desirable speed in good weather, traffic and road conditions.

The Advisory Speed sign is normally used with a sign in the Alignment Signs W1, and may also be used with the

Uneven Road (W5-2) or HUMP (W5-3) sign where an indication of the comfortable speed is desirable.

The Advisory Speed sign shall be installed on the same posts as, and below, the warning sign with which it is associated. In no case shall such a sign be installed until the nominated speed has been determined by accepted traffic engineering procedures.

3.12.2 On Side Road (W8-2)



W8-2

The ON SIDE ROAD sign is used as a supplement other signs such as FLOOD (W5-7) or RAIL CROSSING (W7-2 or W7-3), to warn the road users of a hazard on a side road in close proximity to the through road.

3.12.3 (Distance) m (W8-3); (Distance) km (W8-4)

The (Distance)...m and (Distance)...km signs are used in conjunction with a warning sign where an indication of distance to the hazard is desired.



W8-3

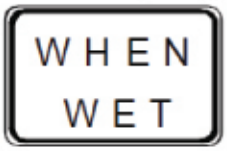


W8-4



W8-4A

3.12.4 When Wet (W8-5)



W8-5

This sign is used in conjunction with the Slippery Road warning sign (W5-9).

3.12.5 Blind (W8-6); Aged (W8-7); Playground (W8-8); School (W8-9); Disabled (W8-10)

The BLIND, AGED, PLAYGROUND, SCHOOL and DISABLED signs, as appropriate, are used in conjunction with the PEDESTRIAN and CHILDREN Crossing signs (W6-1) and (W6-2).



W8-6



W8-7



W8-8



W8-9



W8-10

3.12.6 For PUJ (W8-11A); For Buses (W8-11B)

These supplementary signs are used in conjunction with Turning Prohibition signs NO LEFT TURN (R3-13); NO RIGHT TURN (R-14); and NO U TURN (R3-15). They must not be used individually by themselves.



W8-11A



W8-11B

3.13 Other Warning Signs (W9)

3.13.1 Vertical Clearance (W9-1A; W9-1B)

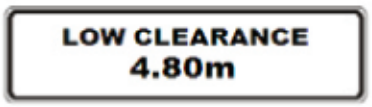
The CLEARANCE signs shall be rectangular in shape and not less than 1500mm x 600mm in size with the long axis horizontal. They shall be black letters on white reflectorized background. (See Also R6-3 for symbolic height restriction sign).

The CLEARANCE X.Xm sign is installed on structures where signed clearance is greater than 4.80m and generally not more than 5.5m.

The LOW CLEARANCE X.Xm sign shall be rectangular in shape and not less than 1950mm x 600mm in size with the long axis horizontal. It shall be installed on all bridges, underpasses and other structures where the vertical clearance above the road pavement is 4.80m or less to warn motorist of the restricted height of the approaching structures. Vertical clearances shall be reckoned from the highest flood level.



W9-1A



W9-1B

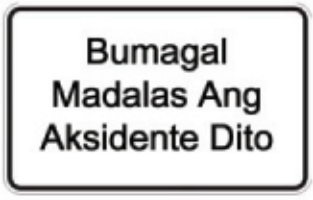
3.13.2 Slow Down Accident Prone Area (W9-2A) or Bumagal Madalas Ang Aksidente Dito (W9-2B)

The SLOW DOWN ACCIDENT PRONE AREA or BUMAGAL MADALAS ANG AKSIDENTE DITO sign shall be rectangular in shape and not less than 1060mm x 600mm in size with the long axis horizontal. Letters and borders shall be black on white reflectorized background.

These signs shall be temporarily installed to warn motorists of the risk and frequency of accidents while passing a road section. These should be removed from the site after improvements have been done.



W9-2A



W9-2B

3.13.3 Slow Down Merging Traffic Ahead (W9-3)



W9-3

The SLOW DOWN MERGING TRAFFIC AHEAD sign shall be rectangular in shape and not less than 1060mm X 600mm in size with the long axis horizontal. Letters and borders shall be black on white reflectorized background. These signs shall be installed to warn motorists of merging traffic from an entry ramp on a high speed highway.

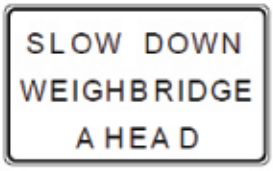
3.13.4 Lane Ends – Merge Left (W9-4)



W9-4

The LANE ENDS MERGE LEFT is an advance warning to drivers of lane drop ahead and is to be used in conjunction with appropriate lane marking and FORM 1 (or 2) LANE (S) sign (S2-10). This sign is rectangular in shape, not less than 950mm X 600mm in size, with long axis horizontal.

3.13.5 Slow Down Weighbridge Ahead (W9-5)



W9-5

This warning sign is used to warn motorists in advance of a weighbridge station ahead on the highway. This is followed by the direction Service Sign (G7-2). This sign is rectangular in shape, not less than 1060mm x 600mm in size, with long axis horizontal.

4 GUIDE SIGNS OR INFORMATION SIGNS (TYPE G)

Guide signs inform road users about the direction and distances of destinations on the route they are following or along other roads that intersect their route. They also supply information to identify points of geographical or historical interest and give directions to rest areas, camping or parking areas.

Guide signs do not normally lose their value by frequent use but they can be ineffective unless attention is given to their proper location and the clarity of the message.

Signs in the Directional Signing series are usually classified into four categories:

- Those installed in advance of the intersection. These include Advance Direction Signs (e.g., G1-1 to G1-6) and Lane Designation Signs (GE2-3);
- Those installed at the intersection. These include Intersection Direction Signs (G2-1 to G2-4) and Finger Board signs (G4 signs);
- Those on departure from the intersection. These are Reassurance Direction Signs (G3-1 and G3-2); and,
- Those installed on expressways. The GE signs is described in Section 5 of this manual.

4.1 Classification of Guide Signs

Guide sign classification	Section
▪ Advance Direction Signs (G1)	4.5
▪ Intersection Direction Signs (G2)	4.6
▪ Reassurance Direction Signs (G3)	4.7
▪ Finger Board Direction Signs (G4)	4.8
▪ Street Name Signs (G5)	4.9
▪ Town Name and Geographical Feature Signs (G6)	4.10
▪ Service Signs (G7)	4.11
▪ Tourist Information and Tourist Destination Signs (G8)	4.12
▪ Route Markers (G9)	4.13

4.2 Design

4.2.1 Shape

Guide signs are generally rectangular in shape. Where practicable, they should be designed with long axis horizontal. Exceptions to this rule are route markers, which are normally on a shield of distinctive shape and kilometer posts.

4.2.2 Color

The words, symbols, and borders of guide signs should be reflectorized on all colors except black that contrasts with the background of the sign.

The background color should be easily recognizable by motorists as being applicable to the particular category of guide signs for which it is used. The color combinations, which shall be used are as follows:

- Black legend on white background: Information signs, street name signs and kilometer posts;
- White legend on standard green or blue background: Advance direction signs, intersection and special direction signs, and re-assurance direction signs, including signs giving directions to expressways from the adjacent road and street system;
- White legend on blue background: Signs indicating roadside facilities, services and legends used. The size adopted will depend on the required letter size, the number of words in the legend, symbols used and the general arrangement;
- White legend on brown background: Tourists interests;

4.2.3 Size

Standardization of guide sign size is not always practicable due to the variety of legends used. The size adopted will depend on the required letter size, the number of words in the legend, symbols used and the general arrangement.

The likely visual impact of the sign must be considered in relation to its location, background and surroundings. For example, in an urban street with advertising signs, guide signs may need to be increased in size to compete effective with adjacent signs. Overhead signs need to be larger than signs mounted in normal positions at the side of a road, while roads, which carry predominantly high-speed traffic, require larger signs than low-speed roads.

Special attention should be given to single-name direction signs having short names to ensure that the visual impact of the sign is not lost by economizing on its overall size.

4.2.4 Type of Lettering

Standard alphabets shall be used on guide signs (see Section 1.7.4). Whether the legend of a guide sign should have capital letters only, lower-case letters, or a combination of the two, is either described or illustrated for each type of sign. In general, the destinations on advance direction signs, intersection direction signs, reassurance direction signs, and expressway signs should have initial capital letters followed by lower-case letters.

4.2.5 Size of Lettering

A driver approaching a guide sign should have sufficient time to read it before it passes from his normal field of vision. The distance at which a sign can be read is a function of the letter size and spacing while the time available to read it depends upon the number of words and the speed at which the sign is approached.

A well designed sign can be read at a glance by drivers familiar with the destinations or the message displayed at normal approach speed. Allowance should be considered when selecting the size of lettering for those less familiar with the sign, for the possibility that other vehicles may briefly obstruct a driver's view, and for a slower response by some drivers due to poor eyesight or inattention.

If a sign has to be located outside the driver's normal field of vision, the size of lettering should be increased. This applies to roadside signs on multi-lane roads and to a lesser degree to cantilevered signs and some overhead signs.

4.2.6 Letter Spacing

The legibility of the legend on a sign depends, among other things, on the spacing between individual letters. Legibility distance is greater for widely spaced letters than for closely spaced letters. There is, however, an optimum spacing, which, if exceeded, increases the difficulty in reading the legend.

In determining a suitable spacing for letters, it should be noted that reflectorized letters on a non-reflective background appear to have a wider stroke width when viewed at night, while non-reflectorized letters on a

reflective background appear to lose stroke width. Adjustment of letter spacing may, therefore, be needed to compensate for this effect. Street name signs - which normally have Series C capital letters of a smaller size than other guide signs, may require special consideration.

4.2.7 Amount of Legend

The principal legend on a guide sign should be limited to the number of words a driver can read and in time he can turn his attention from the road to the sign.

Desirably, a guide sign should carry not more than three lines of legend or three destination names. However, up to five lines or names may be used in special cases.

4.2.8 Distance Indication

When distances are shown on guide signs, the following rules shall apply:

- The distance shall be shown in meters for distance up to 999m;
- The distance shall be shown in 0.1km increments for distances from 1km to 4.9km;
- The distance shall be shown in 0.5km increments for distances from 5km to 9.5km; and,
- To the nearest kilometer for greater distances.

4.2.9 Reflectorization and Illumination

All guide signs, including expressway guide signs, which need to be read at night should be reflectorized.

The method of reflectorization would be the use of retro-reflective materials for the background, letters, borders and legend of the sign.

Overhead signs should require external or internal illumination even at locations where there is street lighting. In general, the degree of illumination required on the face of the sign will depend upon the level of competing illumination surrounding the sign – the brighter the surrounding illumination the higher will be the level of luminance required on the sign face. The use of high performance reflective sheeting should be considered.

In some situations where signs need additional visual impact at night, illumination may also be desirable for signs that are not located overhead. Externally illuminated signs should also be faced with reflective materials for possible power failure.

Where external illumination is used, the source of illumination may be either above or below the sign; shadows can be cast across the face of the sign in daylight and these may detract from the legend. Also, there is a tendency at night for the light source to form a reflection on the face of the sign, thus reducing the legibility. Under some circumstances where the location of lighting is critical, it is preferable to use reflectorized lettering on a matte finish background.

If external illumination is located below the sign, care should be taken to ensure that the light fittings do not shine below the sign towards opposing traffic. A double strip of fluorescent tube lighting located either above or below a sign will normally illuminate the sign face to a height or approximately 2.0m. Signs more than 2.0m high normally require both top and bottom lighting.

4.3 Location

Generally, roadside guide signs should be located on the right side of the road where a driver would expect to see them. In some circumstances the sign may be mounted above the carriageway (see Section 1.8).

The lateral placement and height of guide signs shall be in accordance with Section 1.8.2. Very large roadside signs may require special consideration, while special circumstances of road layout and adjacent topography may also warrant departures from the given rules.

Normally, guide signs should not be erected in medians unless they have special relevance to traffic traveling in the median lane. In special cases, a sign is required to supplement a similar sign on the left side. In urban situations with wide medians and roadside development, mounting of signs within the median may be unavoidable.

At channelized intersections, some guide signs need to be erected in traffic islands or on the right side of the road. If practical, they should be within a driver's normal line of vision as he approaches the intersection. If this cannot be achieved, guide signs should be on the side of the intersection where the driver is likely to be looking if he is required to execute a turn. However, in all cases, the signs should not obscure a driver's vision of other approaching traffic or pedestrians.

4.4 Supports for Guide Signs

4.4.1 Roadside Signs

The size and number of supports required together with typical mountings and the spacing between posts are given in Appendix A, Figures 11.1 and 11.2. The lateral positioning of roadside signs is indicated in Figure 1.1.

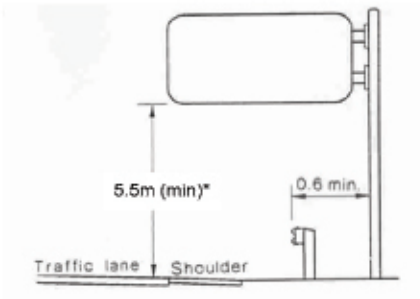
In urban areas where large signs need to be erected in the footpath, the sign and its supports should present a pleasing appearance and supporting posts should not be erected where pedestrians are likely to walk into them at night. Supporting structures, which completely span a footway with supports on each side, are undesirable.

On high-speed roads the use of breakaway supports should be considered for roadside signs where they are likely to be struck by vehicles. (see Appendix A, Figure 11.3)

4.4.2 Overhead Signs

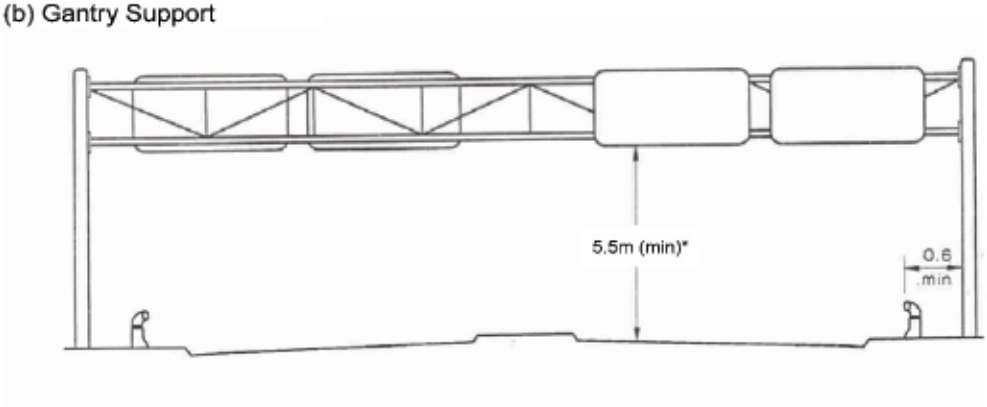
Typical methods of supporting overhead signs are shown in Fig. 4.1.

(a) Cantilever Support



* Where the sign does not overhang the running lanes, the minimum clearance may be reduced to 5.0m.

(b) Gantry Support



* The minimum clearance applies to catwalks, lighting brackets or other fixtures, where these project below the sign.

(c) Butterfly Support

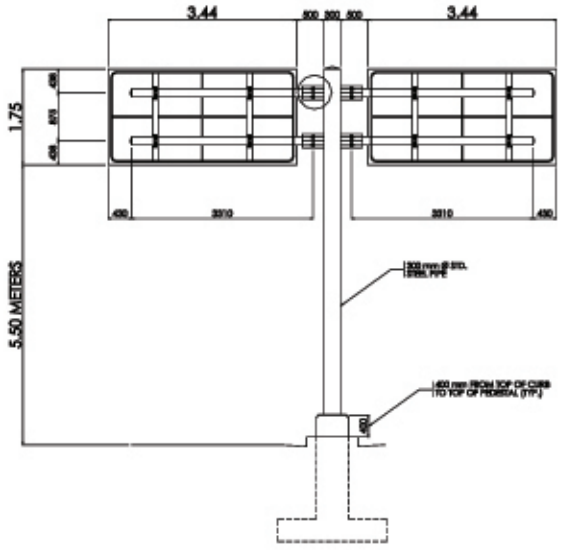


Figure 4.1: Methods of Supporting Overhead Sign

4.5 Advance Direction Signs (G1)

4.5.1 Application

Advance direction signs are used in advance of an intersection to indicate destinations along each route leading away from the intersection, providing prior information of the routes ahead by showing place, names, arrows, symbols and instructions to indicate directions.

Advance Direction signs should usually be erected:

- in advance of intersections where two arterial roads meet or cross; or on an arterial road crossing a feeder road;
- in advance of intersections where the arterial road turns;
- on feeder road intersecting arterial road; or,
- in advance of intersections where arterial road may be confused with another road.

4.5.2 Shape, Color and Reflectivity

Advance direction signs shall be rectangular in shape, normally with long axis horizontal. They shall have reflectorized white legend, symbols and border on reflectorized green background.

4.5.3 Format and Use

The two types of Advance Direction signs are Stack and Diagrammatic. Each should normally be located at the road side, but in restricted places in the urban areas, overhead installation may be applicable.

(a) Stack Signs

The stack sign is the type normally used. Such signs list destinations together with appropriate direction arrows, and if required road names and route markers. (see Section 7.3.2 of Appendix A, Figure 7.1)

The direction in which an arrow points should be indicative of the movement ahead, and not necessarily representative of the geometric layout. Arrows pointing to the destinations therefore should either be vertically upward, horizontal, or upward at 45 degrees to the horizontal. Horizontal and angled arrows should always be placed at the nearest the side of the panel to which they point. Downward arrows **should not** be used on stack signs. (see examples of G1-1; G1-2 and G1-3 type signs)

The vertical sequence of panels should be as follows:

- Straight ahead arrow – top of sign;
- Angled arrows above horizontal arrows; and,
- Alternate panels to have arrows at opposite ends of the sign.

(b) Diagrammatic Direction Signs

This type of sign presents a simplified diagram of the intersection layout (see G1-4 and G1-5). It should be used at complex intersections and major roundabouts (rotunda) and for successive closely spaced road junctions or locations where a stack sign can not adequately indicate the complex layout.

The legend size on a diagrammatic sign should normally be no smaller than that required for stack signs in the same situation. This usually results in a sign board much larger than an equivalent stack sign.



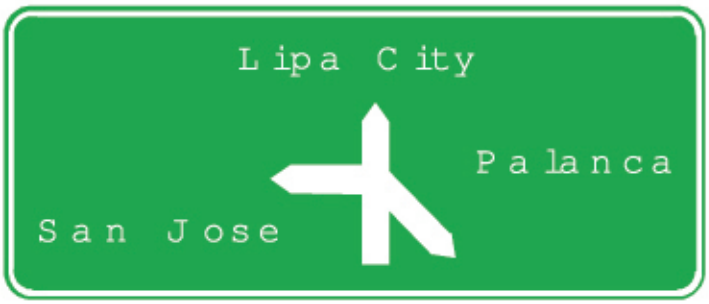
G1-1



G1-2



G1-3



G1-4



G1-5

4.5.4 Legend

Stack signs should preferably be limited to a maximum of five lines of legend, including route number and street names, with no more than two lines in any one panel, except that G1-3 type sign may have up to three lines. The diagrammatic signs should be limited to a total of five items, including destination and route names.

No more than two place names, and preferably only one should be used for any one direction. Where two names are shown, the first (top) name shall be that of the first destination on the route.

The destination to be shown should be the next place of importance on the route to be followed, and preferably one which motorists are familiar with. Sometimes it may be necessary to show on the signs a town which, although small, is important due to its location, e.g., at a junction of two highways.

Distances to destinations **should not** be given on Advance Direction Signs. However, if the distance to the next intersection is much greater than usual, or farther than the motorist may expect, then the distance may be shown on a supplementary distance plate beneath the sign.

4.5.5 Lettering

All lettering for destinations on both stack and diagrammatic signs shall be lower case with Modified Series E initial capitals.

Road names on stack signs shall be in Series D or E capitals approximately the same height as the lower case height of the directional legend.

The minimum letter size for destination legend shall be as follows:

- For two lane rural roads and urban roads up to two lanes one direction: not less than 160 Mod E /120 LC;
- For multi-lane rural highways and urban roads wider than two lanes each direction: not less than 240 Mod E / 180 LC; or,
- For overhead signs in any location: not less than 240 Mod E / 180 LC.

Other factors which may affect the size of letter or sign include:

- Distraction due to road side activities;
- Signs composed of short legends may be enlarged to increase conspicuity;
- Signs containing short and long legends require a balance of legend size to ensure equal visual impact; and,
- The need to emphasize a more important direction by making larger than other names on the sign.

To reduce overall length of a sign, use standard abbreviation e.g., **HWY** for Highway; **RD** for Road; **ST** for Street; **AVE** for Avenue; and, **EXPRWAY** for Expressway.

4.5.6 Location

The distance at which an Advance Direction sign should be located in advance of an intersection varies according to the expected speed of approaching vehicles. In rural areas Advance Direction signs should be located at a minimum distance from the intersection as indicated in the following table:

Table 4.1: Location of Advance Direction Signs

85th Percentile Speed (kph)	Distance from Intersection (m)
<60	75 – 100
60 – 70	100 – 125
71 – 80	125 – 150
81 – 90	150 – 200
>90	180 – 250

4.6 Intersection Direction Signs (G2)

4.6.1 Function and Application

Intersection Direction signs supplement Advance Direction signs and should be placed at more important intersections or decision points to show where the intersecting roads lead. The principal destination for the route shall be repeated on an Intersection Direction sign if it has been given on the Advanced Direction sign. A distance indication should not be shown on Intersection Direction signs as this distance is usually shown on the Reassurance Direction sign beyond the intersection. (See Section 4.7).

Intersection Direction signs often perform two more other important functions:

- They can indicate to the motorist the presence of the intersection and the precise point where a decision may be required; and,
- At complex channelized intersections, they can help to pinpoint the exact direction to be followed.

Examples of Intersection Direction signs are G2-1; G2-2; G2-3 and G2-4.



G2-1 G2-2

G2-3

G2-4

4.6.2 Design and Layout

Intersection Direction signs shall be rectangular in shape with long axis horizontal. They may be shaped to a point at one or both ends with a white chevron inside the point to indicate the direction or directions to be followed.

They shall have a white legend and a border on a standard green background, both reflectorized, except the road name panel, which has a black legend on a white reflectorized white background and shall be square ended.

4.6.3 Legend and Lettering

Lettering on Intersection Direction signs shall be lower-case with initial letters in capitals for destinations. The size of lettering for the principal legend should not be smaller than 140 Mod E/105 LC (see Section ***7.3.1*** in Appendix A)

A maximum of two legend lines, plus one road name (if applicable) can be used on the same sign.

4.6.4 Location

Intersection Direction Signs should be located within or near the intersection at the site where they are readily visible to the approaching motorists.

4.7 Reassurance Direction Signs (G3-1; G3-2)

4.7.1 Function and Shape

Re-assurance Direction signs may be used beyond intersections to reassure motorists who are traveling towards their intended destination and to indicate the distances to the desired destination. These signs are rectangular, normally with the long axis horizontal. Where the signs contain more than three destinations, they may be designed with long axis vertical.

4.7.2 Lettering and Legend

Lettering for destinations on Reassurance Direction signs shall be white (160 Mod E/120 LC minimum) on a standard green background. Distance numerals shall be Modified Series E, the same size as the initial capital of the destination.

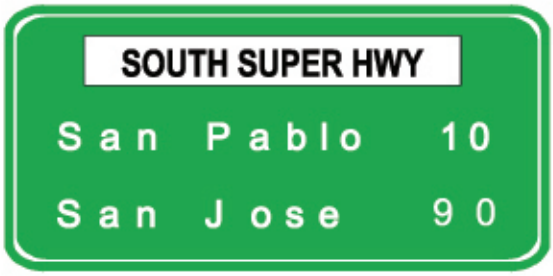
Letters for route or street name, if shown, shall be black Series D or Series E capital letters only, approximately same size as the lower case letters of the destination names. The route name shall be on white panel.

If route number is provided it shall be on the left side of the route name.

Only major town names shall appear in the Re-assurance Direction sign. The names shall appear in order of their distance from the intersection just passed, with the shortest distance on the top of the sign.



G3-1



G3-2

4.8 Finger Board and Direction Signs for Less Important Roads (G4)

4.8.1 Purpose

At the less important intersections away from the National Highways, special 'Finger Board' type of signs are used to provide directions to towns, scenic attractions, geographical interests, and to other local facilities such as post offices, railway stations and aerodromes.

These signs are only used on local roads of lesser importance. They shall not be used on National Roads.

Examples of Finger Board signs are shown in G4-1; G4-2 and G4-3.



G4-1



G4-2



G4-3

4.8.2 Shape, Color and Reflectorization

Fingerboards shall be rectangular in shape with the long axis horizontal and may be shaped to a point at one or both ends to indicate the direction or directions to be followed, and should be reflectorized. The legend shall generally be black with white reflectorized background.

Where a fingerboard is erected at the last junction with an access road leading directly to a place of tourist interest recognized by the appropriate local authority, it may have white legend on brown background.

4.8.3 Lettering

The lettering on fingerboards should be either Series D or Series E. Series C may be used for long destination names. Lettering on Finger Boards shall be 100 DM minimum and 140 DM maximum. Numerals shall be the same height as the capital letters but in Series E.

4.8.4 Legend

The number on finger boards erected on a single post at an intersection should be kept to a minimum, and should not exceed two for each direction of travel. The name or names selected should include those given on the advance direction signs if such signs are erected. Legends can be Road Names or Destination Names with or without distance shown.

4.8.5 Distance Indication

The distance in kilometers to a destination shall be shown on fingerboards as shown in G4-1. The legend km, after the distance numeral should not be shown.

4.9 Street Name Signs (G5)

4.9.1 Purpose

Street Name signs inform road users of the names of roads and streets that they are passing or entering.

4.9.2 Location and Height

Street Name signs should be located on posts as near as practical to the intersection so that they are clearly visible to both pedestrians and drivers. In addition to the name of the street, the sign may also carry the house number range for one block.

Where the signs are erected in the footway, the height should be not less than 2.2m or more than 3.0m measured to the bottom of the sign. Where they are erected in a verge or at other locations clear of pedestrian ways, a lower erection height may be adopted. Where two street name signs are to be carried on a single post they should be erected at an angle indicated by the streets so signed.

Street Name signs can also be mounted on Overhead signal masts or attached to overpass structures.

4.9.3 Shape and Size

Street Name signs shall be rectangular in shape with their long axis horizontal. The length of the signs should not be less than 500mm or more than 1.2m. The vertical dimension is dependent upon the information given on the sign; for signs containing both street name and house numbers, the minimum shall be 200mm while signs having only the street names should not be less than 150mm.

4.9.4 Color

Street Name signs should preferably have white legend on blue or green background. Other color combinations may be used provided red is not used as a background color. Street name signs should be reflectorized.

4.9.5 Lettering and Numerals

Lettering on Street Name signs shall be capital letters not less than 100mm. Series C letters may be used, but Series D is preferred where the length of the legend can be contained within the allowable maximum length. Numerals used for house numbers should not be less than 60mm. Lettering for municipality names should preferably be capitals not greater than 40mm.

The following abbreviations are permitted:

Avenue	AVE
Boulevard	BLVD
Place	PL
Crescent	CRES
Road	RD
Drive	DR
Street	ST
Lane	L

Examples of Street Name signs (G5-1) and (G5-2) are shown below:



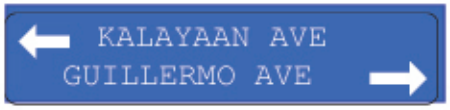
G5-1



G5-2A



G5-2B



G5-3

4.10 Town Names and Geographical Feature Signs (G6)

4.10.1 Application

This group of signs conveys to the motorist general information of interest, such as geographical locations.

Town Names signs and names of local geographical interests such as the name of a river, should be erected on the right side of the road at the boundary or entrance to a town or the location of interest.

These types of signs shall be rectangular in shape with long axis horizontal. They shall have black legend on white background. Lettering used should be Series D or E capitals although Series C is permissible for long words. The principal legend should not be smaller than 140mm for any sign located to face approaching traffic. For signs erected with face parallel to the road centerline, such as geographical boundary signs, letters smaller than 140mm may be used.

Examples of these signs are shown in G6-1 (Town Name); G6-2 (Province Name); G6-3 (Geographic Feature); and G6-4 (Local Government Boundary).



G6-1



G6-2



G6-3



G6-4

4.11 Service Signs (G7)

4.11.1 Application

Generally, Service signs shall be rectangular in shape, generally with long axis horizontal. They should have white legend on blue background and may be fully reflectorized if the service is available for use by night.

The lettering on service signs shall have a minimum size of 120mm and should be Series D or E.

Some of the typical Service Signs are shown as in G7-1, G7-2, G7-3, G7-4, and G7-5 and symbols for most service signs with their meanings are shown in Figure 4.2.



G7-1



G7-2



G7-3



G7-3A



G7-4



G7-5



Figure 4.2 : Service Sign Symbols

4.12 Tourist Information and Tourist Destination Signs (G8)

Tourist Information signs having white legend on brown background may be erected on an arterial road to denote places of public, scenic, historic or cultural interest that are recognized by the appropriate authority and through which the road passes. They may be erected also as fingerboards at the last junction with an access road leading directly to the place of tourist interest.

Tourist Information signs are not intended to replace normal direction signs to established tourist areas. However, they may be incorporated into normal Direction Sign panel, but with a brown background to distinguish its tourist interest.

Tourist Destination signs are designed similar to other directional signing with legends in capital lettering with minimum size of 140 DM.



G8-1



G8-2



G8-3



G8-4

4.13 Route Markers (G9)

4.13.1 Purpose

The identification and general direction of arterial roads and national highways that have significance as 'through' routes can be achieved by the display of Route Markers showing the number and direction of the route. The route numbers can also be displayed on directional signs indicating the appropriate national highway the motorists is on. A route numbering system can only be successful when the route number is shown on the road maps that are freely available to the motorists.

This chapter provides some basic design and application information for the future implementation of a route marking system.

4.13.2 Design

The national highways could be identified by the shield (G9-1) that has black numerals and border on reflectorized white background.

When erected as an individual sign, the size of the shield should be:

- 310mm x 360mm, on national roads, and,
- 410mm x 480mm, on expressways.

with Series C numerals, but for route markers with one numeral only, Series E is used.

The size to be used at a particular location will depend on local conditions. When Route Markers are incorporated in advance direction or direction signs, their size will vary to suit the letter size used.

The direction of the route shall be indicated by arrow boards (G9-2 to G9-6 inclusive), located at top of the route marker (Fig. G9-8).

The direction of the arrows on the arrow board will depend on the road or intersection geometry.

At the end of the route, the sign END (G9-7) shall be displayed.

Arrow boards and END signs shall have black arrows or legend and black border on reflectorized white background.

4.13.3 Location of Route Markers

The Route Markers should be incorporated in the sign where advance direction signs are erected at an intersection or junction.

Other Route Markers are located as follows:

- at all intersections and junctions where motorists need to be assured of the route;

- beyond intersections and junctions before which markers have been incorporated in the directional signs;
- beyond all intersections and junctions with important roads to indicate the correct route number of the highway;
- just outside the built-up area leaving a city or town;
- in rural areas at intervals not less than 8 km, except where reassurance signs have been erected beyond junctions located within these limits;
- in urban areas at intervals of not more than 2 km except where reassurance signs have been erected beyond junctions which are spaced less than 2 km apart; and,
- at other locations where reassurance is considered to be desirable.



G9 - 1



G9 - 2



G9 - 3



G9 - 4



G9 - 5



G9 - 6



G9 - 7



G9 - 8

4.14 Asian Highway Route Markers (G10)

4.14.1 Purpose

The Philippines is one of the 32 member countries of UN-ESCAP. As part of our commitment, Route Markers and Directional Signs shall be put up along the Asian Highway. Our country has been assigned the Asian Highway route number AH26. The route links major seaports and cities in the country comprising mostly of the Daang Maharlika which commence from Laoag-Manila – Legaspi-Matnog – (Ferry) – Allen-Tacloban (- Ormoc-(Ferry)-Cebu) – Liloan – (Ferry) – Surigao-Davao (- Cagayan de Oro) – General Santos-Zamboanga. The total length of AH 26 is about 3,517 kilometers. The main purpose is to identify general direction of arterial roads of the Asian Highways that have significance as 'through' routes.

The Route Shield can also be displayed on directional signs to easy identify the route. To make the Asian Highway Route identification more successful, this shield (G10-1) should be shown on the road maps that are freely available to the motorists.

This chapter provides some basic design and application information for the implementation of Asian Highway Route marking system.

4.14.2 Design

The Asian Highway could be identified by the shield (G10-1) that has a white retro reflective letters, numerals and border on retro-reflective blue background.

When erected as an individual sign, the size of the shield should be:

- 600mm x 750mm, on national roads, and,
- 720mm x 900mm, on expressways.

Kilometer number (W8-4) can also be supplemented under the shield to aid the motorist on which point of the route he is in to. The kilometer number shall have black legends and border on retro-reflective yellow background.

Supplemental arrow board signs can also be installed and shall have black arrows or legend and black border on reflectorized white background.

The direction of the arrows on the arrow board will depend on the road or intersection geometry.

- In rural areas at intervals of not exceeding 10 km and not less than 5 km, except where reassurance signs have been erected beyond junctions located within these limits;
- In urban areas at intervals of not more than 5 km except where reassurance signs have been erected beyond junctions which are spaced less than 2 km apart; and,



- G10-1

4.14.3 Advance Directional Signs with Route Marker Shield

The AH 26 shield should be incorporated in the sign where advance directional signs are erected at an intersection or junction.

When Route Marker AH26 is incorporated in advance directional signs, the height of the numeral (AH "26") is equal to 1.0 (desirable) or 0.75 (minimum) times capital letter Height of the main sign legend.

Locations for Advance Directional Signs with Route Marker Shield:

- at all intersections and junctions where motorists need to be assured of the route;
- beyond intersections and junctions before which markers have been incorporated in the directional signs;
- beyond all intersections and junctions with important roads
- just outside the built-up area leaving a city or town;
- at other locations where reassurance is considered to be desirable.



- Typical incorporation of AH 26 Shield on Stack Sign G1-1



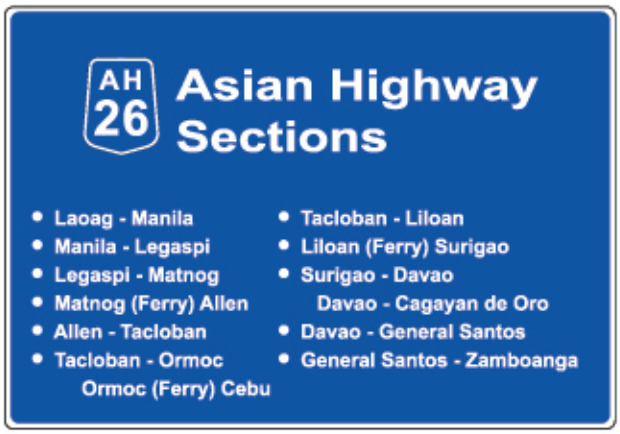
- Typical incorporation of AH 26 Shield on Intersection Directional Sign G2-1

4.14.4 Asian Highway Leg Marker Sign (G1-1, G1-2, G1-3, G1-4)



At the start of each segment or leg of the Asian Highway, a gantry type marker shall be put-up comprising of three types of overhead signage.

The first is **G1-1** (2440mm x 1700mm) which will appear only on both ends of the highway. This sign shall have reflectorized white legend on reflectorized blue background; with AH26 shield. It describes the various segments of the Asian Highway 26.



G1-1

G1-2 (2440mm x 1700mm) This sign shall have reflectorized white legend on reflectorized blue background; with AH shield, kilometer box and a map describing the total length of the Asian Highway 26 section.



G1-2

G1-3 (2050mm x 1700mm) This sign shall have reflectorized white legend on reflectorized blue background; It informs the motorist on what jurisdictional region district the next segment is in to.



G1-3

G1-4 (variable x 1700mm) This sign shall have reflectorized white legend on reflectorized blue background; with AH26 shield, informing the motorist of the name of the road ahead and its distance.



G1-4

SIGNS ON EXPRESSWAYS (TYPE GE)

5.1 General

The Directional Signs described in previous sections are also applicable to expressways. However, because expressways are designed to carry traffic at high speed, it is essential that drivers be given adequate advance information to ensure that they can position their vehicles in the correct lanes to undertake the correct maneuvers and so ensure that delayed decision making is kept to a minimum.

Where there are long distances between interchanges, it is necessary to keep drivers informed of the distances to the destinations ahead. The general principles of color, shape, size of letters and letter spacing have been described in Sections 4.2.1 to 4.2.6. Most expressway signs should have Series E letters, with recommended minimum requirement of 160 Mod E for Approach signs and 240 Mod E-400 Mod E on the Expressway.

The following are the Advance Direction signs exclusively to be used on expressways that are not normally used on ordinary highways.

5.2 Expressway Approach Signs (GE1-1, GE1-2 and GE1-3)

These signs shall have reflectorized white legend on reflectorized green background so that they are visible at night.

The signs are to be installed in advance or at the nearest intersection or interchange leading to the expressway.



GE1-1



GE1-2

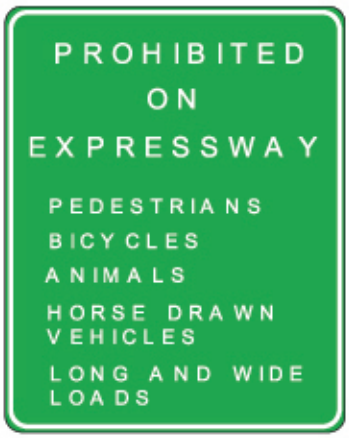


GE1-3

5.3 Expressway Information Signs (GE2)

5.3.1 Prohibited on Expressway (GE2-1A; GE2-1B; GE2-1C)

Certain classes of traffic may be prohibited from traveling on an expressway. Where this occurs, the appropriate signs PROHIBITED ON EXPRESSWAYS should be erected on the roads leading to the entry ramps. The location of the signs will depend upon local conditions. They may best be associated with one of the signs, giving advance direction to the expressway so that prohibited users may read the signs and take appropriate action before reaching the entry ramp. The signs shall have reflectorized white legend on reflectorized light-green background.



GE2-1A



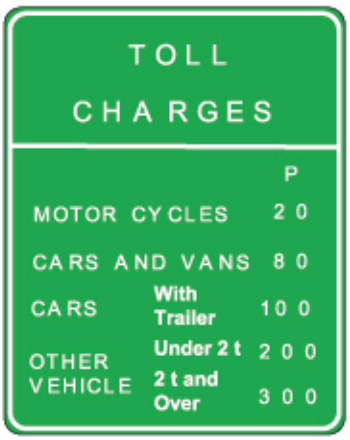
GE2-1B



GE2-1C

5.3.2 Toll Charges (Advance Information) (GE2-2)

The Advance Toll Charges Information sign is to be located in advance to the Toll Plaza to inform motorists the amount of toll charges required to pay at the toll plaza.



GE2-2

5.3.3 Lane Direction Signs (GE2-3)

Lane Direction signs are used to guide the motorist onto correct lanes leading to an intersection or an interchange. Method of mounting of Lane Direction signs on overhead gantries is referred to in Figure 4.1.

Typical examples of the design are shown in GE2-3.



GE2-3

5.4 Advance Exit Signs (GE3-1; GE3-2; and GE3-3)

Advance Exit signs shall be erected in advance of an exit ramp to advice drivers of the principal destinations to be reached from the exit ramp, and /or the distance to the exit point. Not more than two destinations should be shown on the sign. This series consists of the following types:

- GE3-1 Advance Exit with distance;
- GE3-2 Advance Exit with Distance plus RIGHT LANE and, where applicable, a route marker could be included; and,
- GE3-3 Supplementary Advance (NEXT EXIT).



GE3-1



GE3-2



GE3-3

5.5 Expressway Exit Direction Signs (GE4-1; GE4-2; GE4-3; GE4-4)

Exit signs with Destination (GE4-1) shall be erected overhead before the exit ramp of the interchange.

The NEXT EXIT.....KM (GE4-2) is placed below the first advance exit sign at an interchange where it is desirable to inform drivers that it will be an unexpectedly long distance before they again leave the expressway.

The EXIT (GE4-3) sign is always placed at the exit ramp gore, 20m to 30m back from the physical nose. The GE-3A version is used where exits are numbered.



GE4-1



GE4-3A



GE4-2



GE4-3

5.6 Expressway Service Signs (GE5)

Signing to services on or off expressways can either be:

- to services provided on the expressway such as a rest area, truck parking area or a service center; or,
- to services provided off the expressway such as Restaurants, Gasoline Stations, and Information Center.

Typical signs with nominal sizes are shown in the following table:

Table 5.1: Expressway Service Signs

Sign	Sign Number	Size (mm)
Rest Area Right Lane 2km	GE5-1 GE5-1A	2800 X 1500
Rest Area 2km	GE5-2	2500 X 1100
Rest Area	GE5-3	1500 X 1800
Service Center 2km	GE5-4	2800 X 1500
Truck Parking 2km	GE5-5	2240 X 1800
Restaurant Next Exit	GE5-6	3240 X 1800
Truck Parking exit	GE5-7	2800 X 1800

5.6.1 Rest Area (GE5-1 to GE5-3)

Rest areas adjacent to an expressway are usually located away from the main carriageway via a ramp so that other guide signs do not influence the signs directing traffic to them.

The principles to be followed for signs on the approaches to a rest area are similar to those applying to other exit ramps. An advance exit sign should be located 2 km from the exit ramp, followed at 1 km by a second sign giving directions to the lane to be used for exit.

The sign GE5-3A or GE5-3B shall be erected in the foregoing direction by arrow to the rest area. It may have its long axis vertical GE5-3A or horizontal GE5-3B to suit the location, and being in the fore, should be erected on a breakaway post. All rest area signs shall have a reflectorized white legend on



GE5-1



GE5-1A



GE5-2



GE5-3

5.6.2 Other Expressway Service Signs (GE5-4; GE5-5; GE5-6)

These signs include advance information for SERVICE CENTER (GE5-4); TRUCK PARKING (GE5-5) facilities or other facilities off the expressway. The advance information signs should be followed by exit signs showing these facilities (e.g., GE5-7).



GE5-4



GE5-5



GE5-6



GE5-7

5.7 End of Expressway (GE6-1; GE6-2; GE6-3; GE6-4)

A warning of the end of an expressway is provided by Sign (GE6-1) at 1 km or 2 km (GE6-1A) in advance. This should be followed by a CHECK BRAKES sign (S1-4E) and REDUCE SPEED NOW Sign (GE8-2) at approximately 400m from the end of the expressway. The END EXPRWAY sign GE6-3 is placed at the end of the expressway. All these signs have white legend on reflectorized light-green background.

Examples of design are shown in Appendix A. The nominal sign sizes are shown in the following table:

Table 5.2: End of Expressway Signs

Sign	Sign Number	Size (mm)
END EXPRWAY 1 Km	GE6-1	2300 X 1500
END EXPRWAY 2 Km	GE6-1A	1200 X 600
START EXPRWAY	GE6-2	900 x 450
END EXPRWAY	GE6-3	900 X 450



GE6-1



GE6-1A



GE6-2



GE6-3

5.8 Toll Signs (GE7-1; GE7-2; GE7-3)

5.8.1 General Application

Where a toll plaza is located on an expressway, it is necessary to provide the motorist with advance warning of the toll barrier. At least, 2 km from the toll plaza, a sign TOLL PLAZA AHEAD with distance (GE7-1) with black legend on white background should be erected. At 400m from the toll plaza, the sign REDUCE SPEED NOW (GE8-2) should be erected and at approximately 200m before the plaza, STOP AT TOLL GATES (GE7-2) with black legend on white background should be erected. All signs shall be fully reflectorized.

Where toll plazas are also placed to collect tolls at exit ramps, an advance warning of PAY TOLL AHEAD sign (GE7-3) followed by STOP AT TOLL GATES (GE7-2) should be erected.

The Toll Signs shall be rectangular in shape, black legend on white reflectorized background, except STOP AT TOLL GATES (GE7-2), which requires red legend on reflectorized white background.

5.8.2 Sign Size

The toll signs associated with toll way applications are listed in the following table:

Table 5.3: Toll Signs

Sign	Sign Number	Size (mm)
Toll Plaza Ahead	GE7-1	2600 X 1600
Stop At Toll Gates	GE7-2	1600 X 1900
Pay Toll Ahead	GE7-3	2400 X 1200



GE7-1 GE7-2 GE7-3

5.9 Expressway Traffic Instruction and Regulatory Signs (GE8)

These special signs are normally exclusively for expressways. These signs are normally rectangular in shape with black legend and white reflectorized background except WRONG WAY – GO BACK (GE8-1) and REDUCE SPEED NOW (GE8-2), which have white legend on reflectorized red background. Other Regulatory Signs such as Speed Restriction signs belong to the normal Regulatory Sign series.

Traffic Instruction signs associated with expressway use are shown in the following table:

Table 5.4: GE8 Signs

Sign	Sign Number	Size (mm)
Wrong Way – Go Back	GE8-1	2300 X 1470
Reduced Speed Now	GE8-2	2600 X 2000
Right Lane Ends .....m	GE8-3	1600 X 1700
Right Lanes Ends Merge Left	GE8-4	2700 X 1700
Lane Ends Merge Left	GE8-5	2700 X 1400
Merge Left	GE8-6	1750 X 1500
Slow Vehicle Use Right Lane	GE8-7	2400 X 2950
Check Brakes	S1-4E	2000 X 1100
Speed Limit Sign	R4-1(XXX)	900/1200mm Disc
Minimum Speed Limit	R4-3 (XX)	900/1200mm Disc
Speed De-restrictions	R4-2	900/1200mm Disc

5.9.1 Wrong Way – Go Back (GE8-1)



GE8-1

The WRONG WAY – GO BACK sign (GE8-1) is used to inhibit wrong way movements by drivers attempting to enter the wrong road either:

- via an exit ramp; or,
- at an at-grade intersection.

This sign is located at approximately 200m from the ramp terminal or intersection, is to be duplicated on both sides of the ramp or road.

This sign is only used on expressways.

5.9.2 Reduce Speed Now (GE8-2)

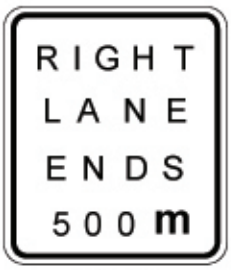


GE8-2

The REDUCED SPEED NOW sign is used in advanced of the end of an expressway. It is desirably located at 300m to 500m in advance of the end of the expressway where a low speed or stop condition may occur at the expressway terminal. The sign may be used in advance of any other conditions on an expressway or ramp where experience shows that drivers are approaching too fast for safety.

To be effective, drivers need to see a purpose for slowing down and therefore other signs should be erected in conjunction with this sign, e.g., END EXPRWAY (GE6-3).

5.9.3 Right Lane Ends 500m (GE8-3)



GE8-3

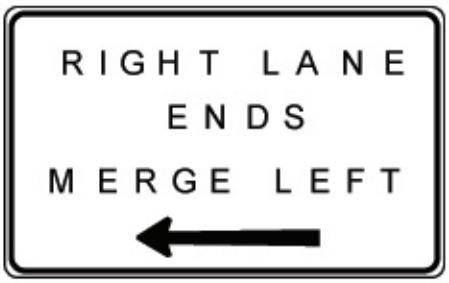
The RIGHT LANE ENDS 500m sign is located approximately 500m from the start of merge taper, to give the first warning of a lane drop. Due to site constraints, the distance may be reduced to 300m in exceptional circumstances.

5.9.4 Right Lane Ends, Merge Left (GE8-4); Lane Ends Merge Left (GE8-5); Merge Left (GE8-6); Slow Vehicles Use Right Lane (GE8-7) Signs

The RIGHT LANE ENDS, MERGE LEFT sign is located 180m to 220m from the start of the merge taper. The LANE ENDS MERGE LEFT sign is used where the opportunity exists to place the sign directly above the terminating lane, e.g., on a sign gantry in the vicinity of an exit.

In all cases the MERGE LEFT sign is placed at the start of the merger taper.

Three equally spaced merge arrows should also be marked in the lane which ends.



GE8-4



GE8-5



GE8-6



GE8-7

The SLOW VEHICLES USE RIGHT LANE (GE8-7) sign is used to direct slow moving vehicles to keep right and allow faster vehicles to overtake on the left lane.

5.9.5 Check Brakes (S1-4E)



S1-4E

The CHECK BRAKES sign is used in conjunction with REDUCE SPEED NOW sign on the Expressway. It is normally used as a supplementary sign to Steep Decent warning sign (W5-4) on major highways (see also Section 6.3.2). This sign used on the expressway should be designed with 240 EM minimum legend size.

6 TRAFFIC INSTRUCTION SIGNS (TYPE S)

Special Instruction signs are those used at locations where ordinary guide and regulatory signs do not achieve the desired result. These signs instruct the motorist to follow a direction or to obey a course of action.

Traffic Instruction signs are normally not regulatory signs but are used in conjunction with regulatory or warning signs to form a standard treatment, and to support the operation of traffic rules.

Some Traffic Instruction signs are exclusively used on Expressways. These are included in Chapter 5.

6.1 Design

These signs are generally rectangular in shape, with white reflectorized background and black legends. Legends must be concise and specific and letter size adopted will depend on the usage but in general should not be smaller than 80mm D or E series.

An Instruction sign should not carry long messages and where possible no more than five (5) lines of message should be used. Other design criteria should be based on those for guide signs.

6.2 Type

Two major types of Instruction signs are used, namely, Supplementary signs and Movement Instruction signs.

6.3 Supplementary Signs (S1)

These signs include those which are normally used in conjunction with other signs, either Warning Signs (W) or Regulatory Signs (R).

Sign sizes are as follows:

Table 6.1: Supplementary Signs

Sign	Sign Number	Size
USE OVERPASS	S1-1	600 X 300
USE PEDESTRIAN CROSSING	S1-2	600 X 450
TRUCK USE LOW GEAR	S1-3A S1-3B	800 X 600 1000 X 750
CHECK BRAKES	S1-4	620 X 420

6.3.1 Use Overpass (S1-1); Use Pedestrian Crossing (S1-2)

The USE OVERPASS sign (S1-1) and the USE PEDESTRIAN CROSSING (S1-2) signs are used in conjunction with NO PEDESTRIAN CROSSING disc (R3-10).



S1-1



S1-2

6.3.2 Trucks Use Low Gear (S1-3); Check Brakes (S1-4)

The TRUCKS USE LOW GEAR sign is used in conjunction with the STEEP DECENT warning sign (W5-4) at the top of long and steep downgrades. It should be erected between the warning sign and the start of the down grade, or immediately below the warning sign to match the sign size. The CHECK BRAKES sign (S1-4) is also used in conjunction with W5-4, and should be erected at approximately 300m after the warning sign. The CHECK BRAKES sign is also used on the approach to the end of an expressway. See also Section *5.9.5.*



S1-3



S1-4

6.4 Movement Instruction Signs (S2)

Movement Instruction signs included in this series are shown in the following table:

Table 6.2: S2 Signs

Sign	Sign Number	Size
REDUCE SPEED	S2-1	1500 X 750
STOP HERE ON RED SIGNAL	S2-2	450 X 750
TURN LEFT WITH CARE	S2-3L	400 X 600
TURN RIGHT ANYTIME WITH CARE	S2-3R	750 X 500
DETOUR FOR HIGH VEHICLES (L & R)	S2-4A	1300 X 350
DETOUR FOR HEAVY VEHICLES (L & R)	S2-4A(L)(R)	1400 X 350
GIVEWAY TO PEDESTRIANS	S2-5	900 X 600
NO RIGHT TURN ON RED SIGNAL	S2-6	500 X 800
SLOW VEHICLES USE RIGHT LANE	S2-7	600 x 900
MABAGAL NA SASAKYAN MAMALAGI SA KANAN	S2-7A	
TRAK AT BUS MAMALAGI SA KANAN MALIBAN KUNG LULUSOT	S2-7B	
NO THROUGH ROAD	S2-8A S2-8B	600 X 400 900 X 600
ROAD CLOSED	S2-9	900 X 550
FORM ONE (TWO) LANE	S2-10	600 X 800
ALT ROUTE for TRUCKS and BUSES	S2-11	2100 X 350

6.4.1 Reduce Speed (S2-1)



S2-1

The REDUCE SPEED sign may be erected at sites where the approach speed of traffic is high and the majority of drivers must slow down and may be required to stop. It shall be erected in conjunction with the appropriate standard warning sign (see Section 3.0 on Warning Signs) so that the reason for the reduction in speed is apparent to a driver.

REDUCE SPEED signs should not be erected instead of other standard warning devices and signs, and generally should not be erected unless the other devices have proved to be, or likely to be ineffective. They should not be regarded as a cure for every high-speed traffic situation; indiscriminate and frequent use will destroy the impact, which the sign, properly used, has on approaching drivers.

REDUCE SPEED signs should be erected 60m to 120m in advance of the appropriate warning sign so that both signs are visible at once to an approaching driver.

6.4.2 Stop Here On Red Signal (S2-2)



S2-2

The STOP HERE ON RED SIGNAL sign shall be used near the flashing signals located at railway level crossings or in any other situation where a vehicle is required to stop at a red signal and the position at which the vehicle must stop is not readily apparent.

6.4.3 Turn Left with Care (S2-3L)



S2-3L

The sign TURN LEFT WITH CARE may be erected at an intersection controlled by traffic signals where there is no control on a left turn movement and where a separate lane for turns has been provided. The process is called the "left-filter scheme".

6.4.4 Turn Right Anytime with Care (S2-3R)



S2-3R

The sign TURN RIGHT ANYTIME WITH CARE may be erected at channelized signalized intersections where a right turning lane is segregated by a traffic island.

6.4.5 Low Clearance Ahead High Vehicles Detour (S2-4)



S2-4L (R)

The advance warning of low clearance of a structure ahead (such as a bridge, or an overpass) for high vehicle detour shall be erected in advance of a junction with a detour.

6.4.6 Detour for ... Vehicles (S2-4A)

The DETOUR FOR ... VEHICLES sign is erected at the junction with an alternative route where certain classes of vehicles may be unable to negotiate the through route. The words HIGH, HEAVY, WIDE or LONG may be used, as appropriate, on the sign.



S2-4AL



S2-4AR

6.4.7 Give Way to Pedestrians (S2-5)



S2-5

The GIVE WAY TO PEDESTRIANS sign is used only at signalized intersections where there is a need to remind drivers of right or left-turning vehicles that although they are still under the control of the intersection signals, **they must give way to pedestrians**.

The sign may be required at or before a marked pedestrian crossing that is outside the intersection area. This situation occurs at staggered intersection and at pedestrian crossings not parallel to the road from which vehicles turn to cross them.

The sign should not be used except in these special circumstances because indiscriminate use would reduce the effectiveness of the general regulation applying at signalized intersection.

6.4.8 No Right Turn On Red Signal (S2-6)



S2-6

The NO RIGHT TURN ON RED SIGNAL is used at signalized locations where right turn on red signal will cause conflict problems either with through vehicles or with pedestrians.

6.4.9 Slow Vehicles Use Right Lane (S2-7); Mabagal Na Sasakyan Mamalagi Sa Kanan (S2-7A)

The SLOW VEHICLES USE RIGHT LANE and MABAGAL NA SASAKYAN MAMALAGI SA KANAN sign shall be erected on the left side of a road at the beginning of the taper leading to a lane for slow-moving vehicles.



S2-7



S2-7A

6.4.10 Trak At Bus Mamalagi Sa Kanan Maliban Kung Lulusot (S2-7B)



S2-7B

The TRAK AT BUS MAMALAGI SA KANAN MALIBAN KUNG LULUSOT sign is used on major roads, particularly where a public utility vehicle lane is installed.

6.4.11 No Through Road (S2-8)

The NO THROUGH ROAD sign, either S2-8A or S2-8B should be used where there is a possibility that through traffic may enter a dead-end local road in error. A suitable place to erect the sign is underneath the street name sign in the side road. Otherwise, it should face drivers likely to turn into the road. Signs smaller than those specified may be used for some minor residential street situations.



S2-8A



S2-8B

6.4.12 Road Closed (S2-9)



S2-9

The ROAD CLOSED sign should be erected in the center of a road that is closed to vehicular traffic. It should be erected in conjunction with a permanent barrier across the road.

6.4.13 Form 1 (2) Lane (s) (S2-10)



S2-10

This sign is used to instruct drivers to form into appropriate number of lanes. It is usually erected in conjunction with LANE ENDS MERGE LEFT (W9-4) signs.

6.4.14 Alternative Route (For Trucks and Buses) (S2-11)



S2-11

This sign is used to indicate an alternative for some types of vehicles when the normal route may not be accessible for any reason.

7 HAZARD MARKERS (TYPE HM)

7.1 General

This section covers the standard forms of hazard markers. The most commonly used forms and sizes are given. The hazard markers used for road works are not included in this chapter. They are separately provided in the Road Works Safety Manual.

7.2 Function

Hazard Markers are used to emphasize to the approaching driver a marked change in the direction of travel and the presence of an obstruction

7.3 Design

Hazard Markers are rectangular and generally consist of a series of alternate black and white bands. The white portion is always reflectorized. The bands may consist of either diagonal strips where only a target is required or of chevron where directional, as well as target, properties are desirable.

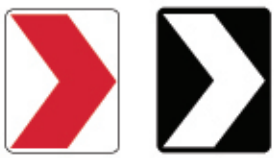
In recent years for single chevron one-directional markers, red chevron symbol on white reflectorized background is used in some countries and has also been adopted in the Philippines. This alternative is also included.

For the shapes illustrated, both size of board and the number and spacing of the bands or chevrons may be varied to suit visibility requirements.

7.4 Types of Markers

The types of markers and their overall sizes are shown in Table 7.1.

Table 7.1: Types of Hazard Markers

Name	Hazard Marker	Number	Typical Size
One-Way Hazard Markers		HM 1A HM 1B	450 X 600 600 X 800
		HM 2	1600 X 400

Name	Hazard Marker	Number	Typical Size
Two-Way Hazard Markers		HM 4A	2000 X 400
		HM 4B	1200 X 400
		HM 5	400 X 1000
Width Marker (L or R)		HM 6A HM 6B	225 X 450 450 X 900
Obstruction Marker		HM 3	1800 X 400

7.4.1 One-Way Hazard Markers (HM1)

One-Way hazard markers indicate to the approaching driver the direction to be followed if the marker appears in the driving path. They may point to the left or right as appropriate and are used as follows:

- to delineate an abrupt narrowing of pavement, for example, at a lane drop;
- at exposed ends of raised median islands where traffic is required to pass to one side;
- on central island of a roundabout facing entering traffic; and,
- to delineate the curve approach just prior to entering an intersection.

The HM1 chevron Hazard Marker shall generally be used to delineate curves where visibility is poor, or with restricted sight lines.

7.4.2 Chevron Signs

The Chevron Signs (HM -1A and HM - 1B should be used to guide drivers through a change in horizontal alignment of the road. Chevron signs should be used to supplement any of the advance warning signs, the Horizontal Alignment Signs (W – Types) or the standard Guide Posts and Delineators.

7.4.2a Design

The chevron sign shall be a vertical rectangle. No border shall be used on the chevron sign.

The point of the arrow in chevron shall indicate the direction of travel. They shall be visible for at least 150m to provide the road user with adequate time to react to the change in alignment. The minimum lateral offset of the chevron sign shall be 1.8m from the edge of the pavement.

The chevron signs shall be installed on the outside of the curve, set up aligned with the approaching traffic at right angle to a driver's line of sight. Two-sided chevron signs may be used on two-lane, two-way roads to guide driver's travelling in both directions.

It is recommended that the spacing of the chevrons signs should allow the driver to see at least three (3) signs in view while negotiating the curve , until the change in alignment eliminates the need for the signs.

Chevron signs shall be mounted clear of roadside vegetation and clearly visible under headlight illumination by night. Chevrons should be installed 1.5m above the ground in rural areas and 2.2m in urban areas. The recommended spacing for chevrons within a curve is shown below.

Table 7.2: Recommended Spacing for Chevron Signs

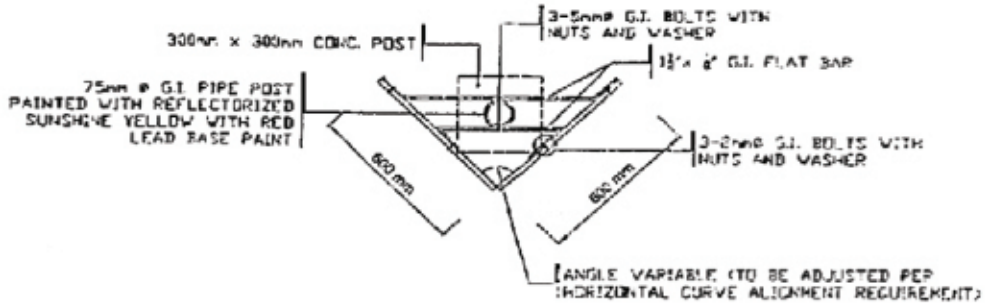
Advisory Speed Limit (kph)	Radius (m)	Chevron Spacing (m)
≤ 20	≤ 60	12
30-50	60-120	24
60-70	120-210	36
80-90	210-300	48
> 90	> 300	60

The above spacing distances shall apply to points within the curve. Approach and departure spacing distances shall be twice those shown above.

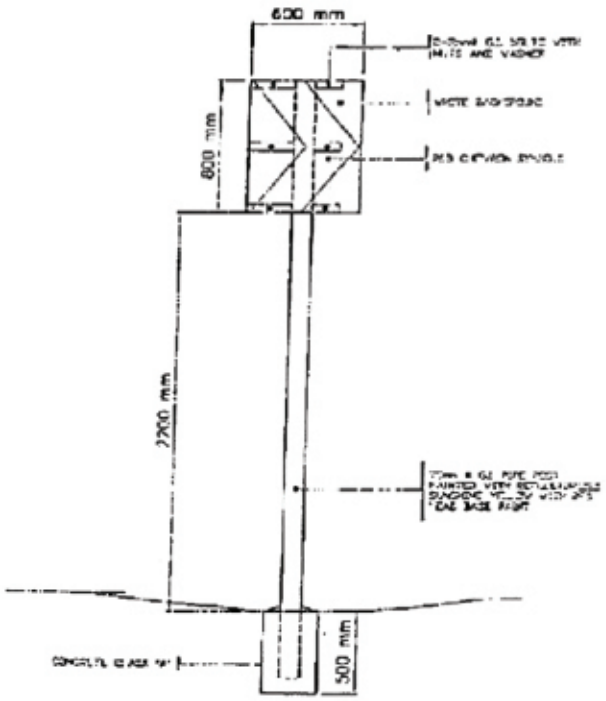
Table 7.3: Types of Chevron Signs

	Type		Typical Size		Application
a.	HM-1A	-	450mm x 600mm		≤ 60 kph design speed with no visible problem
b.	HM-1B	-	600mm x 800mm		> 60 kph design speed and/or with no visibility problem (e.g. fog)

Figure 7.4: Butterfly Support of Chevron Signs



PLAN



ELEVATION

FIGURE 1 . Detailed drawing for two (2) adjacent Chevron alignment on one (1) instead of two (2) G.I. pipe posts

Figure 7.5: Spacing of Chevron Signs

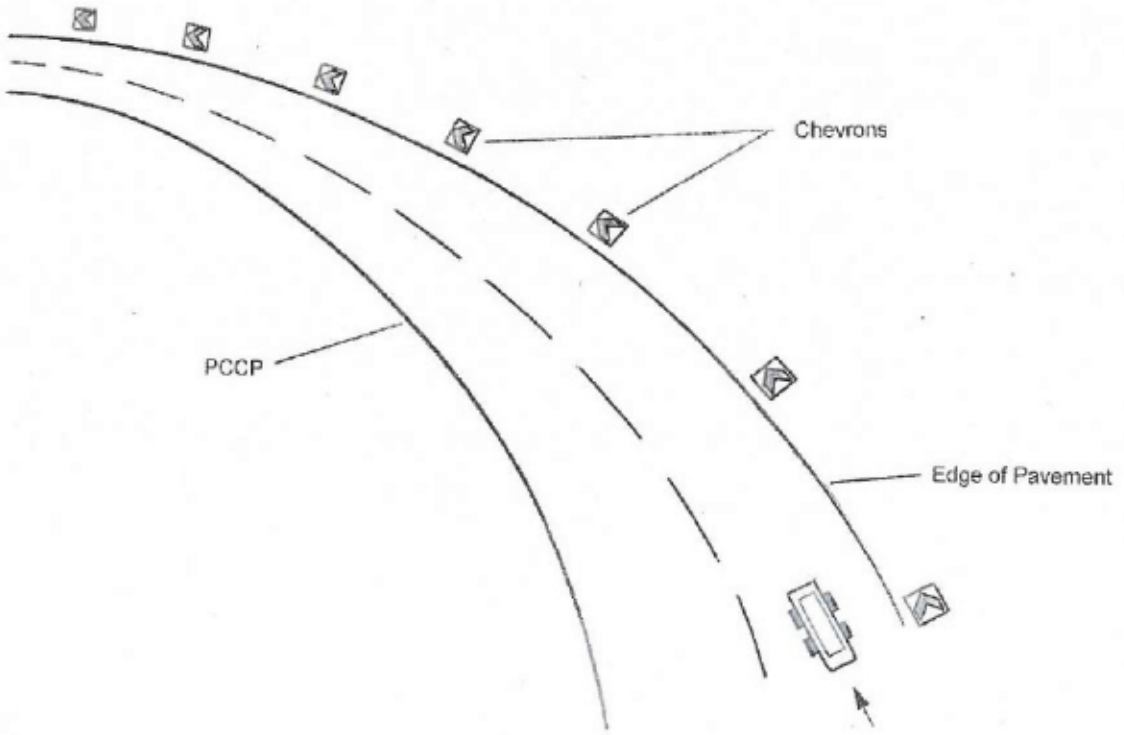


FIGURE 2 - Showing that the spacing of the Chevron Signs allow the driver to see at least three (3) signs in view while negotiating the curve until the change in alignment eliminates the need for the signs as contained in the 4th paragraph of Section 620.2.2, Design for Item 620 – Chevron Signs

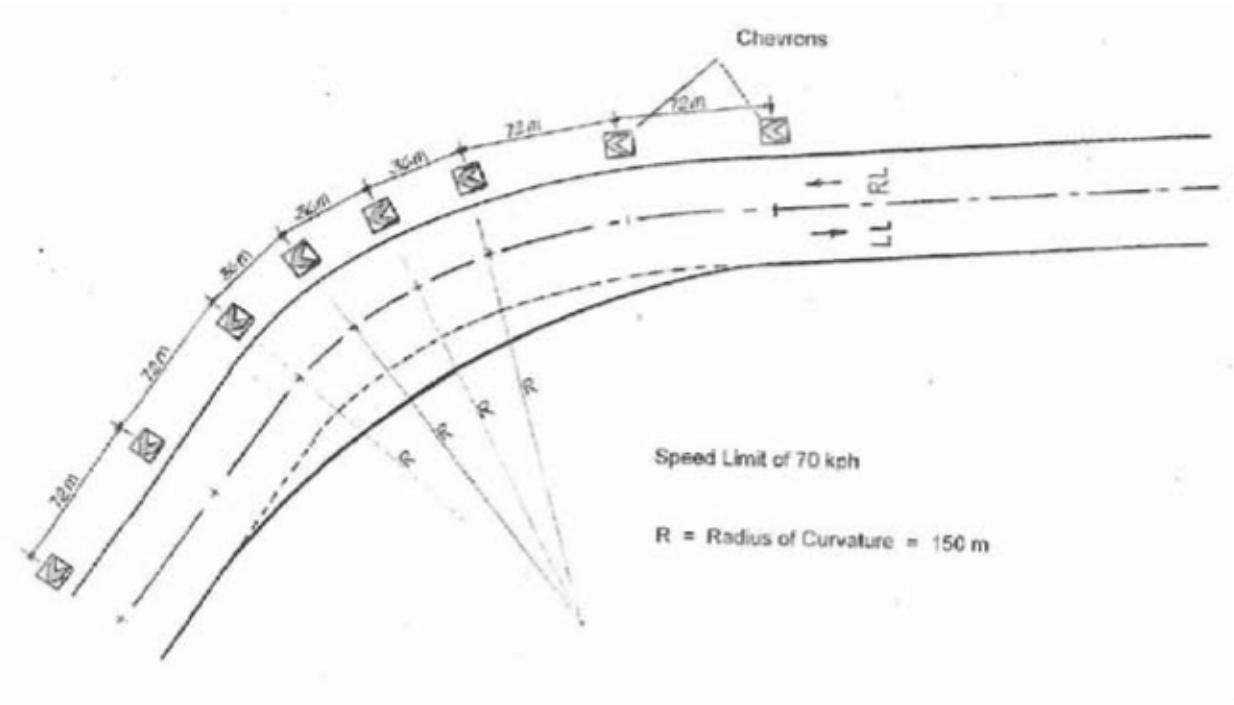


FIGURE 3 - The recommended spacing distances for the Chevron Signs within the curve and approach/ departure of the road as shown in Table 620.1 – Recommended spacing for Chevron Signs and as contained in the 6th paragraph of Section 620.2.2, Design for Item 620 – Chevron Signs

7.4.3 Two-way Hazard Markers (HM-4A, HM-4B, HM-5)

The Two-Way Hazard Markers are used where it is necessary to delineate an exposed obstruction on a traffic island nose at which traffic may pass to either side. This sign can be used on a wide column of an overpass structure, or a median island separating the carriageway with traffic proceeding in the same direction

The HM 4A Hazard Marker is also placed opposite the stem of a T-junction as a target, and for guidance of traffic approaching along the terminating road. They are generally used on rural road and at poorly lit intersections. The marker should be mounted on an appropriate height to ensure the maximum reflectivity of the sign and to avoid frequent cleaning due to dust and dirt splashed onto the sign.

7.4.4 Width Marker (HM6)

Width Markers are used at approaches to road bridges:

- where clearance to bridge curb from the edge of the running lane is less than the shoulder or curb width of the approach road;
- where there are non-frangible vertical obstructions less than 600mm clear behind the bridge curb; and,
- where any bridge less than 2m wider than the approach pavement or running portion of the carriageway.

The size of markers to be used is as follows:

- A size – rural area where average traffic volume is less than 300 vehicles per day; and,
- B size – all other cases.

7.4.5 Obstruction Markers (HM3)

The Obstruction Markers are used to delineate obstructions within or above the road.

Typical uses of these markers are:

- To highlight road closures, either mid-block or at the end of a road (e.g., cul-de-sac, service road).

To delineate vertical clearance above the road where height restrictions exist, i.e., overhead structures that require the display LOW CLEARANCE XXm (W9-1B) or R6-3.

8 GUIDE POSTS AND DELINEATORS

8.1 Guide Posts

8.1.1 General

Guide posts are used to mark the edge of the road formation. They assist the road users by indicating the alignment of the road ahead, especially at horizontal and vertical curves.

8.1.2 Design and Application

The minimum requirement for a standard guide post shall be a post 1000 +/- 50mm high, with a white area at least 100mm wide over at least the upper 300mm of the post displayed towards on-coming traffic, double sided on a two-way carriageway. If 1000mm high posts obstruct the visibility across the inside of a curve, the overall height may be reduced to 600mm minimum (see Figure 8.1).

8.1.3 Installation

Guide posts should be erected at or near the edge of the road formation with a uniform distance from the pavement edge. The nominal spacing of guideposts on a straight section of road shall be 150m, with posts in pairs, one on each side of the formation.

On curves, the spacing in meters to be used is given as follows:

- Curve radii up to 150m — Spacing = 0.3R + 5
- Curve radii over 150m — Spacing = 0.6R, Where R = curve radius in meters.

Nominal spacing of Guide Posts on straights and curves are shown in Table 8.1.

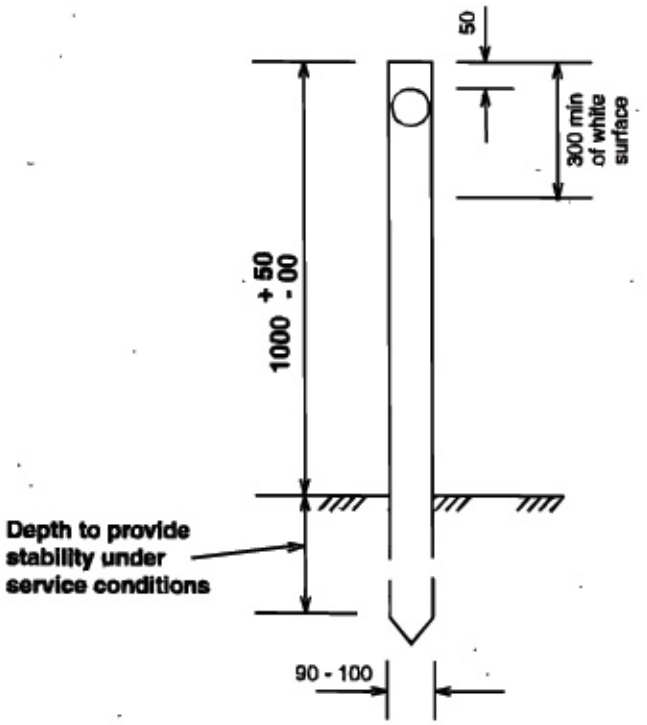


Figure 8.1: Typical Guide Post

Table 8.1: Spacing of Guide Posts

Curve Radius (m)[1]	Spacing (m)[2] Outside of Curve	Inside of Curve[3]
<100	6	12
100 – 199	10	20
200 – 299	15	30
300 – 399	20	40
400 – 499	30	60
600 – 799	40	60
800 – 1199	60	60
1200 – 2000	90 [4]	90 [4]
> 2000 including straights	150 [4]	150 [4]

Notes

(1) Where the radius of curve of an existing curve is not available from the record, it may be determined approximately by measuring the middle ordinate offset from a chord of known length using the edge of pavement or marked separation line as a guide
(2) On guard fence, spacing should be adjusted, if necessary, to the nearest multiple of post spacing.
(3) Post on inside of curve to be placed opposite to post on outside of curve where possible.
(4) Reduce to 60m in areas subject to fog.

8.2 Delineators

8.2.1 General

Delineators are small reflective panels or buttons mounted on guideposts or guard fence as an effective aid to delineate the roadway for driving at night.

8.2.2 Design and Application

Delineators are made of reflective materials capable of reflecting light clearly visible under normal atmospheric conditions from a distance of 300-500m when illuminated by the upper beam of a standard automobile head lamp.

When used on through roadways, delineators shall be single white reflective unit 100mm x 50mm placed on the right hand side of a two way and on both sides of a one-way road. Where delineators are used on the left at a hazardous right hand curve on a two – way road they may be bi-directional; i.e., delineators with a double face visible from both directions or two delineators with single face mounted back to back.

Delineators should be used at pavement width change, and changes in vertical and/or horizontal alignment.

8.2.3 Installation

Generally, delineators are placed on guideposts near the edge of the shoulder at a height such that the lower edge of the reflecting surface should not be less than 500mm above the pavement surface level. Delineators should be located at intervals not exceeding 30m with closer spacing on curves. Guidepost should be erected such that the reflective surface of the delineators would be approximately 300mm from the outer edge of the shoulder.

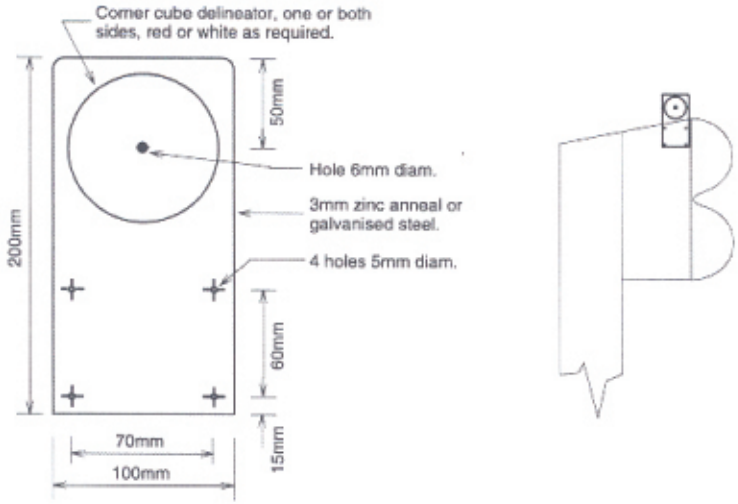


Figure 8.2: Placement of Delineator on Guard Fence

8.3 Linear Delineation System (LDS)

8.3.1 General

Linear Delineation System is intended for the linear reflectorization of concrete barriers and/or metal guardrails. The panels shall be available in white, red, fluorescent yellow and fluorescent orange colors. The panels are fabricated from Type II materials and are laminated onto a thin gauge of galvanized iron or aluminum and formed to a unique shape designed to provide highly effective, long–life daytime and nighttime visibility in typical roadway barrier configurations.

8.3.2 Design and Application

The panels shall be constructed using at least Type II retro-reflective materials in standard highway colors permanently bonded to Galvanized Iron or an Aluminum sheeting substrate, with a standard length of 86.36 cm (34 inches) 91.44 cm (36 inches) is the actual length of the panel prior to formation) and in 10.16 cm. (4 inches) or 15.24 cm. (6 inches) widths. The LDS panels will provide continuous linear delineation by installing the panels edge to edge with a recommended spacing of 46 cm. (18 inches) between panels, especially into and around a curve. For panels installed on barriers or guardrails running parallel with traffic, the spacing can be at a maximum of 91.44 cm. (36 inches) between panels.

8.3.3 Installation

Linear delineators are placed on concrete barriers, metal guardrails, parapet block type barriers, and concrete safety barriers on roadways and interchanges. It's either bolted or welded at a height such that the lower edge of the reflecting surface should not be less than 500mm above the pavement surface level. Linear delineators should be located at intervals not exceeding 46 cm.

FIGURE 8.3: **LDS Panel Detailed Drawing**

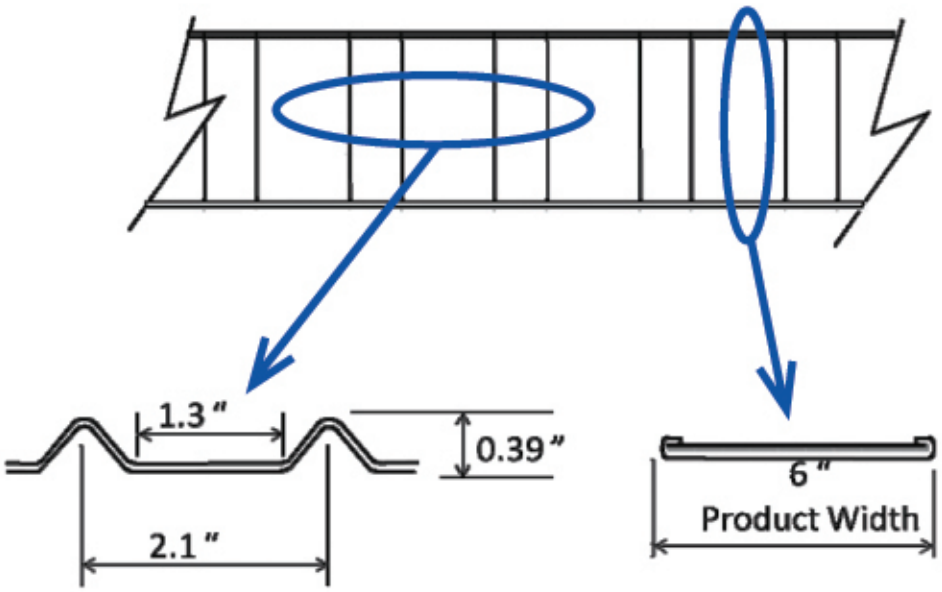


FIGURE 8.3A: **LDS PANEL**

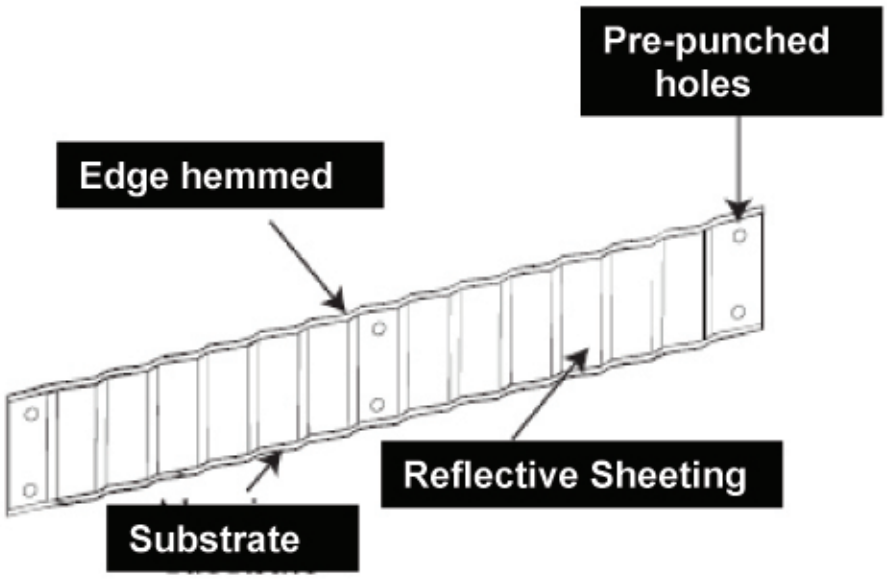


FIGURE 8.3B: **BOLT INSTALLATION**

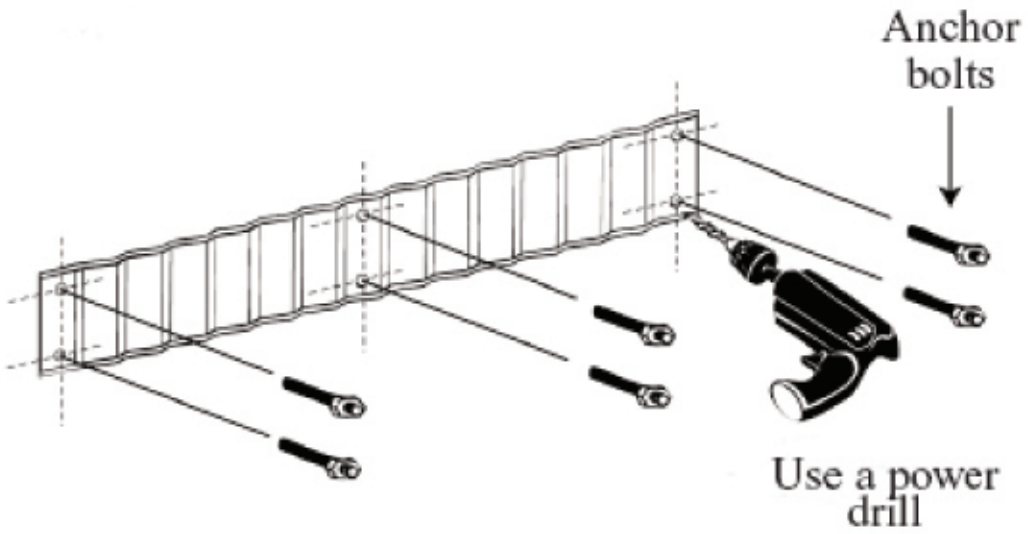


FIGURE 8.3C: **INSTALLATION – CONCRETE BARRIER**

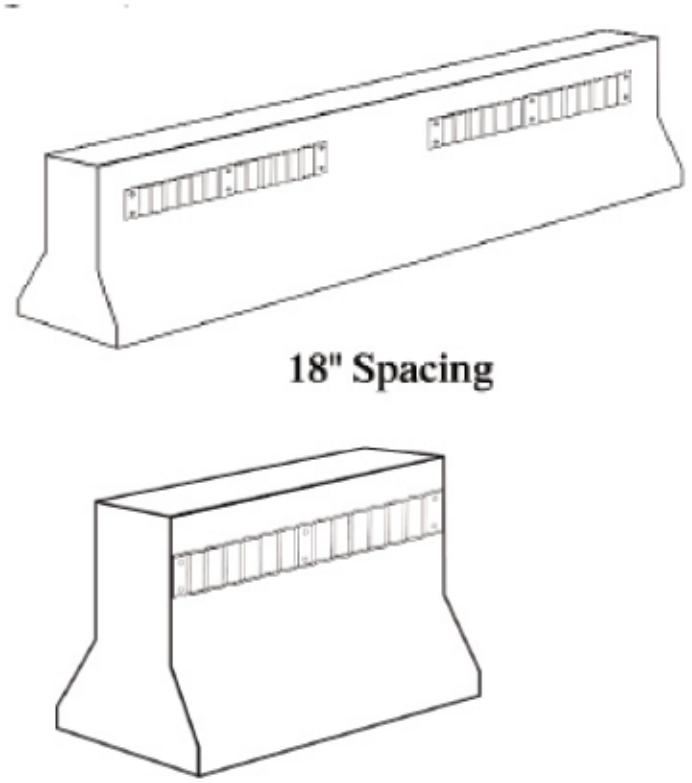
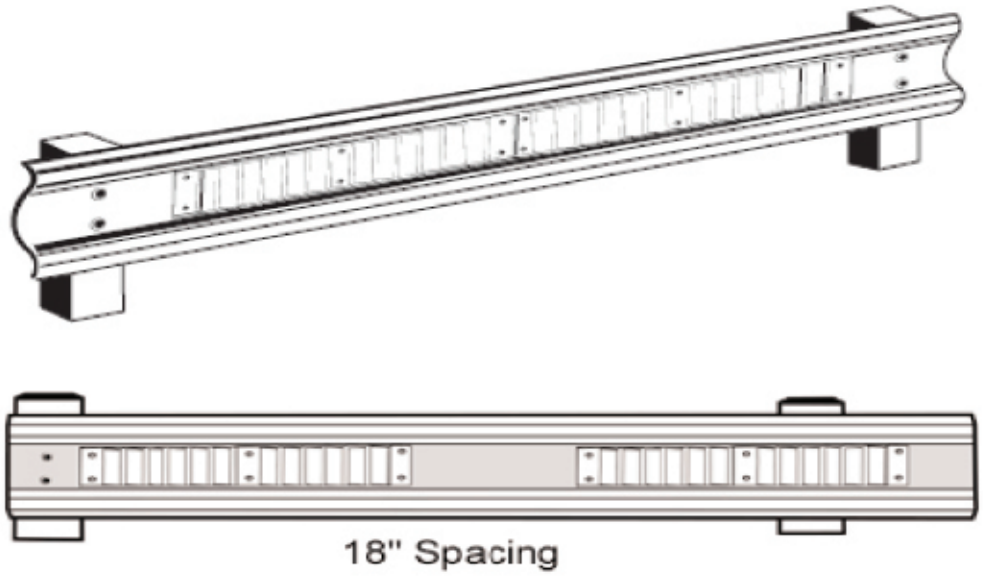


FIGURE 8.3D: **INSTALLATION – METAL GUARDRAILS**



PART B: PAVEMENT MARKINGS

9 INTRODUCTION AND GENERAL SPECIFICATION

9.1 Functions and Limitations of Pavement Markings

A system of clear and effective pavement markings is essential for the guidance and control of vehicles and pedestrians. They take the form of lines, symbols, messages, or numerals, and may be set into the surface of, applied upon, or attached to the pavement. In some cases, pavement markings are used as a supplement to other traffic control devices, such as traffic signals and road signs. In other instances, they may simply guide traffic or give advance warning or they may impose restrictions supported by traffic regulations. Pavement markings have definite limitations:

- They are subject to traffic wear and require proper maintenance;
- They may not be clearly visible if the road is wet or dusty (e.g., near shoulder edge or median);
- They may be obscured by traffic;
- Their effect on skid resistance requires careful choice of materials; and,
- They cannot be applied on unsealed roads.

Pavement markings may create confusion to road users if not properly applied. Unless new pavement markings will directly overlay worn-out ones, old pavement markings should be scraped off and totally erased, and road surface is resealed before new pavement markings are installed. Likewise, when raised pavement markers on concrete roads are used to supplement reflectorized painted markings, the painted markings should be completed before the raised pavement markers are laid. Where a road on which raised pavement markers have been installed is to be resealed, all markers shall be removed and holes repaired just prior to resealing.

9.2 Legal Authority

Pavement markings shall only be applied and/or removed by the DPWH or an authority to which these powers are delegated.

All pavement marking plans must be approved by the DPWH before installation/application.

9.3 Standardization

Pavement markings shall be uniform in design and application. As in the case with all other traffic control devices, it is imperative that markings be uniform so that they may be recognized and understood instantly by all drivers. The DPWH, on request, will furnish the Regional and District Offices, local traffic authorities, material suppliers/manufacturers and similarly interested agencies, detailed drawings of the standard designs and locations.

9.4 Types of Markings

Markings as defined for the purposes of this manual are classified into the following groups.

9.4.1 Pavement and curb markings

- **Longitudinal lines** which are those laid in the direction of travel. These include: Center Line; Lane Line; Double Yellow Line; 'No-Passing' Zone Markings; Pavement Edge Line; Continuity Lines; and, Transition Line;
- **Transverse Lines** which are laid across the direction of travel. These include Stop Line; Give Way Lines; Pedestrian Crossing Markings; and, Roundabout Holding Lines;
- **Other lines**, which include: Turn Lines; Parking Bays; Painted Median Islands; and, Bus & PUJ Lane Lines; and,
- **Other markings** which include: approach markings to islands and obstructions; Chevron marking; diagonal markings; Markings on Exit and Entrance Ramps; Curb markings for Parking restrictions; Approach to Railroad crossing; Messages and Symbols; and, Pavement Arrows.

9.4.2 Object Markings

- Object within the roadway; and,
- Object adjacent to the roadway.

9.4.3 Reflectorized Markings

- Retro-Reflector Raised Pavement Markers;
- Hazard markers (refer to Chapter 7); and,
- Delineators (refer to Chapter 8).

9.5 Materials

Road pavement markings should be of non-skid materials and should not protrude more than 6mm above the level of the carriageway. Raised pavement markers on concrete roads should not protrude more than 25mm above the level of the carriageway. The following subsections describe the commonly used materials for road markings.

9.5.1 Reflectorized Paint

Paint with glass beads, embedded or premixed can be applied either by hand or with line marking machines. For proper reflectorization at night, the amount of glass beads used should be no less than 0.45 kg and no more than 0.50kg per liter for drop-on and at least 30% for pre-mixed paints. Glass beads also improve skid resistance.

Application of glass beads may either be:

Drop-On

As the name implies, glass beads are 'dropped' onto pavement marking materials as they are being applied. The thickness of the wet paint film should be at least 60% of the nominal diameter of the drop-on glass beads, which, varies from 0.40mm to 1.0mm.

Pre-Mixed

Beads are mixed with the paint from the material source and the mixture is applied directly to the pavement.

9.5.2 Pavement Marking Tape

Pavement marking tapes are retro-reflective pattern pavement markings that can be used as an inlay or overlay marking on asphalt and concrete pavement surfaces which are in good condition, pre-coated with Pressure Sensitive Adhesive (PSA) on the bottom surfaces with retro-reflective layer of glass beads bonded in a high durable polyurethane topcoat.

9.5.3 Raised pavement markers

These are studs of plastic, ceramic, aluminum, or cast iron, which are set into the carriageway or attached to the road surface with adhesive. They must be reflective (see Section 17). It can also be hot-applied reflective profiled thermoplastic road marking materials.

9.6 Color of Pavement Markings

The color of pavement markings shall be white except for the alternative uses of yellow as specified below:

- Double yellow no-passing lines;

- Unbroken portion of no-passing lines;
- Curb markings for prohibition of parking;
- On islands in line of traffic;
- Bus and PUJ lanes; and,
- Keep Intersection Open markings.

Red shall be used in:

- No Loading/Unloading Zone; and,
- Fire lane zone.

Black may be used in hazard markers to warn road users at locations where the protruding objects such as bridge piers, traffic islands and other permanent objects on or near the roadway. However, the use of black does not establish it as standard color for pavement marking.

9.7 Types of Lines

Depending on the direction that lines are marked on the pavement, lines may be longitudinal, transverse or oblique. Depending on the use and meaning of such lines, they are either broken lines or solid lines.

A broken line shall consist of line segments with equal lengths separated by uniform gaps. The speed of vehicles on the section of road or in the area in question should be taken into account in determining the lengths of the line strokes and of gaps between them.

A solid unbroken line is used where crossing of the line is either discouraged or prohibited. It is generally used to replace or supplement a broken line where required e.g., barrier lines, and center lines. Solid lines may be either yellow or white depending whether or not crossing the line is legally prohibited.

9.8 Width of Lines and Tolerance

The width of solid or broken lines varies from 100mm to 300mm depending on the usage of the specified line. Transverse lines are usually wider because of the angle at which the road user sees pavement markings on the carriageway. Width of line markings shall conform to the following tolerances:

- Under 500mm in length +20% or –10%
- 500mm or over but under 5m in length +10%
- 5m in length or over +5%

10 DEFINITIONS

For purposes of this Manual, the following terms are defined in conformity with the 1968 Vienna Convention of the United Nations on Road Signs and Signals.

Road Markers – means any traffic control device marked on the surface of the carriageway used to regulate traffic or to warn or guide road users. They are used either alone or in conjunction with other signs or signals to emphasize or clarify their meaning. Median islands are not classified as road markers.

Road – means the entire surface of any street open to traffic, including shoulder and sidewalk.

Highway – shall mean any public thoroughfare, public boulevard, and avenue, but shall not include roadway upon grounds owned by private persons, colleges, universities, or other similar institutions.

Carriageway – means the part of the road normally used by vehicular traffic.

Lane – means one of the longitudinal strips from which the carriageway can be divided, whether or not defined by longitudinal road markings.

Intersection – means any level crossroad, junction, including open areas formed by such crossroad.

Built-Up Area – means an area with entries and exits especially sign posted as such or otherwise defined in domestic legislation.

Domestic Legislation – is the entire body of national or local laws and regulations in force in the country.

Motor Vehicle – shall mean any vehicle propelled by any power other than the muscular power using the public highways, except heavy construction equipments, trolley cars, street sweepers, sprinklers, lawn mowers, amphibian trucks, and tractors, trailers and traction engines of all kinds used exclusively for agricultural purposes.

Standing – a vehicle is said to be standing if it is stationary for the time needed to pick up or set down persons or to load or unload goods.

Parked – a vehicle is said to be parked if it is stationary for the period during which the vehicle is not limited to the time needed to pick up or set down persons or goods.

Driver – shall mean any and every licensed operator of a motor vehicle.

Road Users – shall mean any persons using the road including drivers, pedestrians, cyclists, and commuters.

Urban Roads – roads where speed limit is 60 kph or less.

Rural Roads **-** roads where speed limit is over 60 kph. Although there are high-speed roads in the urban area, for the purpose of line marking, they are defined as rural roads.

11 LONGITUDINAL LINES

11.1 Center Line (or Separation Line)

A center line is used to separate opposite traffic movements of an undivided roadway and is generally placed centrally on all roads and bridges 6.0m or more in width. Under some circumstances this line may be placed off-center (e.g., where an extra uphill traffic lane is provided or parking on one side of the road only).

11.1.1 Warrants for Marking Center Lines

A center line may be marked on an urban or rural road if one or more of the following conditions are met:

- Two lane road (greater than 6m in width) carrying an Annual Average Daily Traffic (ADT) in excess of 1000 vehicles;
- Two lane road (less than 6m but more than 5m in width) carrying an ADT in excess of 300 vehicles; and,
- Winding roads with widths of 5m or more. Irrespective of these warrants, marking of other sections may be desirable where one of the following conditions is present:

  - Frequent horizontal or vertical curves, or both;
  - Sub-standard curves;
  - In areas subject to fog;
  - On approaches to major roads;
  - Where accident record indicates the need for center lines;
  - Continuity of an arterial road; and,
  - Heavy night traffic or tourist traffic, or both.

11.1.2 Center Line on Urban Roads

The center line on a two-lane urban road, where the 85th percentile speed (or speed limit) is 60 kph or below, shall be a broken line with a minimum width of 150mm and equal line segments of 3m and equal gaps of 6m. For high speed roads, line segments and gaps are the same as for rural roads. However, a solid white line of 200 mm wide may be used in the following cases:

- On roads with more than two lanes if not separated by median islands;
- Around a curve where no warrant exists for yellow barrier lines; and,

- On approaches to an intersection or junction.

Examples of center lines on urban roads are shown in Figures 11.1a and 11.1b.

11.1.3 Center Line on Rural Roads

The center line on a two-lane two-way rural road or any other road where the 85th percentile speed (or speed limit) is greater than 60 kph, shall be a broken line, with a minimum width of 150mm and 3m long with gaps of 9m spacing. A solid white line of 200mm wide may be used in the cases as specified for Urban Roads (see section 11.1.2).

11.1.4 Center Lines at Bridges

Where approaches to bridges are lined marked, they shall be marked as follows:

- If bridge is 5m or more between curbs, center lines (or separation line) shall be continued across the bridge; and,
- If bridge is less than 5m between curbs, center lines shall be discontinued 30m from the bridge abutments (see Figure 11.2).

11.2 Lane Line

A lane line is used to separate adjacent lanes of traffic moving in the same direction.

Lane lines on roads with an 85th percentile speed (or speed limit) of 60 kph or less shall have a minimum width of 150mm and 3m long with 6m gaps.

Lane lines on roads with 85th percentile speed (or speed limit) in excess of 60 kph shall be 150mm wide, 3m long and 9m gaps.

Lane lines must not be continued on the following cases:

- Across signalized intersections. However, lane lines of low priority road must be discontinued at the intersection;
- Across side street entrances unless the street is one-way street (going in only); and,
- Past the start of the taper at which a multi-lane road narrows down.

Lane lines are generally broken lines except where lane changing is to be discouraged (but not prohibited) particularly on approaches to intersections.

Illustration of typical lane line installations is found in Figures 11.1a, 11.1b, 11.7 and 13.2.

As a guide, lane lines should be used in the following cases:

- Where the road is wide enough for two or more lanes of traffic in one direction with a two way annual average daily traffic (AADT) of 8000 or more (depending on whether parking is permitted);

- At approaches to widened or signalized intersection; and,
- On divided roads.

Where practical, the standard lane widths shall conform to the following table.

Table 11.1: Standard Lane Widths

Particulars	Lane Width (m)	
	Urban	Rural
Traveled Lanes	3.3	3.7
Traveled Lanes adjacent to curb	3.7	3.7
Parking Lanes	2.5	2.5

A lane width defined by lane lines may only be reduced to 2.75m in urban areas.

A minimum of 2.5m is only permissible in special cases where a maximum number of lanes must be made available such as at a signalized intersection where provision must be made for the most efficient storage of stopped vehicles. The center or innermost lanes of roads without median islands should have a minimum width of 3m in urban areas and 3.5m in rural areas.

11.3 Barrier Lines

Barrier lines may consist of either:

- two unbroken yellow lines;
- single unbroken yellow line; or,
- single yellow line with a broken white line.

Double unbroken yellow lines should only be used where overtaking from both directions of the road and all crossing movements are prohibited. Vehicles must always keep to the right of the double yellow lines.

Single unbroken yellow line should be used where overtaking from both directions of the road are prohibited. However, crossing movements are permitted. Vehicles must always keep to the right of the double yellow lines.

Combinations of an unbroken yellow line and a white separation line have the same regulatory significance as a double unbroken yellow line for vehicles proceeding in the direction where the unbroken yellow line appears on the right of the markings, but vehicles traveling in the other direction are permitted to cross this line (see Figure 11.3).

The following are the cases where barrier lines should be used:

- As center lines on approaches to signalized intersections;
- As center lines of multi-lane roads where overtaking must be prohibited, because of sight restrictions;
- 'No-Passing' zones where there is a restricted sight distance due to horizontal or vertical curves, or both; and,
- As center lines on approaches to railway crossings (see Figure 14.3).

The size of the double yellow lines shall be 150mm in width and shall have a gap space of 100mm -150mm (max).

11.3.1 No-Passing Zones

'No Passing' zones shall be established at vertical and horizontal curves and elsewhere on two and three-lane highways, where passing must be prohibited because of dangerously restricted sight distance or other hazardous conditions.

The legal bases for the establishment of no-passing zones are as follows:

- The DPWH is hereby authorized to determine those portions of any highway where overtaking and passing or driving to the left of the roadway would be especially hazardous and may, by appropriate signs or markings on the roadway, indicate the beginning and end of such zones, and these markings should be clearly visible to an ordinarily observant person. Every driver of a vehicle shall obey the directions thereof; and,
- Where signs or markings are in place to define a no-passing zone as set forth in Section 11.3.2 no driver shall at anytime drive on the left side of the roadway within such no-passing zones or on the left side of any pavement striping designed to mark such no-passing zones throughout its length.

Table 11.2: Guide for Marking 'No Passing' Zones

85th Percentile Speed	Min. sight distance (1.15m and 1.15m)	Min. length of road with sight distance below the min. sight distance	Min. length of barrier Lines	Min. distance between barrier lines (if less, join the lines)
(kph)	(m)	(m)	(m)	(m)
(1)	(2)	(3)	(4)	(5)
Roads with less than 1000 vehicles per day				
All Speeds	150	25	75	125
Roads with more than 1000 vehicles per day				
40	120	20	60	100
50	150	25	75	125
60	180	30	90	150
70	210	35	105	175
80	240	40	120	200
90	270	45	135	225
100	300	50	150	250
110	330	55	135	280
Over 110	360	60	180	300

Note: Refer to Figure 11.4.

11.3.2 Markings of 'No-Passing' Zones

The methods and procedures applied to marking of 'No-Passing' zones are as follows:

- Vertical and horizontal curves on a two-lane sealed road shall be marked as 'No-Passing' zones in accordance with Table 11.2;
- Barrier lines shall not be marked unless the sight distance available falls below the appropriate minimum sight distance for at least the length shown in the tables (column 3);
- If the length of road, with sight distance below the minimum sight distance, is less than the minimum length of barrier line shown in the tables, the additional length of the marking shall be added to the beginning of the zone (column 4); and,
- Where the distance between the end of one barrier line and the beginning of the next barrier line restricting traveling in the same direction is less than that shown in the tables, the barrier lines shall be joined to form one continuous barrier line (column 5).

11.3.3 Methods for establishing 'No-Passing' Zone

The beginning and the end of barrier lines for vertical and horizontal curves shall be located as illustrated in Figure 11.4.

Methods for establishing 'No-Passing' zones as illustrated are as follows:

Vertical Curves

- Start on upgrade side of curve proceeding in direction A as shown in the sketch;
- When B's target just drops out of A's sight, mark the position of A (start of barrier line in direction A) and the position of B (end of barrier line in direction B);
- When B's target again comes into A's sight, mark the position of A (end of barrier line in direction A) and the position of B (start of barrier line in direction B);
- When the minimum sight distance is different in each direction the barrier lines must be marked out separately in each direction; and,
- The curve is then spotted out in accordance with standard practice.

Horizontal Curves

- Start in advance of the curve on the pavement center line;
- When A's view of B is obstructed, mark the position of A (the start of the no passing zone for direction A) and the position of B (the end of no-passing zone for direction B); and,
- When A can again see B, mark the position A (end of no-passing zone for direction A) and the position of B (the start of no-passing zone for direction B).

Before any road on which 'no-passing' zones are marked is resealed or resurfaced, the beginning and end of each barrier line in each direction should be marked by wooden or steel stakes, painted white, at the left side of the road.

Climbing Lanes

A particular use of 'no-passing' lines is associated with the provision of slow moving vehicles or climbing lanes on one side of a two-lane pavement. The center line of the two-lane pavement should be marked as follows (see Figure 11.5):

- Double unbroken lines where visibility is restricted for downhill traffic; and,
- Where visibility is unrestricted for downhill traffic the double line should be continued with an unbroken line on the side of uphill traffic and a broken line on the side of downhill traffic.

11.4 Edge Line

The edge line is used to delineate the edge of the traveled way to distinguish it from the shoulder area. It should be a solid white line between 100mm and 200mm wide. Studs, or raised pavement markers may be used in conjunction with edge lines where there are paved shoulders.

The purpose of installing edge lines is generally based on the following:

- to discourage travel on road shoulders;
- to make driving safer and more assured, particularly at night and during inclement weather by providing a continuous guide for the driver;
- to act as a guide past objects which are close to the edge of pavement and which constitute a hazard; and,
- to prevent parking at or near intersections.

On undivided roads and on roads of more than one lane, edge lines may be used to supplement center or lane lines only on pavements 6.5m or more in width, unless for special reasons such as poor alignment, fog or similar conditions. For pavements less than 6.5m, edge lines should be used under special conditions without lane or centerlines. On divided roads, edge lines should be used at left-hand edge of each pavement if the median is not curbed. They may also be used to delineate raised concrete curbs at median or to define sealed or unsealed shoulders.

Table 11.3: Recommended Width of Edge lines

Road Type	Outer Lane Width	Edge Line Width
Urban	3.5m	100mm
Rural	3.5m >3.5m	100mm 150-200mm
Expressway	4.0m	300mm

11.4.1 Pavement Edge

An edge line should not reduce an adjacent lane width to less than 3.5m.

Widths of edge line vary from 100mm to 300mm depending on the available lane width and the prevailing speeds of the vehicles on the road. In general the line widths applied should conform to Table 11.3.

11.4.2 Medians

Edge lines at raised medians are 100mm wide and placed with the center of the line not more than 300mm from edge of the median curbing. The line should not reduce the adjacent lane width to less than 2.75m in urban areas and 3.5m in rural highways and expressways.

11.4.3 No Parking Zones

The road curb for No Parking Zones shall be painted yellow (See Figure 11.6). The limit of the No Parking Zone depends upon the implementing Local Government Units. Further, No Parking Zones shall mean parking prohibition at all times. If parking is to be permitted at times (e.g., outside peak hours), then curb painting shall be supplemented with standard signs.

11.4.4 No Loading / Unloading Zones

Road curb for No Loading / Unloading Zones shall be painted red.

11.5 Continuity Line

A Continuity Line is used to indicate that portion of a carriageway assigned to through traffic. It is intended to be crossed by traffic turning at an intersection, or entering or leaving an auxiliary lane at its start or finish (see Figures 11.5, 11.7 and 13.2).

This line is generally 1m long, 100mm-200mm wide, with gaps of 1m.

11.6 Transition Lines

Transition Lines are used to guide traffic safely past obstructions on roadways such as islands, median strips, bridge piers or indicate changes in the width of the traveled portion of the roadway and an increase or reduction in traffic lanes.

Lane, edge, separation or continuity lines may be used as transition lines which ever is appropriate (see Figure 11.7). Minimum transition lengths shall be in accordance with the prevailing speed of the road, as shown in the following table.

Table 11.4: Length of Transition Lines

Speed (kph)	Minimum Length per Meter of Lateral Deviation	
	Diverging (m)	Merging (m)
up to 60	9	27
80	12	36
100	15	45
110	17	50

12 TRANSVERSE LINES

Transverse lines are markings across the carriageway. Because of the low angles at which the markings are viewed, it is necessary that all transverse lines be proportionally widened to give visibility equal to that of longitudinal markings or to avoid apparent distortion where longitudinal and transverse lines are combined in symbols or letterings.

Transverse lines may be classified into the following types:

- Stop Lines;
- Give Way lines;
- Pedestrian Crossing Markings; and,
- Roundabout Holding Lines.

12.1 Stop Line

12.1.1 General

Stop lines should be placed across the appropriate portion of the roadway at positions where vehicles are required to stop in compliance with a stop sign, traffic signals, or any other legal requirement. A Stop Line is a solid white line not less than 300mm or more than 450mm wide on urban roads and up to 600mm on rural roads.

12.1.2 Placement of lines

The positions of the stop lines are in accordance with the following situations:

Signalized intersections

Line should be placed 1.5m (center to center of line) in front of and parallel to the nearest pedestrian lane. Where there is no pedestrian crossing lane, the stop line should be at the desired stopping point, no more than 6m or less than 1.5m from the prolongation of the curb line of the intersecting road (see Figure 12.1a).

Isolated "Stop" Signs

If a stop line is used in conjunction with the stop sign (P-1), it should generally be placed in line with the Stop sign. At an intersection or junction, such lines shall usually be placed in line with the edge of the sidewalk or shoulder. The exact location of the Stop sign shall depend on the sight distance requirement of the stopping vehicle (see Figure 12.1b).

Pedestrian actuated signals (mid-block)

The stop line should be placed 3m before the nearest pedestrian crossing line (see Figure 12.1c).

Railway Crossing

See Section 14.6 and Figure 12.1d.

Stop lines may be supplemented by the word "Stop" marked on the carriageway as shown in Figure 12.1b. The distance between the word STOP and the stop line should be between 10 to 25m.

12.2 Give Way Line

Give Way or holding lines are markings consisting of a two adjacent broken white lines across the carriageway at which drivers must give way to all traffic in accordance with the standard sign R1-2 of the Philippine's Road Signs and Pavement Markings Manual (Section A: Road Signs).

The minimum width for holding lines should be 200mm and the maximum 600mm. The distance between the two lines should be at least 300mm. The gaps between line segments shall be 600mm.

The give way lines may be supplemented by the give way symbol. The distance between the base of the give way triangle and the nearest give way line should be between 5-25m depending on the location.

This type of marking is illustrated in Figure 12.2.

12.3 Pedestrian Crossing Markings

Two types of pedestrian crossings are zebra and crosswalk.

12.3.1 Zebra (non-signalized crossing)

The marking consists of a series of longitudinal bars 300mm or 600mm wide and generally not less than 4m long. The bars are placed parallel to the road center line with gaps of equal width to the bar (see Figure 12.3).

12.3.2 Crosswalks (signalized crossing)

Crosswalks are defined by a pair of solid white lines across the road surface not less than 4m and not more than 8m apart, 150-300mm in width. They should be used in conjunction with mid-block or intersection signals (see Figure 12.1c).

12.4 Roundabout Holding Lines

Holding lines at roundabouts shall consist of broken reflectorized white line, 400mm wide and 600mm long with 600mm gaps. The holding lines are painted in accordance with the general principles applied to other intersection types. The leading edge of the holding line forms a prolongation of the curb and the painted outline of the traffic island on the approach.

No line is marked across the exit from the roundabout. However, exit linemarking is installed on multilane roundabouts. It is also essential that pavement arrows be provided on all multilane approaches to roundabouts to promote lane discipline for drivers (see Figure 12.4).

13 OTHER LINES

13.1 Turn Lines

A turn line may be used to guide vehicles through a turning movement at intersections. Turn lines, if used, should be so designed as to indicate the proper course for turning vehicles without being needlessly confusing to through traffic or the traffic making other turns. The line segments are 600mm long and 150mm wide with 600mm gaps. The line generally forms an arc and is positioned on the left hand edge of the turning lane. The line commences at the termination of the lane, edge or separation line, and shall continue up to but not across another turn line (see Figures 13.1 and 13.2).

13.2 Parking Bay Lines

There are two types of parking bays, parallel parking and angle parking. In parallel parking without bays marked, the parking line is a 100mm wide white line, 2.5m from and parallel to the curb. Bays, if marked, shall be also 100mm wide white line at minimum bay length of 5.2m. The end bay shall be 5m minimum. For the angle parking, bay width shall be 2.5m minimum and

the minimum bay length (i.e., minimum distance from curb to end of bay) shall be 4.8m (see Figures 13.3a and 13.3b).

To ensure that the flow of turning traffic is not impaired, parking near intersections should be prohibited within the following distances from the boundaries of lateral roads:

- Parallel Parking – 5m on both approach and exit sides
- Angle Parking – 12m on approach side and 9m on exit side.

On approach to intersections where traffic signals are operating, a minimum distance of 20m from the traffic signal post is recommended.

Angle parking should be permitted only where there is sufficient pavement width and light traffic.

A parking bay should always be allocated for the disabled at the most convenient area painted with the disabled sign. Disabled sign shall be white 800mm high and 690mm wide on a blue background.

Figures 13.3a and 13.3b illustrate markings on parking bay and curb parking, respectively. Figure 13.3c shows the details for 'people with disability' symbol.

13.3 Painted Median

Painted median islands are used on wide roads where light traffic volume cannot justify the installation of solid curbed median island.

The painted outline of the median shall be at least 100mm wide with a minimum median width of 2m. No painted median should be installed on roads less than 10m wide.

13.4 Bus and PUJ Lane Line

The Bus and PUJ lane line is an unbroken yellow line 150-300mm wide used to separate other vehicles from buses and PUJ's. The Bus and PUJ lane line can be supplemented by raised pavement markers on concrete pavements. The line is tapered at the approach to the signalized intersection. The distance between the taper and the stop line should be determined according to the capacity of the intersection and should generally be less than 100m (see Figure 13.4).

13.5 Loading and Unloading Bay Lane Line

The Loading and Unloading Bay Lane Line is an unbroken white line 150mm wide with a gap of 1000mm used to indicate the proper location of loading and unloading zone of public utility vehicles preferably with parking restriction. The Loading and Unloading lane line can be supplemented by road signs (see Figure 13.5).

13.6 'Do Not Block Intersection' Lines

The 'Do Not Block Intersection' lines consist of yellow box within the intersection and yellow diagonals lines forming an 'X' inside the box (see Figure 13.6). The lines are 200mm wide. These lines shall be complemented with DO NOT BLOCK INTERSECTION sign (R5-10). (see section 2.10.8)

14 OTHER MARKINGS

14.1 Approach Markings to Islands and Obstructions

Diagonal marking on approaches to obstructions and median islands shall consist of a splayed line or lines 100mm wide extending from the center of lane line to a point of 300mm to 800mm to the right side or to both sides, of the approach end of the obstruction.

The width of the diagonal bars (at 45° to splayed lines or the direction of travel) is 500mm and gaps between bars should generally be 4m minimum on urban roads and 8m on rural roads. The total length of the splayed line depends on the width of the island or obstruction but should generally be a taper of 1 in 25 for roads on which the 85th percentile speed is below 60 kph and 1 to 50 for roads with higher 85th percentile speeds (see Figure 14.1).

14.2 Chevron Markings

Chevron markings are often used to guide traffic into the right turning lanes separated by an island, such as a corner island at a signalized intersection.

The outline width is generally 100mm (150mm on high speed roads). Bars of 500mm to the outline in the direction of travel and spaced generally at 2-4m apart in urban roads. The spacing between the bar and the outline shall be 100mm (or 150mm on high speed roads) (see Figure 14.1).

14.3 Diagonal Markings

Diagonal Markings are placed on sealed shoulders or other sealed portion of the road where traffic is not desired. Such markings are of the same bar width as other diagonal markings. The spacing between bars is generally 6m.

14.4 Rumble Strips

Is a type of thermoplastic lane marking designed to aid and provide motorist with visual, audio and motion warnings on the road. Rumble Strips are highly visible horizontal lines on the road that produce a humming sound and ample bumpy ride to the motorists when ran over. It promotes better traffic safety because it stimulates more the human senses while driving.

14.5 Marking on Exit and Entrance Ramps of Expressways

14.5.1 Exit ramp marking

A solid line at least 100mm in width shall be placed along the sides of the triangular neutral area between the edges of the main roadway and the exit ramp lane at the gore of every ramp terminal. With a parallel deceleration lane, a broken white line shall be placed from the apex of the triangular area for a distance of approximately one-half of the length of the full width deceleration lane. Diagonal markings should be used in the neutral area.

14.5.2 Entrance ramp marking

A solid white line at least 100mm in width shall be placed along the side of the triangular neutral area adjacent to the ramp lane at the gore of every entrance ramp terminal. With parallel acceleration lanes, a broken white line but not beyond the point where the tapered line meets the outer edge of the near through lane. Examples of the uses of exit and entrance ramp markings are shown in Figure 14.2.

14.6 Curb Markings for Parking and Loading/Unloading Restrictions

The curb markings for parking restrictions shall be of solid yellow color, covering the face of the curb. Such markings are usually supplemented by parking prohibition signs to indicate the extent of the area where parking is legally prohibited at all times.

On the other hand, curb markings for loading/unloading restrictions shall be of solid red color applied in the same manner as with parking restrictions.

14.7 Approach to Railroad Crossing

Pavement markings consisting of a cross, the letters RR, a “No-Passing” zone marking, and a double solid stop bar at a distance of 3 to 12m in front of and parallel to the railway line, shall be placed on all paved approaches to level or at-grade railroad crossings. Such markings shall be white except the NO PASSING barrier line which shall be yellow.

Where there are boom gates at the signal controlled crossings, stop bars are to be marked parallel to the boom gates. These markings are auxiliary to the standard international sign W7-1 for railroad advance warning and the crossing signals for gates.

The design of railroad pavement markings is illustrated in Figure 14.3.

15 MESSAGES AND SYMBOLS

15.1 Messages

Messages when painted on pavement should be limited to three words or less. They shall only be used to supplement other traffic control devices. The distance between words is variable depending on the message and location at which it is based (usually twice the length of the word if achievable).

The first word of the message is to be nearest the motorist on rural roads. In urban low speed areas, the order is optional.

Messages are white in color. Letters or numerals used on roads in urban areas shall be at least 2.5m. On high speed highways, they must be at least 5m (see Figure 15.1 and 15.2).

Some of the only permitted messages markings are:

STOP

KEEP CLEAR

SCHOOL

PED XING

RAILROAD X'ING

SIGNAL AHEAD

NO RIGHT (LEFT) TURN

BUS & PUJ LANE

15.2 Symbols

15.2.1 Give Way Symbol

The symbol used to supplement the give way sign consists of an isosceles triangle having two equal sides of 3.1m and a base 1m. Outline width is 450 mm at the base and 150mm for the sides. The distance of the symbol from the holding line is between 5 and 25m depending on the location and vehicle speeds on that road (see Figures 12.2 and 15.2).

15.2.2 Pavement Arrows

Pavement arrows are used for lane use control. White in color, they are generally 5m in length on urban roads and 7.5m on high-speed roads. The sizes and arrow heads are illustrated in Figure 15.3.

For half turn movements, the stems of the straight arrows can be bent to suit the particular direction of movement.

The first set of arrows should be placed at a distance of 15m from the stop bar and the subsequent sets should be placed at 30m apart.

15.2.3 Numerals

The only numerals that should be used are those associated with speed limits at locations to supplement speed limit signs which are continuously disregarded by drivers or which are obscured and cannot be read easily.

16 OBJECT MARKING

16.1 Application of object markings

Physical obstruction in or near a roadway that constitute serious hazard to traffic, including installations designed for the control of traffic shall be adequately marked. Typical obstructions of this character are:

- Bridge supports;
- Monuments;
- Traffic islands;
- Beacon, signal and sign support;
- Loading islands;
- Railroads and draw-bridge gate;
- Posts of narrow bridges;
- Underpass piers and abutments;
- Culvert headwalls; and,
- Poles, trees, rocks, and structures giving restrictions to overhead clearance.

Judgment must be exercised in the marking of objects off the roadway. However, it may be noted that even where they are theoretically at a safe distance from the roadway, marking them may prevent serious accident and facilitate night driving. In addition to markings, a guardrail should be placed in advance of solid obstructions to deflect runaway vehicles and reduce the severity of impact. Guardrails should be painted reflectorized white.

16.2 Objects within the roadway

Obstructions in the roadway, if not illuminated shall be marked with reflectorized hazard markers.

For additional emphasis it is advisable also to mark obstructions other than islands with reflectorized white paint with no less than five alternating

reflectorized black and white stripes. The stripes shall slope downward at an angle of 45 degrees towards the side of the obstruction on which traffic shall be uniform and no less than 100mm in width. A large surface, such as a bridge pier, may require stripes of 300mm.

In addition to the marking on the face of an obstruction in the roadway, warning of approach to the hazard shall be given by line markings on the pavement.

Where an obstruction lies in the direct lines of traffic, it shall be marked. Whenever practical, it shall be illuminated by a floodlight and so constructed that it will adequately light the object but will not cause a glare in the face of traffic approaching from either direction. When floodlighting is not practical, reflective hazard markers shall be used. A flashing yellow beacon may be used at unusually hazardous obstructions.

16.3 Marking on Curbs

Reflectorized yellow shall be used on curbs of all islands located in the line of traffic flows especially on curbs directly ahead of traffic at "T" and offset intersections.

16.4 Objects Adjacent to the Roadway

Hazard markers either as signs or painted markings are to be used on objects so close to the edge of the roadway as to constitute definite hazard. These include such encroachments as underpass piers, abutments, culverts headwalls, utility poles and ornamental buildings.

Other adjacent objects which are not likely to be hit unless a vehicle runs off the road, such as guardrails, trees and rocks must be painted reflectorized white.

17 RAISED PAVEMENT MARKERS

17.1 General

Raised pavement markers are small devices which are fixed to the concrete pavement surface to stimulate or supplement painted pavement markings. Use or installation of raised pavement markers (or studs) on asphalt-paved roads is subject to the conditions stated in the DPWH Department Order No.36 dated August 12, 2009 (supersedes Department Order No.57, Series of 2000). Raised pavement markers may be reflectorized or non-reflectorized, depending on their use and positions when installed.

Raised pavement markers are generally not obscured at night under wet conditions and the reflective types are more brilliant than reflectorized paint markings.

17.2 Warrants for Use

Because of the high cost of installation and maintenance, use of raised pavement markers may be considered only in the following condition:

- In hilly areas where fog and rain are frequently the causes of traffic accidents; and,
- In winding roads and accident prone areas.

17.3 Substitution of lane lines

The substitution of painted lines by raised pavement markers should only occur where necessary and is usually reserved for lane line where the visual, auditory and tactile effects of the markers help to keep the motorists to stay in a given lane. The marker used for this purpose may be a combination of reflective and non-reflective markers (see Figure 17.1).

17.4 Supplementing painted lines

Reflective markers placed at regular intervals in gaps along a line may help to define the line particularly at night or under foggy or wet conditions.

The lines usually treated in this manner are:

- Center lines; and,
- Edge lines.

17.5 Placement of markers

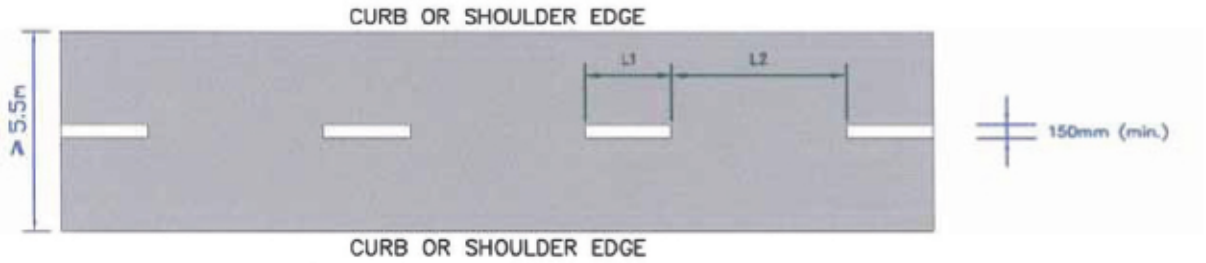
Markers supplementing center or lane lines may be placed in the gaps mid-way between the line segments at a spacing of 9m where fog or heavy rain occurs in the built-up areas. A spacing of 12m shall be used where there is less likelihood of fog and where there is no street lighting in the rural environment. Markers used to replace lane lines shall be placed in groups as shown in Figure 17.1.

Double faced raised pavement markers are placed on undivided roadway while single faced raised pavement markers are placed on divided roadways. **Yellow raised pavement markers are used for yellow pavement markings and white markers for white pavement markings**.

Specifications for different raised pavement markers are shown in Figures 17.2 a through c.

FIGURES: PAVEMENT MARKINGS

CENTER (SEPARATION) LINES

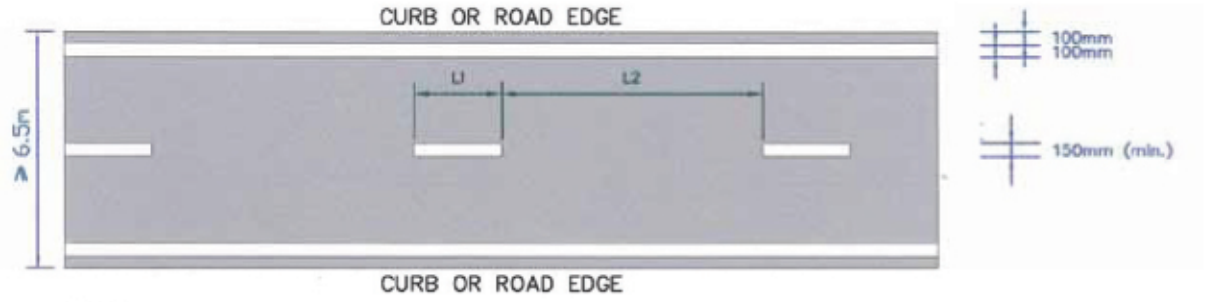


Center line is used to separate traffic movements of a roadway and is generally on all roads and bridges 6.0m or more in width. under some circumstances, this line may be placed off center

WARRANTS:

- Two lane road (greater than 6.0m in width) ADT in excess of 1000 vehicles
- Two lane road (less than 6.0m but more than 5.0m) ADT 300
- Winding road (more than 5.0m in width)

SEPARATION AND EDGE LINES



NOTE:

For 85%ile speed ≤ 60kph L1 = 3.0m L2 = 6.0m
For 85%ile speed > 60kph L1 = 3.0m L2 = 9.0m
Barrier lines may be used as center lines only when no-passing is warranted

Irrespective of this warrant marking and other section may be desirable where the ff. conditions apply:

- Frequent horizontal and vertical curve
- On approaches to major roads
- Where accident records indicates the needs
- Heavy night or tourist traffic
- Areas subject to fog
- Continuity to arterial road

Figure 11.1a: Center and Edge Lines Markings for a Typical 2-Lane Road

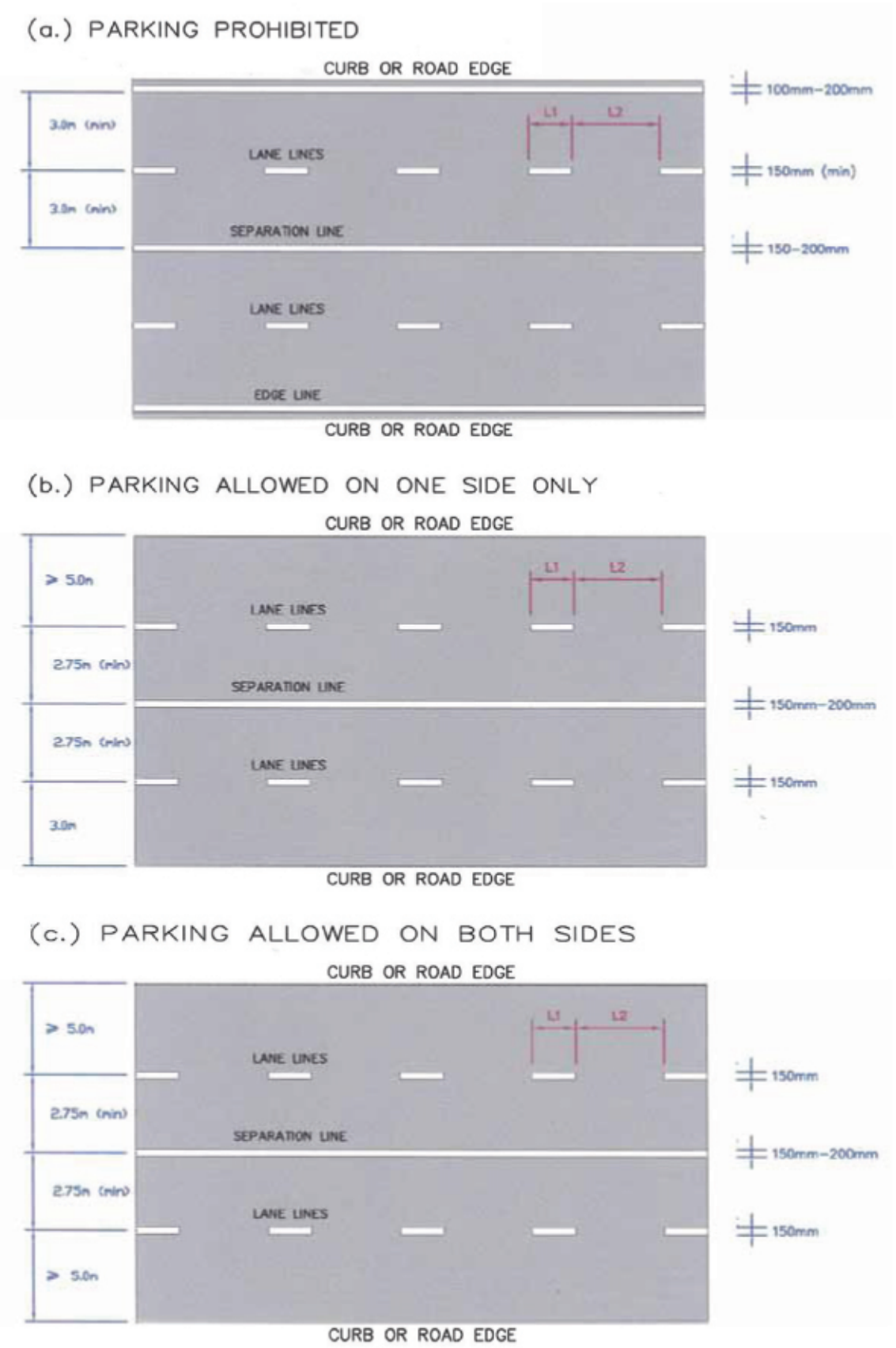


Figure 11.1b: Center Line and Lane Marking for a Typical Multi-Lane Road Without Medians

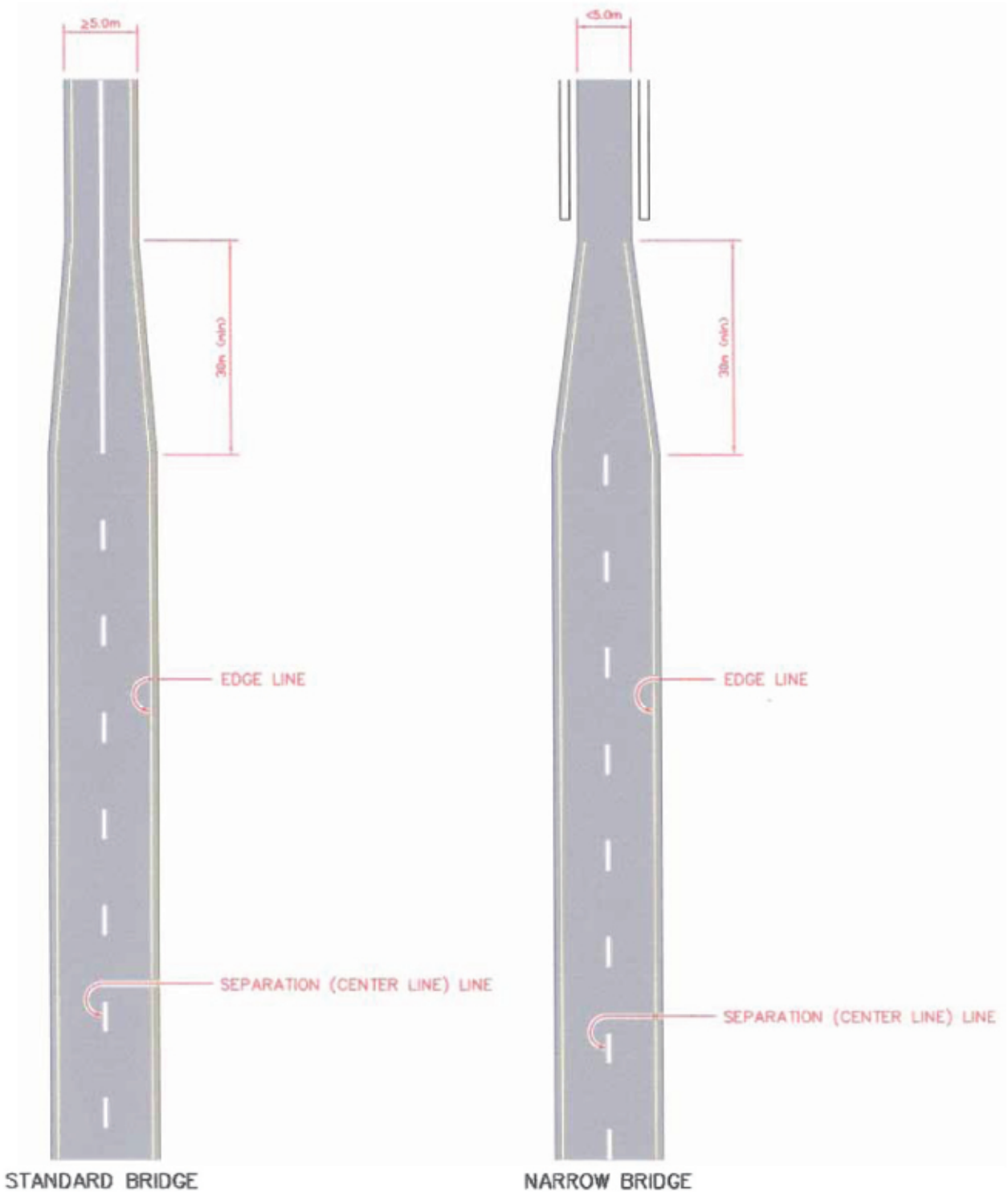
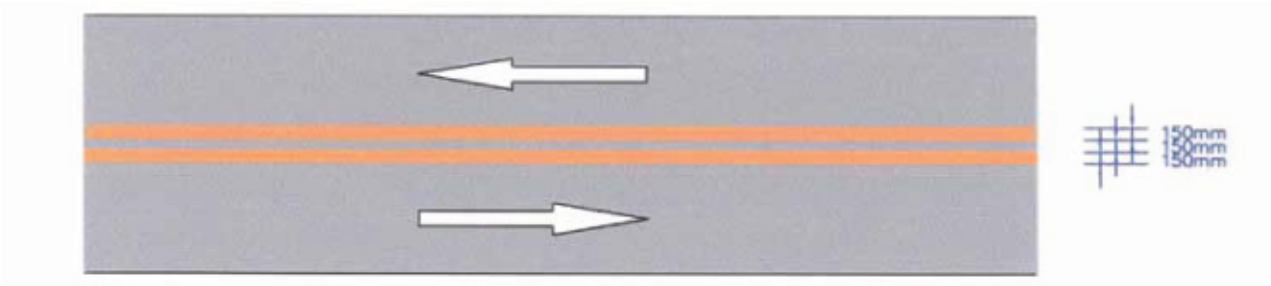
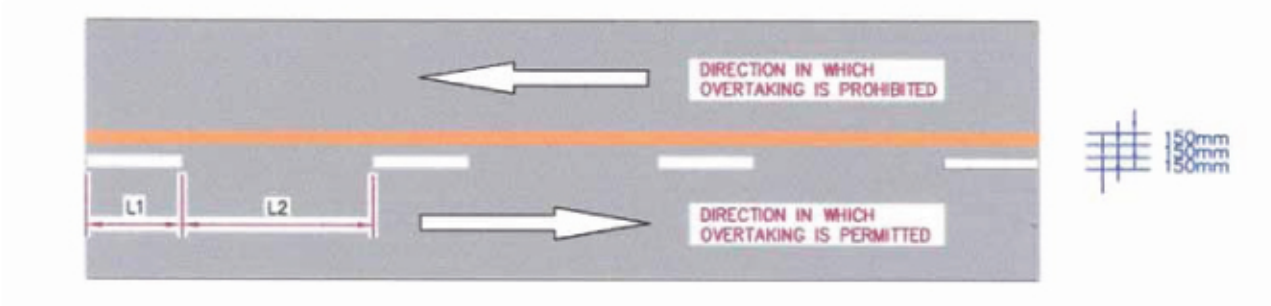


Figure 11.2: Typical Pavement Markings for Approach to Bridges

(a) Overtaking prohibited in both direction and all crossing movements are prohibited. Vehicles must keep at right of the double yellow lines



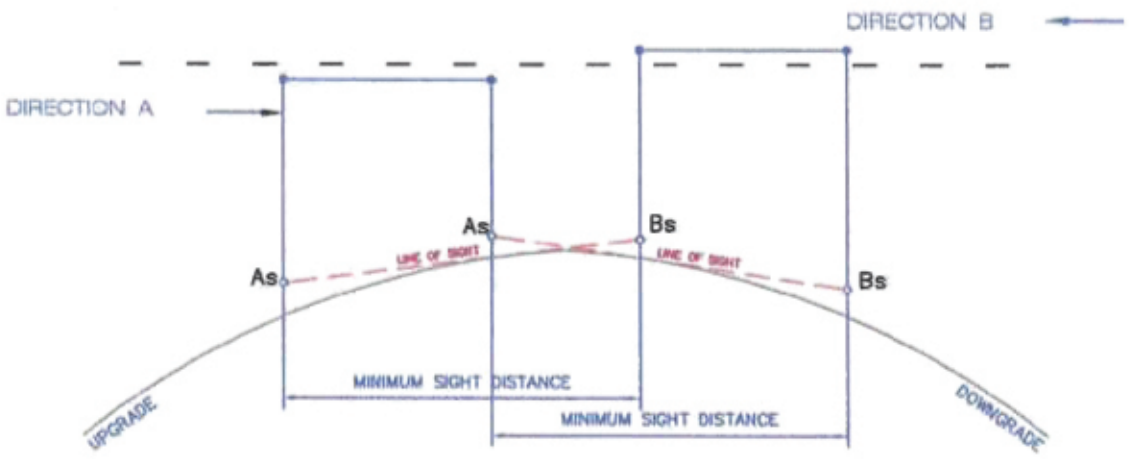
(b) Overtaking permitted in one direction only



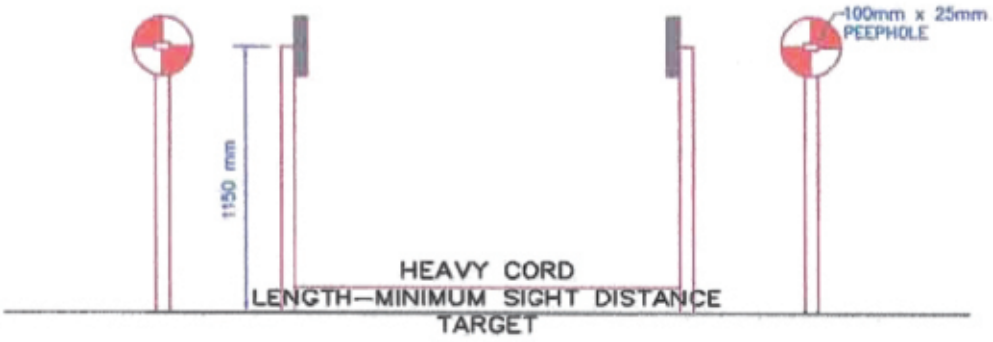
NOTE:

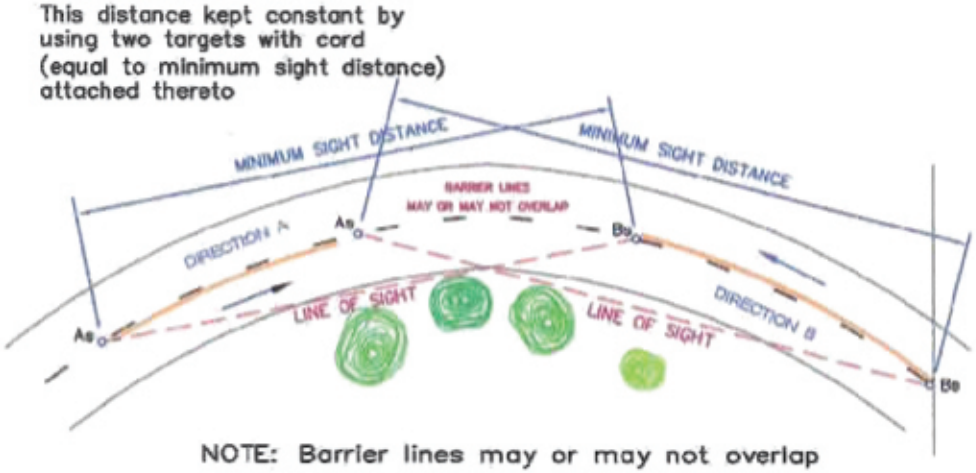
For 85%ile Speed ≤ 60Kph L1 = 3.0m L2 = 6.0m
For 85%ile Speed > 60Kph L1 = 3.0m L2 = 9.0m

Figure 11.3: Barrier (No Passing) Lines



(A) PROFILE – VERTICAL CURVE





NOTE: Barrier lines may or may not overlap

(B) HORIZONTAL CURVE

NO PASSING ZONE shall be established at vertical and horizontal curves and elsewhere on two or three lane–highways where passing must be prohibited because of dangerously restricted sight distance and other hazardous conditions.

Figure 11.4: Method of Establishing 'No Passing' Zones

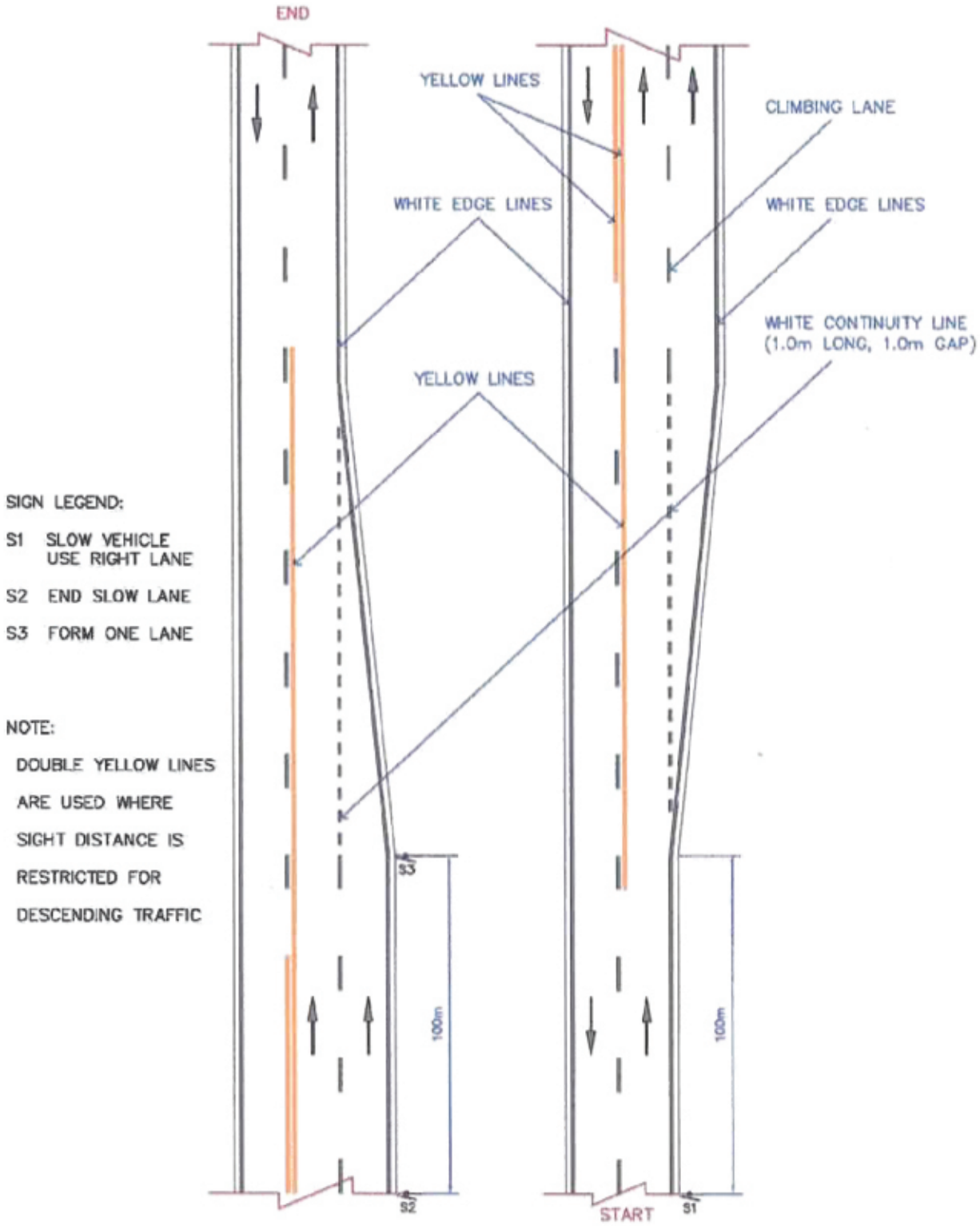


Figure 11.5: Typical Pavement Markings for Climbing Lanes

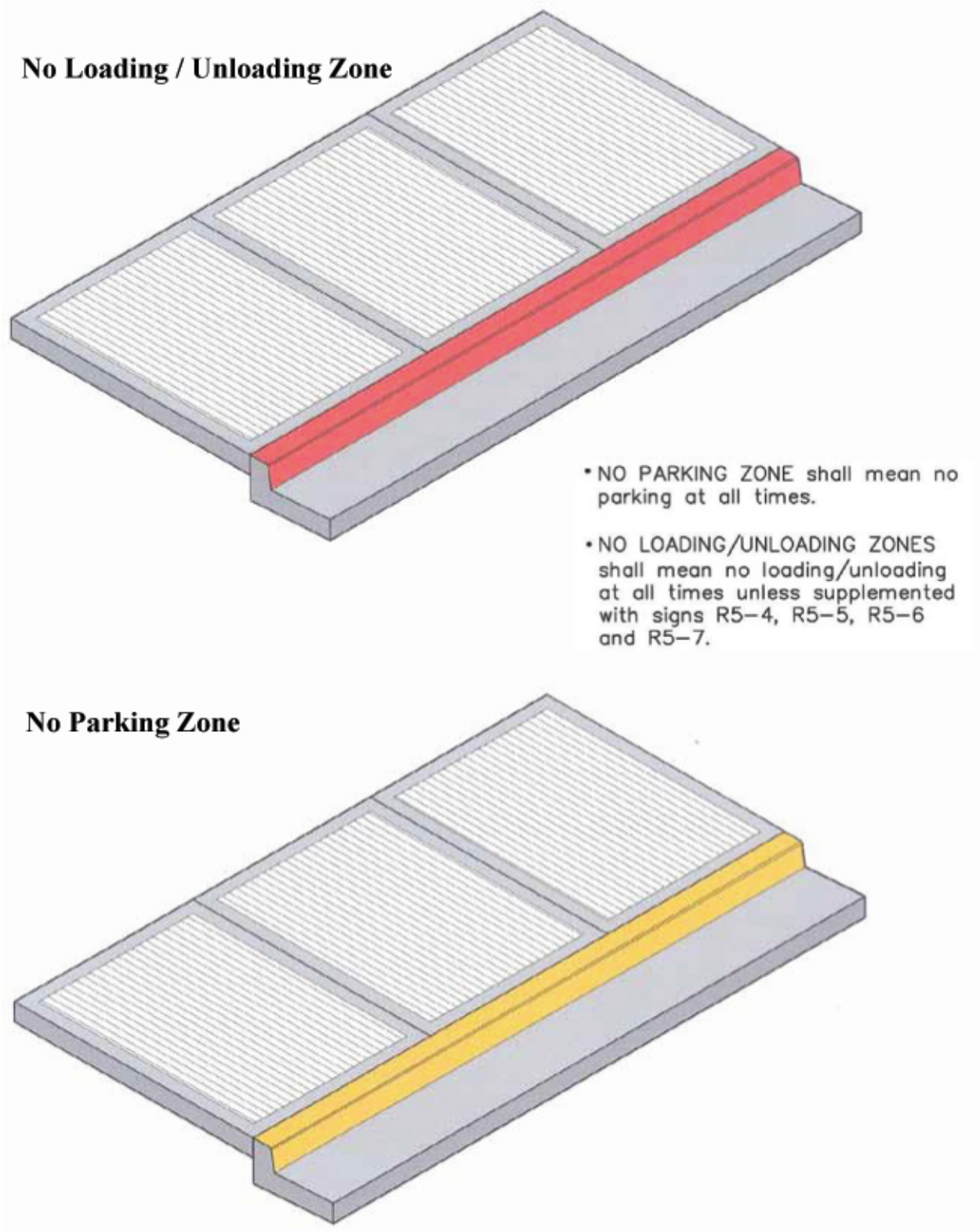


Figure 11.6: Typical Layout of Curb Markings for 'No Parking' and 'No Loading/Unloading' Zones

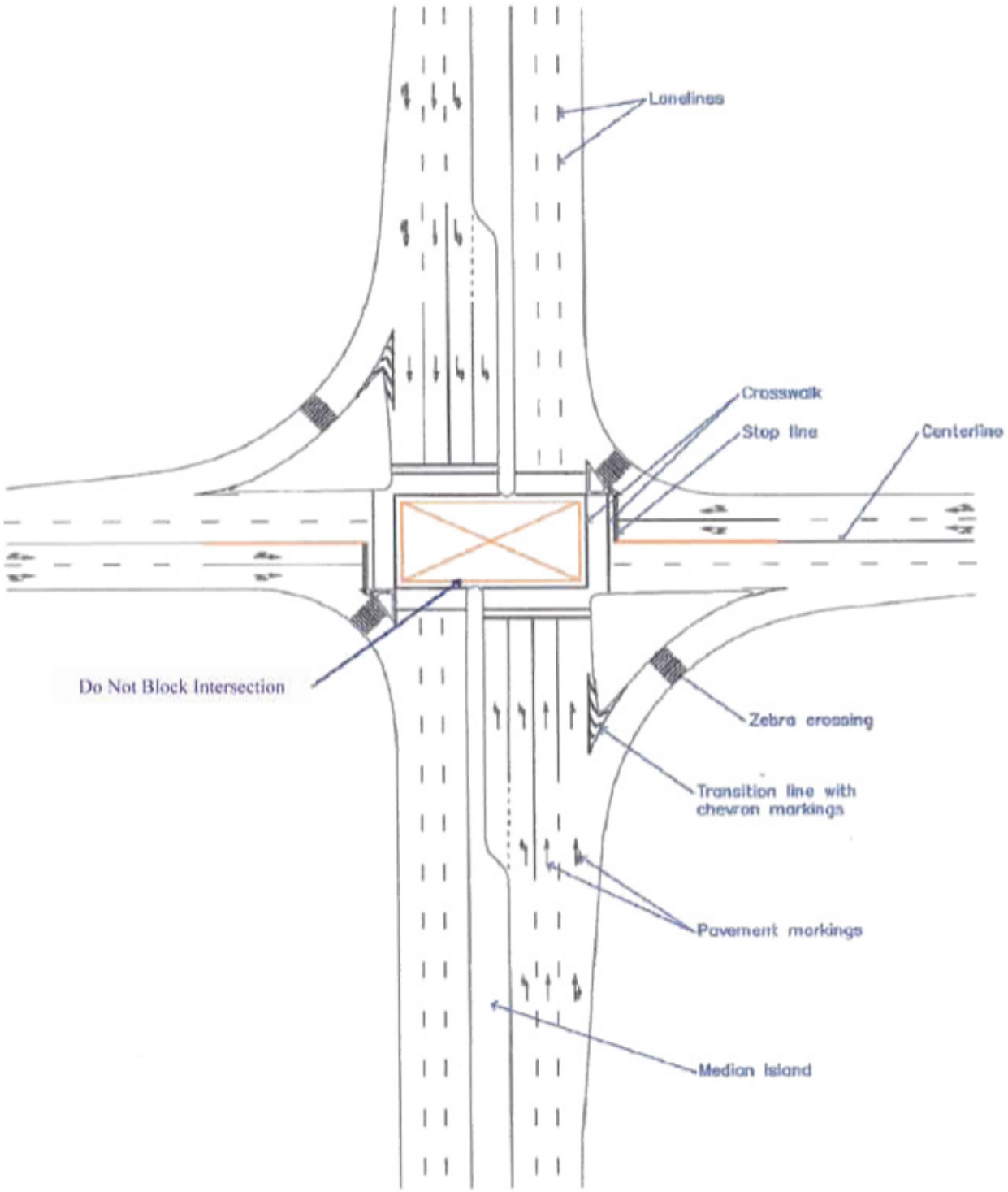
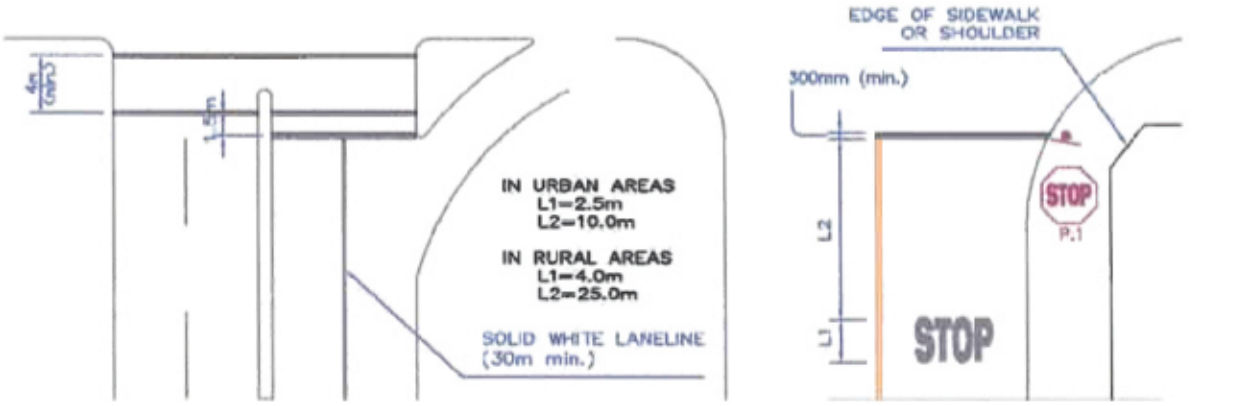
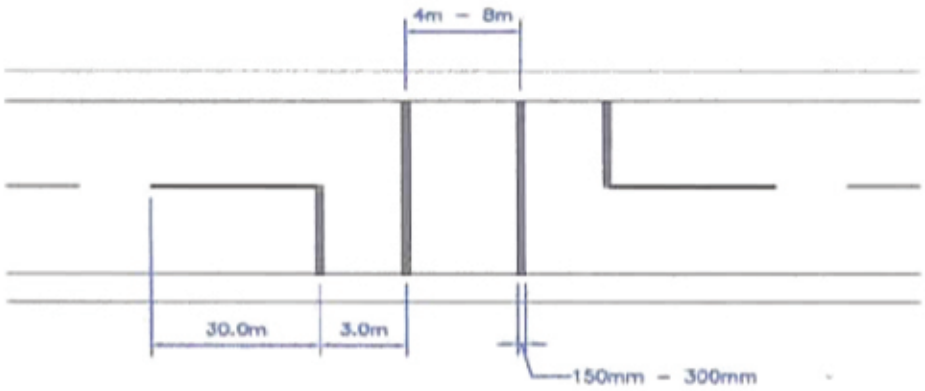


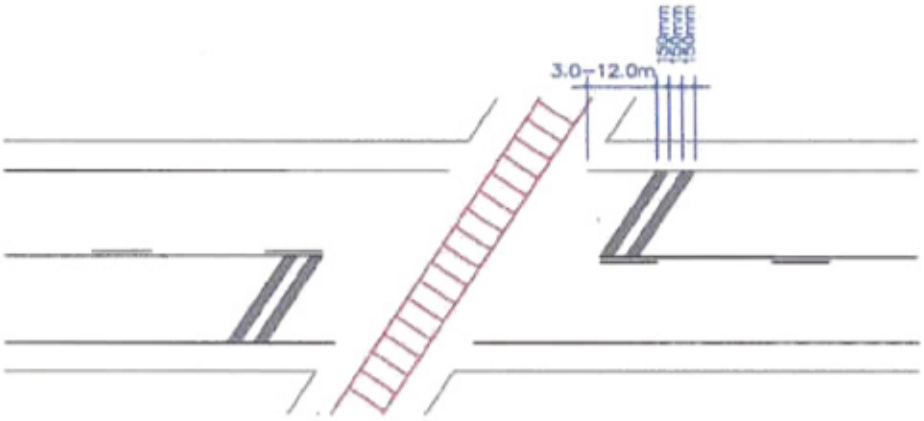
Figure 11.7: Typical Line Markings on an Approach to a Signalized Intersection



(a) SIGNALIZED INTERSECTION (b) UNSIGNALIZED INTERSECTION



(c) SIGNALIZED PEDESTRIAN CROSSING



(d) RAILWAY CROSSING

Figure 12.1: Example of Stop Bar Markings and 'STOP' Message

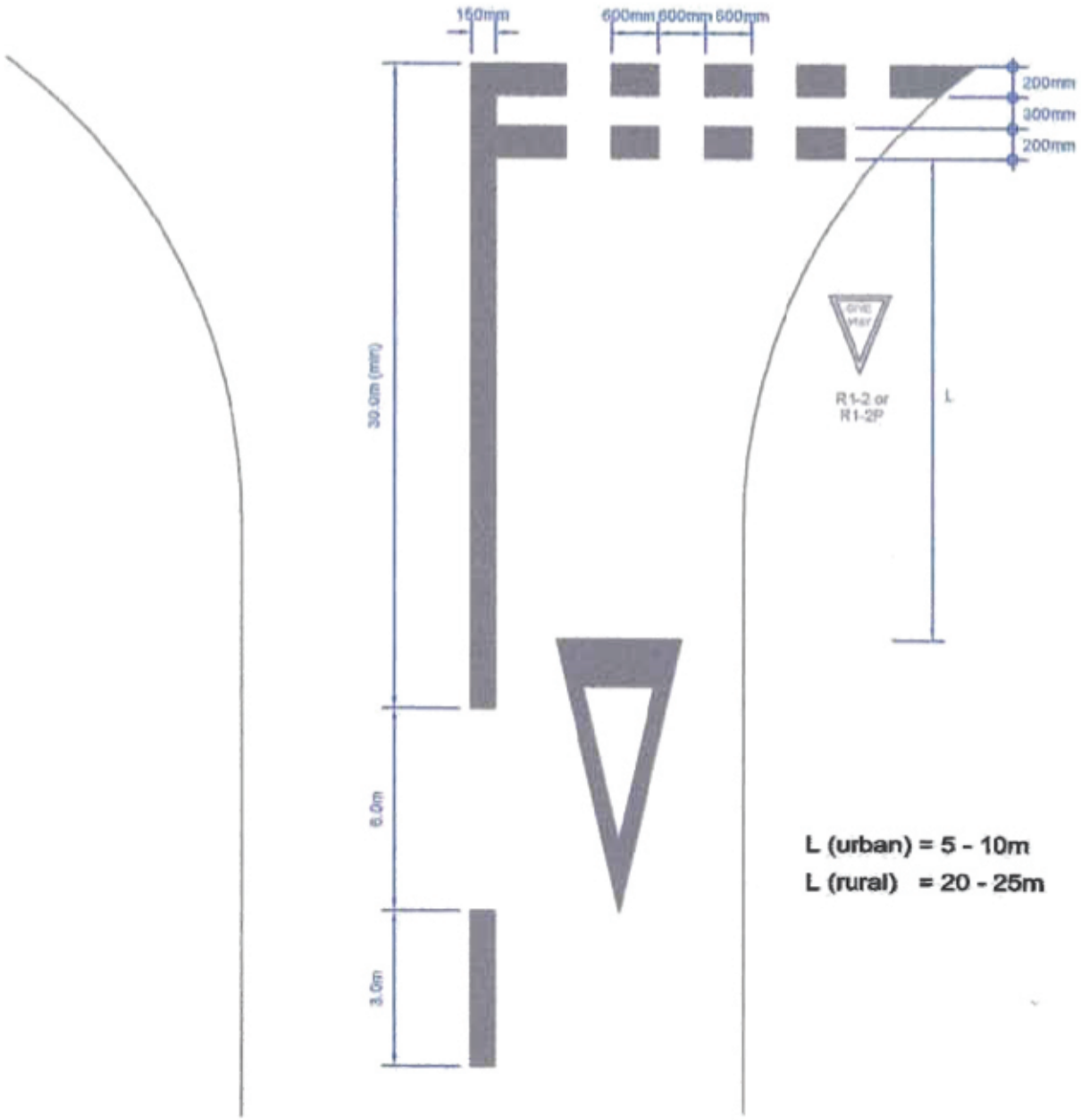


Figure 12.2: 'Give Way' Marking and Symbol

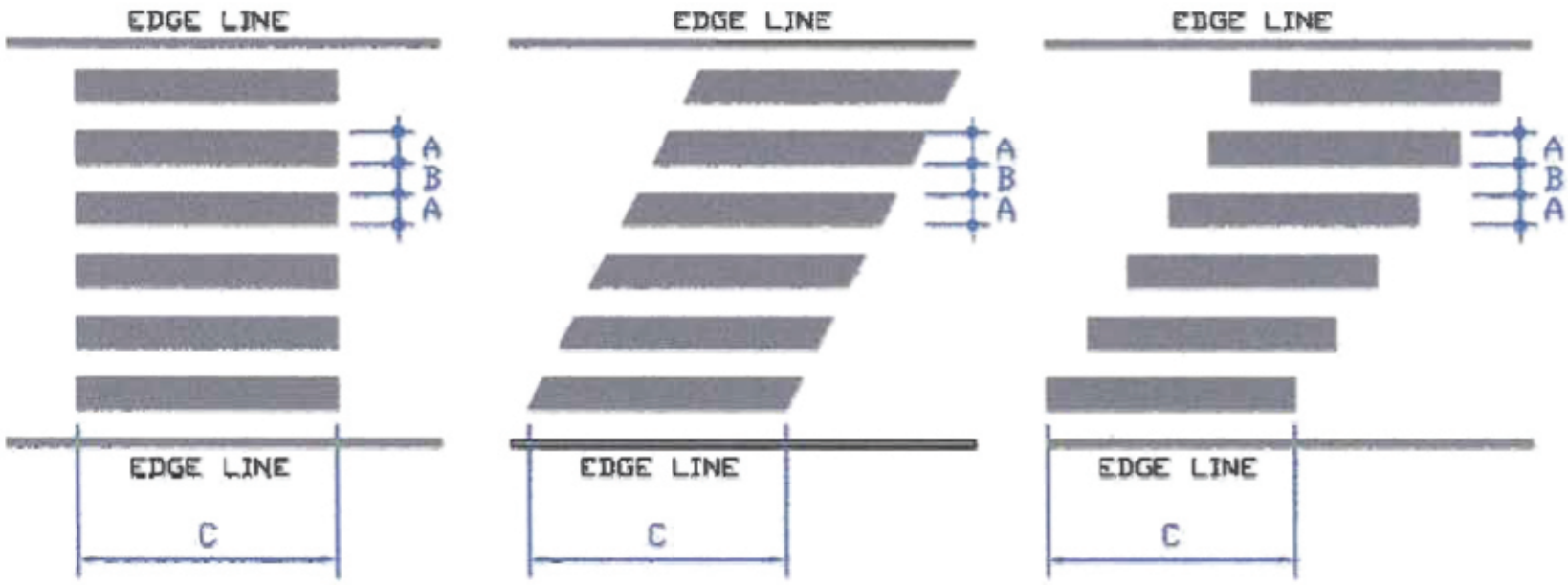
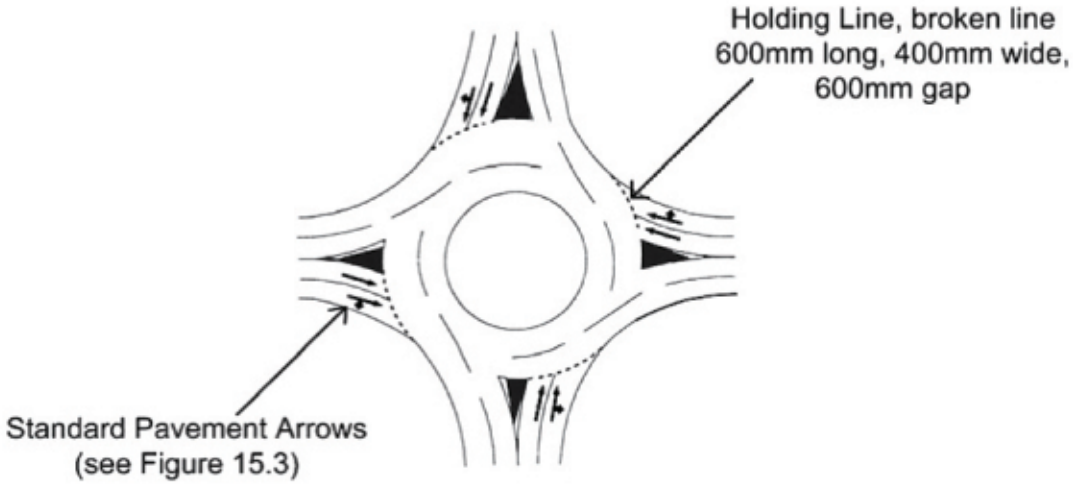
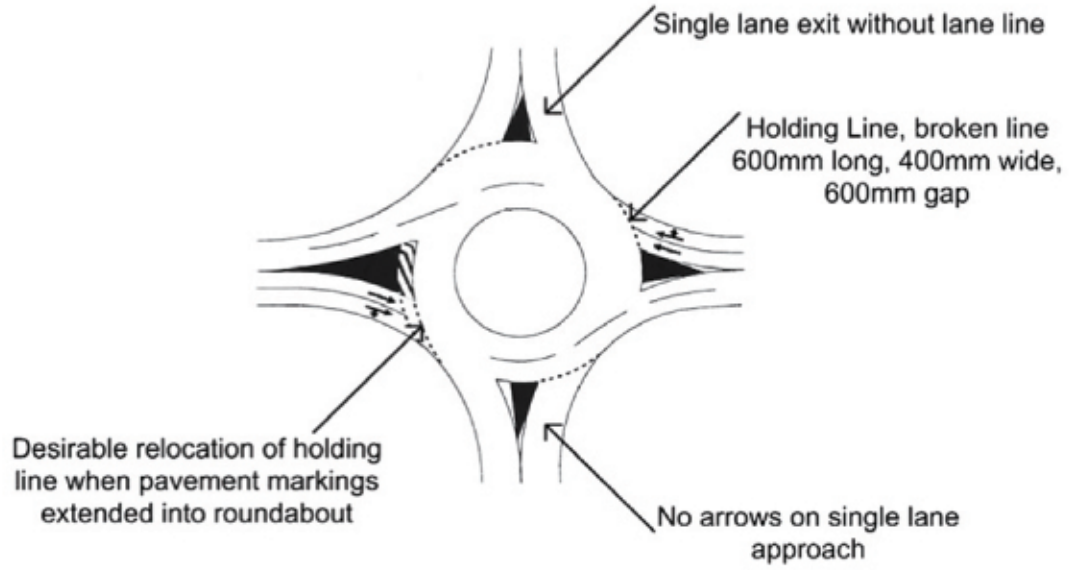


Figure 12.3: Zebra-Type Pedestrian Crossing



Typical multi-lane roundabout showing 2-lane approaches and 2-lane exit



Typical multi-lane roundabout showing two single-lane approaches and two single-lane exit

Figure 12.4: Roundabout Markings

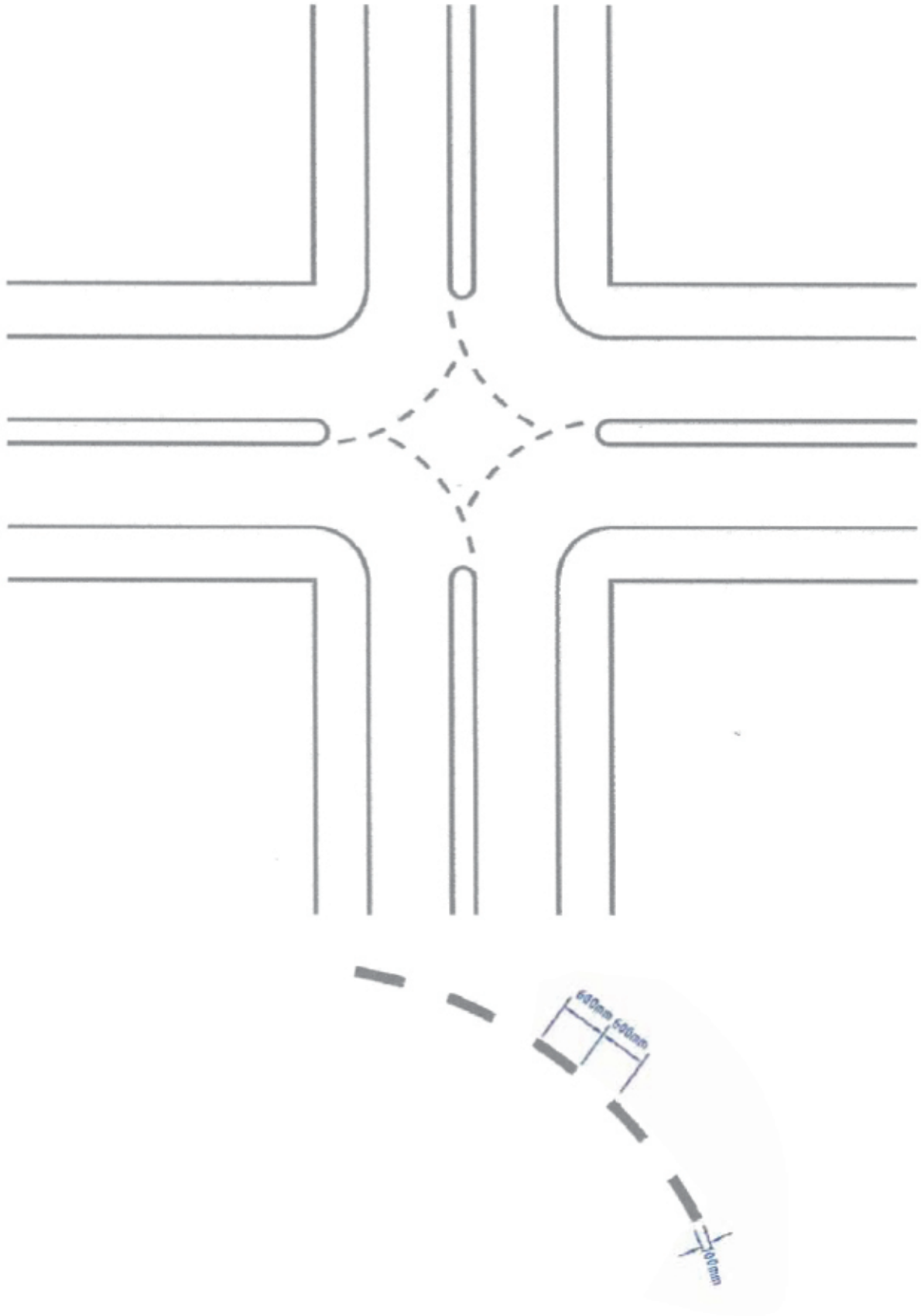


Figure 13.1: Turn Lines

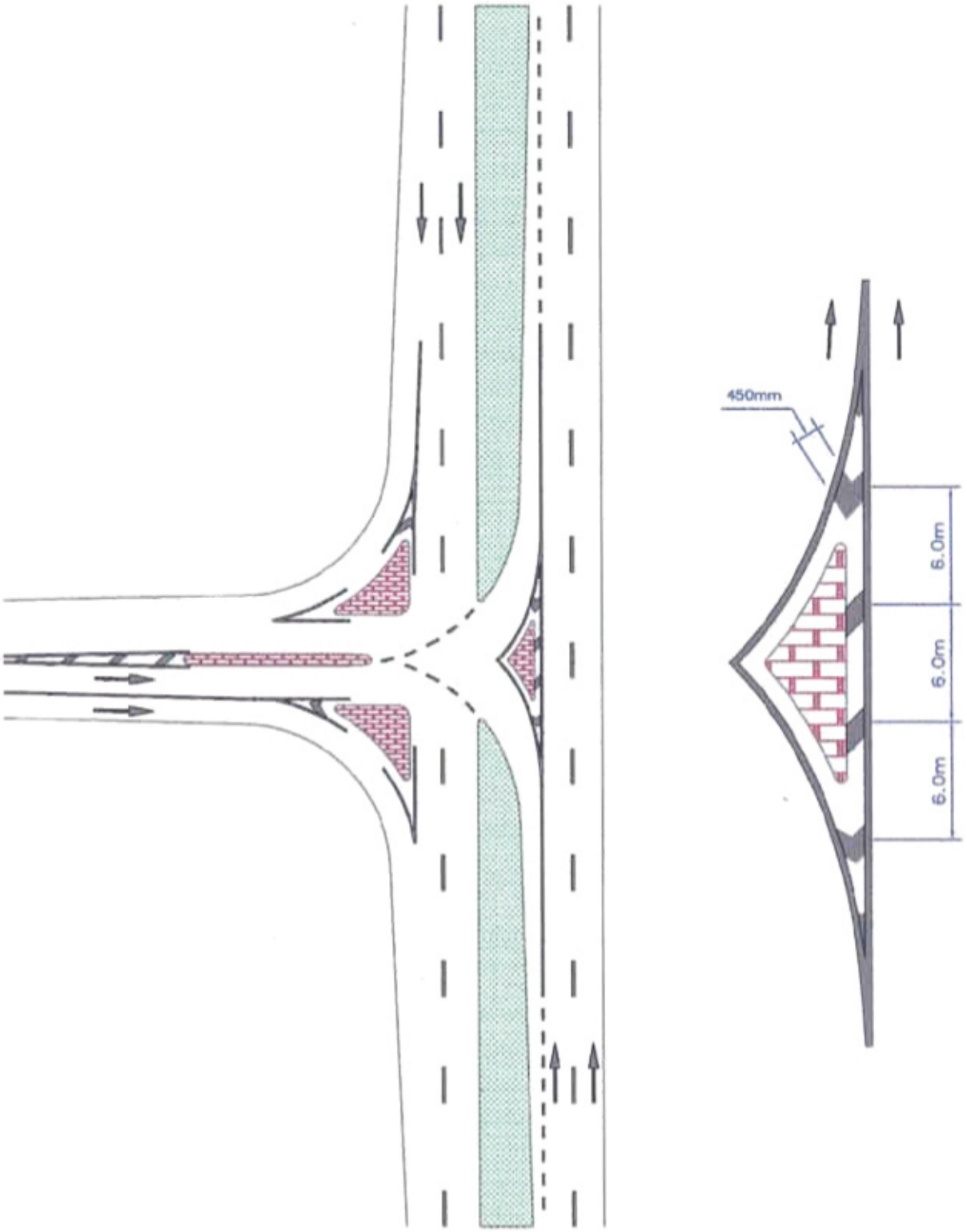
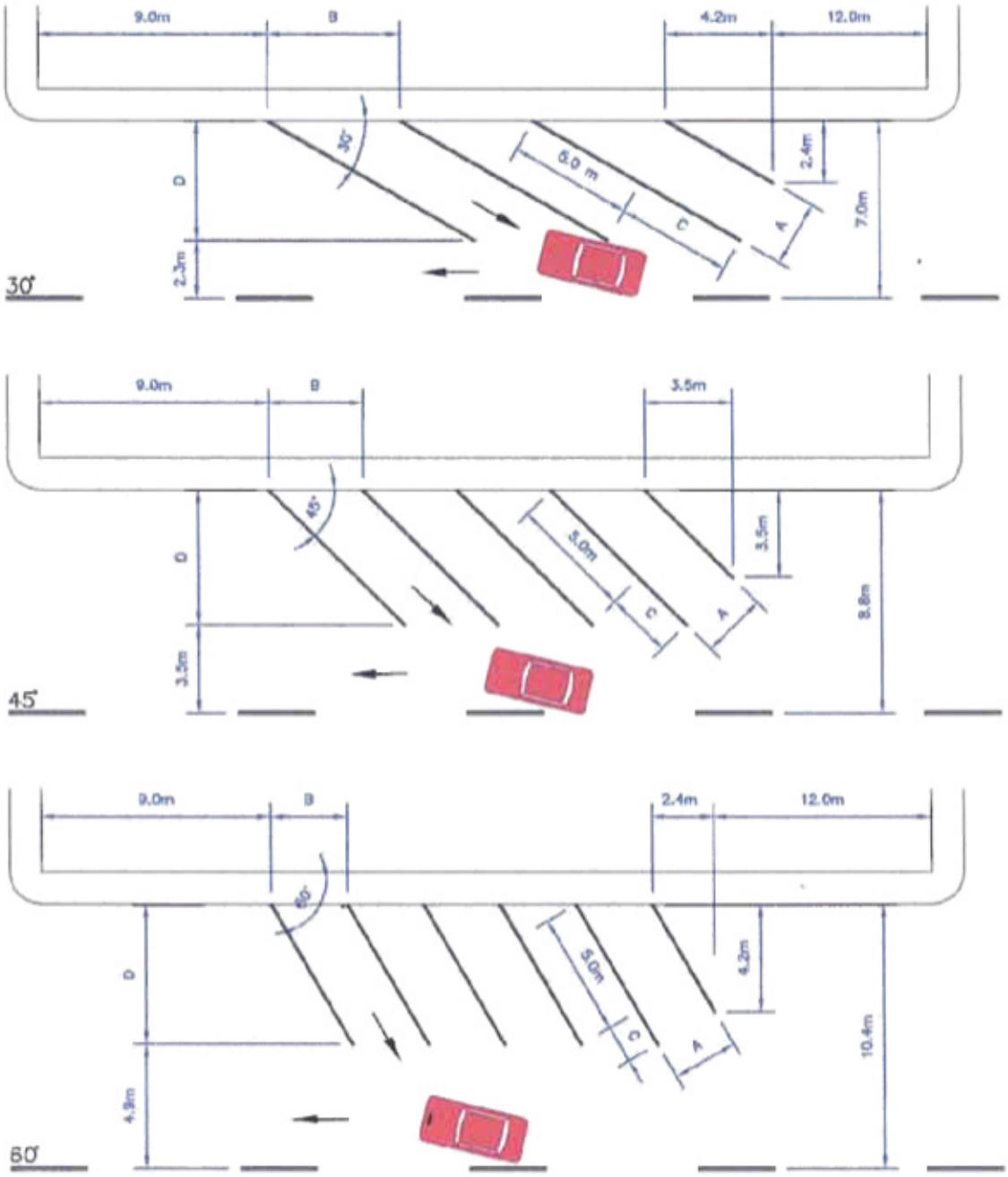


Figure 13.2: Typical Pavement Markings of a Channelized Intersection

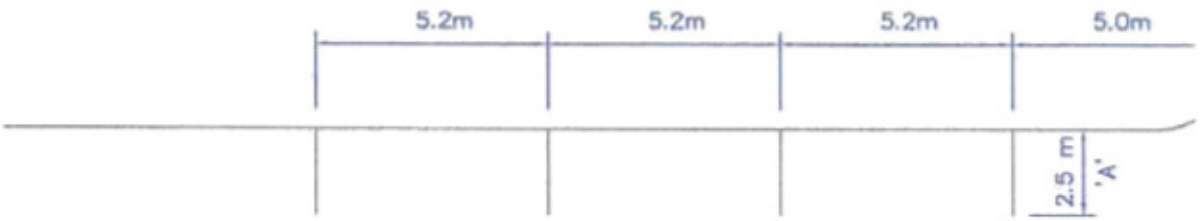


	A	B	C	D
30°	2.5m	5.2m	4.5m	4.7m
45°	2.5m	3.7m	2.6m	5.3m
60°	2.5m	3.0m	1.5m	5.5m
90°	2.5m	2.5m	0	4.8m

NOTE:

The dimensions shown are for minimum size bays.
The parking bay lines are 100mm wide and consist of 300mm long minimum, line segments separated by 300–900mm gaps. The lines are painted white. The value of "A" for the disabled parking space shall be increased by 48% and B, C, and D shall be adjusted accordingly, as per the Philippine National Building Code requirements.

Figure 13.3a: Parking Bay Markings



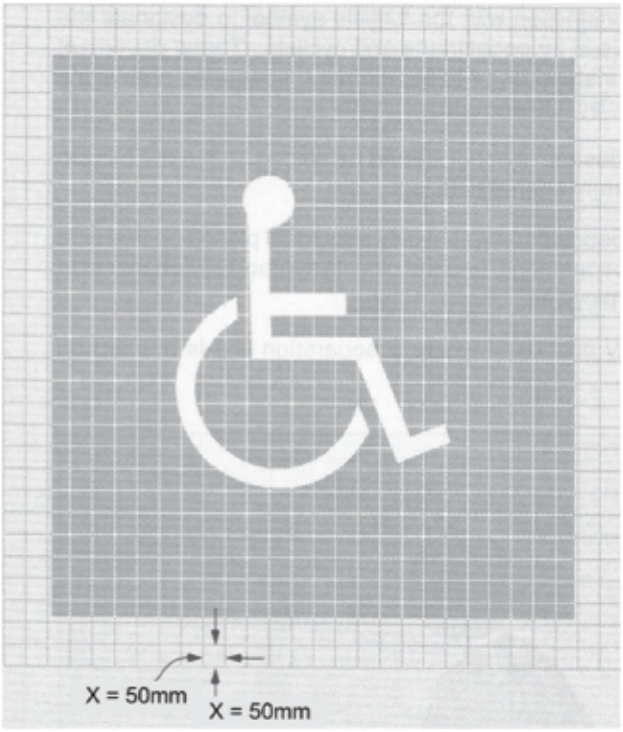
CHOICE BETWEEN PARALLEL PARKING AND ON STREET PARKING ON THE BASIS OF THE FOLLOWING CONSIDERATION.

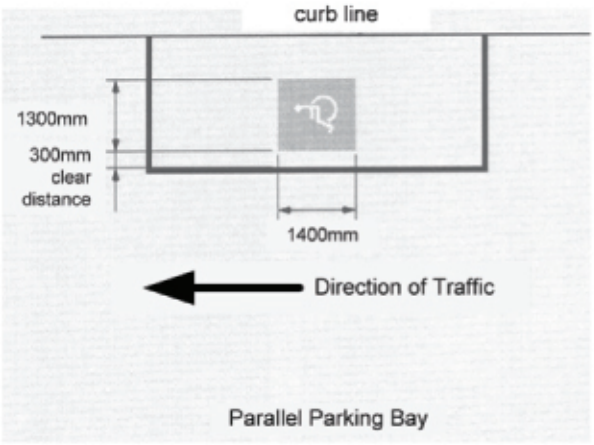
- Parallel parking is preferred over angle parking where the movement of traffic takes priority over the temporary storage of vehicles or vise versa.
- Angle parking provides more spaces than those of parallel parking for the same length of curb space.
- Angle parking is potentially more hazardous than parallel parking because of impaired visibility for the unparking driver.
- The most critical maneuver for angle parking (leaving the space = 12 sec.) is more quickly and easily completed than that on the parallel parking (entering the space = 32 sec.).
- The value of "a" for the disabled parking space shall be increased by 48% (i.e., from 2.5m to 3.7m) as per the Philippine National Building Code requirements.

DESIGN OF CURB PARKING STALLS ARE MARKED.

- Where high turnover is expected.
- Where parking is not parallel to the curb line.
- Where absence of marking will cause inefficient use of available space.

Figure 13.3b: Curb Parking Markings





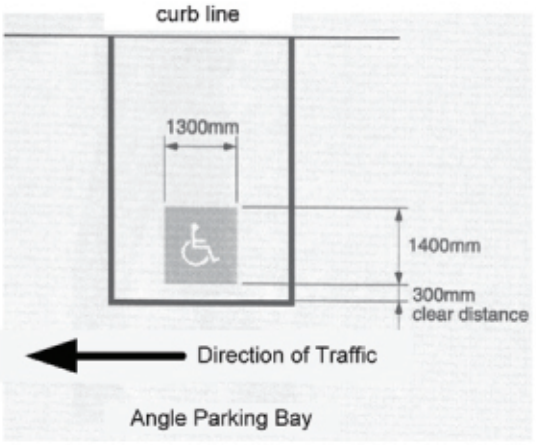


Figure 13.3c: Details of 'People With Disabilities' Symbol

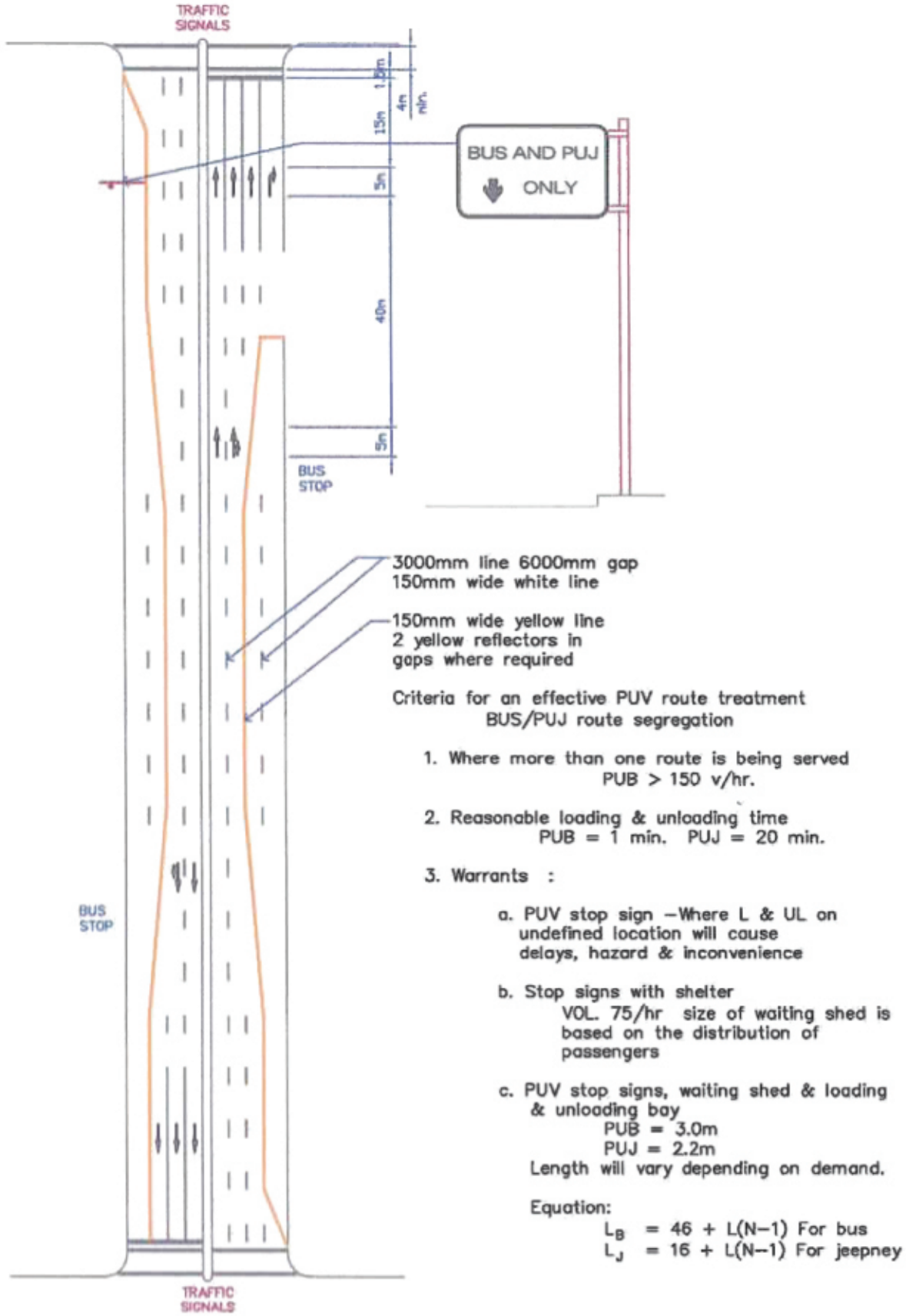
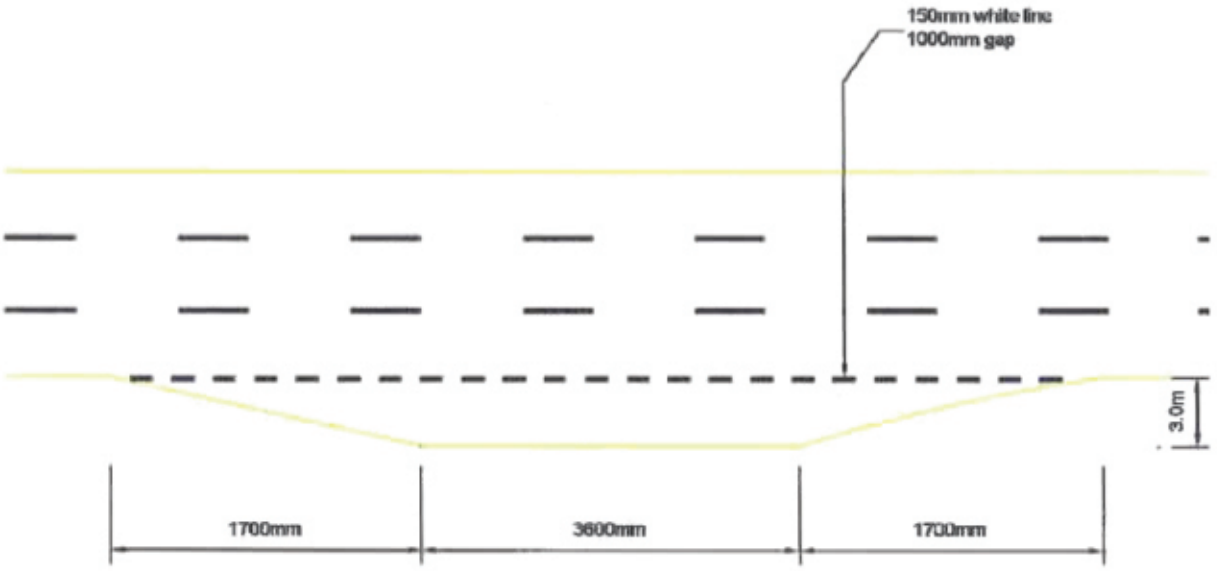


Figure 13.4: Typical Bus and PUJ Lane Marking



d. Design of appropriate sign and defining proper location sign indicating the area where it is allowed to L & UL preperably with parking prohibition

e. Minimum distance relative to the roadway
   a) Where there is no segregation of PUV routes PUV stop should be located not less than 30m before and 50m after the major intersection

Figure 13.5: Loading / Unloading Bay Lines

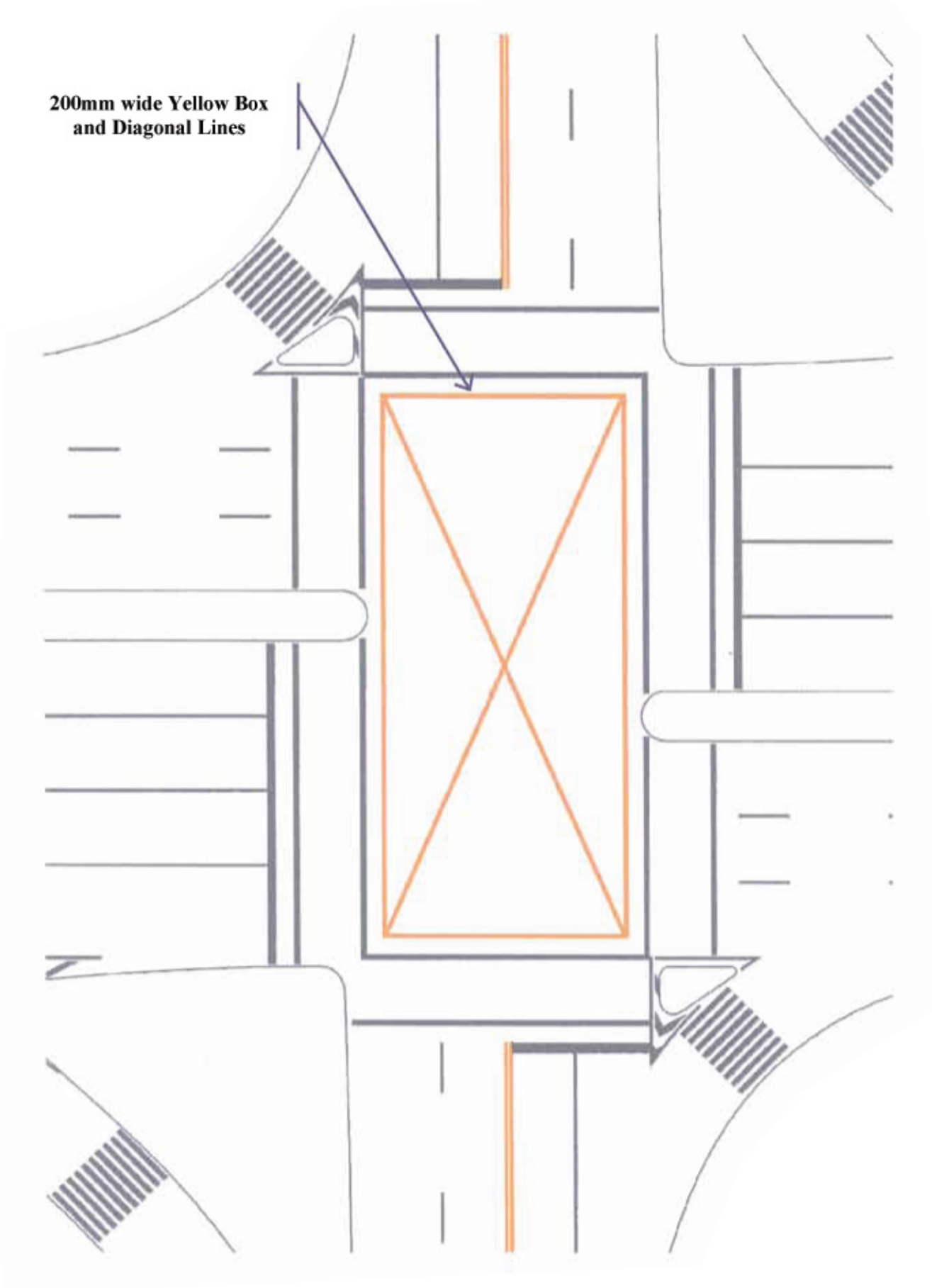
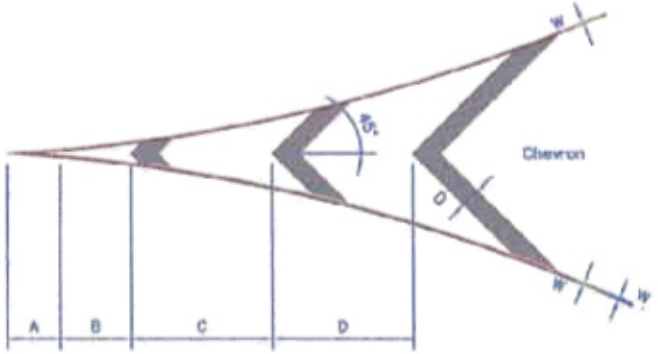


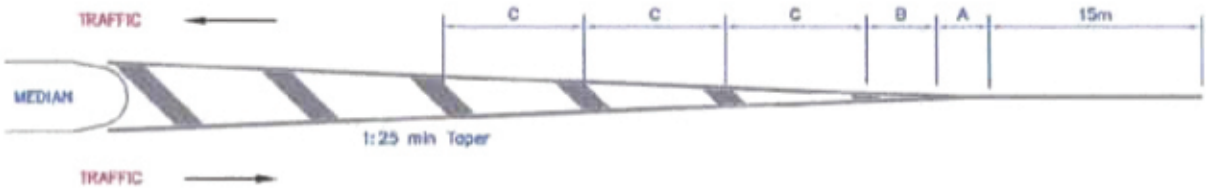
Figure 13.6: Do Not Block Intersection

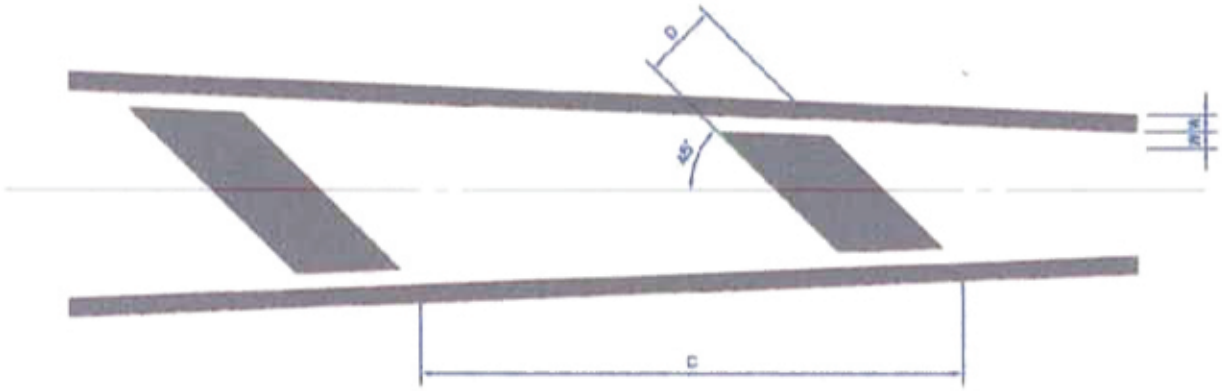
(a) Signalized Intersection



	60km/h or less	Greater than 60km/h
W	100mm	150mm
A	450mm	1000mm
B	1.5m	3.0m
C	2.0m	4.0m
D	4.0m	8.0m

(b) Approach to median





(c) Approach to obstruction or island

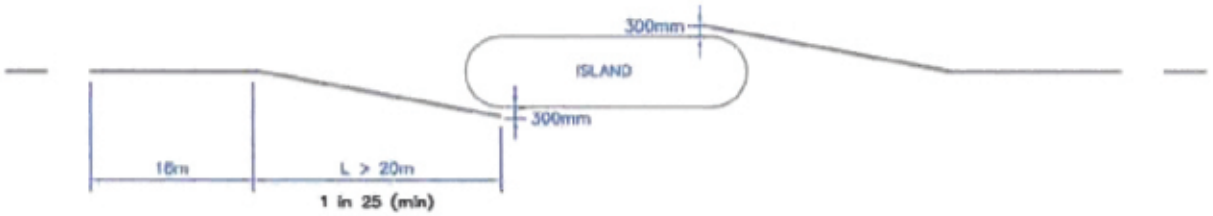
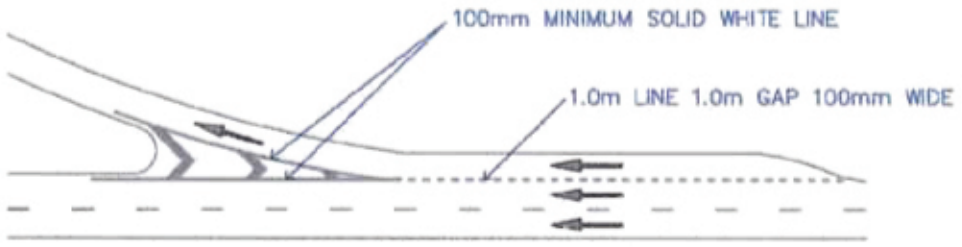
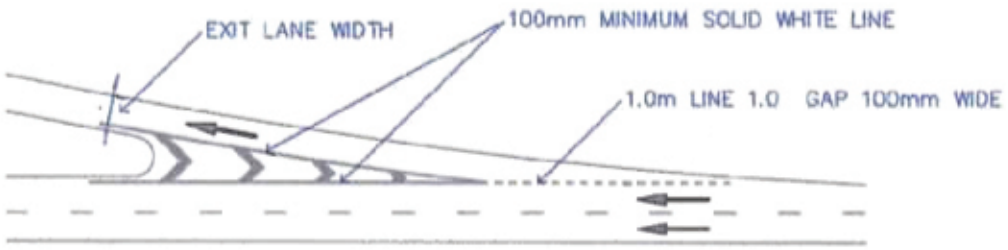


Figure 14.1: Approach Marking to Islands and Obstructions

(a) EXIT RAMP

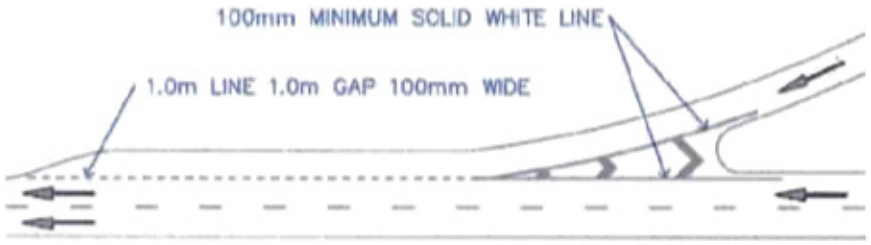


PARALLEL DECELERATION LANE

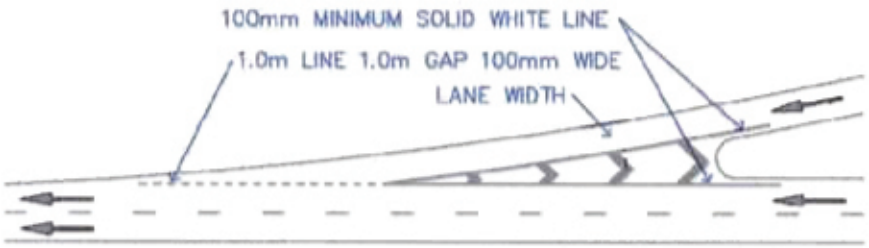


TAPERED DECELERATION LANE

(b) ENTRANCE RAMP



PARALLEL ACCELERATION LANE



PARALLEL ACCELERATION LANE

Figure 14.2: Markings on Exit and Entrance Ramps

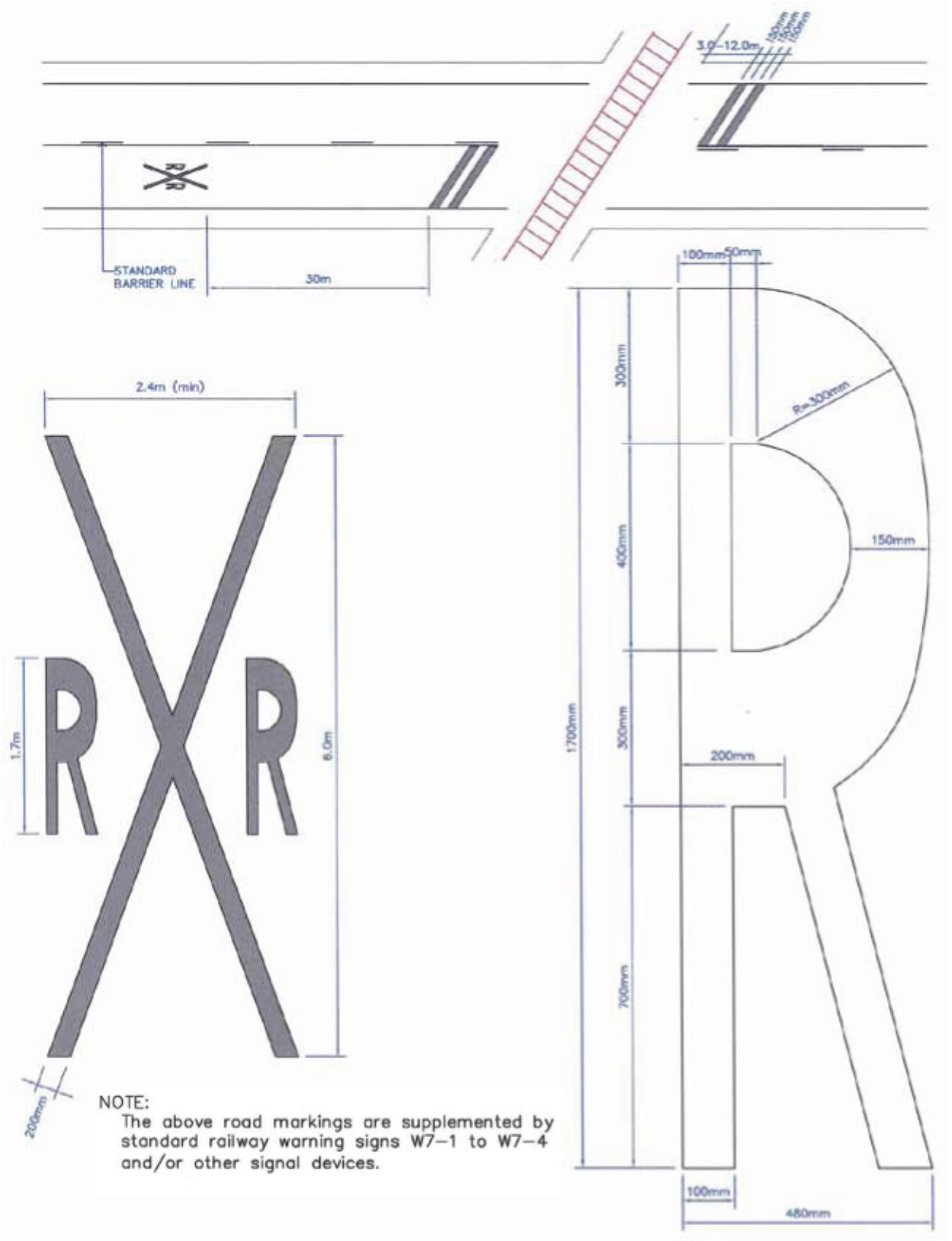
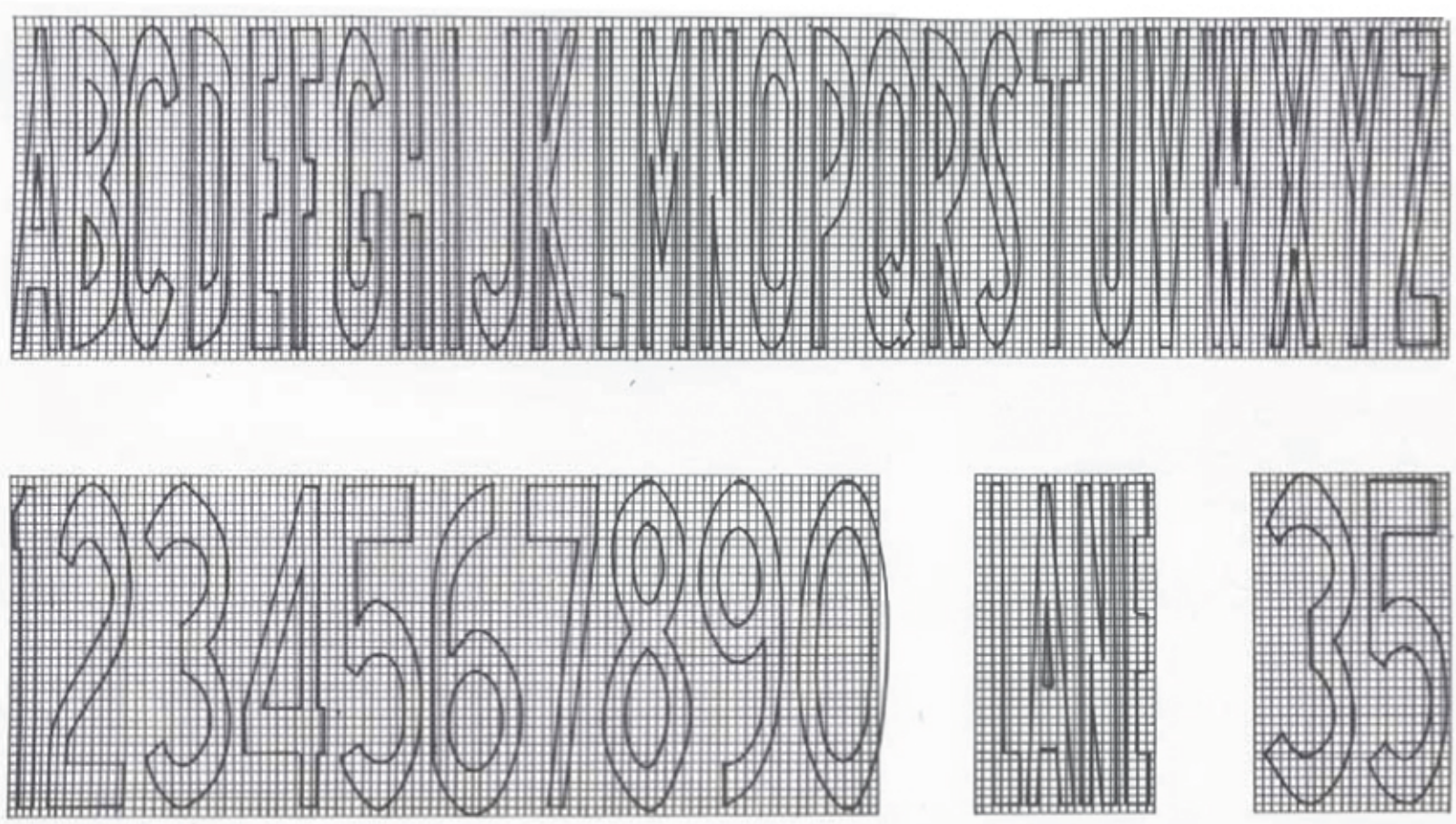


Figure 14.3: Pavement Markings at Railway Crossing



1. Word markings on pavement should not exceed three words.
2. The first word of the message should be nearest the driver.
3. The distance between words should be at least four times of the letters or numerals.
4. Width of letters and grid squares is constant but length of letters and numerals may vary.
5. Length of letter or numeral in metres=X.
6. Length of grid squares = 30 X mm.

Figure 15.1: Pavement Letter and Numeral Markings Guide

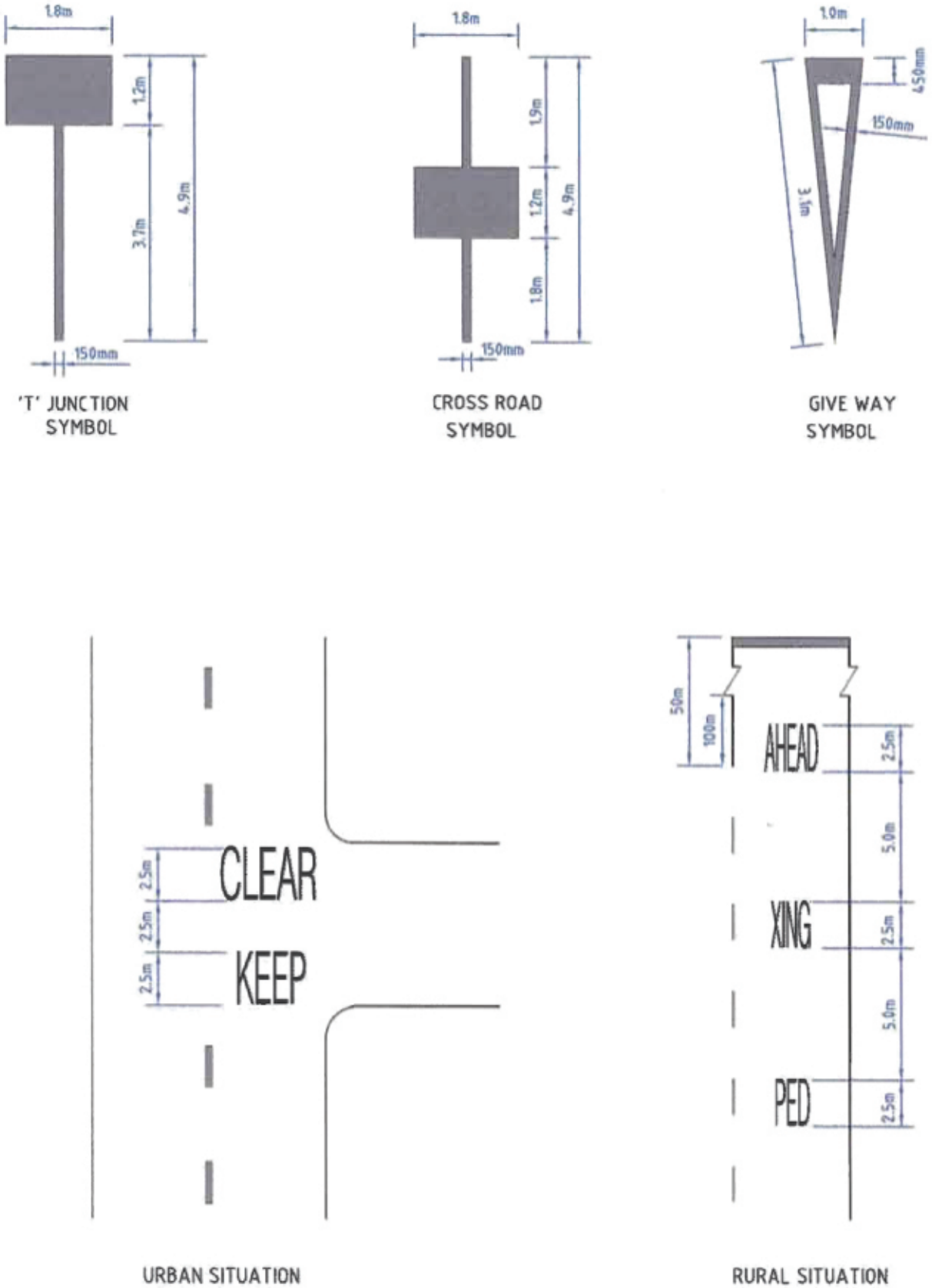


Figure 15.2: Messages and Symbols

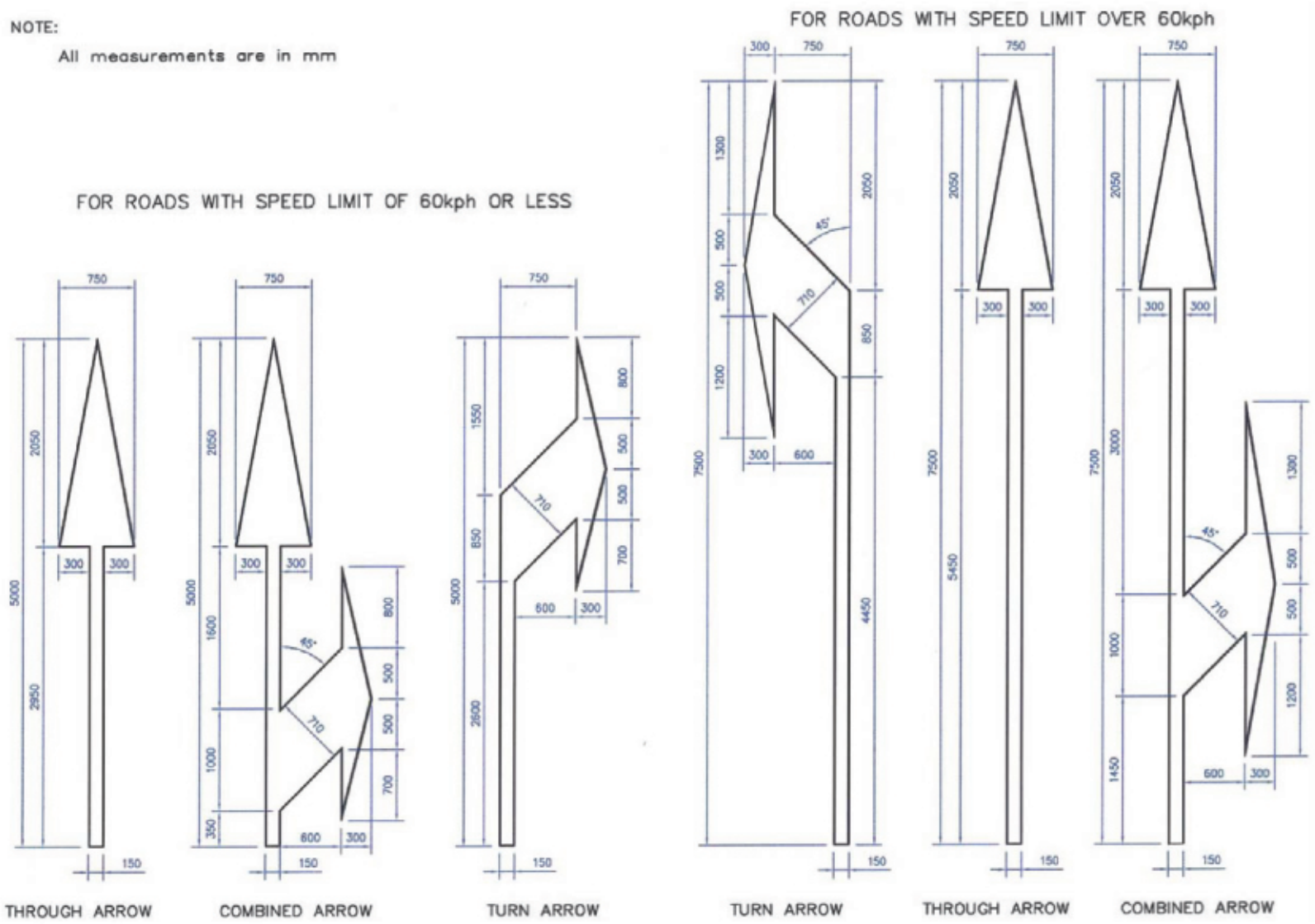
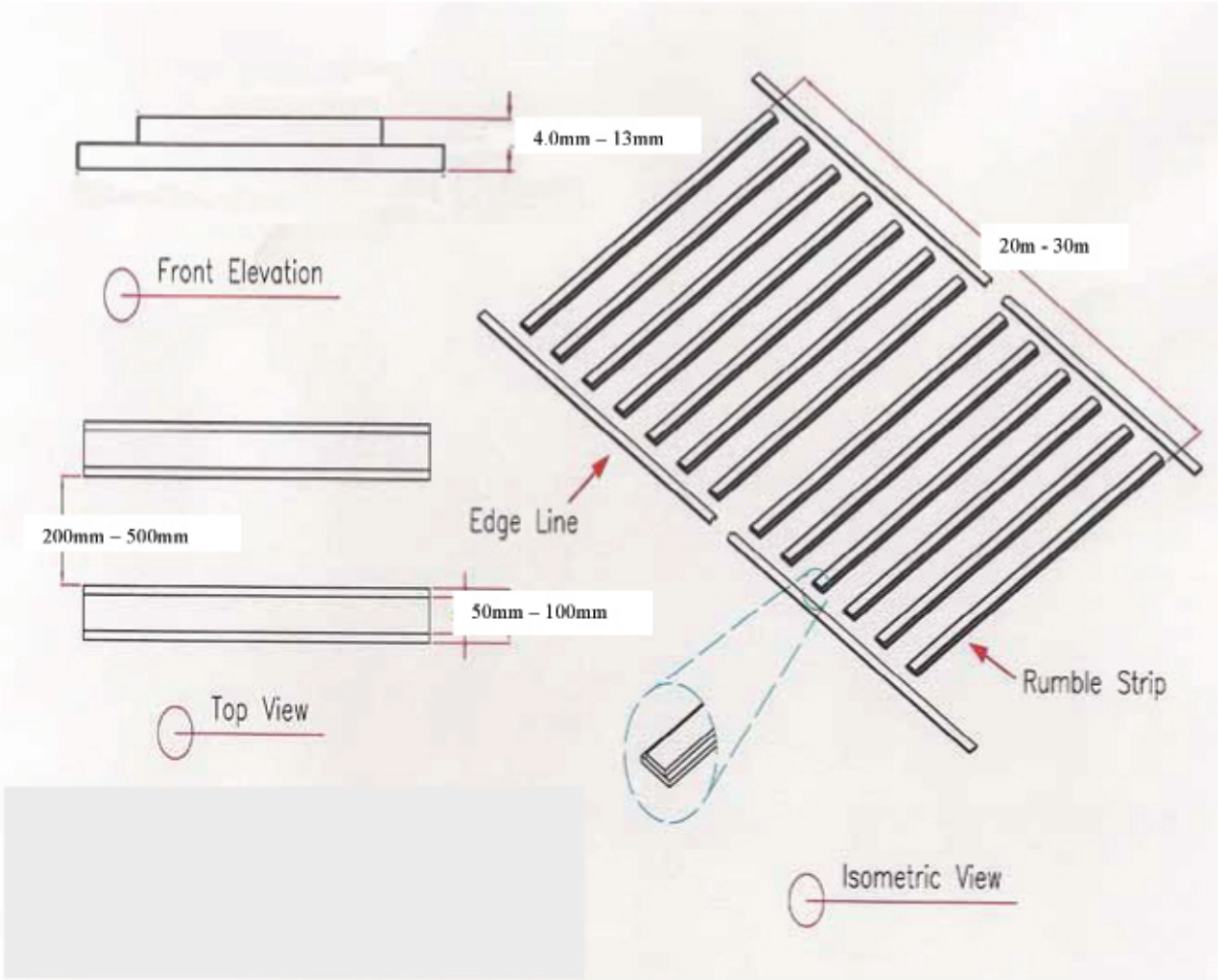


Figure 15.3: Standard Pavement Arrows

RUMBLE STRIPS
(see Department Order No. 31 Series 2010 for complete standard specification)



Reflectorized thermoplastic rumble strips shall have the following dimension:

Height	:	4.0 mm to 13 mm
Width	:	50 mm to 100 mm
Spacing	:	200 mm to 500 mm

As much as possible, placement of reflectorized thermoplastic rumble strips shall be limited to rural locations and shall not be installed near residential areas because of the noise it can generate. It should not be placed through pedestrian crossings or on bicycle routes.

The recommended length of road section where reflectorized thermoplastic rumble strips are to be installed shall be from 20 m to 30 m depending on the advisory speed limit of the road section.

The color of reflectorized thermoplastic rumble strips shall be either white or yellow.

Reflectorized thermoplastic rumble strips placed in the travelled way should not be overused. If used at too many locations, reflectorized thermoplastic rumble strips may lose their ability to gain the motorist's attention.

Figure 16.0: Rumble Strips

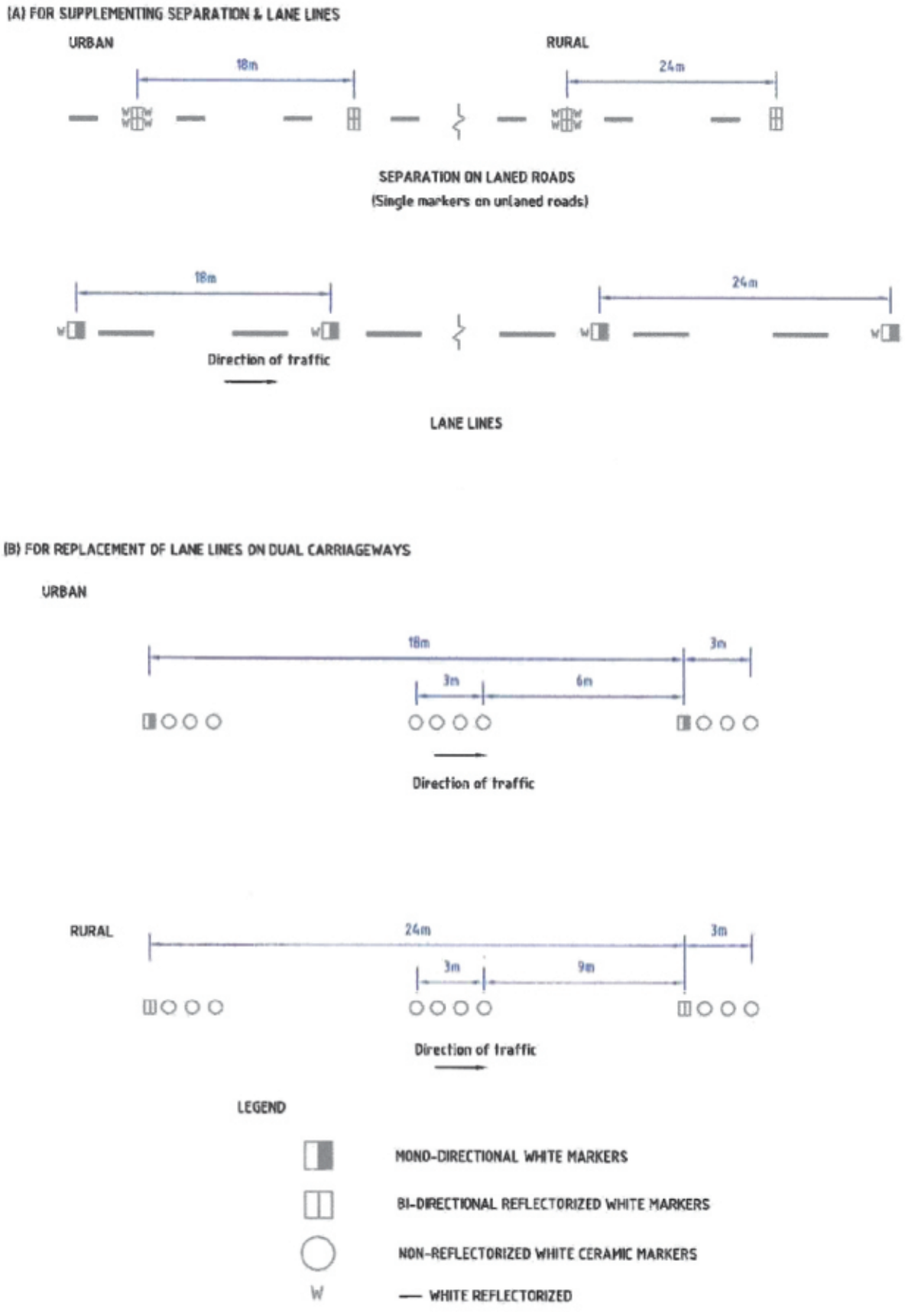
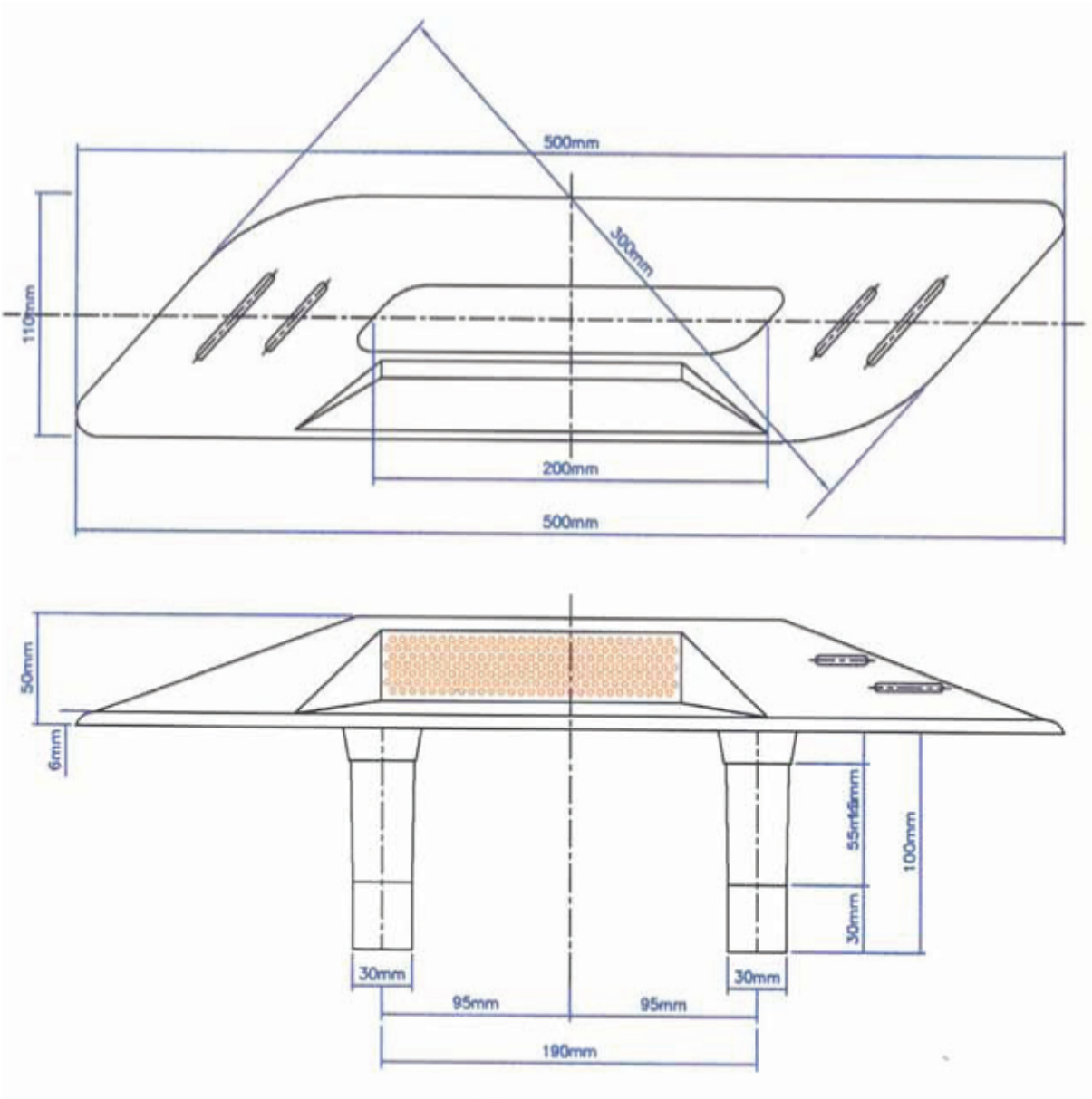


Figure 17.1: Placement of Raised Pavement Markers

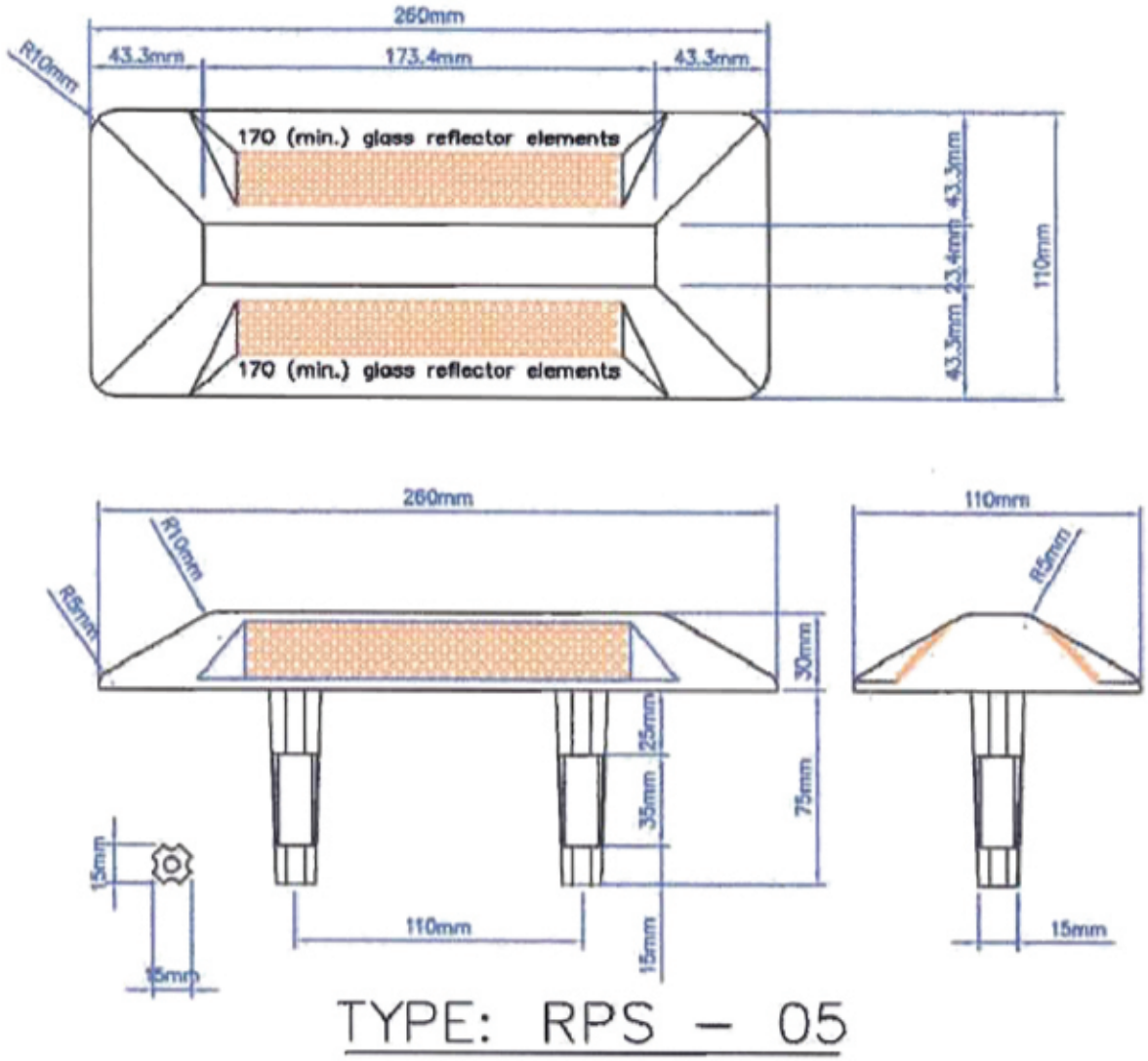


TYPE: RPS – 01

RAISED PAVEMENT MARKERS

DESCRIPTION:	**Aluminum Alloy**
BODY:	**500 x 110 x 50mm**
DIMENSION:	**With shank no less than 75mm and using glass reflector or prismatic lenses embedded in plastic or polycarbonate.**

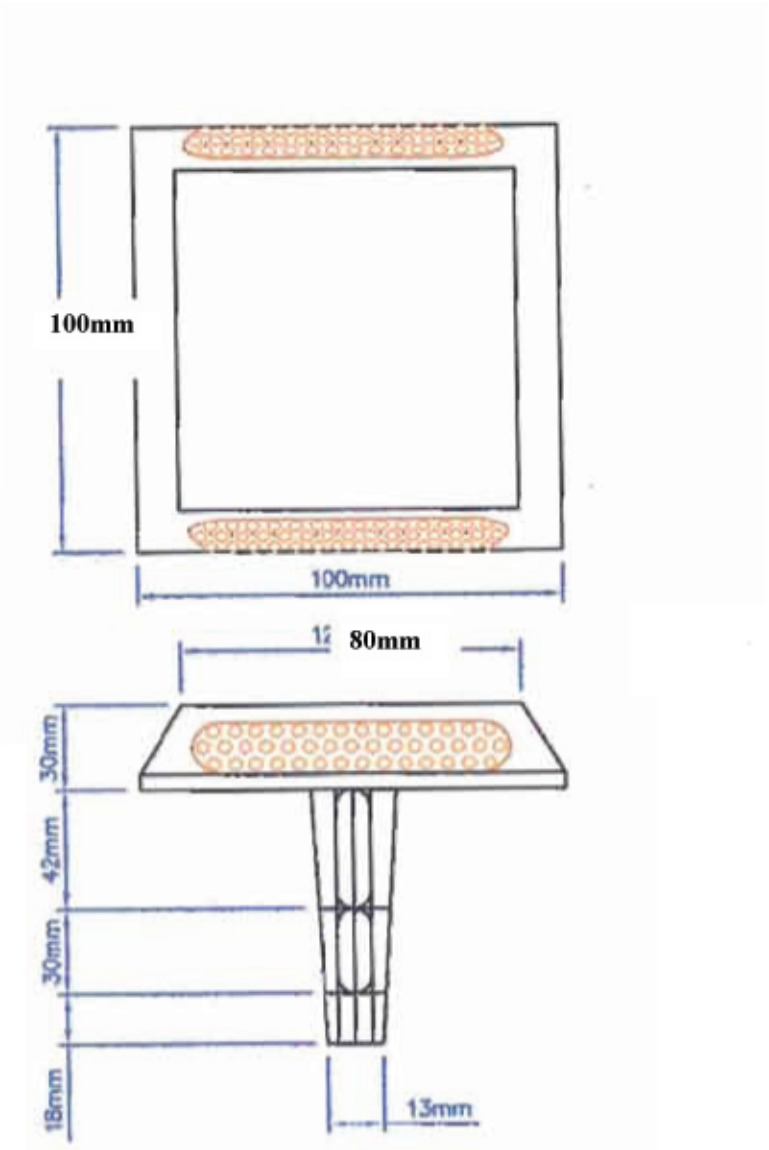
Figure 17.2a: Specifications of Raised Pavement Markers (RPS-01)



RAISED PAVEMENT MARKERS

DESCRIPTION:	**Aluminum Alloy**
BODY:	**260 x 100 x 30mm**
DIMENSION:	**With shank no less than 75mm and using glass reflector or prismatic lenses embedded in plastic or polycarbonate.**

Figure 17.2b: Specifications of Raised Pavement Markers (RPS-05)



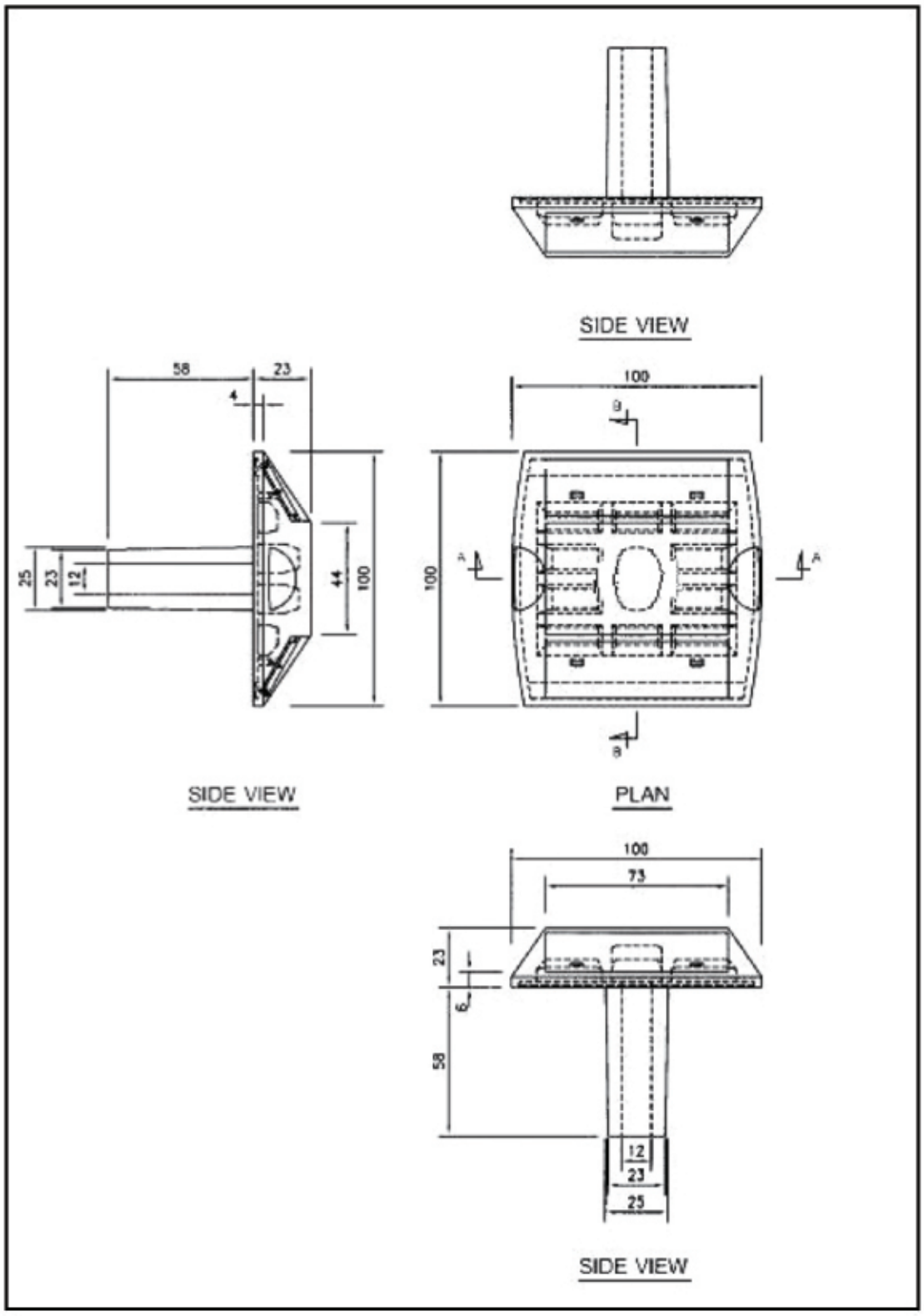
TYPE: RPS – 22

RAISED PAVEMENT MARKERS

DESCRIPTION:	**RAISED PAVEMENT MARKERS**
BODY:	**Aluminum Alloy**
DIMENSION:	**100 x 100 x 25mm**
	With shank no less than 50mm and using glass reflector or prismatic lenses embedded in plastic or polycarbonate.

Figure 17.2c: Specifications of Raised Pavement Markers (RPS-22)

RPS-22 Diagram



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STANDARD DESIGN SPECIFICATIONS

A1 SCOPE AND OBJECTIVE

This Standard Specification forms part of the Philippines Road Signs Manual, which provides guide for sign design, layout and size requirements. The objective of this specification is to provide users and manufacture of road signs with either standard designs or design rules for the shape and graphic content of signs, together with guidance on materials and manufacturing quality.

A2 NUMBERING SYSTEM

The numbering system for signs is as follows:

- A letter prefix, as shown below, denoting class of sign;

  R - Regulatory signs

  W - Warning signs

  G - Guide signs

  GE - Freeway and Expressway signs

  S - Special Traffic Instruction Signs

  HM - Hazard Markers
- A number denoting the series, or group of signs;
- One or two numbers identifying the sign in the series, or group; and,
- A letter denoting the size of sign where more than one size is used (e.g., A, B, C or D, where A is the smallest)

An example would be R2-7A (L) which denotes a regulatory sign in the Direction Type – R2. The sign is the seventh in the series, is the smallest available, and is left hand version.

A3 GRAPHIC DESIGN

A3.1 General

Standard road signs fall into two categories:

- those for which a complete graphic design is preset, or substantially preset; and,
- those which are “made to measure”.

A3.2 Signs with Preset Graphics

These signs shall conform to the graphic designs shown in the drawings. These include all of the regulatory and warning signs, route markers and hazard markers, as well as standard service sign symbols.

A3.3 Made-to-Measure Signs

These signs are separately drafted in each case taking account of the following requirements:

- The horizontal spacing between any two words in one line shall be equal to the recommended spacing between the last letter of the first word and the first letter of the second word, plus the width of the letter N;
- Where numerals are followed by a quantity unit, e.g., 1km, 300m, 4t, the unit shall be in the standard lower case letter height nearest to two-thirds of the numeral height, and the spacing shall be equal to half the numeral height;
- The vertical spacing between lines of words shall not be less than 0.5 times the height of the largest lettering in adjacent lines. For more clarity required this spacing shall be increased to 0.75 times the height of the largest lettering in adjacent lines; and,
- Spacing between the legend and the edges of a sign should not be less than the following, wherever practicable.

  Signs without borders:

  - top and bottom spaces – 25% of adjacent letter height
  - end spaces – 50% of adjacent letter height

  Signs with borders (space measured to inside of border):

  - top and bottom spaces – not less than 40% of adjacent letter height
  - end spaces – 60% of adjacent letter height if top and bottom is 50% of the adjacent letter height; 100% if top and bottom is between 40% and 50%

A4 LEGEND

The following abbreviations are used in the drawings:

A, B, C, D, E, or F = series A to F capital alphabets

Mod E = Modified E capital alphabets

LC = Lower Case alphabets

N = narrow spacing

M = medium spacing

W = wide spacing

Example 120 DN = 120mm height Type D capitals narrow spacing

105 LC = 105mm Lower Case alphabet

A5 SIGNBOARD SIZE

The size and shape proportions of signs in this specification with preset graphics have been selected to achieve economic cut of standard size of materials. The made to measure design should follow the same principle.

A6 BORDERS, EDGE STRIP AND CORNERS

A6.1 Borders and Edge Strip

A6.1.1 Signs with dark colored legends on light colored background

Except for triangular shaped warning signs, recommended border and edge strip widths are shown in the following table.

Table A.1: Recommended Dimensions for Border Widths (Signs with Dark Border and Light Background)

Shortest Dimension of the Sign board	Dark Border	Light Outer Edge Strip
< 200	10	5
200 - 400	16	8
401 - 750	20	10
751 - 1200	30	15
> 1200	50	25

Units in millimeter (mm)

A6.1.2 Signs with light colored legends on dark colored background

Signs in this category which have borders shall have either a border extending to the edge of the signboard or an edge strip outside the border equal to the border width.

Recommended border/edge strip widths based on the character stroke width of the largest legend in the sign are given in the following table.

Table A.2: Recommended Dimensions for Border Widths (Signs with Light Colored Border on Dark Background)

Size of Largest Legend on Sign[1]		Border and Edge Strip[2] (Equal Width)	Border Only[2] (No Edge Strip)
Upper Case	Lower Case		
< 80	< 70	10	15
80 - 140	70 - 100	16	24
141 - 240	101 - 180	25	40
241 - 400	181 - 320	40	60
> 400	> 320	70	100

Units in millimeter (mm)

Notes:

1. If the largest legend on a sign is a single short word such as "NO", the next largest legend may be more appropriate.

2. Users have the option of specifying border only or border and edge strip for light border on dark background signs. If border and edge strip are specified, the third column gives the width of each.

A6.1.3 Triangular Warning Signs

All triangular signs do not have edge strips. Their border with is approximately 5% of the length of the side of the triangle. The recommended borders are shown in the following table.

Table A.3: Border Widths and Corner Radii of Triangular Warning Signs

Sign Size (mm)	Border Width (mm)	Corner Radii
600	28	32
750	35	40
900	42	48

A6.2 Corner Radii

Except Triangular warning signs, signs with shortest dimension less than 2000mm are shown in the following table.

Table A.4: Recommended Corner Radii

Shortest Dimension of Signboard	Corner Radii
< 200	10 or 25
200 to 400	25 or 50
401 to 900	50 or 100
901 to 1,500	100 or 200
1,501 to 2,000	200 or 300
> 2000	300 minimum

The recommended radii in the table do not apply to corners on signs which are other than 90 degrees. Recommended radii for Triangular Warning signs are shown in Table A.3.

A7 DESIGN OF GUIDE SIGNS (G AND GE SERIES)

A7.1 Letter Types and Legibility

Letters used on traffic signs comprises six series of capital letters and numerals ranging from the narrowest Series A to widest Series F, plus one series of lower case letters, together with a modified Series E which is used as initial capital for lower case words.

The procedure for determining the legibility distance required of a traffic sign can be represented diagrammatically as shown in the following figure. This arrangement assumes that the driver does not start to read the information on the sign until sometime after the letters first become legible. This is generally considered to be at a distance equivalent of 2/3 of the legibility distance from the sign.

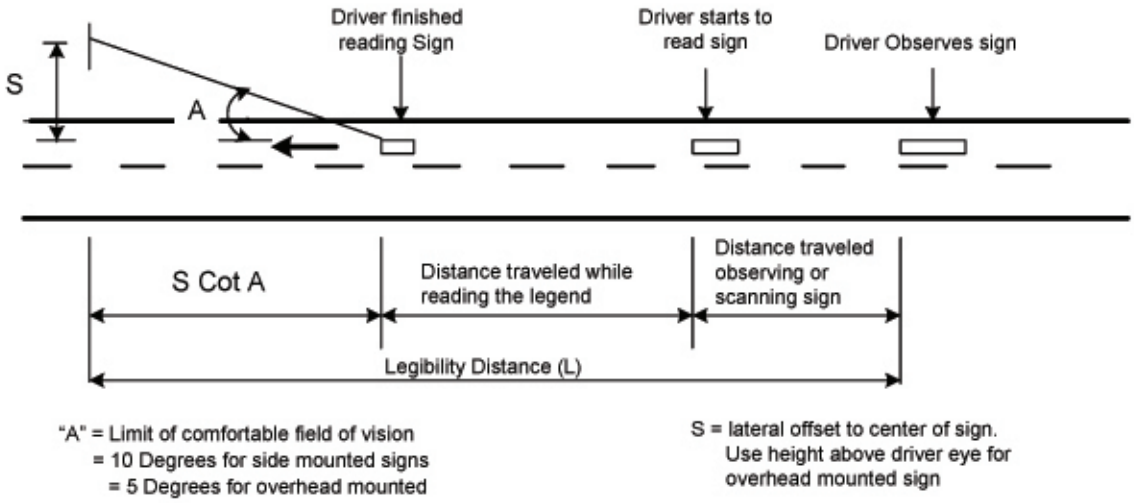


Figure A.1: Sign Legibility Distance

The legibility distances for letters of standard sign alphabets detailed in this manual have been determined for the average observer with normal vision as shown in the following table.

Table A.5: Legibility Distance of Letters

Alphabet Series	Legibility Distance in meters per 100mm of Capital Letter Height
C	50
D	60
E	70
F	75
Mod E (and Lower Case)	75

A7.2 Longitudinal Location of Advance Warning and Direction Signs

Advance Warning signs and Advance Direction Sign are to be placed at appropriate distance before the hazard or the intersection where the driver is required to take action. The location distance D between the sign and the location of the hazard or intersection is shown in the following figure.

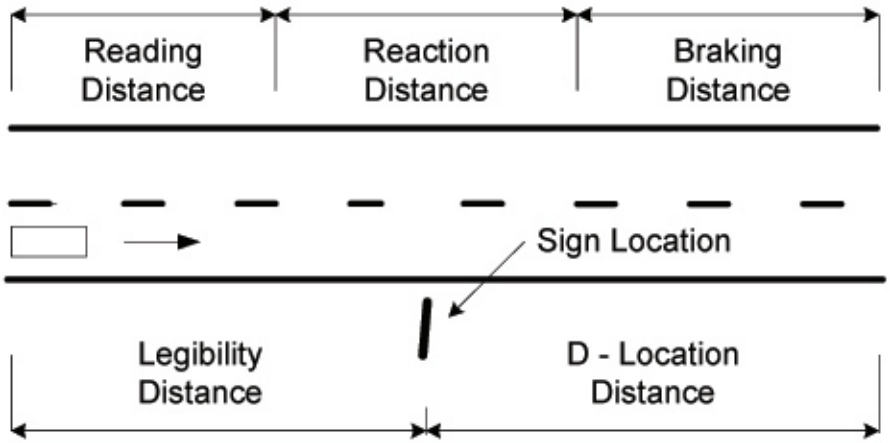


Figure A.2: Longitudinal Location of Signs

The distance required to react to the sign varies considerably depending on the nature of the action required and travel speed. For signs which give an advance warning of an hazard or of a single action required of a driver (i.e., not involving a decision), the location distance for such warning signs is given in the following table.

Table A.6: Longitudinal Location of Signs

Environment	D (m)		B (m)
	Warning Sign	A Direction Sign	
Rural:			
V_{85}: <60 kph	75 - 100	100	50
V_{85}: <75 kph	80 – 120	150	60
V_{85}: 75 – 90 kph	120 – 180	200	70
V_{85}: > 90 kph	180 – 250	250	
Urban **Business and Residential Districts**	30 – 100	100	30
Arterial Roads	As per Rural		
V85th = 85th percentile approach speed measured 1.5 to 2 D in advance of hazard D = Distance of sign to hazard or intersection (or nearest sign to hazard where there are more than one sign) B = minimum distance between successive signs having different messages			

A7.3 Determination of Letter Size and Other Element Sizes

A7.3.1 Letter Size

The following equation applies to check the adequacy of capital letters used in an advance direction sign, including initial capital letter for lower case legends:

$$H = 0.14NV + 11.4S$$

Where **H** = letter height in mm

(initial capital letter for legend with lower case letters)

N = number of words on the sign

V = approach speed in kph

S = lateral offset (m) of center of sign from driver's path

This is the initial capital letter height and the lower case letters are always 75% of the height of the initial capital letter.

This formula applies to the design of mainly directional signs, side mounted in rural highways and freeways in the Type E Modified Capital and lower case letters. For other conditions, the formula should be modified as follows:

- For use of other Series, increase H (after calculation) by the following factors:

  Series C 50%

  Series D 25%

  Series E 7%

- For signs in urban areas, increase H (after calculation) by 25%; and,
- For overhead signs, S used in formula should be vertical offset of center of sign from drivers height multiplied by 2.

The letter size required on signs is the nearest standard letter size to that obtained from the above calculation.

Where an overhead sign is at the side of the road and more than 3m from the edge of the pavement, it may be necessary to calculate the equivalent lateral distance S el from the equation:

$$S\ el = [(S_L)^2 + 4(S_V)^2]^{0.5}$$

where:

S_L = lateral offset of the sign in meters as for formula A1 above

S_V = vertical distance of the center of the sign above driver's eye in meters (distance above the road surface minus 1.2m)

This calculation will ensure the readability of the signs designed, particularly when signs are located at a substantial lateral distance from the road way. It is not always essential that all words on the sign be of the required size, but at least the first line or the most important words should meet the requirement, with other words appropriately smaller (generally no more than one legend size).

The following standard letter sizes are specified:

- Capitals 40mm to 200mm in 20mm increments

  240mm to 320mm in 40mm increments

  all sizes above 400mm in 80mm increments
- Lower case 0.75 x initial capital height for capitals 120mm and above

In practice, the standard letter sizes of made-to-measure direction signs have designated code sizes based on the principal legend height.

Code sizes for standard principal legend heights used for direction signs are:

- AA size 120mm
- A size 140mm
- B size 160 / 180mm
- C size 240mm
- D size 320mm
- E size 400 / 480mm

All lower cases are 0.75 of the size for the capital sizes.

AA size legend is used in exceptional low speed urban areas for lane designation signs and signs on local roads where restriction on overall sign sizes is applied.

The minimum sizes for Advance Direction Signs in metropolitan areas are B sizes.

Size A is generally the minimum size used for intersection directional signing.

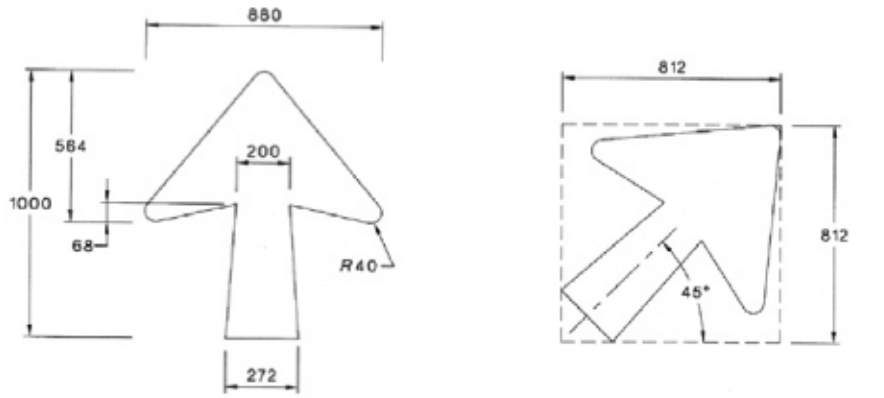
Size B is used for Reassurance Signs where speeds are less than 80 kph.

Size C is used for all overhead mounted Directional signs and for high speed approach roads to expressways.

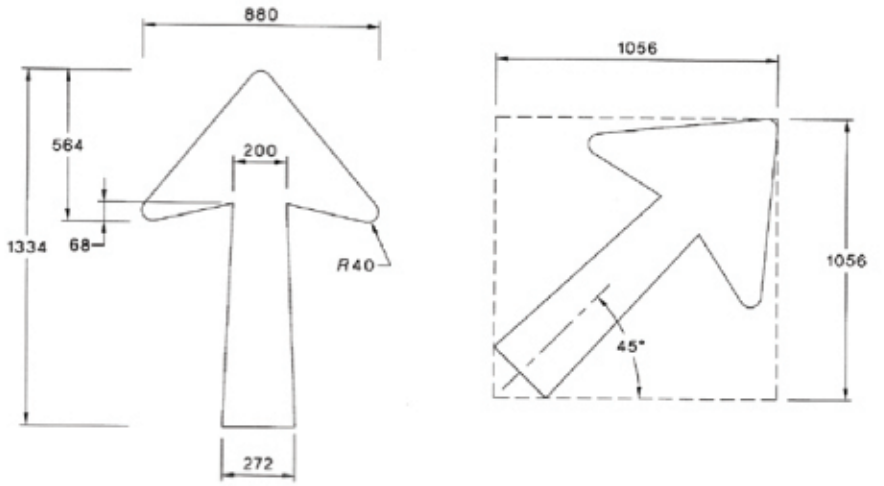
Sizes D and E are used for Directional signs on Freeways and Expressways. Size C is used for Reassurance Signs on Expressways and Freeways.

A7.3.2 Directional Arrows

Standard directional arrows shapes are shown in the following figure. The long arrow is typically used where a single direction, multi-line panel requires a vertical or angle arrow.



(a) Short arrow



(b) Long arrow

NOTES:

1 The arrows in this Figure are appropriate for use on a sign whose principal legend is **640 mm E.Mod/480 mm LC or 480 mm Series A to F.** For other legend heights the arrow size should be altered in proportion.

2 Horizontal arrows have the same dimensions as vertical arrows.

DIMENSIONS IN MILLIMETRES

Figure A.3: Details of Standard Arrows

A8 DESIGN AND LAYOUT OF SYMBOLIC SERVICE SIGNS

A8.1 Scope

This chapter sets out a method of determining the size and layout of symbolic service signs in G7 and GE5 series.

A8.2 Service Symbol Rectangles

Each of the symbols is superimposed on a rectangular grid having a narrow medium or wide configuration as follows:

- Narrow 4 modules wide x 5 modules high
- Medium 5 modules wide x 5 modules high
- Wide 6 modules wide x 5 modules high

The location and size of the symbols within each rectangle is designed so that signs having various arrays of symbols may be made up by allowing a clearance of *one grid module* minimum between adjacent rectangles, between rows of rectangles and between rectangles and other legends, borders etc on the sign.

The grid module sizes for manufacturing the G7 and GE5 signs are shown in the following table.

Table A.7: Grid Module Sizes for Service Signs

Sign Series	Sign Size	Grid Module Size	
		Multi-Symbol	Single Symbol
G7	A	70	90
	B	105	135
GE5	One size only	160	

A8.3 Design Procedures

The recommended procedure for designing a service sign is as follows:

- Establish the sign size designation (e.g., Size A) and, from table A.7, determine the grid module size to be used; and,
- Determine the width of the sign and layout as described in the following layout types:

A8.3.1 For Signs with a Vertical Layout



Figure A.4: Example of Signs on Vertical Layout

- Determine dimension X_1 and X_2 (the length of the rows of symbols) by adding up the number of horizontal grid modules in each symbol rectangle, adding one grid module for each space between the symbols, and multiplying by the grid module size selected (e.g., 70mm for Size A sign). The X_1 in Figure A.4 would be (5 + 1 + 4) x 70 = 700mm. (The Gas Station has 5 modules and the Restaurant has 4 modules – See Service Sign Symbols 1 and 2);

- Determine the dimension W, the overall width of the sign, by adding the greatest of X_1, X_2 or X_3 and the edge distances 2 x Y. The edge distance Y is either:

  - one grid module, plus the border and edge strip if X2 governs or

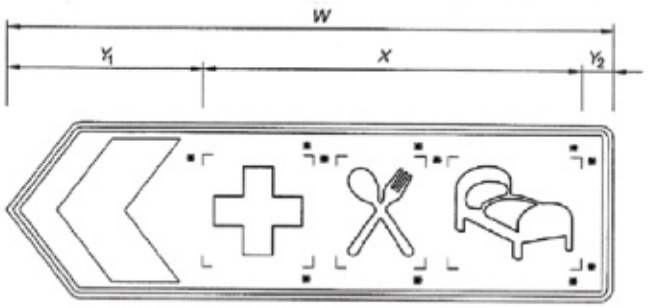
  - 0.6 times the letter height plus width of border and edge strip, if legend line X_3 governs width.

- The vertical distance between rows of symbols is one grid module. The horizontal separation between symbols is always one grid module regardless of whether the row of symbols governs the width of the sign; and,

- If the overall signboard is to be a size convenient for manufacturing, the clearances between symbols and the inside borders may be

decreased to 0.5 times grid module minimum, or increased to 1.25 times grid module maximum. In this example it is either 35mm (0.5 x 70) minimum or 97.5mm (1.25 x 70) maximum)

A8.3.2 For Signs with a Horizontal Layout



*Clearance of *one grid module* applies at these locations. The clearance between symbols and the inside of borders may be adjusted as indicated in ***Section A8.3.1***.

Figure A.5: Example of Horizontal Layout

- Determine X (the width of the row symbols as in A8.3.1 above);
- Determine Y_1 and Y_2 (the two edge distances as shown I relevant drawing on page VV). The Y_2 will normally be equal to one grid module plus the border and edge strip width; and,
- Add X and Y_1 and Y_2 the dimension W, the overall width of the sign.

A9 MATERIALS FOR CONSTRUCTION

Standard road signs may be constructed of metal, timber or plastics. The signs may have a dished, rolled or beaded edge for additional rigidity.

In order to stiffen larger signs and prevent damage by bending, horizontal battens or bars should be fixed to the rear of the signs as supports, and may be utilized to provide mounting to posts.

Metal Signs

Metal signs shall be of:

- Plain carbon steel not less than 1.6mm thick, with the exception of temporary warning signs, which may be a minimum of 1mm with appropriate stiffening;
- aluminum alloy not less than 2.0mm thick unless specially designed stiffening is provided; or,
- other metals suitable for the purpose.

Timber Signs

Timber signs may be of:

- plywood not less than 5-ply thick medium or high density overlaid; or,
- seasoned dressed timber, not less than 30mm thick.

Note: In view of the wide variety of timbers likely to be available, advice should be sought from the local forestry agency regarding suitable available types and grades of timber.

A10 MATERIALS FOR SIGN FACES

Any materials used for the sign face, and not otherwise described in this specification, shall be in accordance with the approved standard specifications as described in the following subsections:

A10.1 Retro-Reflective Materials

Where reflectorization is required the retro-reflecting material shall comply with established standards for retro-reflective materials and devices for road traffic control purposes.

The reflective sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing or dimensional change after two years of unprotected outdoor exposure

The reflective sheeting shall have high reflectivity normal to vehicle headlight dependent on the angle of incidence. The reflective material shall be sharp, no glare, and directed towards the light source of approved angle of incidence.

The reflective sheeting shall perform effectively for a minimum of seven (7) years from date of fabrication.

The reflective sheeting must retain at least 70% (Type 1) and 50% (Type 2) of its original brightness for regular and fluorescent sheeting respectively at the end of seven years. All signs used for road projects should be warranted by the sheeting manufacturer for above-stated performance.

Signs must be dated at the time of installation in order to initiate the 7-year performance warranty. A sign-dating sticker that indicates the manufacturer's name, material type/brand name with the month and year of installation should be placed at the back of the sign face.

The reflective sheeting to be used maybe of two types:

Type I – High Performance Reflective Sheeting

Type I material is to be used for all overhead signs, signs related to movement of pedestrian, chevron alignment signs and signs identified as black spot areas. The reflective sheeting shall consist of full cube micro-prismatic lens sheeting with an interlocking diamond seal pattern with pre-coated adhesive backing protected by a removable liner. The minimum reflective brightness value of reflective sheeting shall be in accordance with the following table.

Table A.8: Reflective Brightness of Traffic Signs Surfaces

	Observation Angle [4](degrees)		
	0.2°	0.5°	1.0°
For –4° Entrance Angle[3]			
White	570	400	120
Yellow	425	300	90
Red	114	80	24
Green	57	40	12
Blue	26	18	5.4
Fluorescent Yellow	340	240	72
Fluorescent Yellow Green	460	320	96
Fluorescent Orange	170	120	36
For 30° Angle[3]			
White	215	150	45
Yellow	160	112	34
Red	43	30	9
Green	21	15	4.5
Blue	10	6.8	2
Fluorescent Yellow	130	90	27
Fluorescent Yellow Green	170	120	36
Fluorescent Orange	64	45	14
For 45° Entrance Angle[3]			
White	100	50	25
Yellow	75	37	19
Red	20	10	5
Green	10	5	3
Blue	4.5	1.5	0.8
Fluorescent Yellow	60	30	15
Fluorescent Yellow Green	80	40	20
Fluorescent Orange	30	15	7

All units are expressed in terms of cd/lux/sq.m.

[3] Entrance Angle – The angle from the illumination axis to the retro-reflector axis. The reflector axis is an axis perpendicular to the retro-reflective surface.

[4] Observation Angle – The angle between the illumination axis and observation axis.

Type II – Medium Performance Reflective Sheeting

Type II material is to be used as minimum standard for all other types of signs not qualified for use under Type I. The reflective sheeting shall consist of non-metalized micro-prismatic lens in an interlocking diamond pattern encapsulated by a flexible transparent plastic film that has a smooth outer surface. The sheeting shall have a pre-coated adhesive protected by an easily removable liner. The adhesive shall be a pressure–sensitive adhesive of the aggressive tack type requiring no heat, solvent, or other preparation for adhesion to surfaces. The minimum reflective brightness of the reflective sheeting shall be as described in the following table.

Table A 9: Reflective Brightness of Traffic Signs Surfaces

(Minimum Coefficient of Retroreflection R_A for new sheeting (cd/lux/sq.m.)

-4° Entrance Angle[2]	Observation Angle[1] 0.2°	0.5°
White	560	200
Yellow	420	150
Red	84	30
Orange	210	75
Green	56	20
Blue	28	10
Brown	17	6
30° Entrance Angle[2]	**0.2°**	**0.5°**
White	280	100
Yellow	210	75
Red	42	15
Orange	105	37
Green	28	10
Blue	14	5
Brown	8.4	3

All units are expressed in terms of cd/lux/sq.m.

[1] Observation (Divergence) Angle – The angle between the illumination axis and the observation axis.

[2] Entrance (Incidence) Angle – The angle from the illumination axis to the retro-reflector axis is an axis perpendicular to the retro-reflective surface.

A10.2 Fluorescent Reflective Sheeting

The fluorescent reflective sheeting shall consist of a visible- activated fluorescent material and full cube micro-prismatic lens sheeting with an interlocking diamond seal pattern with pre-coated adhesive backing protected by a removable liner. The minimum reflective brightness shall be in accordance with the following table.

Table A.10: Reflective Brightness of Traffic Signs Surfaces

	Observation Angle [4] (degrees)		
	0.2°	0.5°	1.0°
For –4° Entrance Angle[3]			
Fluorescent Yellow Green	460	320	96
Fluorescent Orange	170	120	36
For 30° Entrance Angle[3]			
Fluorescent Yellow Green	170	120	36
Fluorescent Orange	64	45	14
For 45° Entrance Angle[3]			
Fluorescent Yellow Green	80	40	20
Fluorescent Orange	30	15	7

All units are expressed in terms of cd/lux/sq.m.

[3] Entrance Angle – The angle from the illumination axis to the retro-reflector axis. The reflector axis is an axis perpendicular to the retro-reflective surface.

[4] Observation Angle – The angle between the illumination axis and observation axis.

A11 POST AND ATTACHMENTS

Posts required for the erection of signs shall be made of galvanized steel pipes not less than 48.8mm (outside diameter) x 3.25mm thick, or other sections of equivalent strength. Aluminum alloy may be used. Plastics may be considered, provided they have been suitably evaluated.

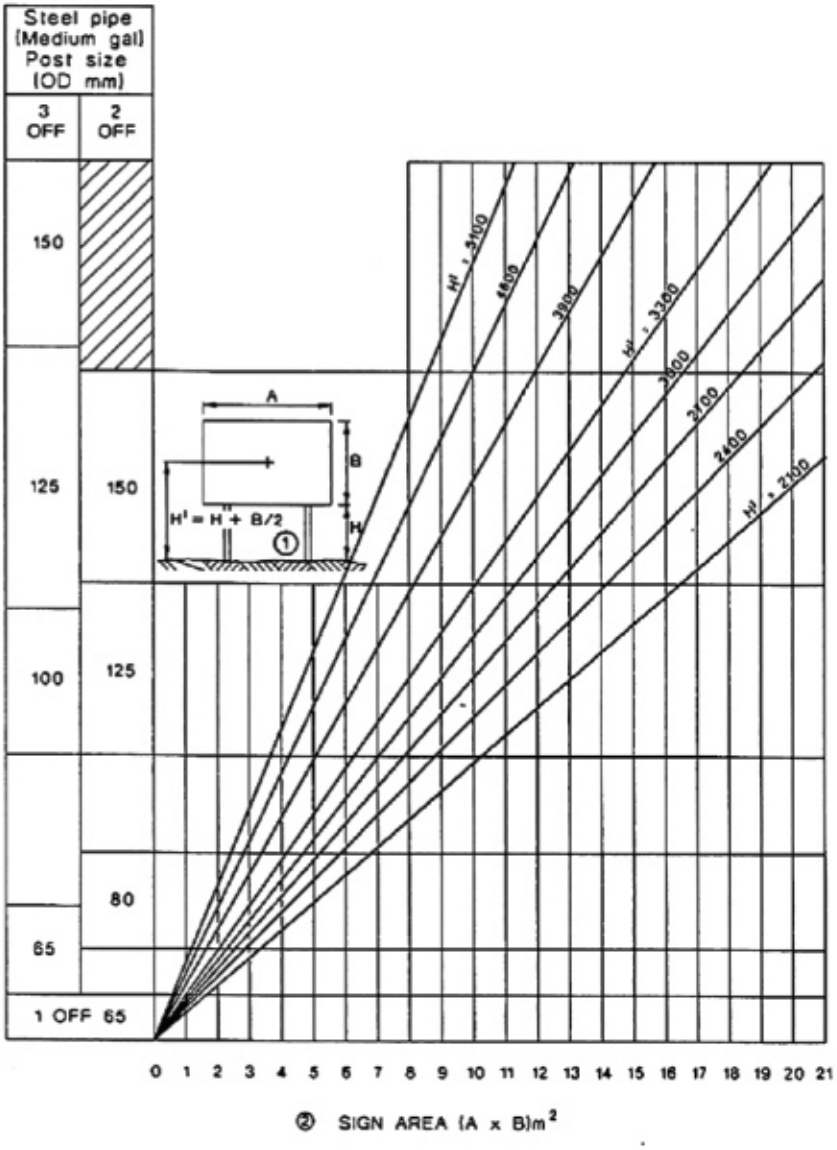
Wide flange posts and frames shall be fabricated from structural steel conforming to ASTM A 283 Grade D. In lieu of wide flange steel posts, the Contractor may use tubular steel posts conforming to ASTM A 501. All posts shall be thoroughly cleaned, free from grease, scale and rusts and shall be given one coat of rust-inhibiting priming paint and two coats of gray paint in accordance with Item 411, Paint DPWH Standard Specification.

Selection of non-frangible signpost lengths based on sign panel sizes and post diameters is given in Figure A.6.

Attachments shall provide for the positive and robust connection of signs to their mounting posts. Consideration shall be given to distributing attachment loads, e.g., by the provision of suitably shaped saddles and clamps or brackets for a round post.

For larger signs, the design of the sign support system as a whole shall take into account possible wind loadings and the criteria specified in appropriate Philippine code for structural designs.

A typical sign mounting is shown in Figure A.7.



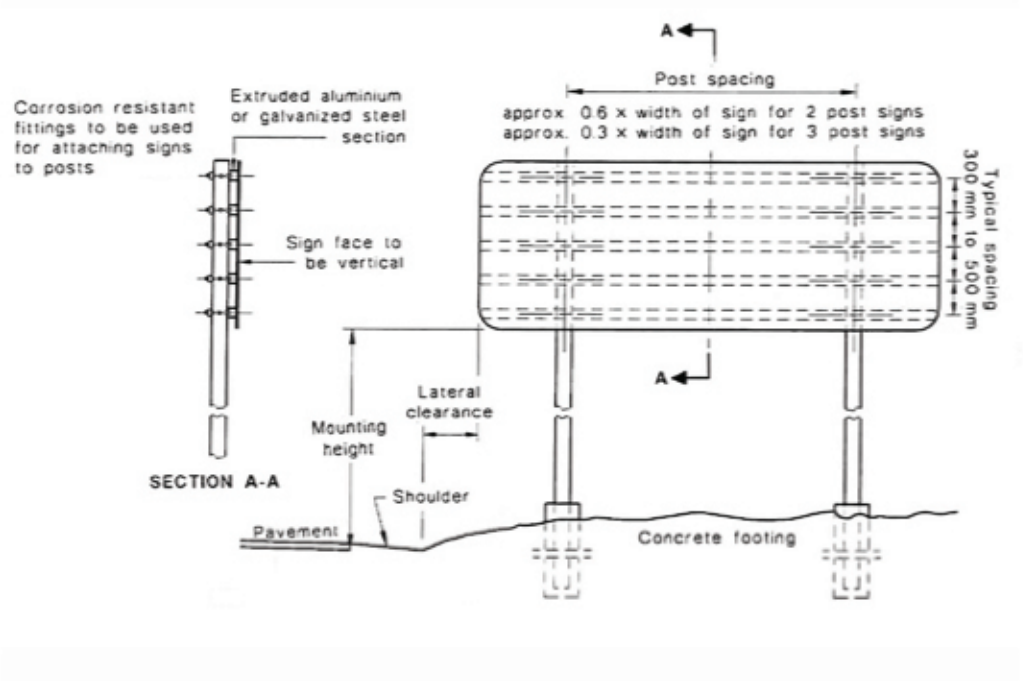
NOTES:

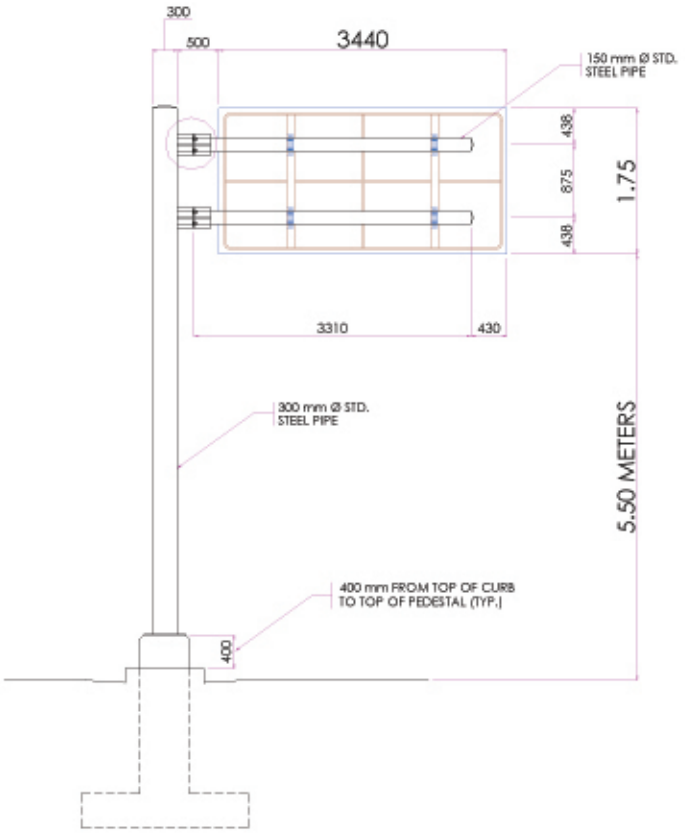
1 Dimensions H and H^1 relate to ground surface below sign. On uneven ground, H = height of the longest post.

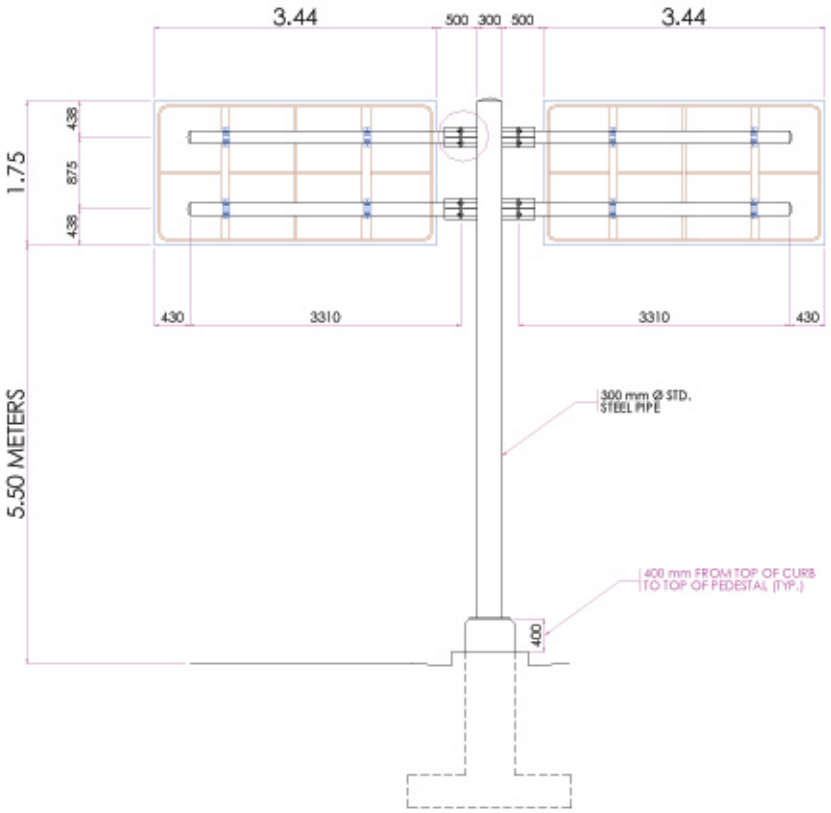
2 Sign areas need to be reduced in locations prone to high winds.

Figure A.6: Signpost Selection Guide

FIGURE A.7: TYPICAL SIGN MOUNTING







A12 PROTECTIVE TREATMENT

All materials used for signs and sign supports shall be either resistant to, or protected against deterioration under exposed paint system.

Where corrosion protection is destroyed or damaged in the manufacturing or fixing process, steps shall be taken to restore protection by appropriate after-treatment.

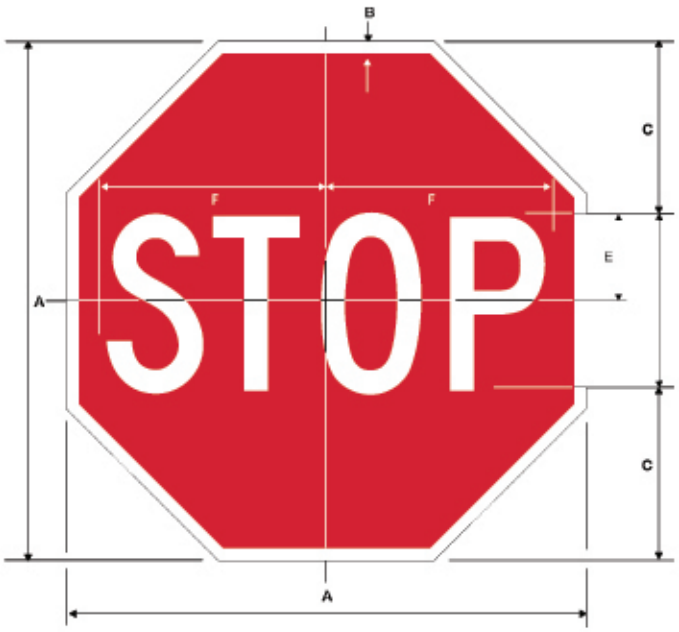
Where different metals are in contact, appropriate action shall be taken to prevent galvanic action and resultant corrosion.

Timber signs shall be sealed at the edges. The timber shall then be properly printed and painted for protection against weather.

SIGNS SPECIFICATIONS

Note: unless otherwise indicated, units shall be in millimeters (mm)

R1-1



	A	B	C	D	E	F
	300	10	105	90 C	45	118.5
	450	10	150	150 C	75	197.5
C	600	15	200	200 C	100	262
	750	20	250	250 C	125	327.5
	900	25	300	300 C	150	393.5
	1200	30	400	400 C	200	525.5

White retro-reflective letters and border on red retro-reflective background

R1-2



	A	B	C	D	E.1	E.2	F	G	H
	600	15	75	35	65.5 E	52.4 E	75.5	20	50
	750	20	100	45	81.9E	65.5E	91	20	50
C	900	25	125	50	100E	79E	162.4	30	60

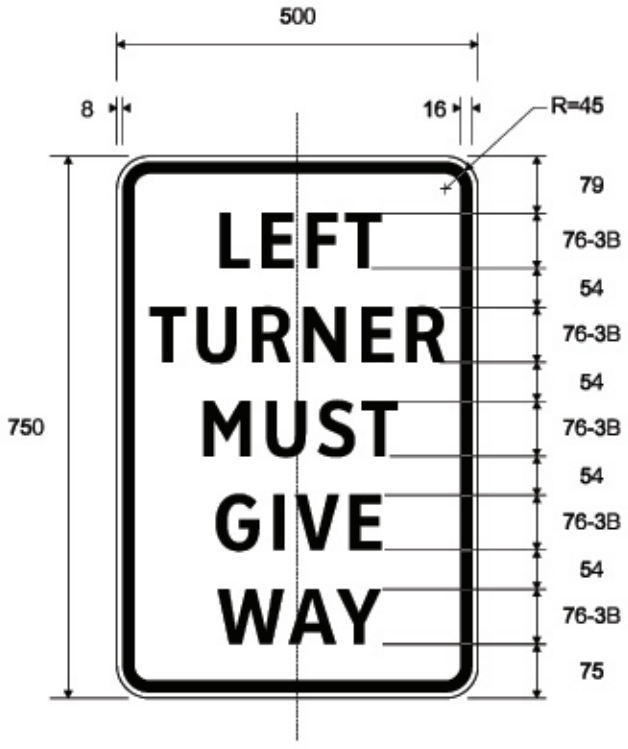
Black letters, red retro-reflective border on white retro-reflective background and edge strip

R1-2P

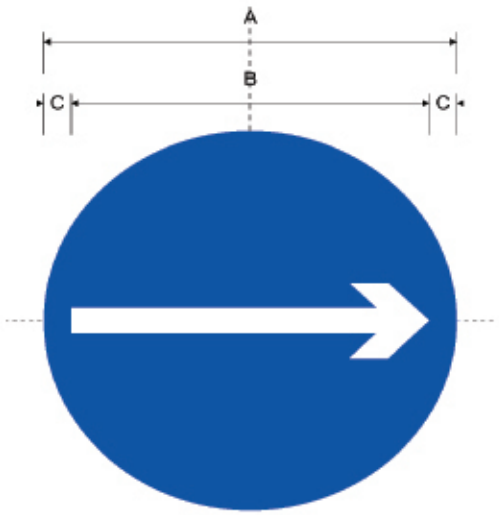


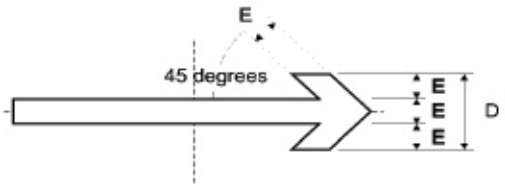
(Standard R1-2 Symbol)
Black letters and border on white retro-reflective background

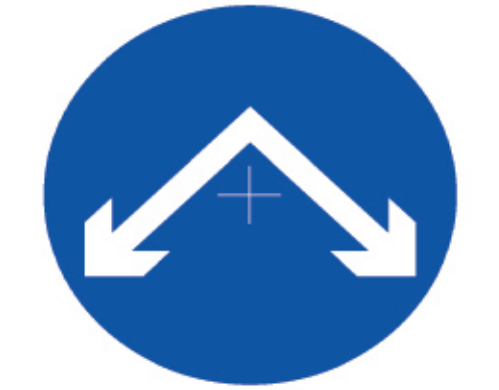
R1-3

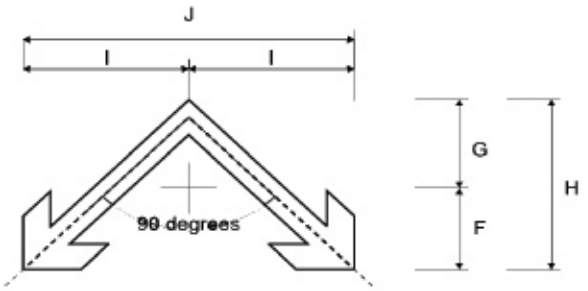


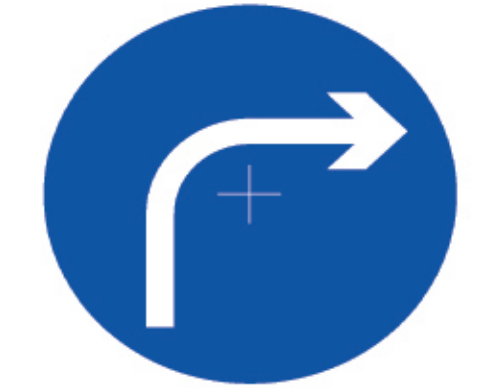
Black letters and border on white retro-reflective background

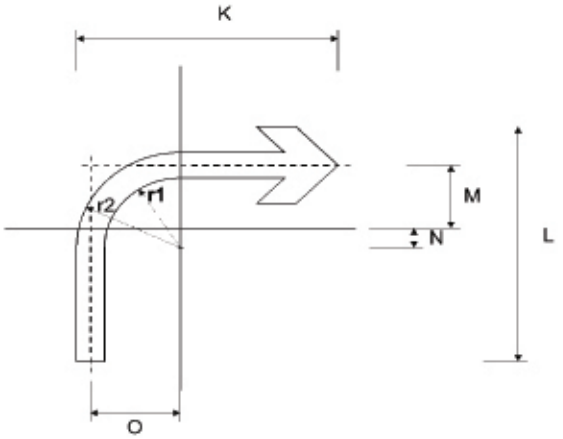












A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	r1	r2
450	360	30	90	30	86	105	200	180	285	285	277.5	75	22.5	97.5	82.5	112.5
600	520	40	120	40	129	140	266	240	400	380	370	100	30	130	110	150
750	650	50	150	50	161	175	50	300	600	475	462.5	125	37.5	162.5	137.5	187.5

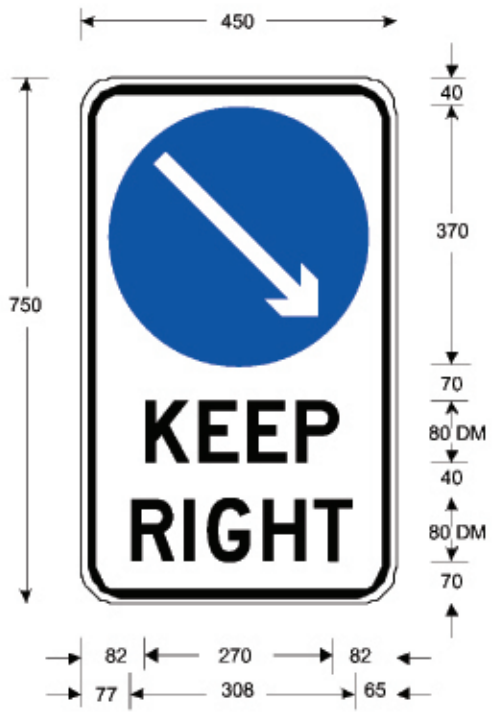
R2-2(R), R2-4, R2-5(R)

Black letters and border on white retro-reflective background

Note:

For design of a 370mm dia disc, the corresponding dimensions are reduced by approximately 38% (i.e., 62% of the dimensions illustrated).

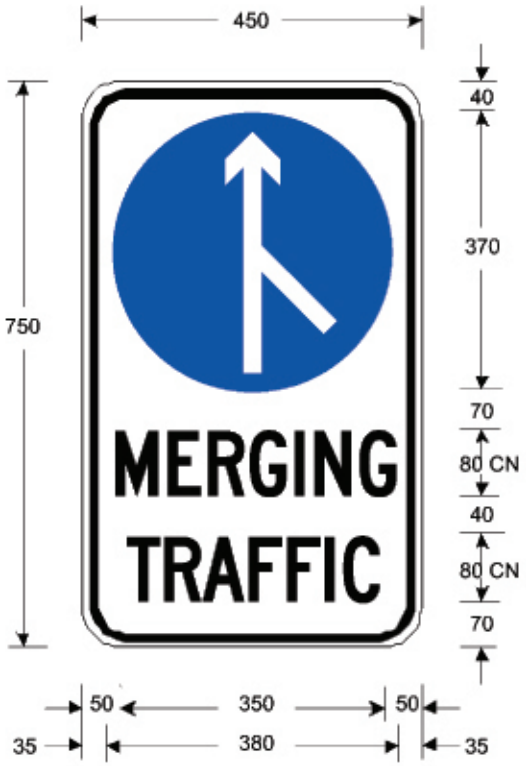
R2-3P



Black letters and border on white retro-reflective background

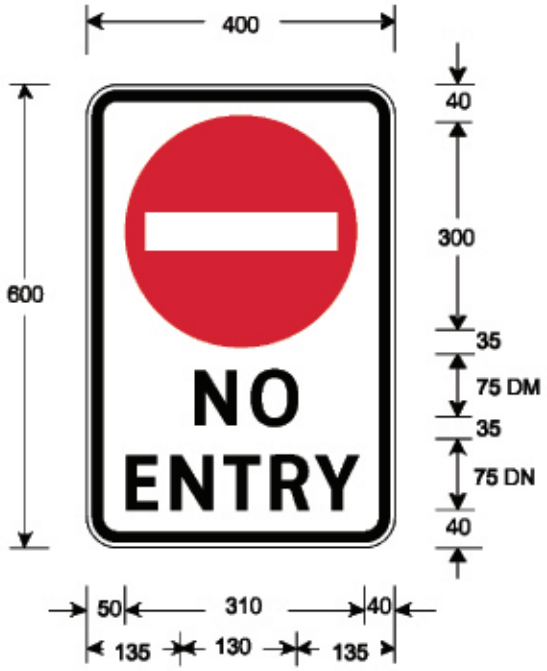
R2-6P

Note:
Use appropriate designs for 370mm discs

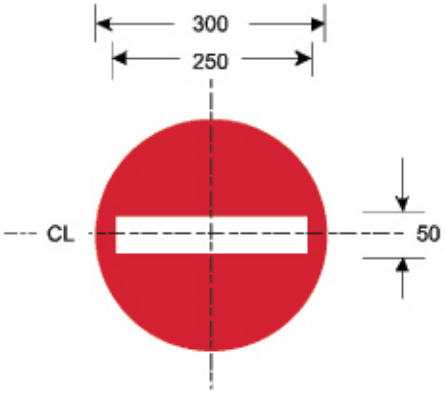


Black letters and border on white retro-reflective background

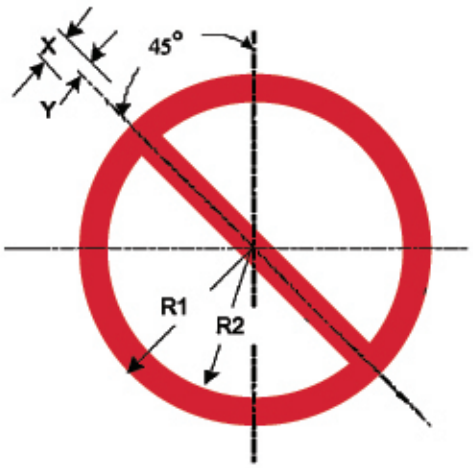
R3-1P



Black letters and border on white retro-reflective background



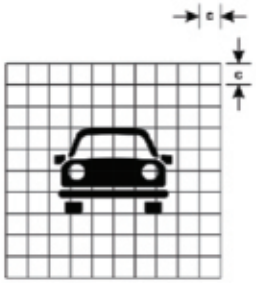
R3 Prohibition Symbol



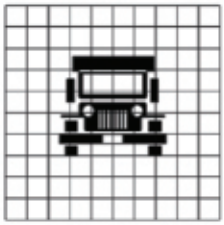
	Disc Size (mm dia)		
	450	**600**	**750**
R1	225	300	375
R2	202.5	250	315
X	40	50	60
Y	20	25	30

Note: This prohibitive symbol does not apply to signs R3-13 (No Right Turn), R3-14 (No Left Turn) and R-15 (No U turn). See separate design for these signs.

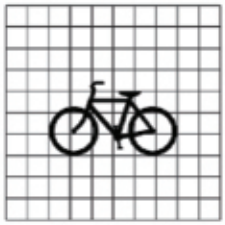
Symbols for regulatory signs



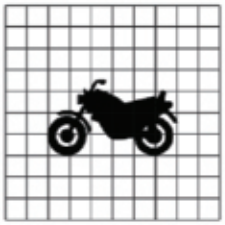
R3-2



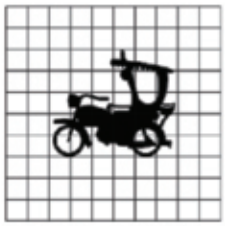
R3-3



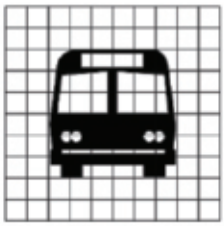
R3-4



R3-5



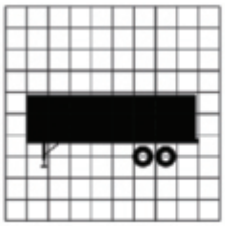
R3-6



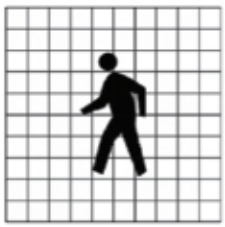
R3-7



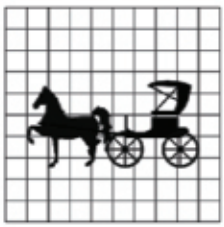
R3-8



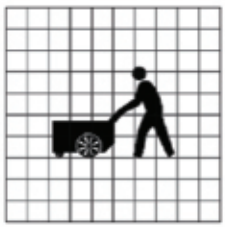
R3-9



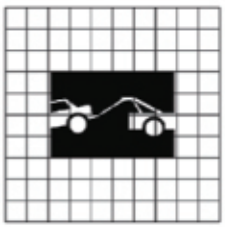
R3-10



R3-11



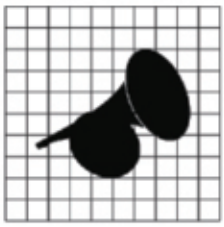
R3-12



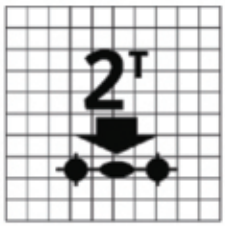
R5-3



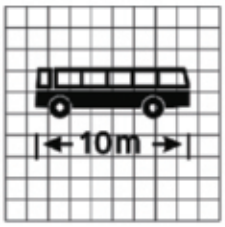
R5-10



R6-1



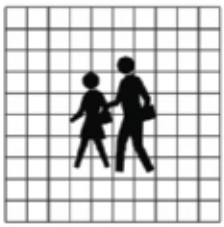
R6-5



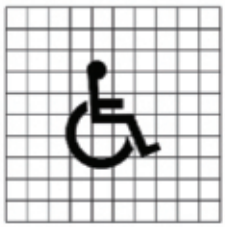
R6-6



R6-7



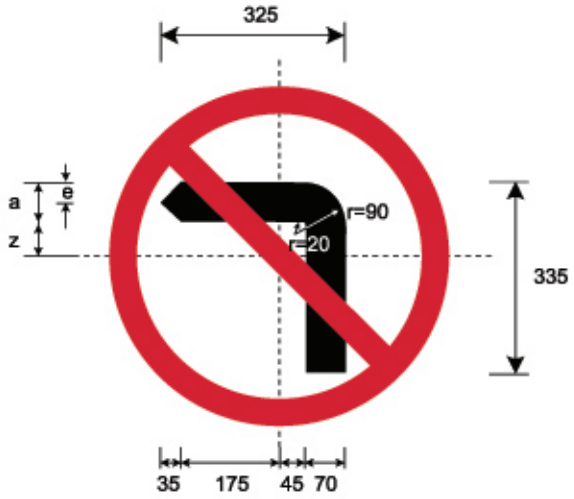
R6-9



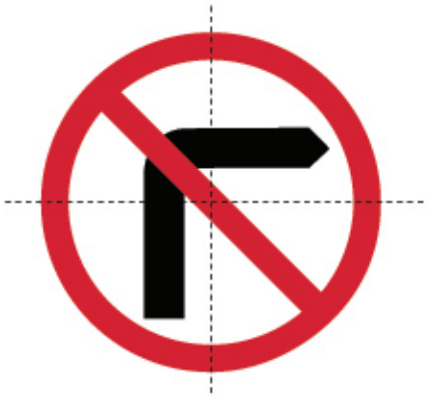
R6-11

Note:
The dimension "c " varies according to size of prohibition symbol

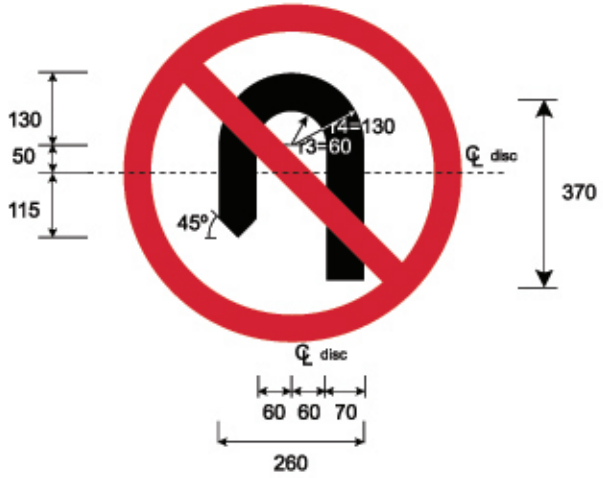
R3-14



R3-13



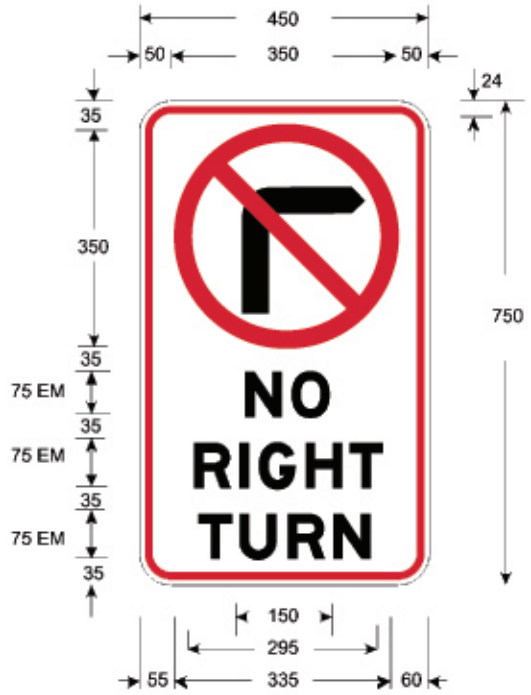
R3-15



Sign Sizes (mm)	A Size 450 dia	B Size(illustrated) 600 dia	C Size 750 dia

Black arrow, red retro-reflective symbol on white retro-reflective background

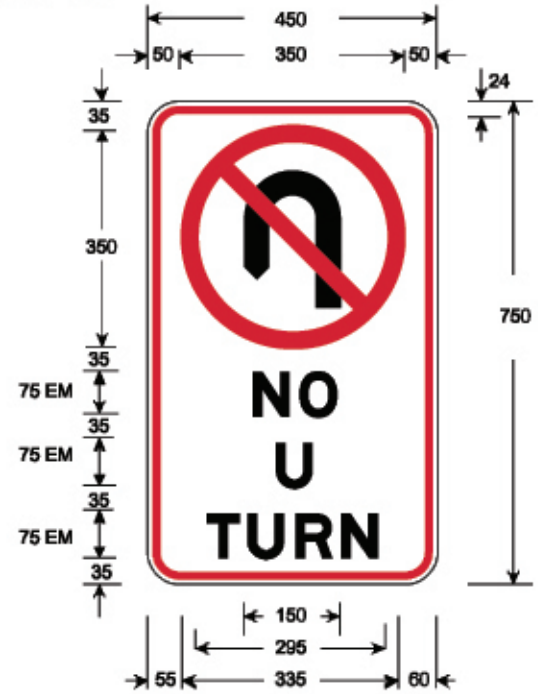
R3-13P



R3-14P

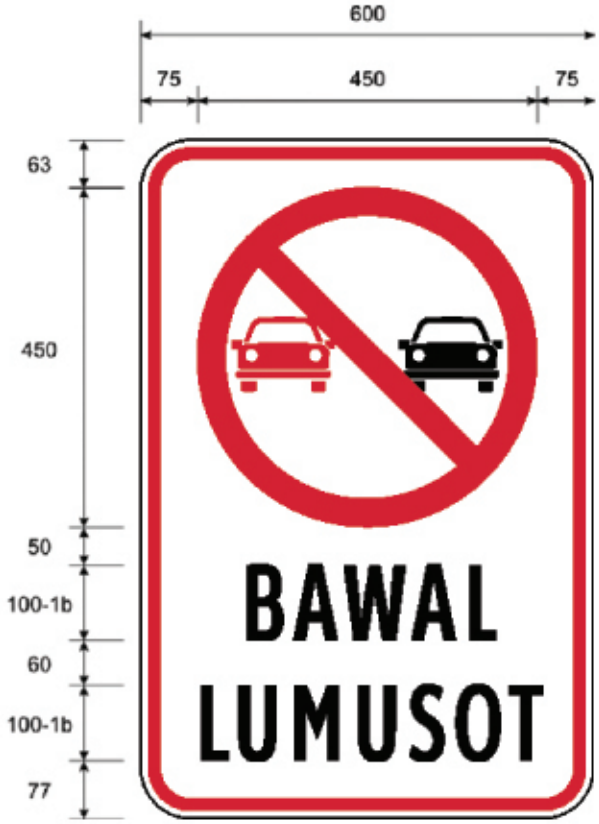


R3-15P

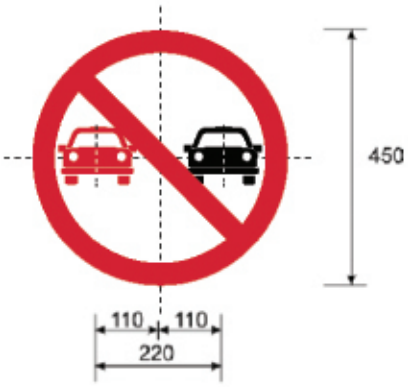


Black letters and movement symbol, red retro-reflective prohibition symbol and border on white retro-reflective background

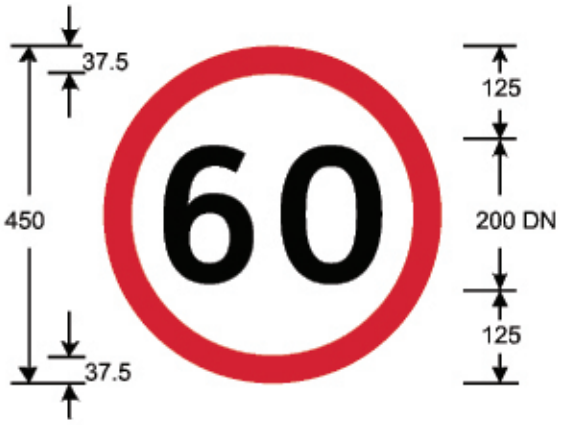
R3-16P



Black letters and right car symbol, red retro-reflective left car and prohibition symbols and border on white retro-reflective background



R4-1(60)

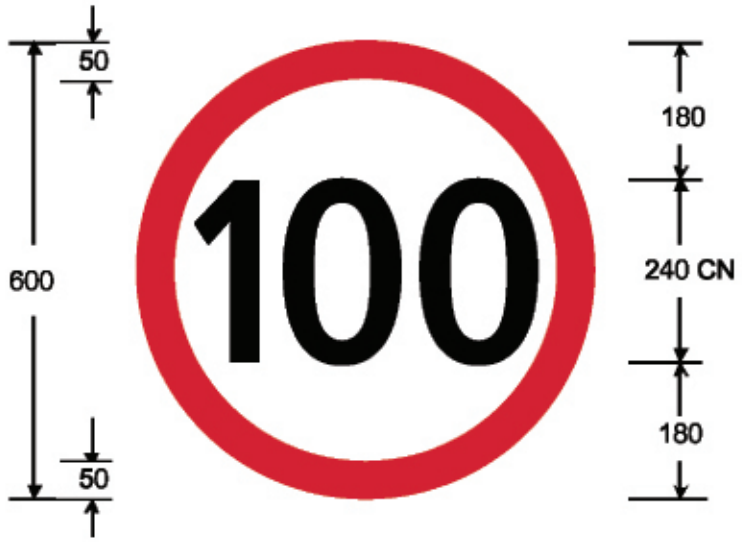


Size in mm		
Disc	**Letter (3 numerals)**	**Ring**
450	200DN	37.5
600	240DN (240 CN*)	50
900	400 DN (320 DN*)	70

*For Speed > 100kph use medium spacing

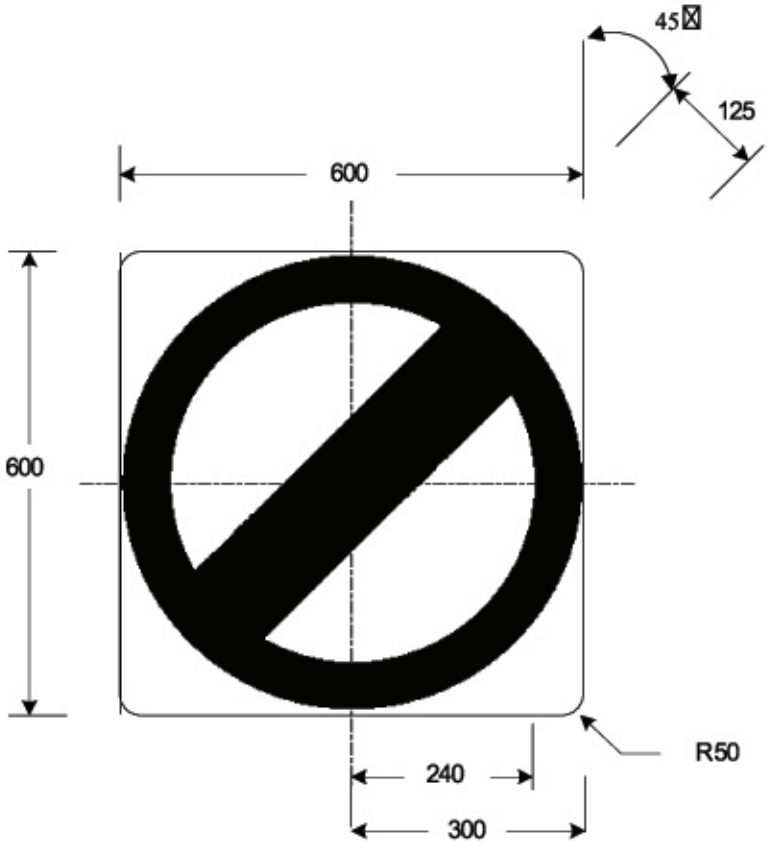
Black numerals and red border on white retro-reflective background

R4-1(100)



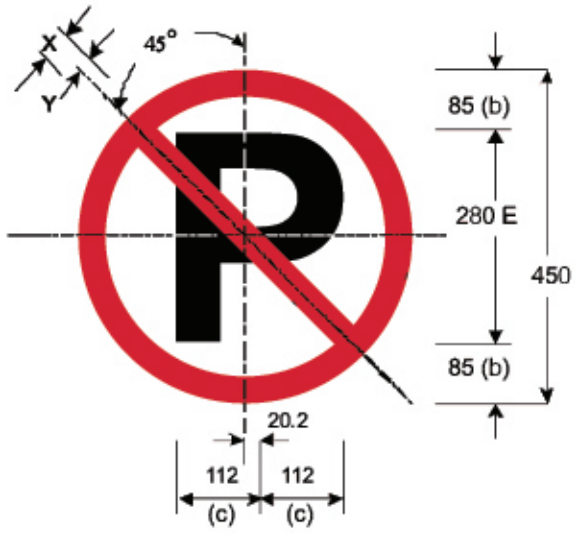
Black numerals and red border on white retro-reflective background

R4-2



Black symbol on white retro-reflective ground

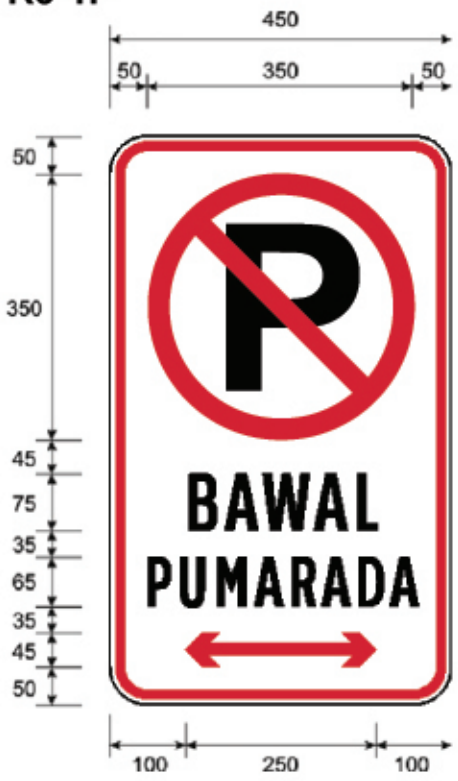
R5-1S



Size (mm)		
	A	B
Disc	450	600
Letter	280E	360E
b	85	120
c	112	149
X	40	50
Y	20	25

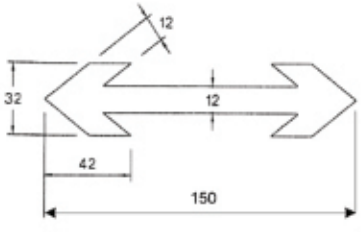
Black P, red symbol on white retro-reflective background

R5-1P



R5-2P

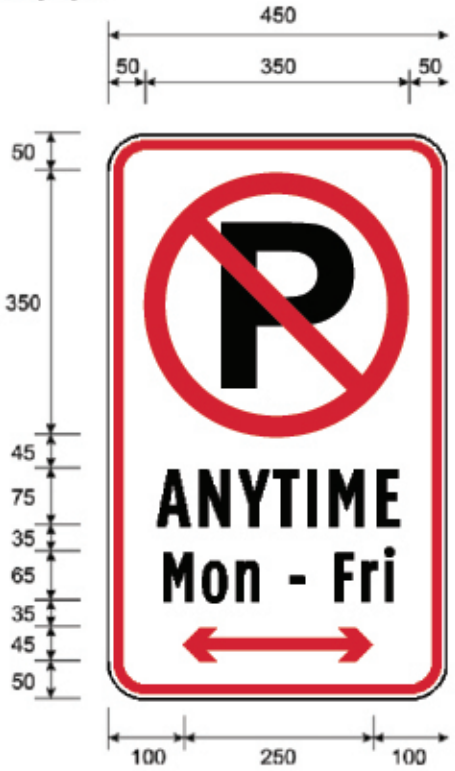


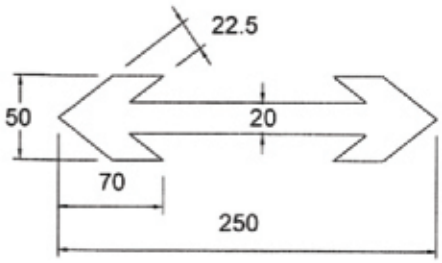


Detail of Arrow

Black P, red symbol on white retro-reflective background

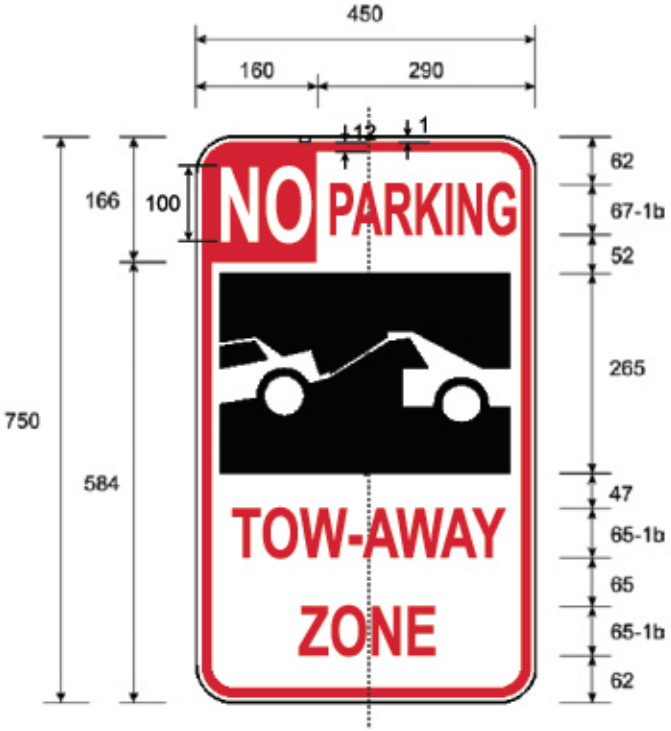
R5-3P





Detail of arrow

R5-3C

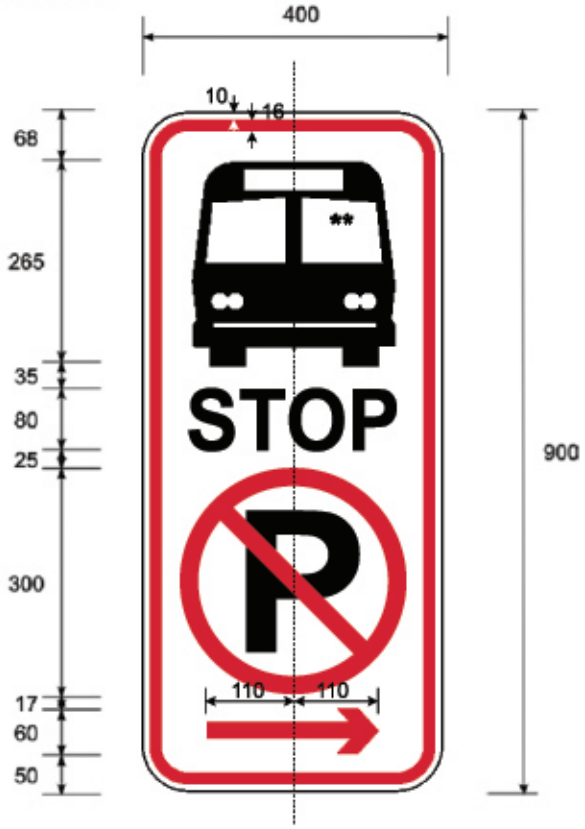


R5-8



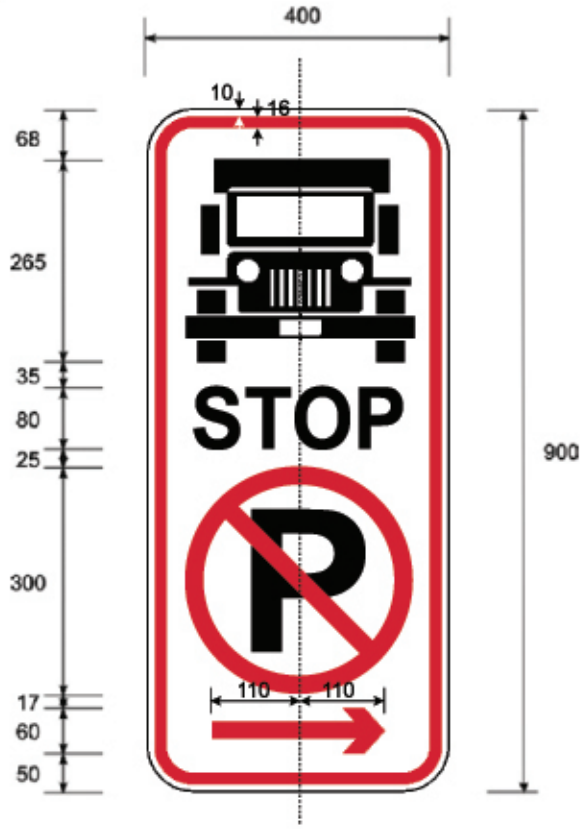
Red symbol, text and arrow on white retro-reflective background

R5-9a



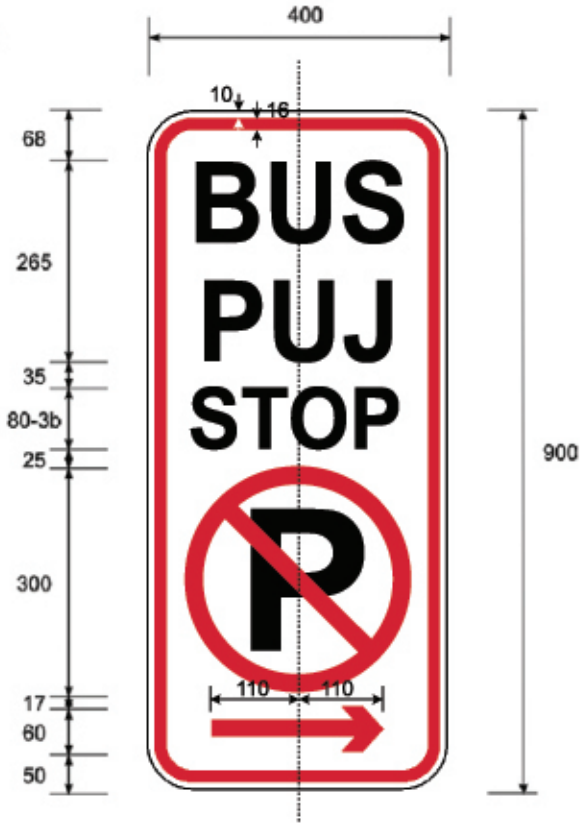
Black letters and symbol, red retro-reflective prohibition symbols, arrow and border on white retro-reflective background

R5-9b



Black letters and symbol, red retro-reflective prohibition symbols, arrow and border on white retro-reflective background

R5-9c

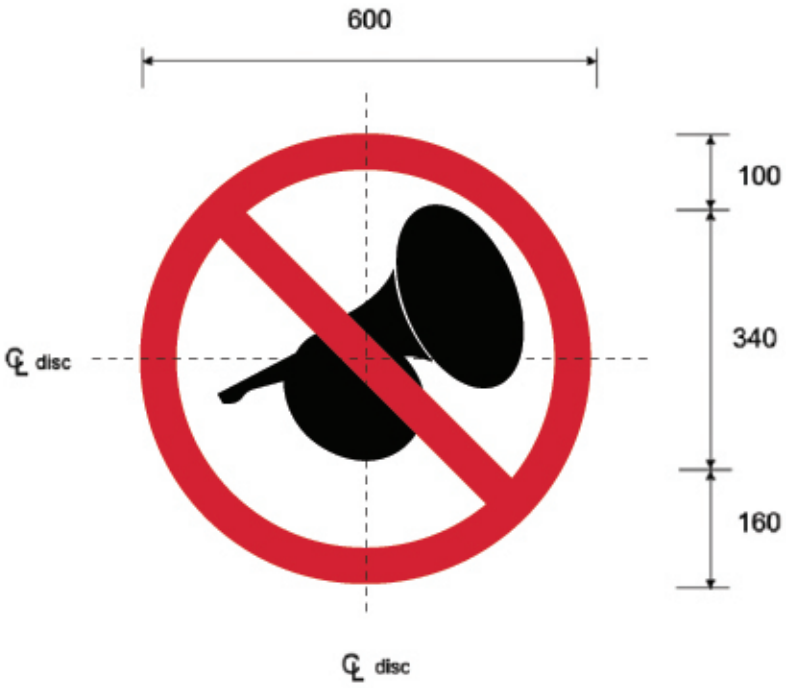


Black letters, red retro-reflective prohibition symbols, arrow and border on white retro-reflective background

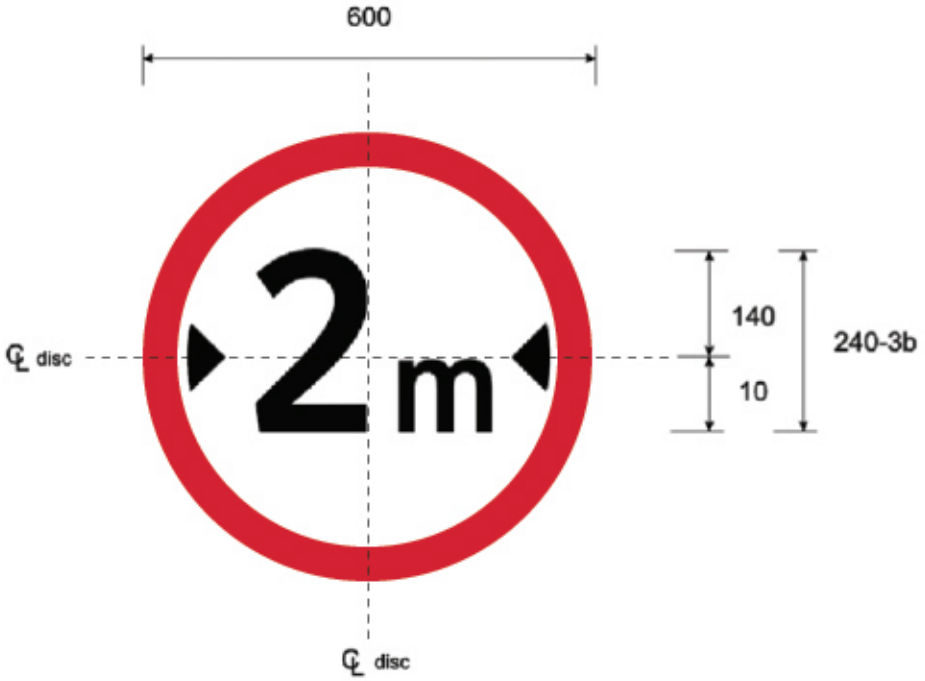
R5-10


400
10
380
10
10
250
50
50-3b
47
50-3b
47
50-1b
46
600
DO NOT
BLOCK
INTERSECTION
68
269
63
92
220
88
26
348
26

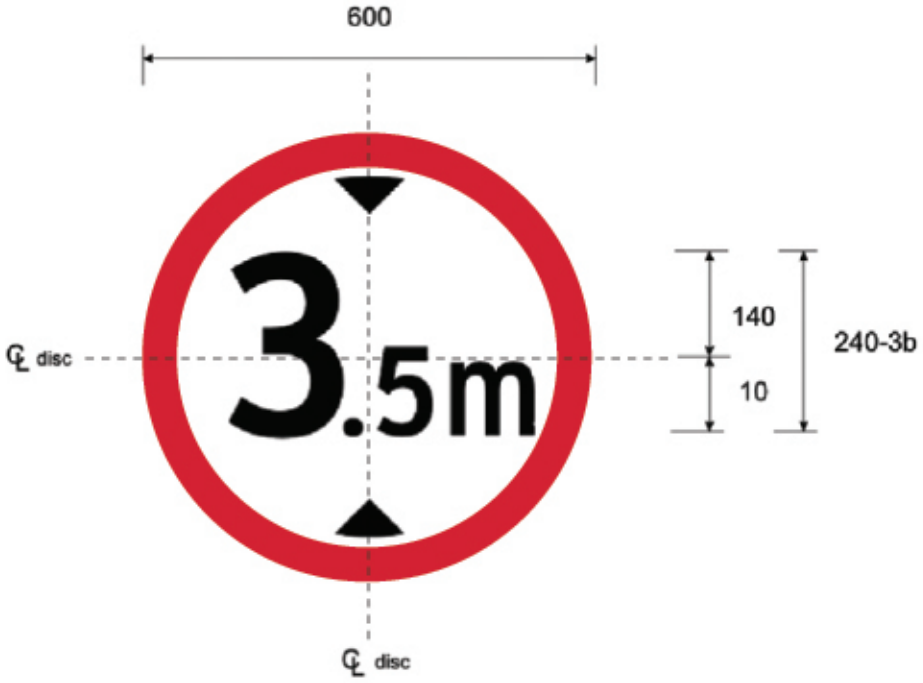
R6-1


600
100
340
160
℄ disc
℄ disc

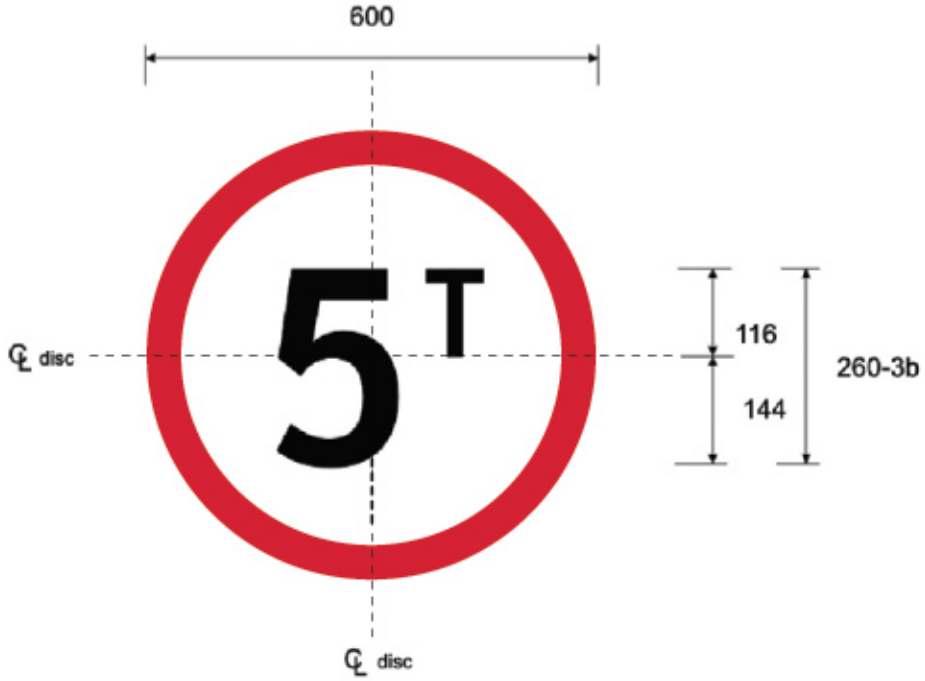
R6-2



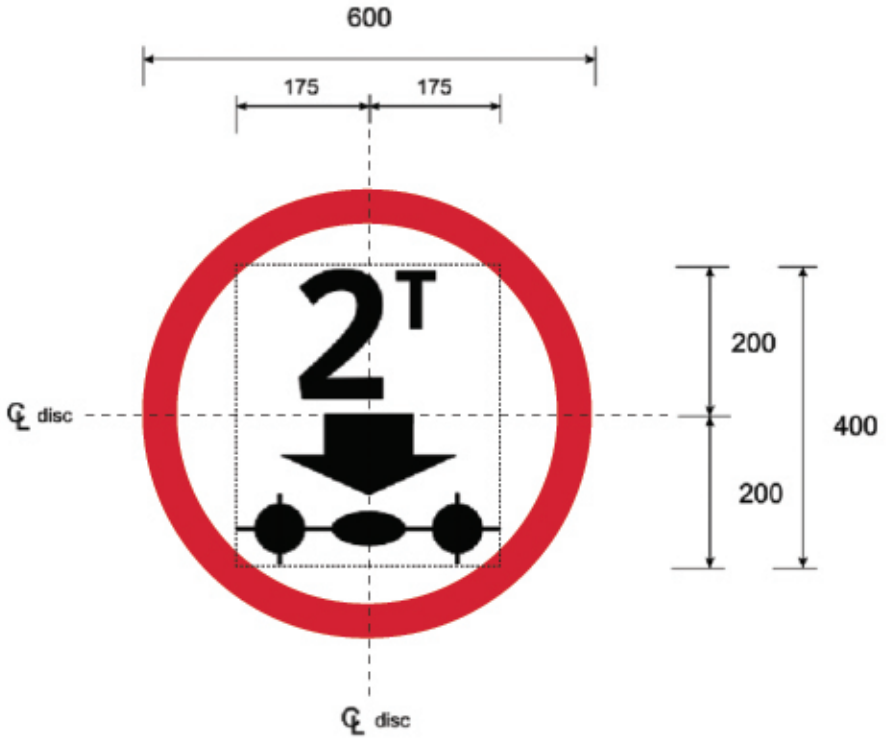
R6-3



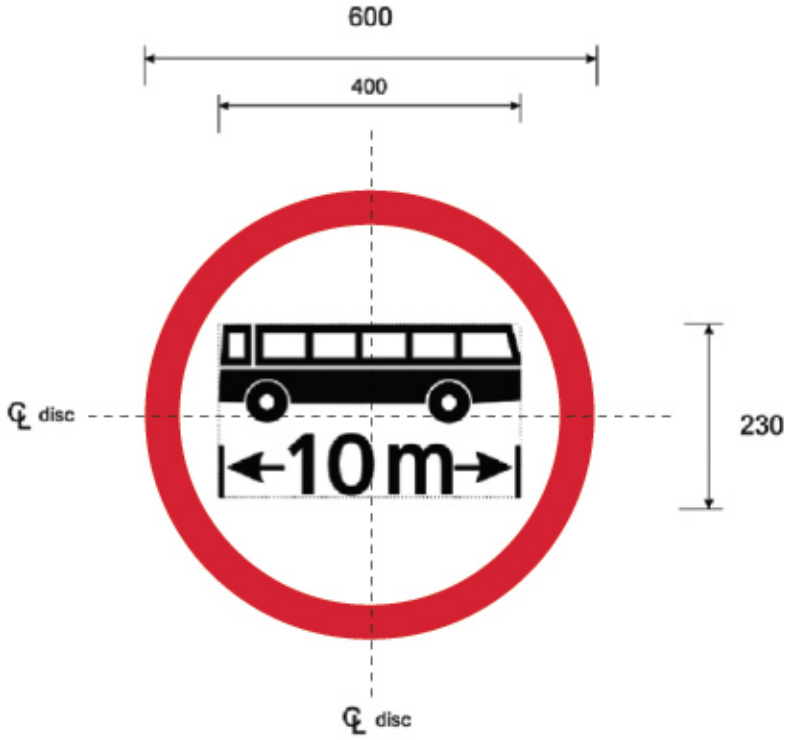
R6-4


600
5 T
℄ disc
116
144
260-3b
℄ disc

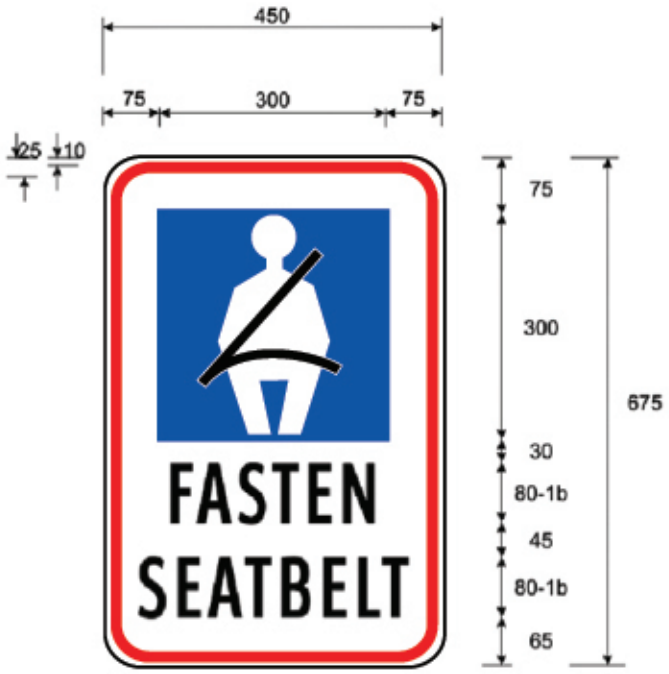
R6-5


600
175
175
2 T
℄ disc
200
200
400
℄ disc

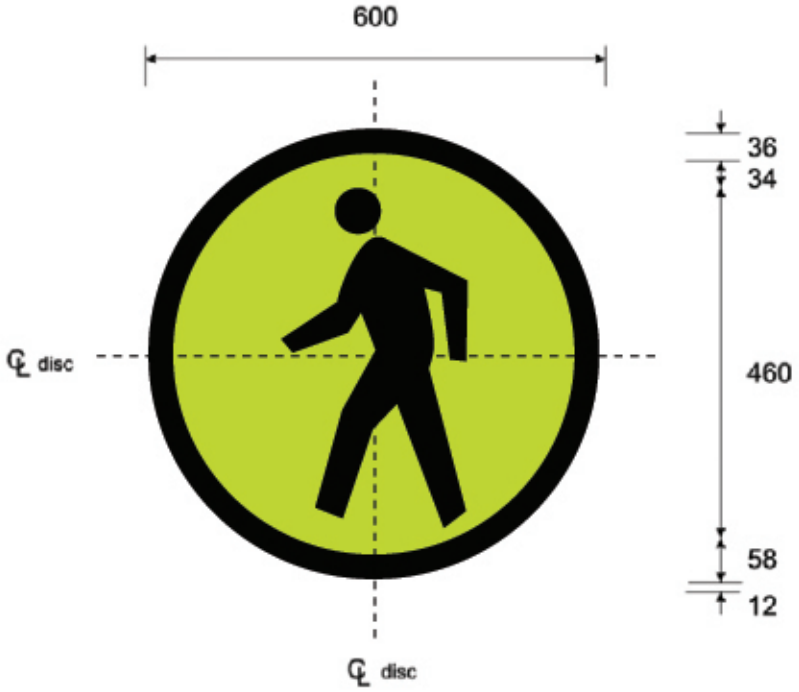
R6-6


600
400
disc
10m
230
disc

R6-7

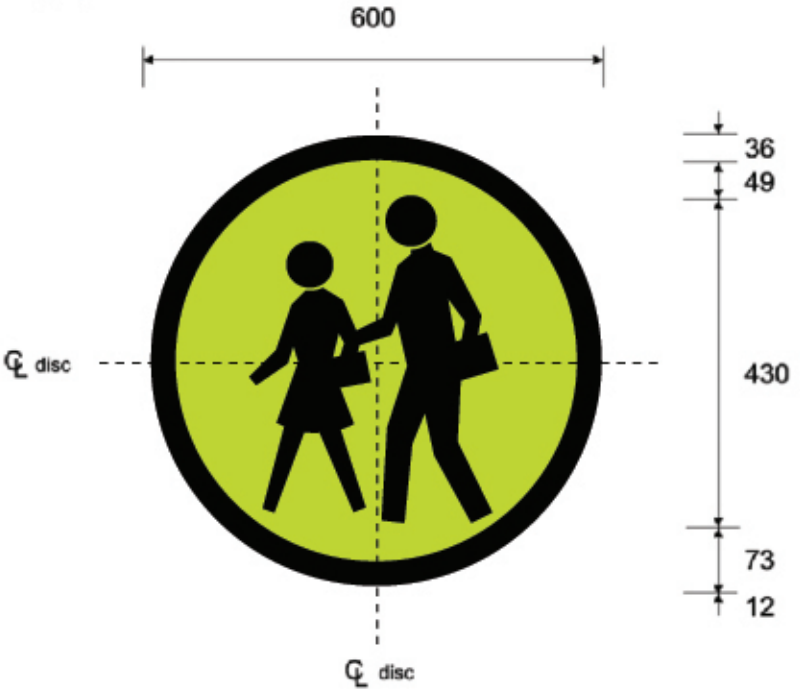

450
75
300
75
25
10
FASTEN
SEATBELT
75
300
675
30
80-1b
45
80-1b
65

R6-8



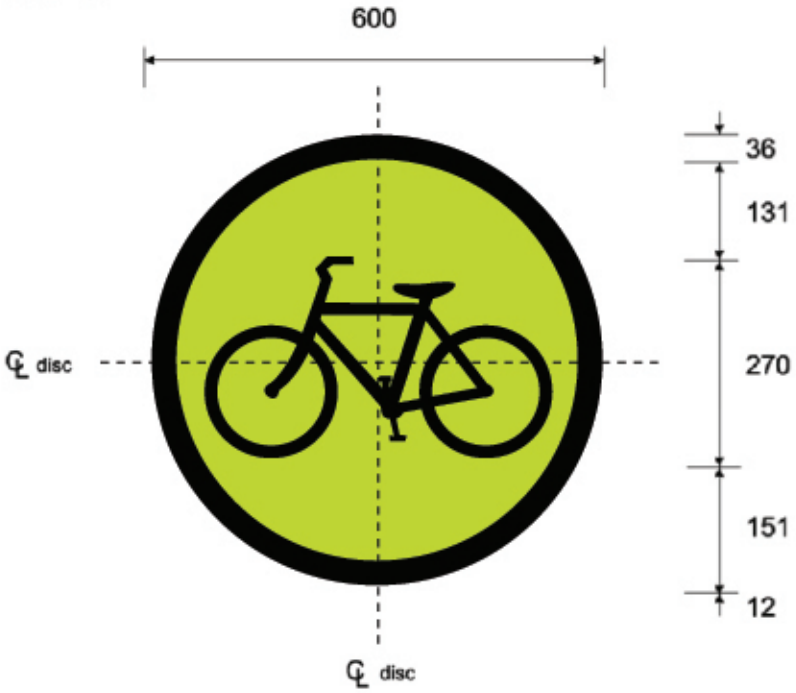
Black symbol and border on retro-reflective fluorescent yellow-green background

R6-9

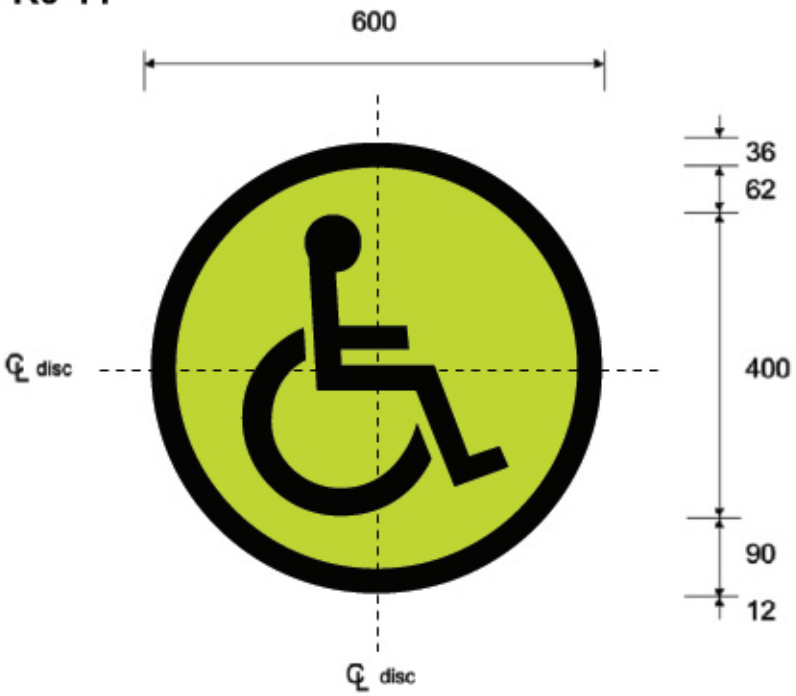


Black symbol and border on retro-reflective fluorescent yellow-green background.

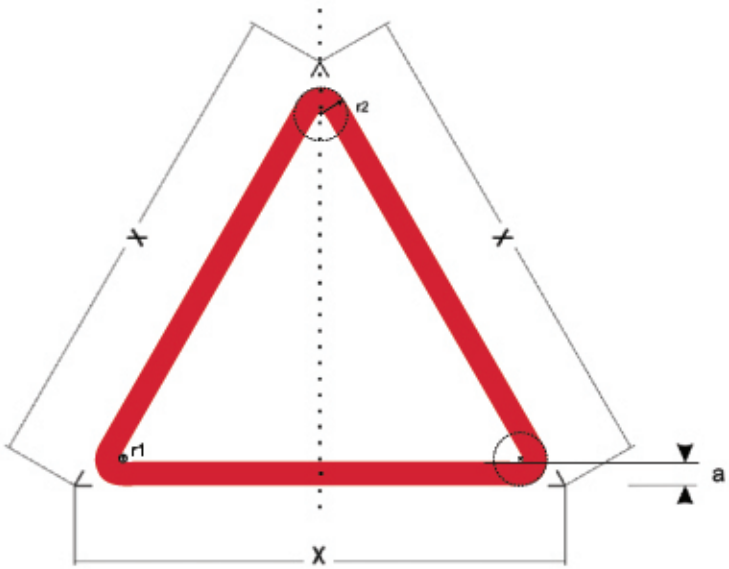
R6-10



R6-11

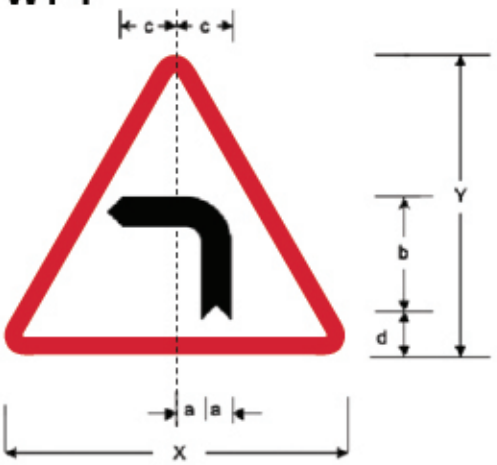


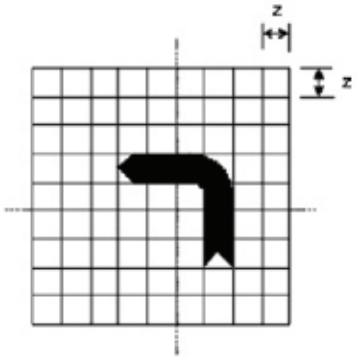
W Series Symbol



size	B	C	D
X	600	750	900
a	28	35	42
r1	4	5	6
r2	32	40	48

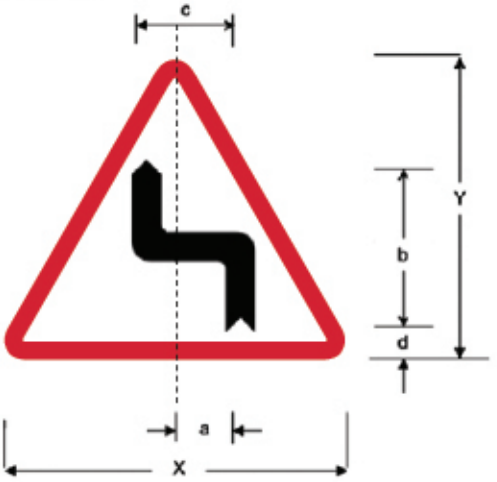
W1-1

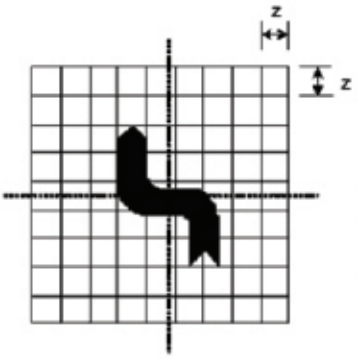




X	600	750
Y	520	650
a	50	60
b	200	240
c	100	120
d	56	70
z	50	62

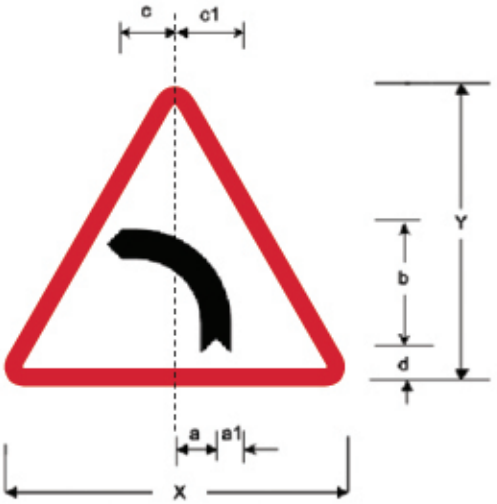
W1-2

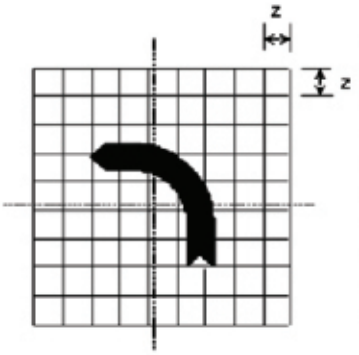




X	600	750
Y	520	650
a	100	120
b	250	310
c	175	220
d	56	70
z	50	62

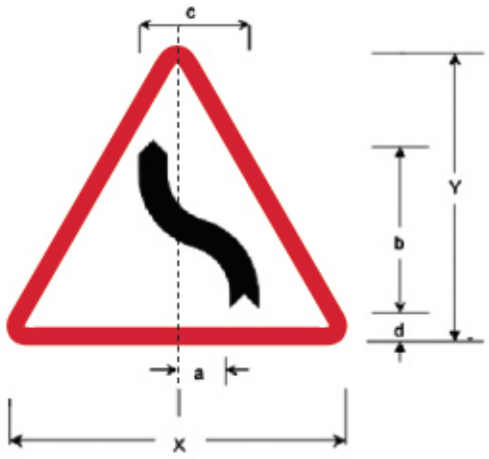
W1-3

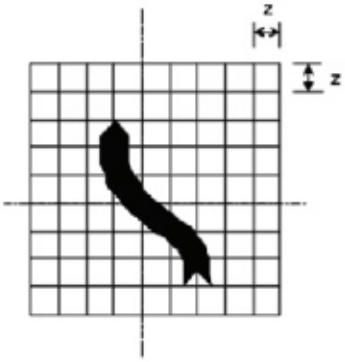




X	600	750
Y	520	650
a	70	88
a1	50	62
b	225	280
c	100	125
c1	120	150
d	56	70
z	50	62

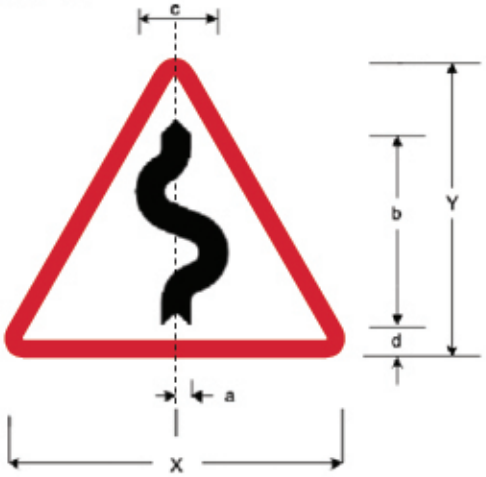
W1-4

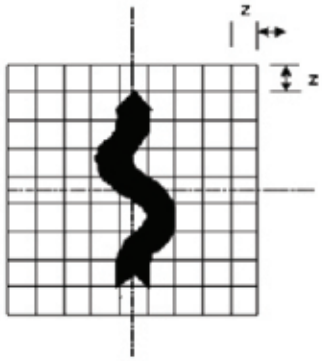




X	600	750
Y	520	650
a	75	94
b	300	375
c	200	250
d	50	62
z	50	62

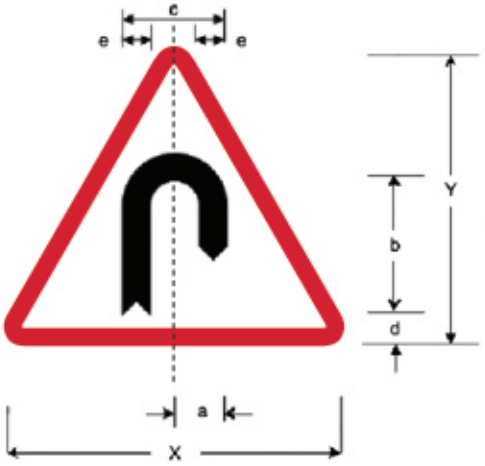
W1-5

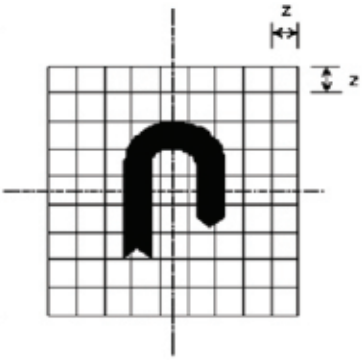




X	600	750
Y	520	650
a	50	62
b	350	437
c	153	190
d	50	62
z	50	62

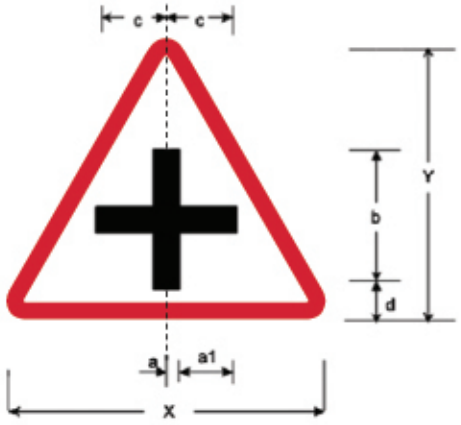
W1-6

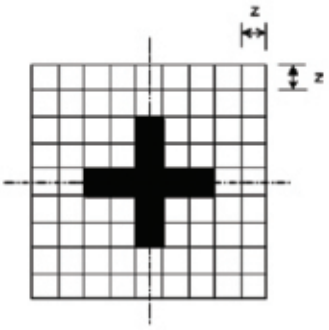




X	600	750
Y	520	650
a	90	112
b	250	312
c	180	225
d	50	62
z	50	62

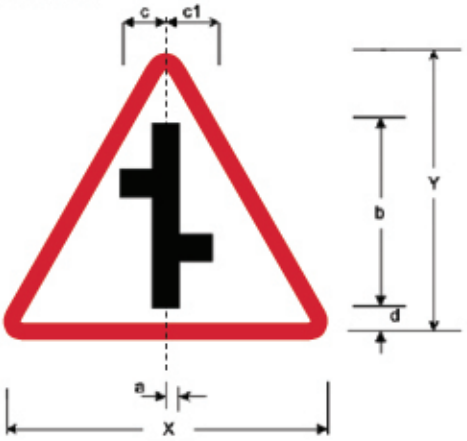
W2-1

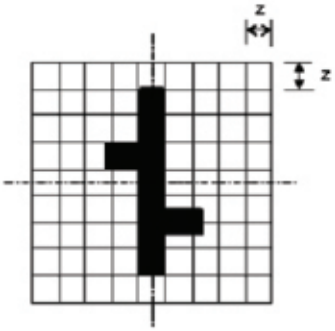




X	600	750
Y	520	650
a	25	31
b	250	312
c	125	156
d	75	94
z	50	60

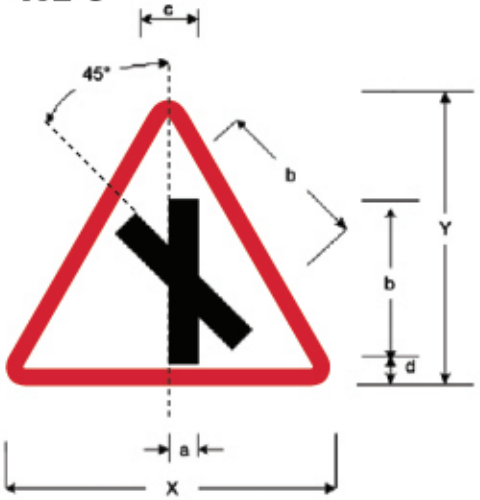
W2-2

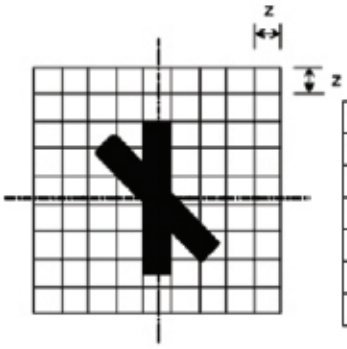




X	600	750
Y	520	650
a	25	31
b	350	438
c	80	100
c1	100	125
d	50	62
z	50	62

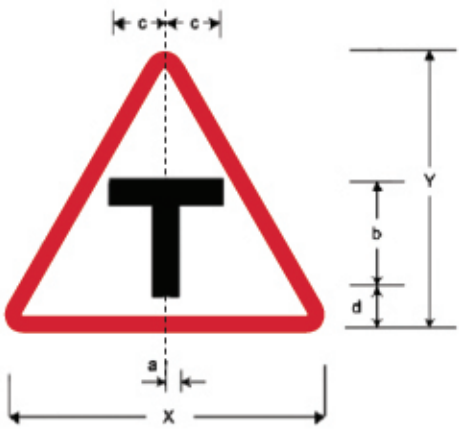
W2-3

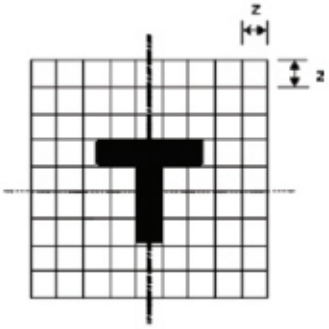




X	600	750
Y	520	650
a	50	62
b	275	344
c	100	125
d	50	62
z	50	62

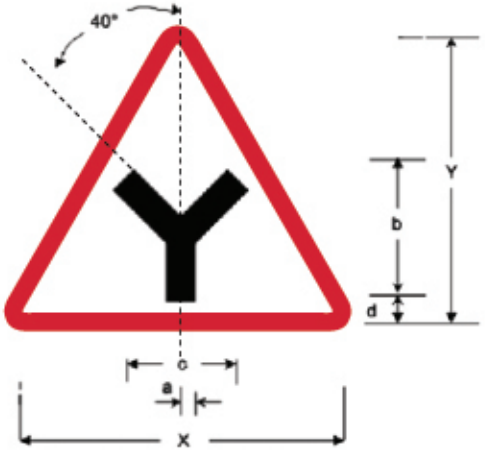
W2-4

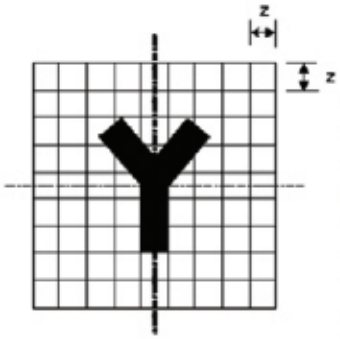




X	600	750
Y	520	650
a	25	31
b	200	250
c	100	125
d	75	94
z	50	62

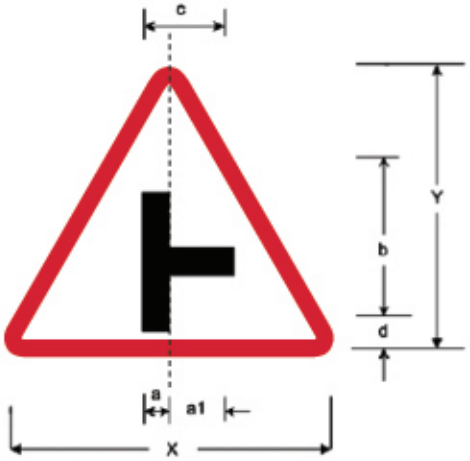
W2-5

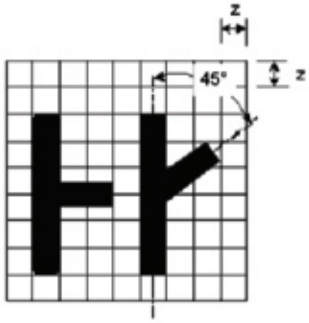




X	600	750
Y	520	650
a	25	31
b	250	312
c	200	250
d	50	62
z	50	62

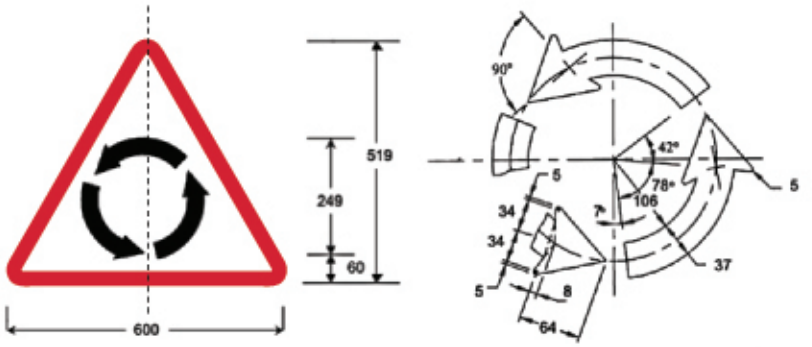
W2-5A and W2-6





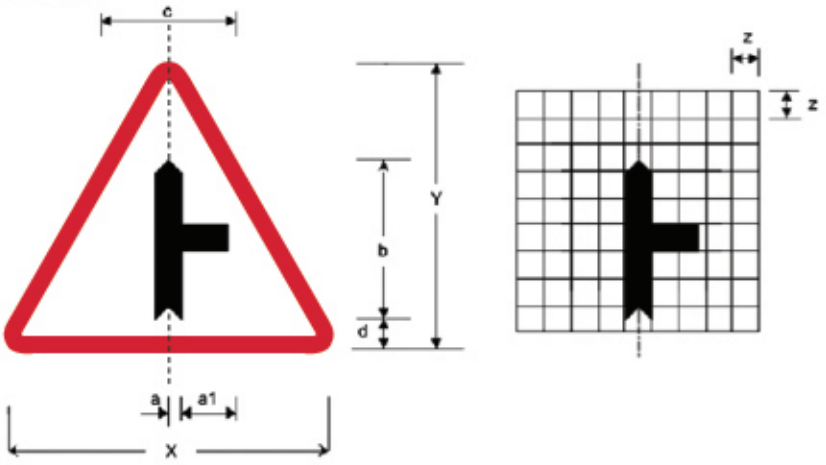
X	600	750
Y	520	650
a	50	62
b	300	375
c	150	188
d	50	62
z	50	62

W2-7



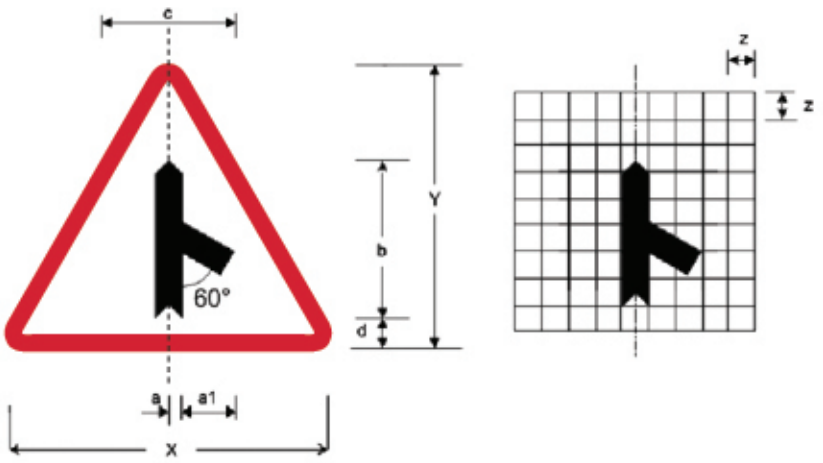
X	600	750
Y	520	650
a	25	31
a1	125	156
b	250	312
c	250	312
d	60	75
z	50	62

W2-8



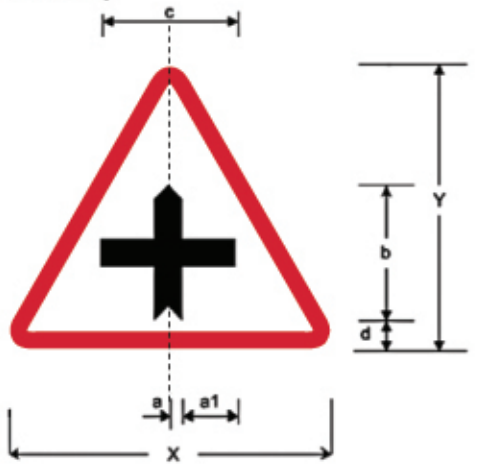
X	600	750
Y	520	650
a	50	62
b	120	150
c	100	125
d	100	125
z	50	62

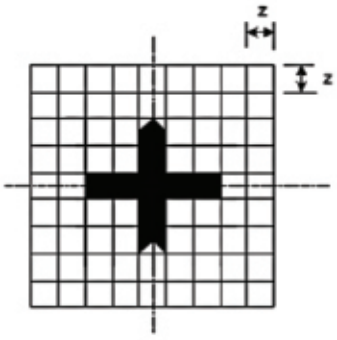
W2-9



X	600	750
Y	520	650
a	50	62
b	120	150
c	100	125
d	100	125
z	50	62

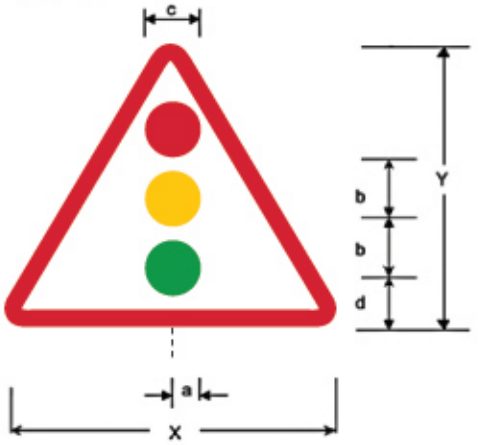
W2-10

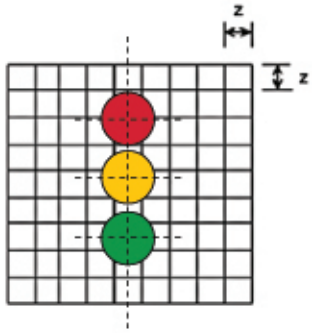




X	600	750
Y	520	650
a	50	62
b	120	150
c	100	125
d	100	125
z	50	62

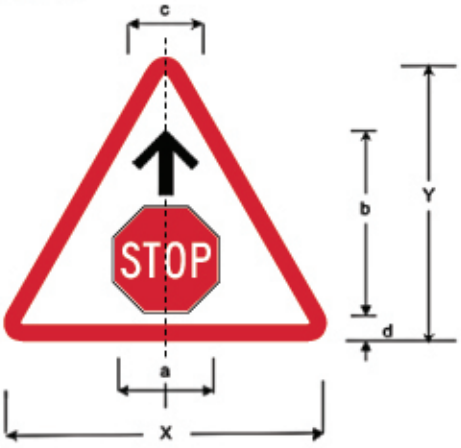
W3-1

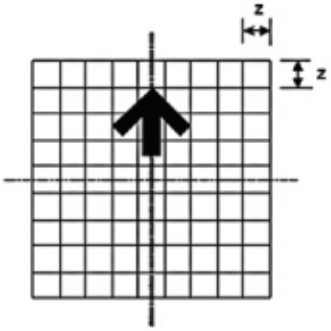




X	600	750
Y	520	650
a	50	62
b	120	150
c	100	125
d	100	125
z	50	62

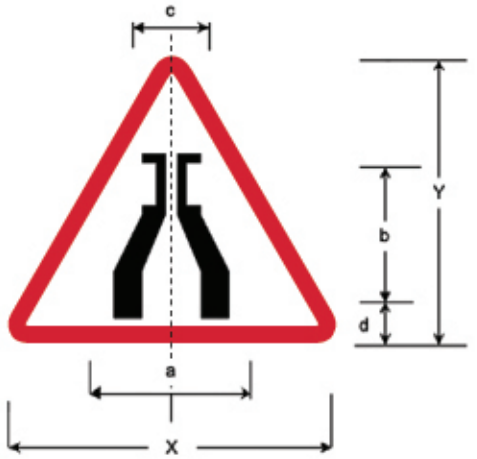
W3-2

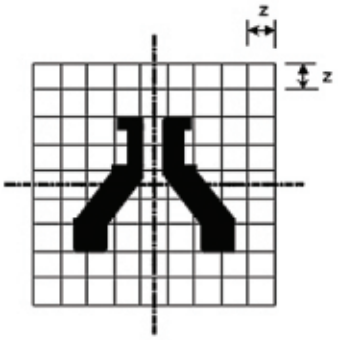




X	600	750
Y	520	650
a	300	375
b	250	312
c	180	225
d	75	94
z	50	60

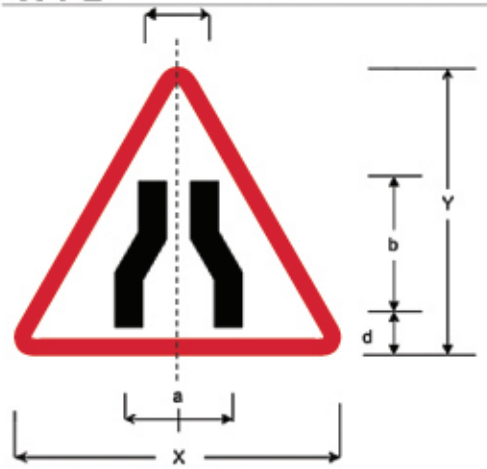
W4-1

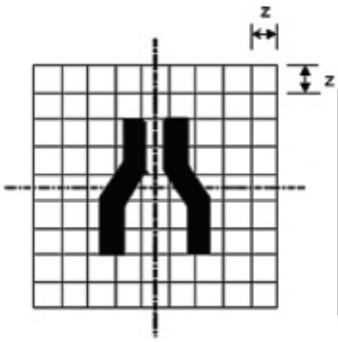




X	600	750
Y	520	650
a	200	250
b	250	312
c	120	150
d	75	94
z	50	62

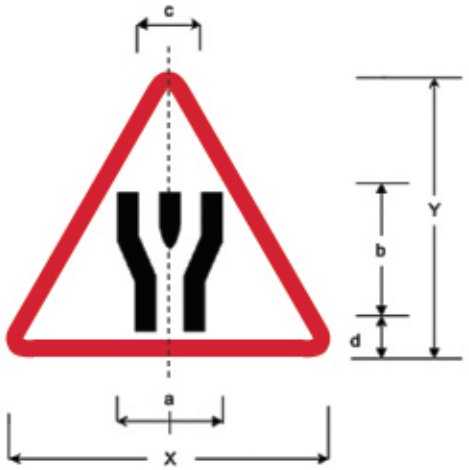
W4-2

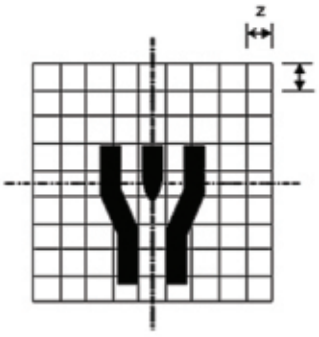




X	600	750
Y	520	650
a	190	234
b	250	312
c	120	150
d	75	94
z	50	60

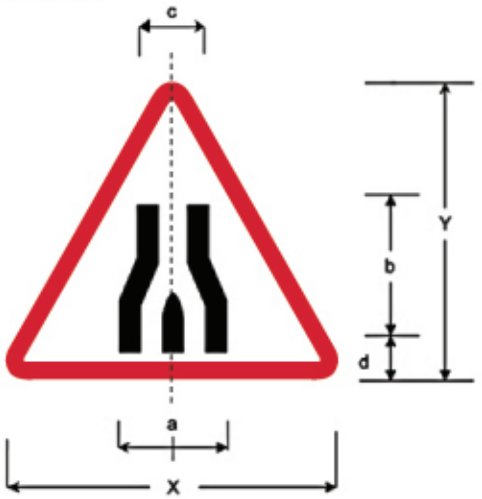
W4-3

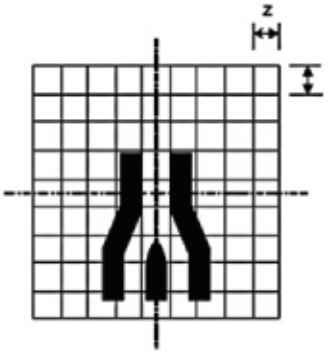




X	600	750
Y	520	650
a	190	234
b	250	312
c	120	150
d	75	94
z	50	60

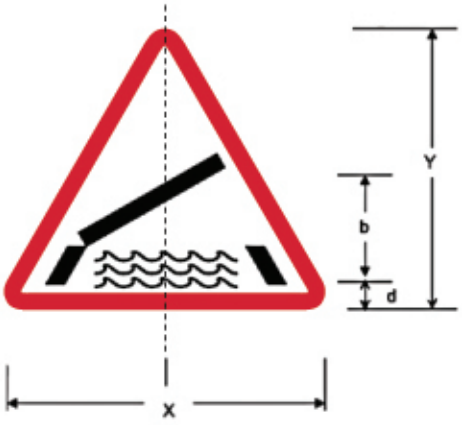
W4-4

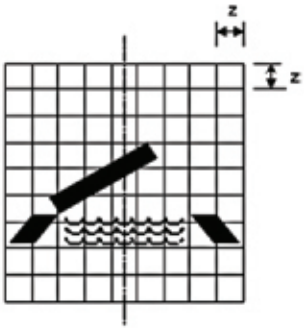




X	600	750
Y	520	650
a	190	234
b	250	312
c	120	150
d	75	94
z	50	60

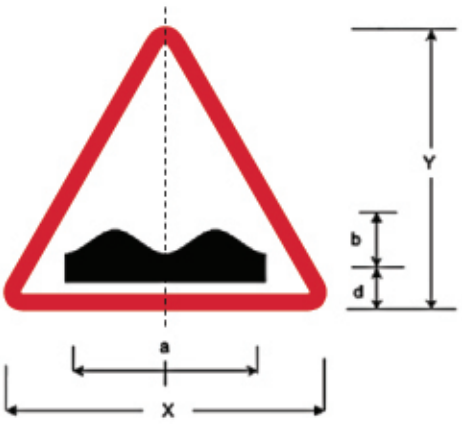
W5-1

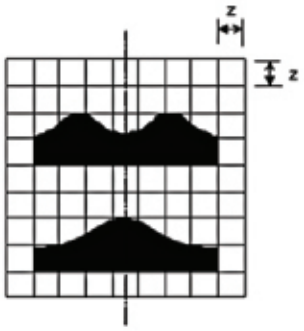




X	600	750
Y	520	650
a	-	-
b	200	250
c	-	-
d	50	62
z	50	62

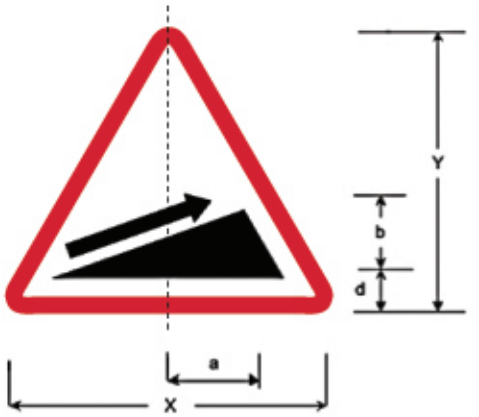
W5-2 and W5-3

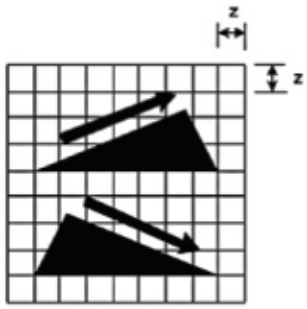




X	600	750
Y	520	650
a	350	438
b	100	125
c	-	-
d	75	94
z	50	62

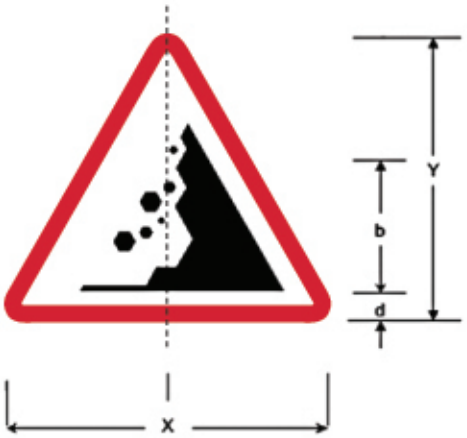
W5-4 and W5-5

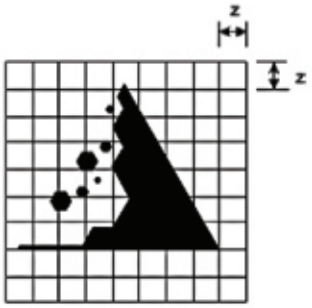




X	600	750
Y	520	650
a	175	219
b	150	188
c	-	-
d	75	94
z	50	62

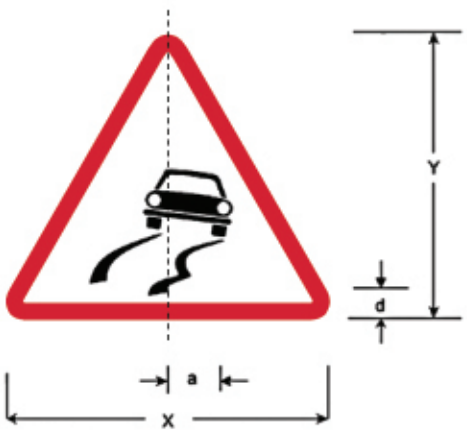
W5-8

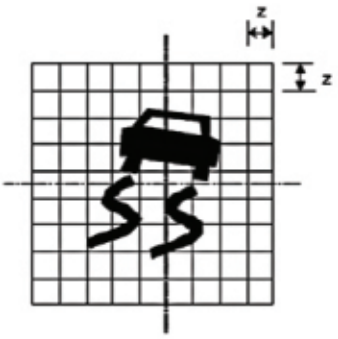




X	600	750
Y	520	650
a	-	-
b	250	312
c	-	-
d	50	62
z	50	62

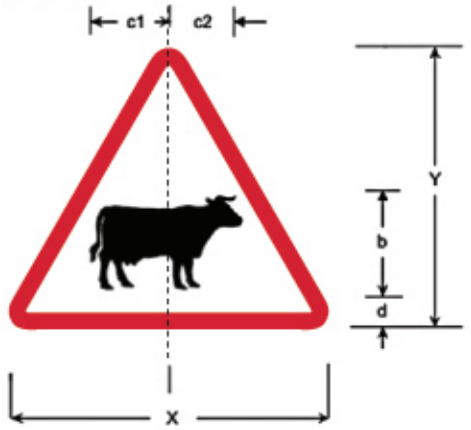
W5-9

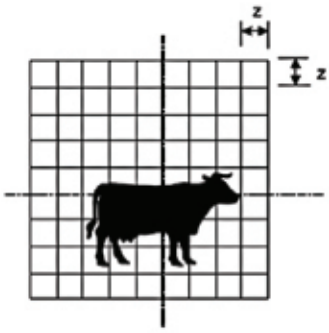




X	600	750
Y	520	650
a	100	125
b	-	-
c	-	-
d	50	62
z	50	62

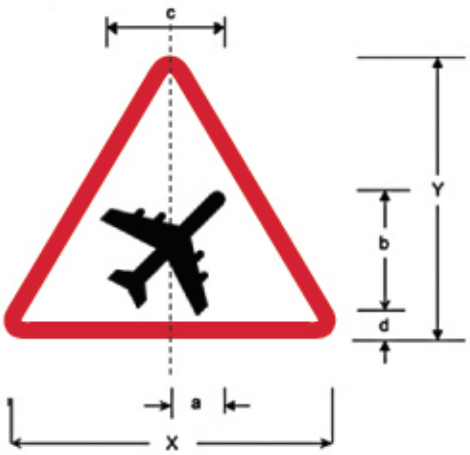
W5-10

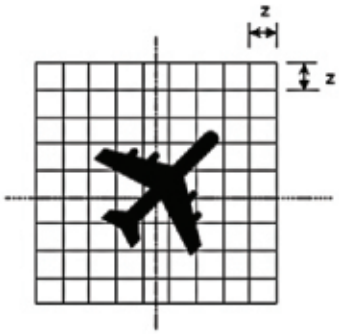




X	600	750
Y	520	650
b	200	250
C1	150	188
C2	120	150
d	50	62
z	50	62

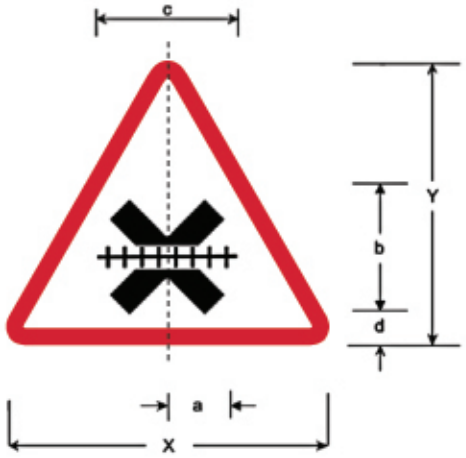
W5-11

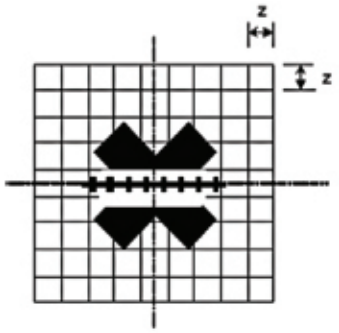




X	600	750
Y	520	650
a	100	125
b	220	275
c	220	275
d	50	62
z	50	62

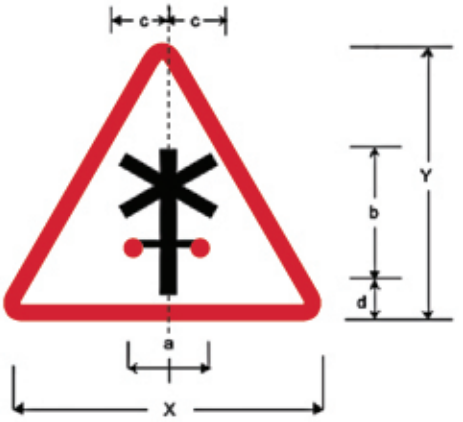
W7-2

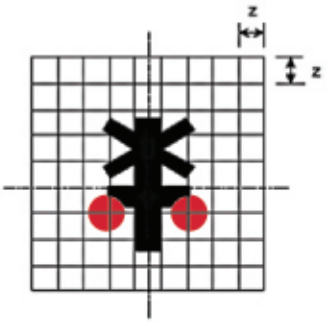




X	600	750
Y	520	650
a	125	156
b	250	312
c	270	338
d	60	75
z	50	62

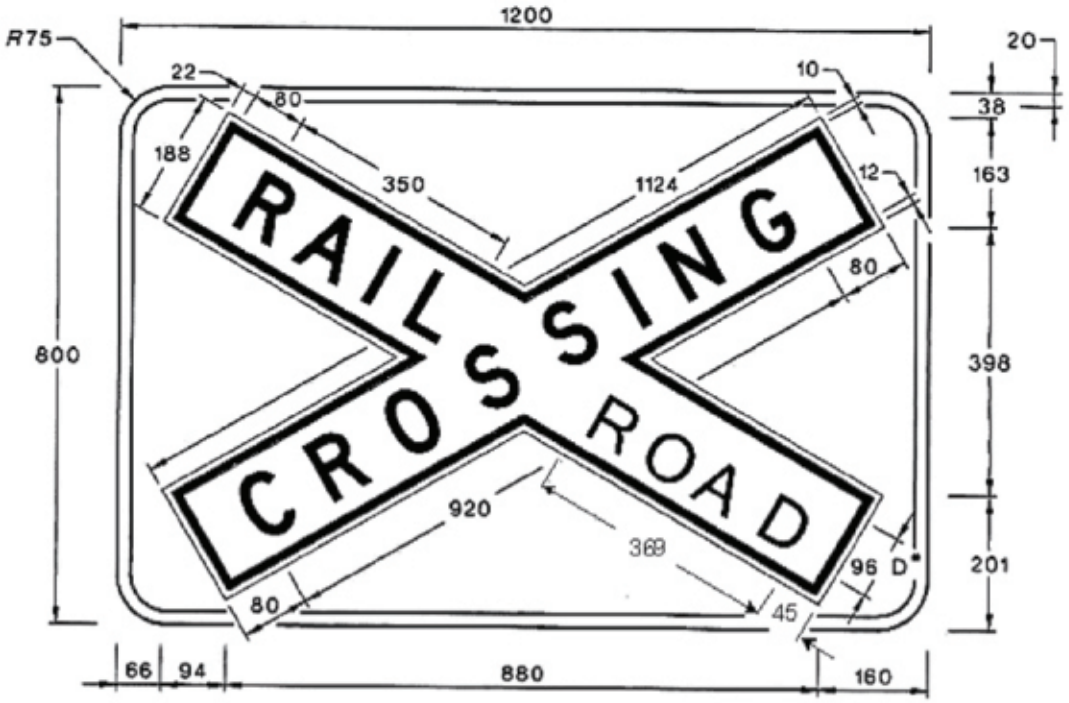
W7-3





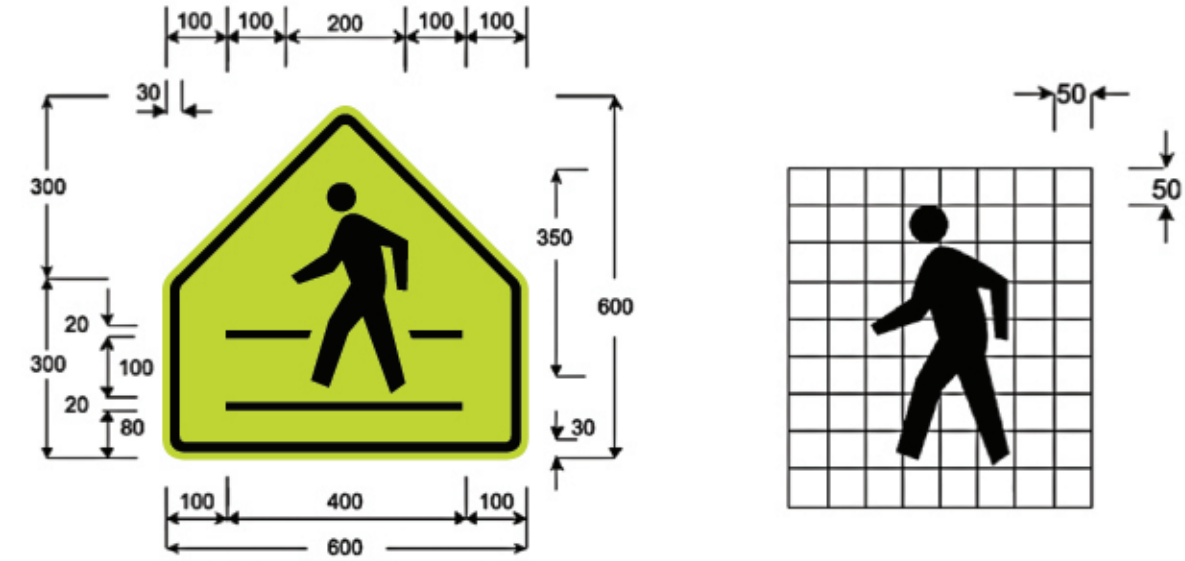
X	600	750
Y	520	650
a	150	188
b	260	325
c	220	275
d	75	94
z	50	62

W7-4



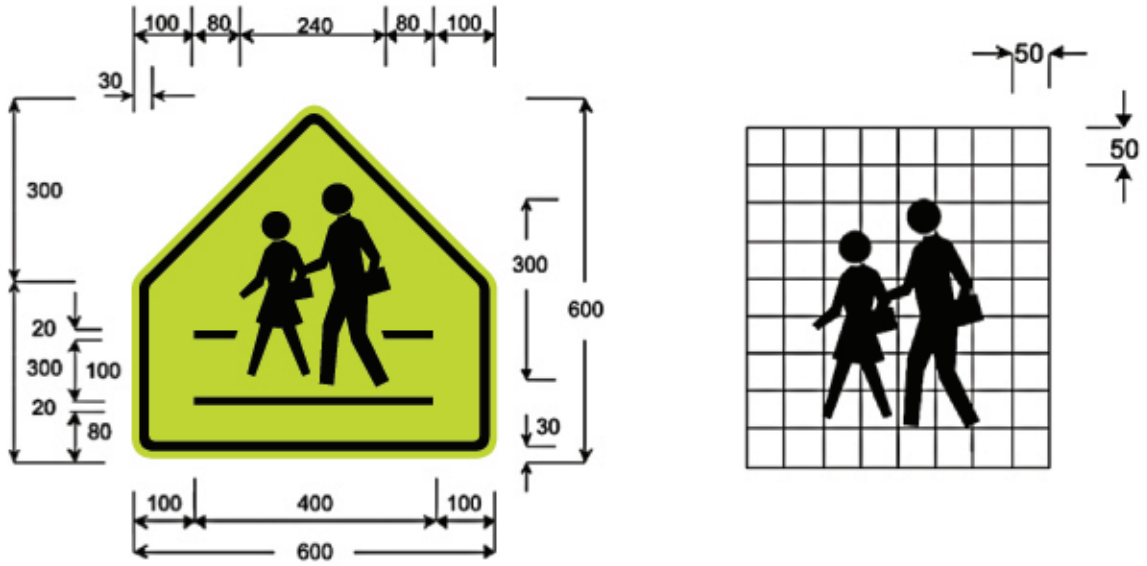
*Non standard spacing

W6-1 (B size illustrated)



Black symbol and border on fluorescent yellow green background

W6-2 (B size illustrated)



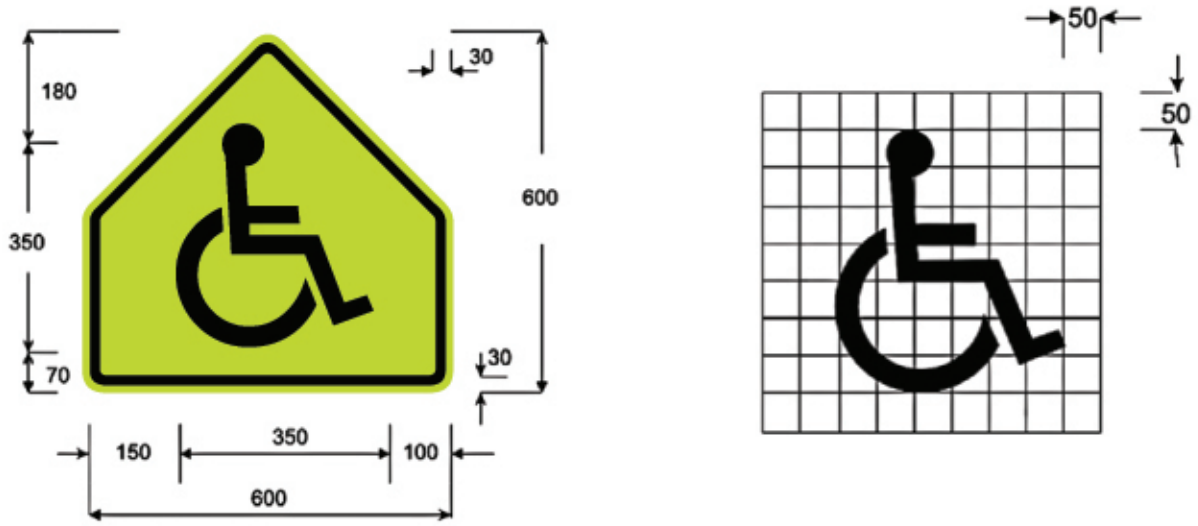
Black symbol and border on fluorescent yellow green background

W6-1P



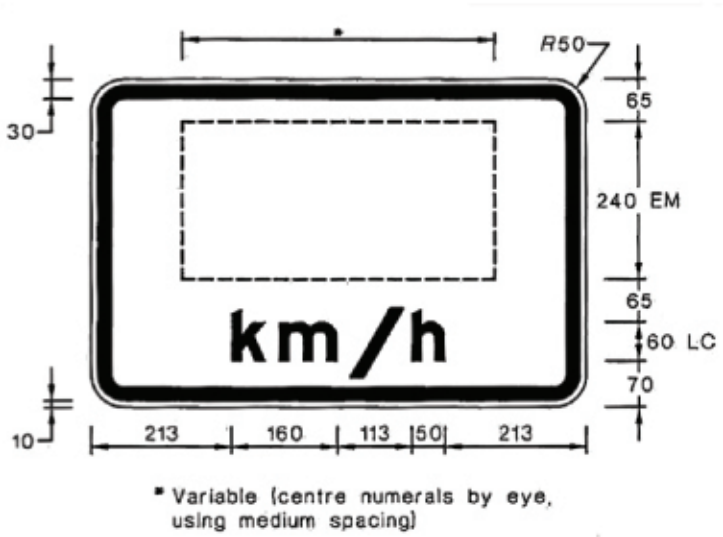
Black letters and border on fluorescent yellow green background

W6-4



Black letters and border on fluorescent yellow green background

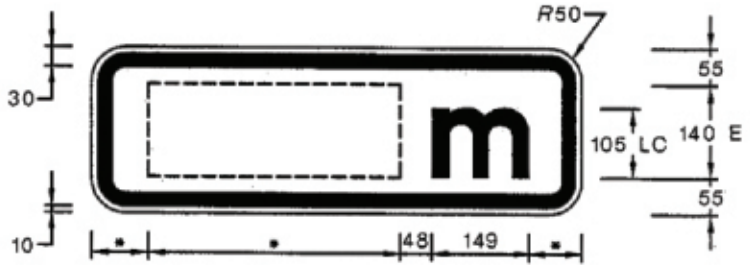
W8-1



W8-2



W8-3



* Variable

Black letters symbol and borders on retro-reflective background

W8-4A



* Variable

W8-5



Black letters symbol and borders on retro-reflective background

W8-6



W8-7



W8-8



W8-9



Black letters symbol and borders on retro-reflective background

W8-10



W8-11A

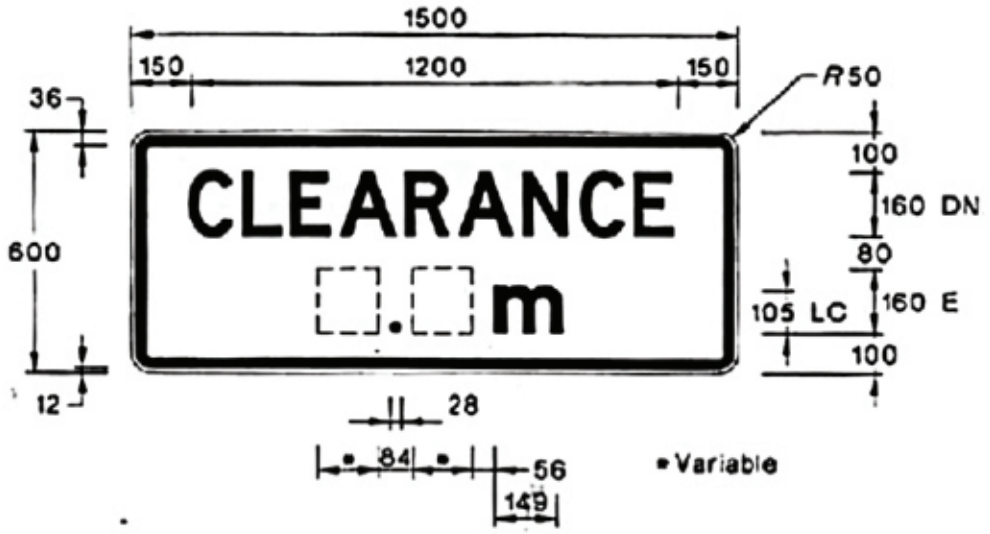


W8-11B



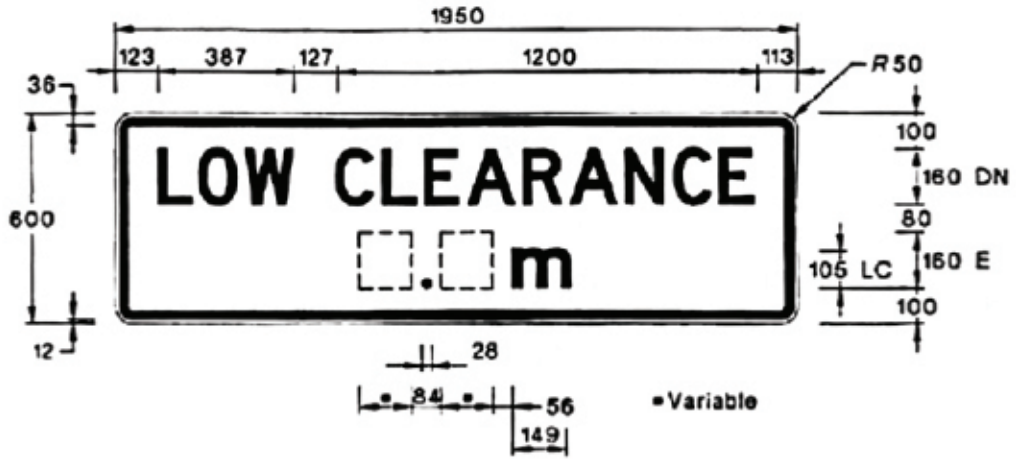
Black letters symbol and borders on retro-reflective background

W9-1A



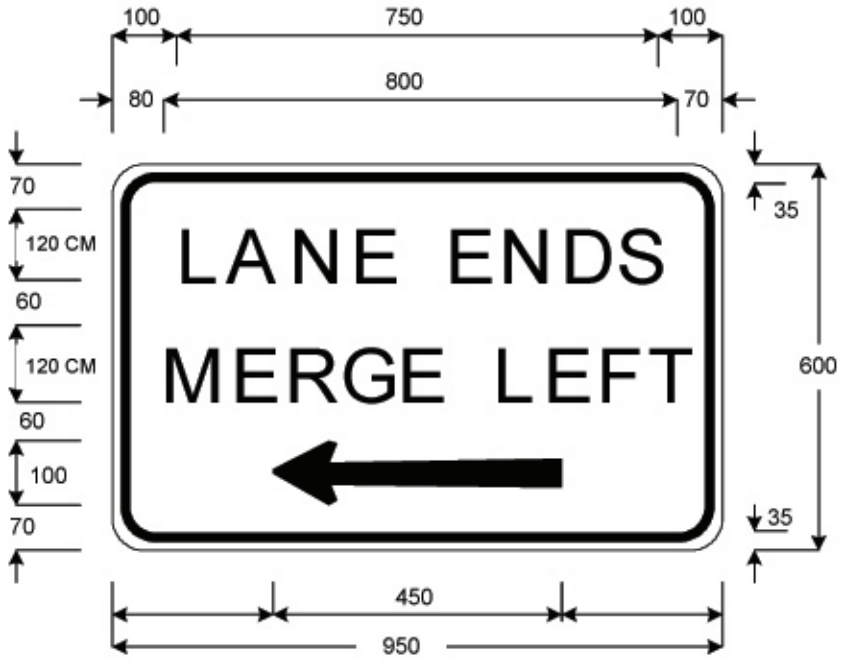
Black letters, numerals and border on white retro-reflective background

W9-1B



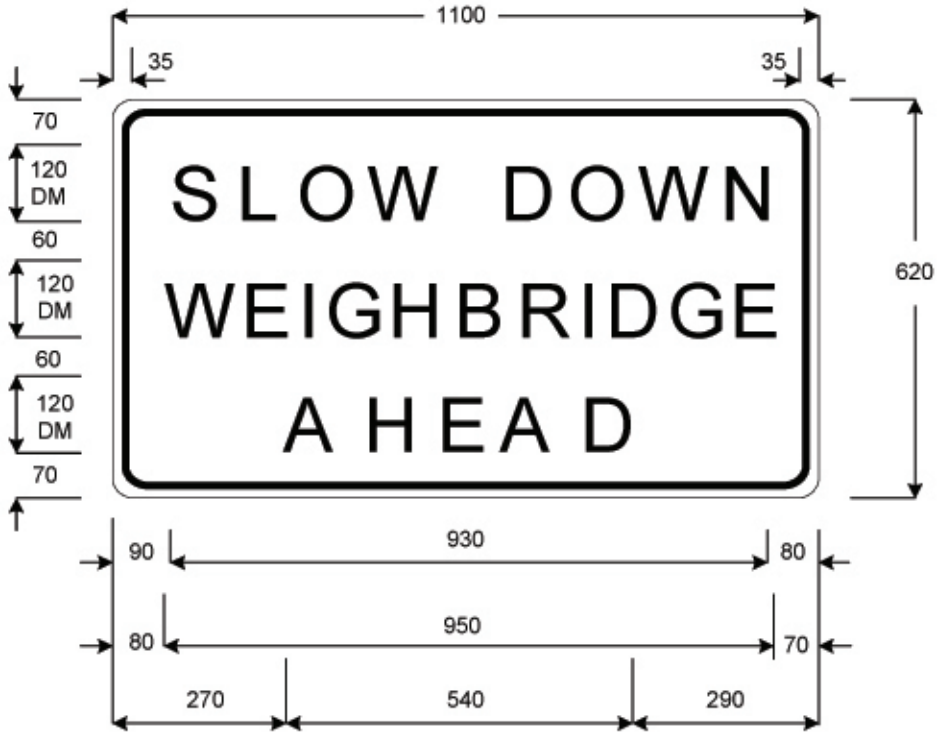
Black letters, numerals and border on white retro-reflective background

W9-4



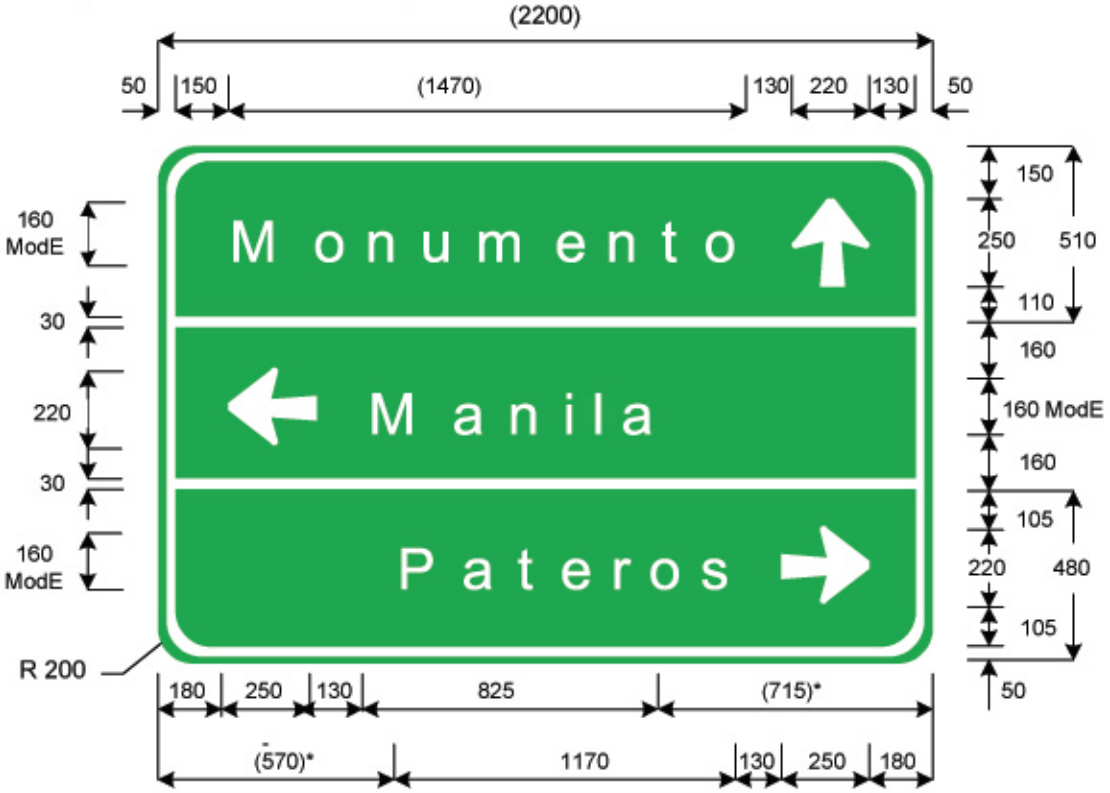
Black letters, numerals and border on white retro-reflective background

W9-5



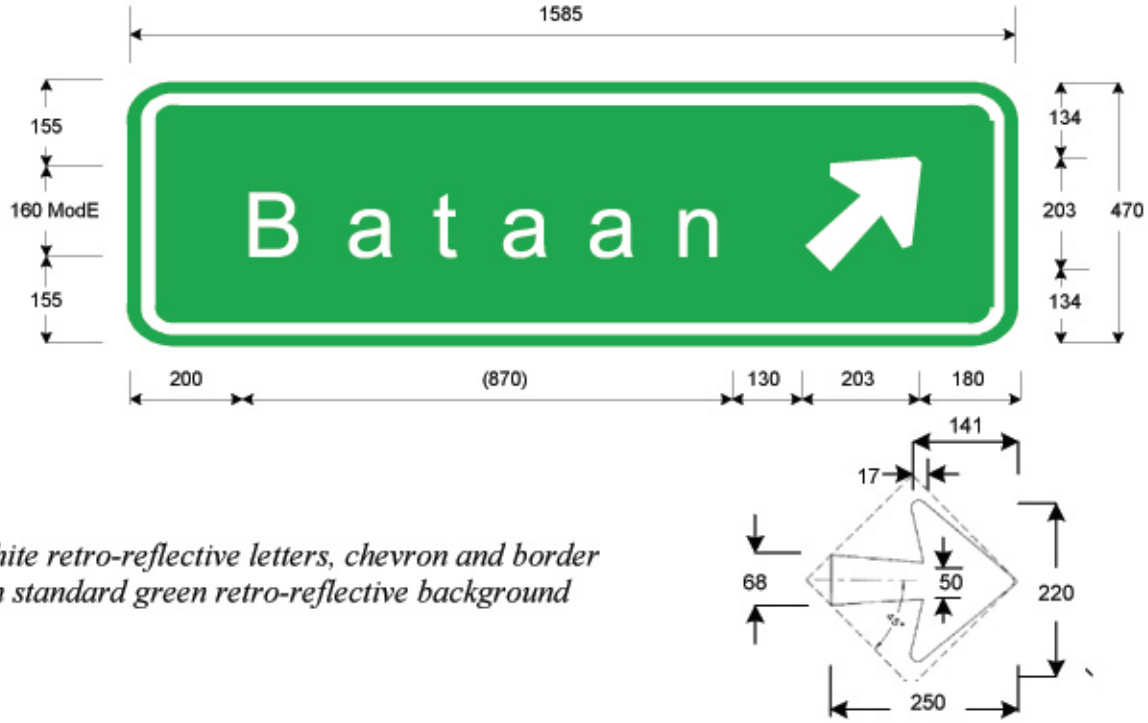
Black letters, numerals and border on white retro-reflective background

G1-1 (Traditional Border)



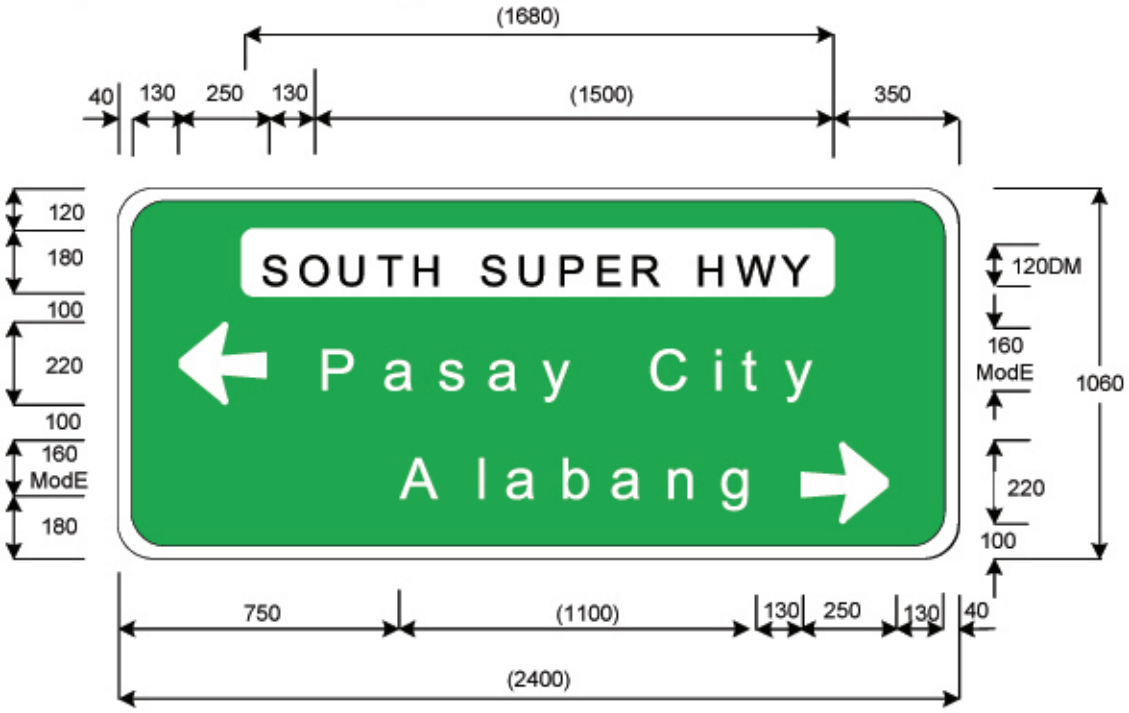
*200 minimum

G1-2 (Traditional Border)



White retro-reflective letters, chevron and border on standard green retro-reflective background

G1-3 (Alternative Border)



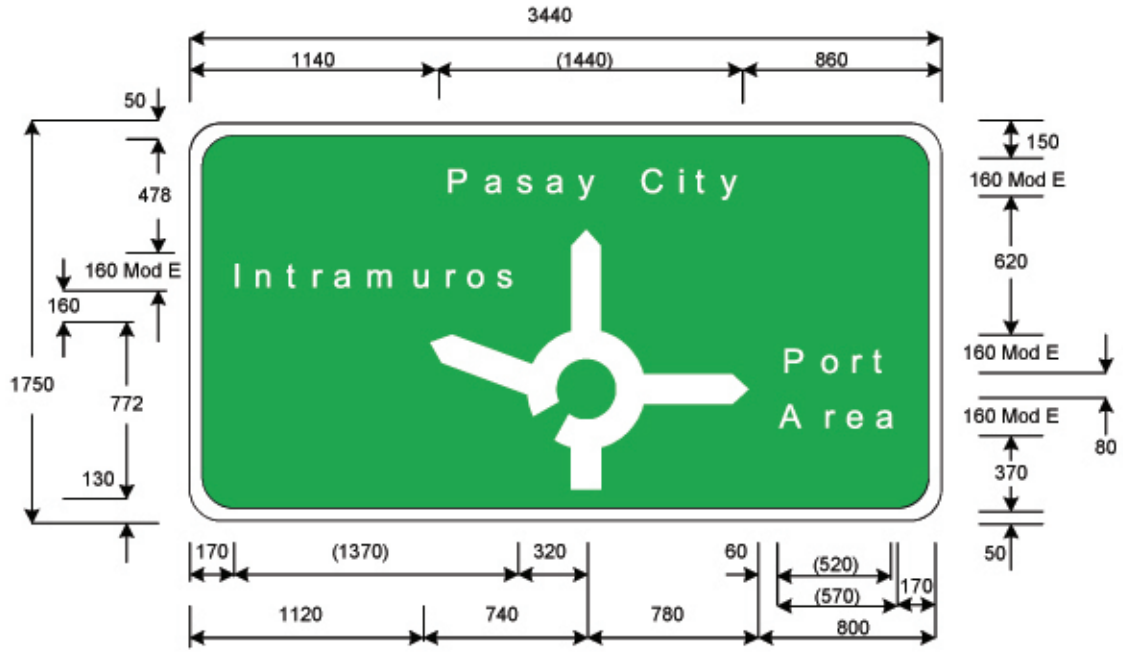
White retro-reflective letters, chevron and border on standard green retro-reflective background

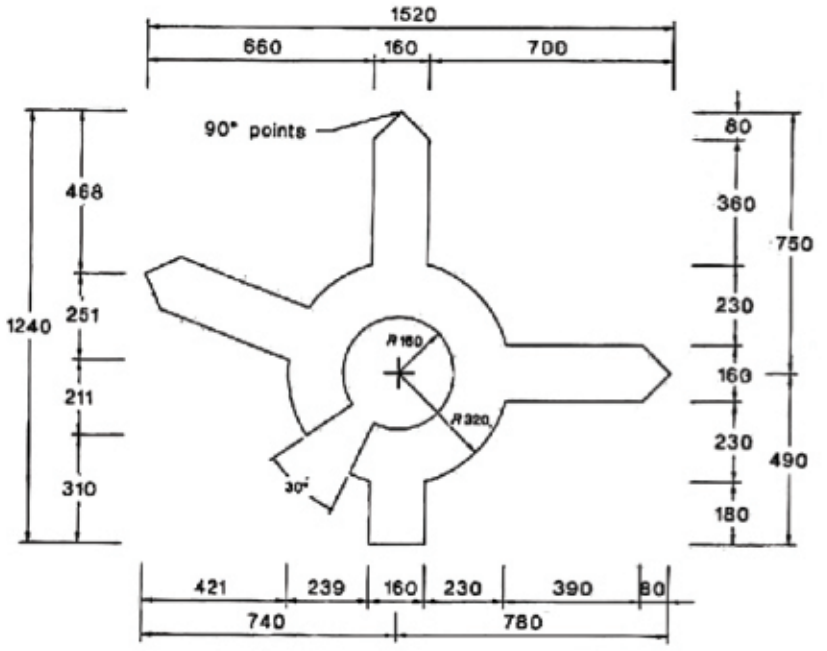
G1-4



White retro-reflective letters, chevron and border on standard green retro-reflective background

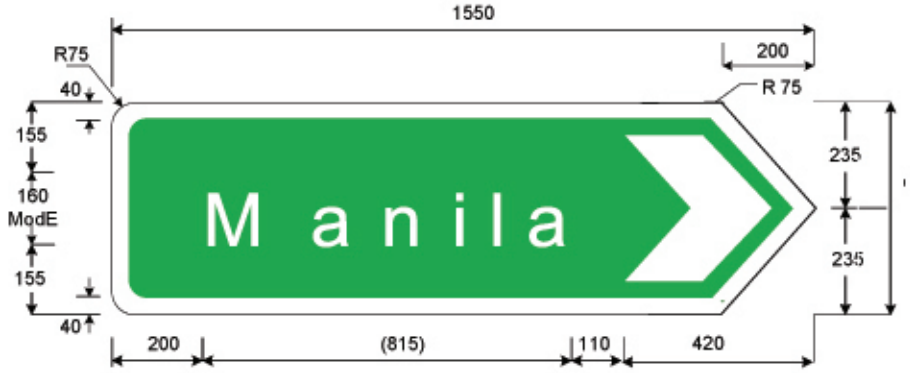
G1-5

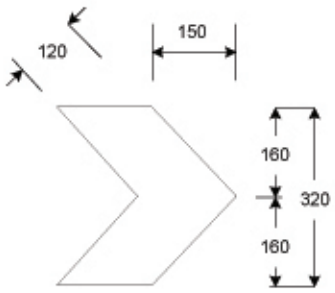




White retro-reflective letters, symbol and border on standard green retro-reflective background

G2-1 (Alternative Border)

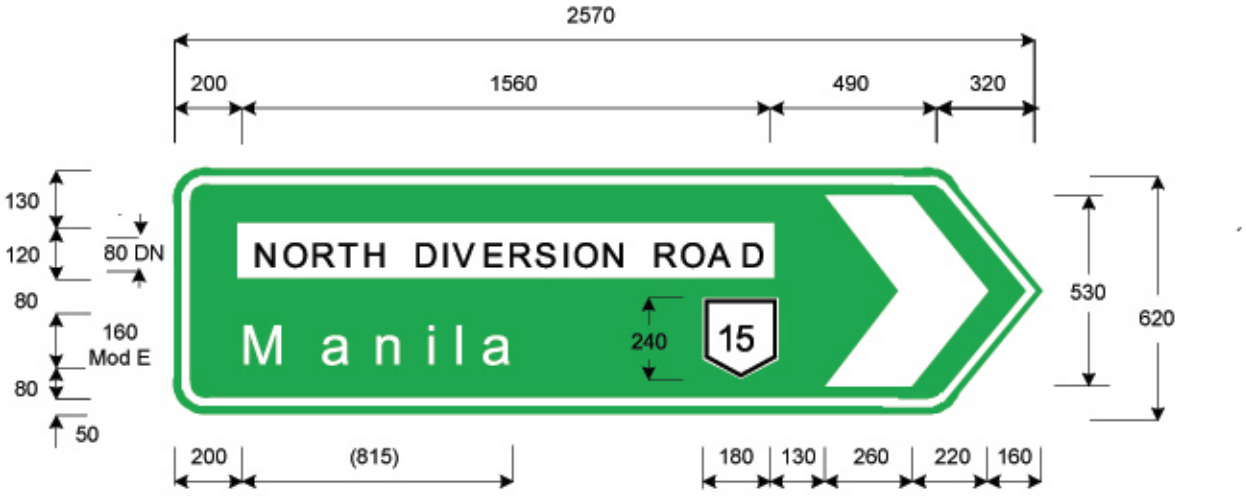




NOTE: Break sharp point with a 20mm radius

White retro-reflective letters, chevron and border on standard green retro-reflective ground

G2-4 (Traditional Border)



White retro-reflective letters, chevron and border on standard green retro-reflective background.

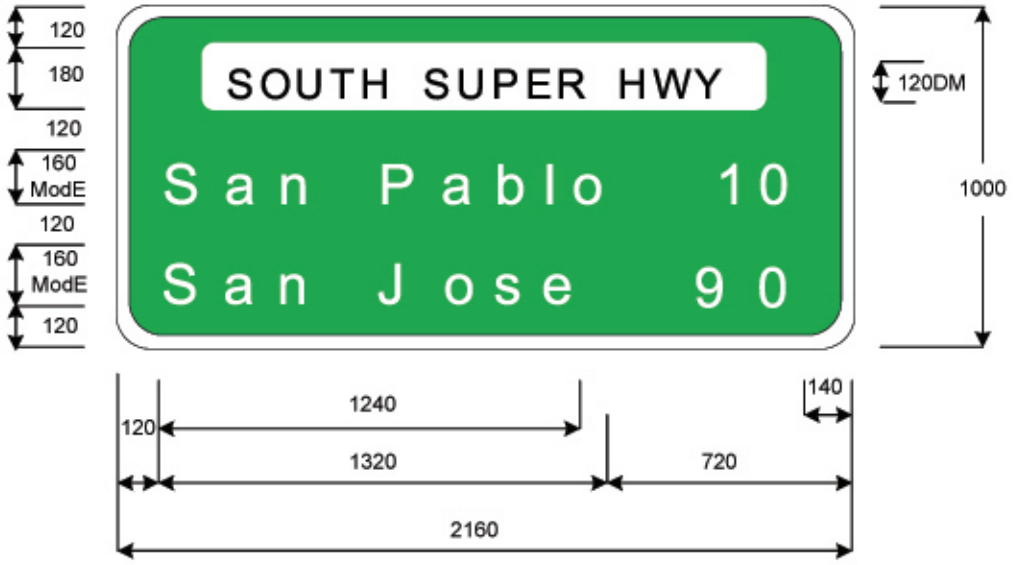
Black route name on white retro-reflective panel

G3-1 (Alternative Border)



White retro-reflective letters, chevron and border on standard green retro-reflective background

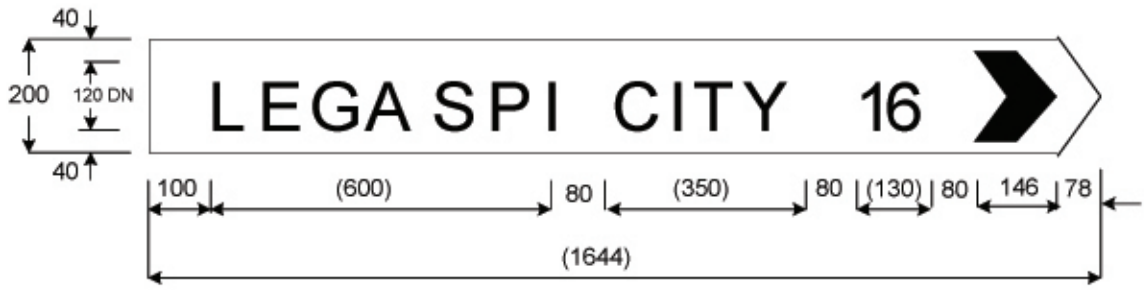
G3-2



White retro-reflective letters, chevron and border on standard green retro-reflective background.

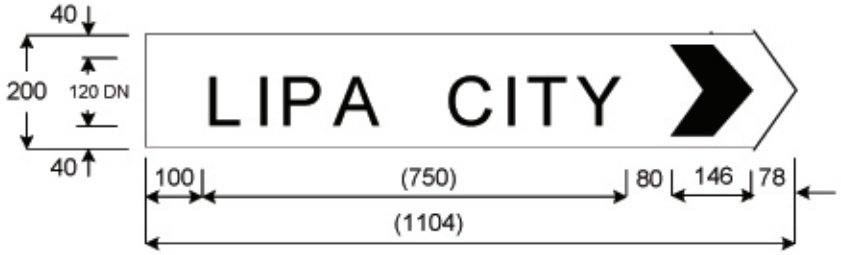
Black route name on white retro-reflective panel

G4-1



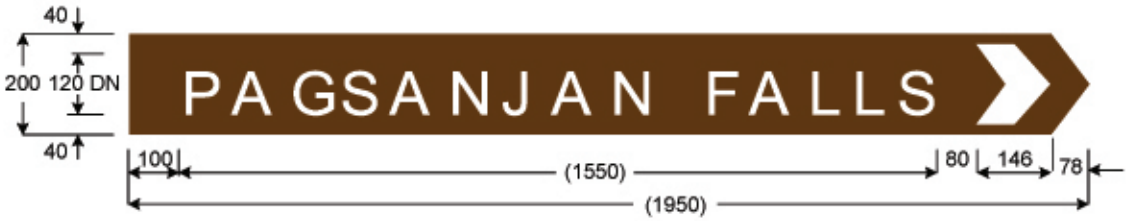
Black letters and chevron on white retro-reflective background

G4-2

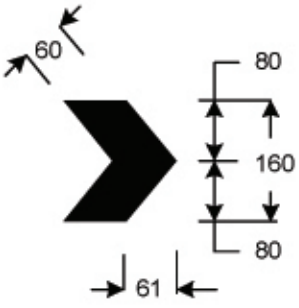


Black letters and chevron on white retro-reflective background

G4-3



White retro-reflective letters and chevron on brown background



G5-1

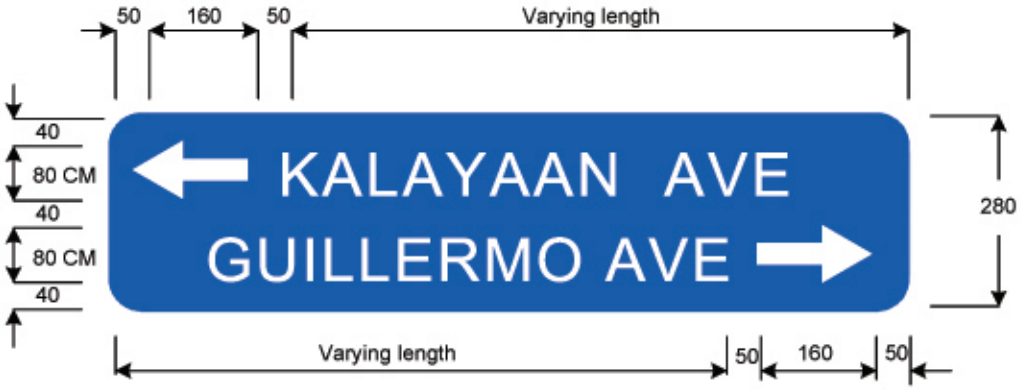


Note: Dimensions a, b, c, d, and e vary according to the street and municipality names.
Black letters on white retro-reflective background or white retro-reflective letters on colored background

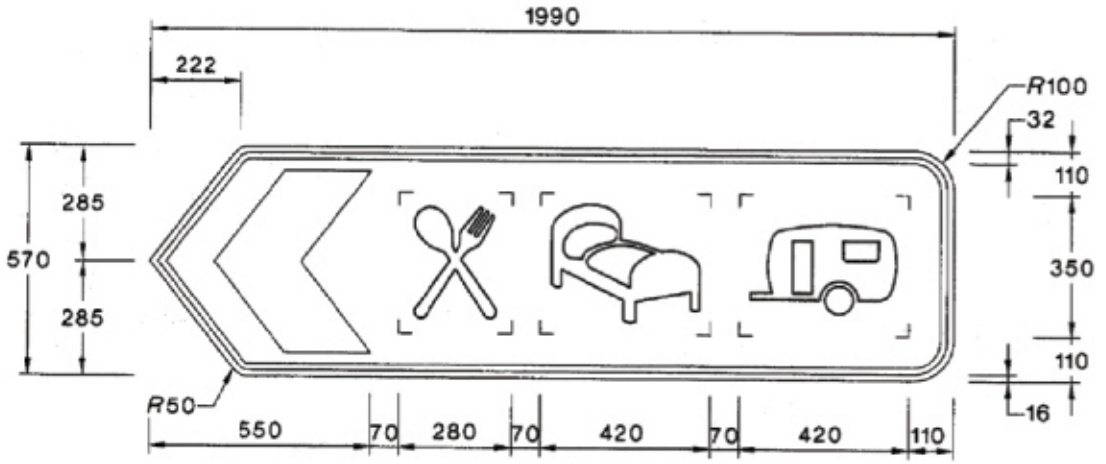
G5-2B



G5-3

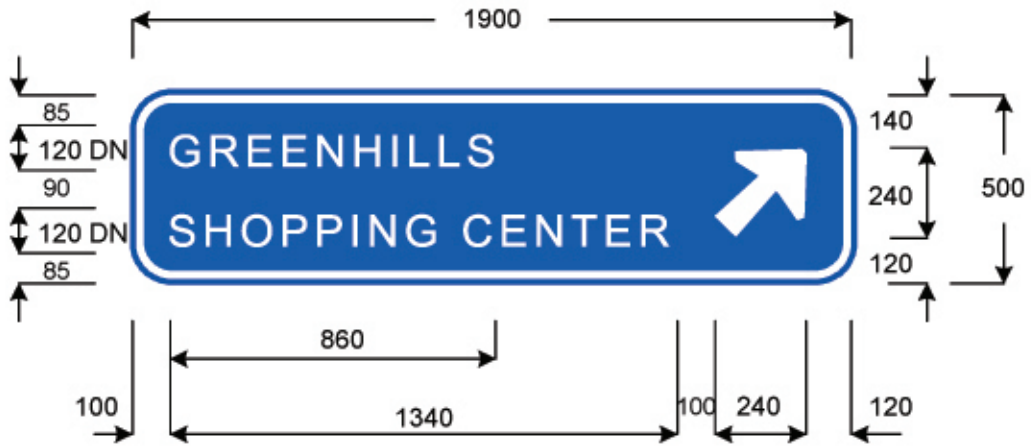


G7-3A



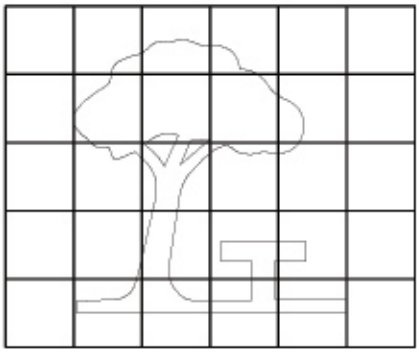
White retro-reflective legends and arrow on blue background

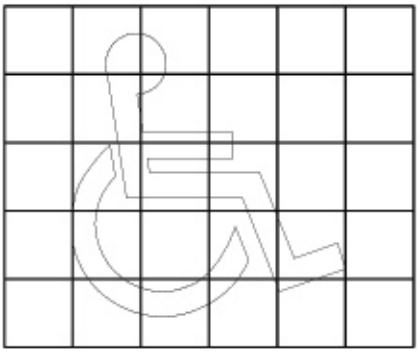
G7-5

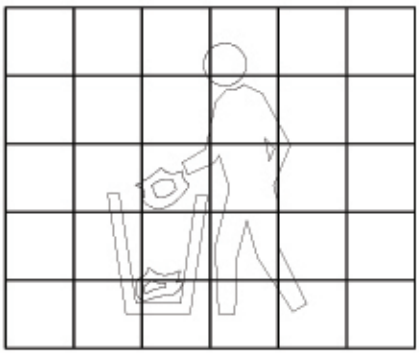


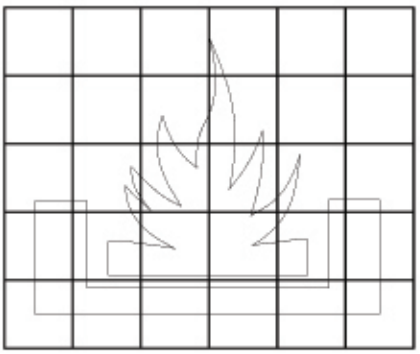
White retro-reflective letters and arrow on blue background

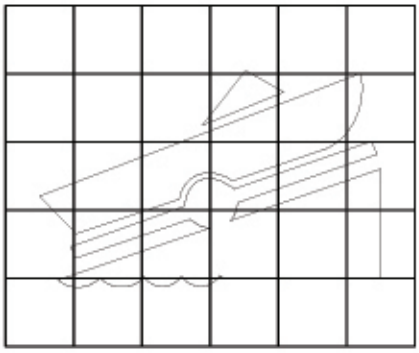
Service Sign Symbols (1)

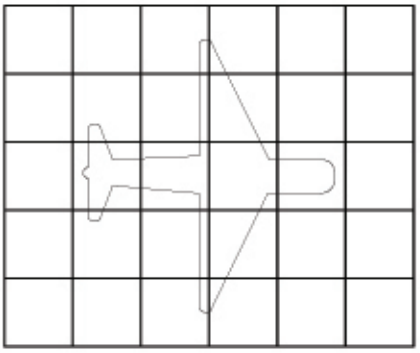


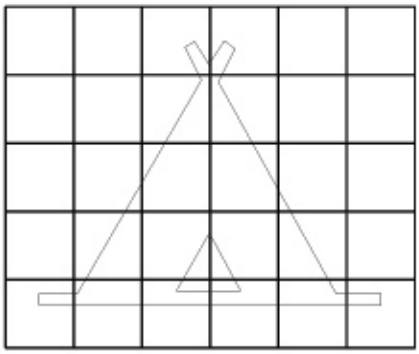


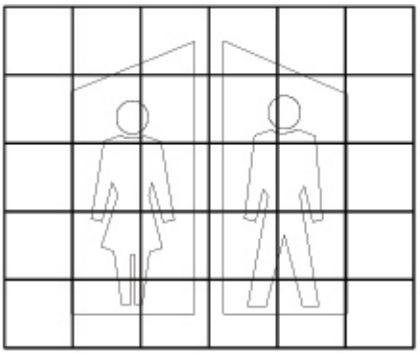




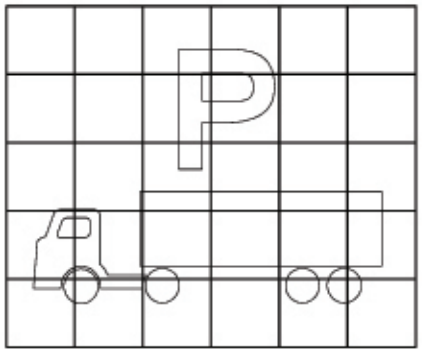


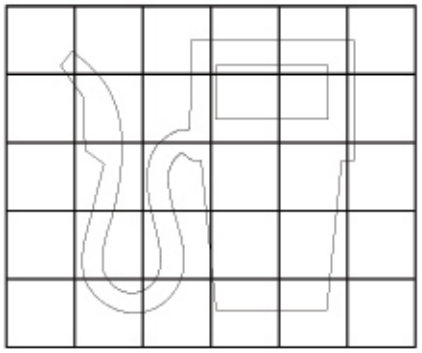


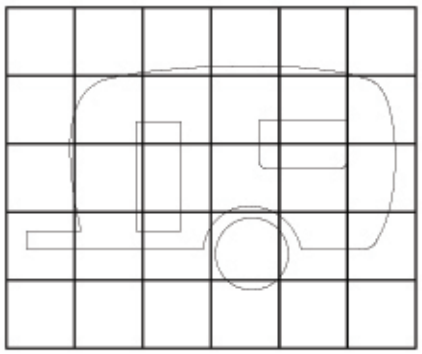


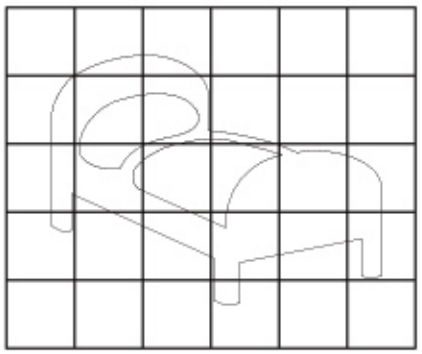


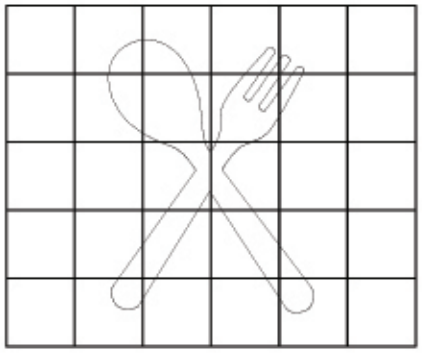
Service Sign Symbols (2)

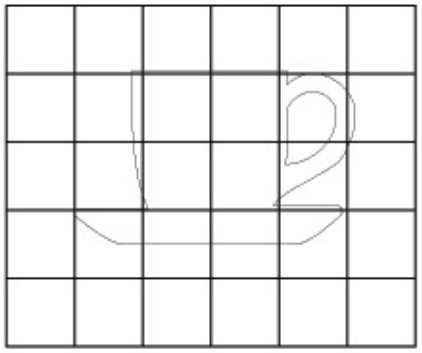


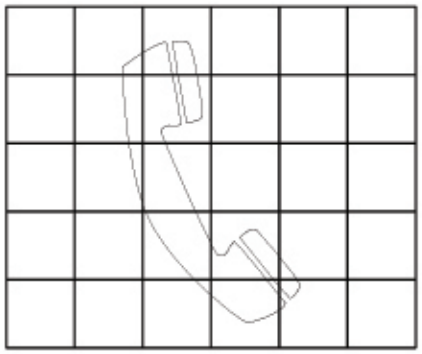


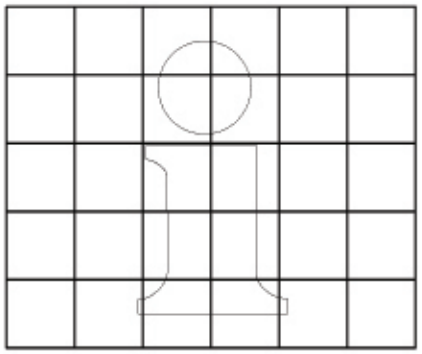










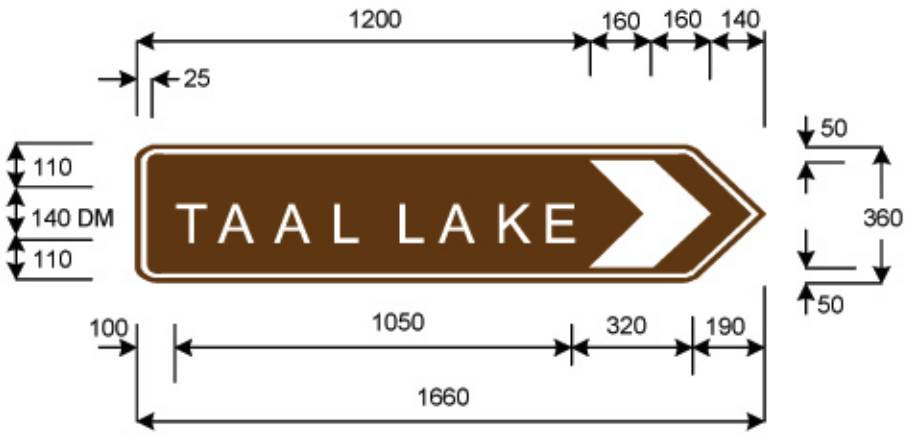


G8-1



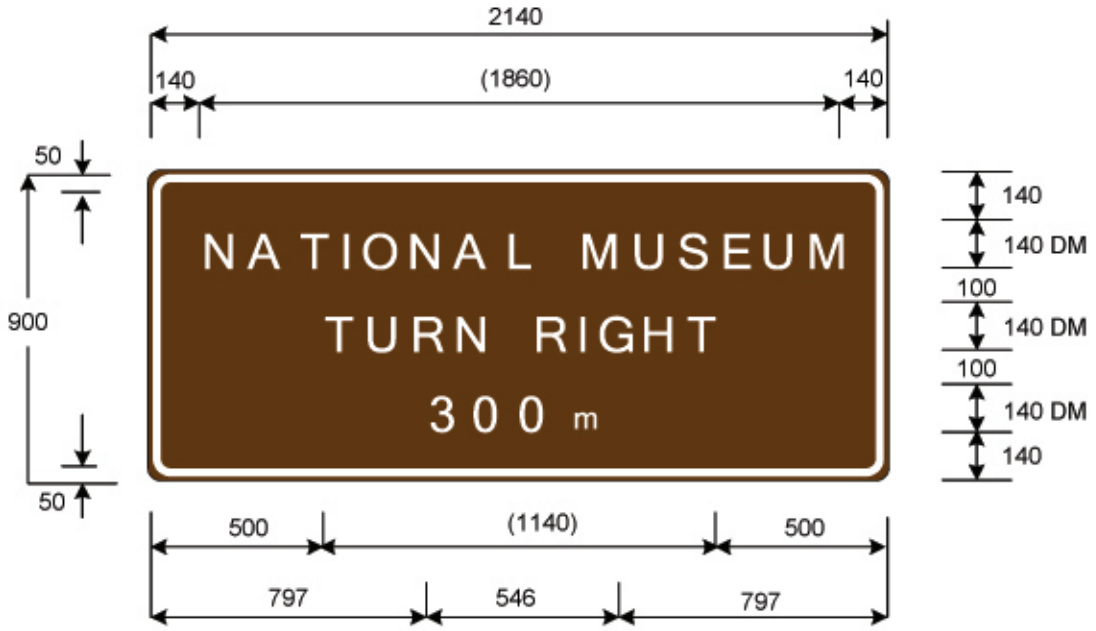
White retro-reflective letters, arrow and border on brown retro-reflective background

G8-2



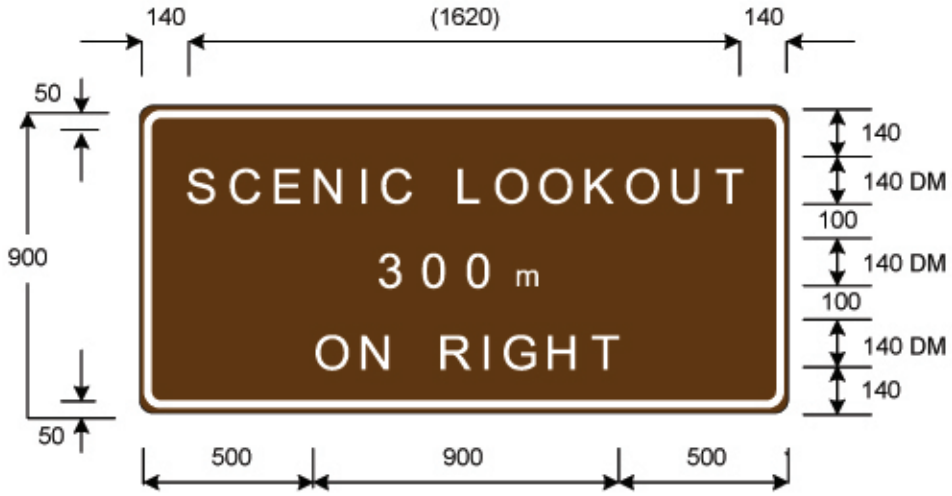
White retro-reflective letters, arrow and border on brown retro-reflective background

G8-3



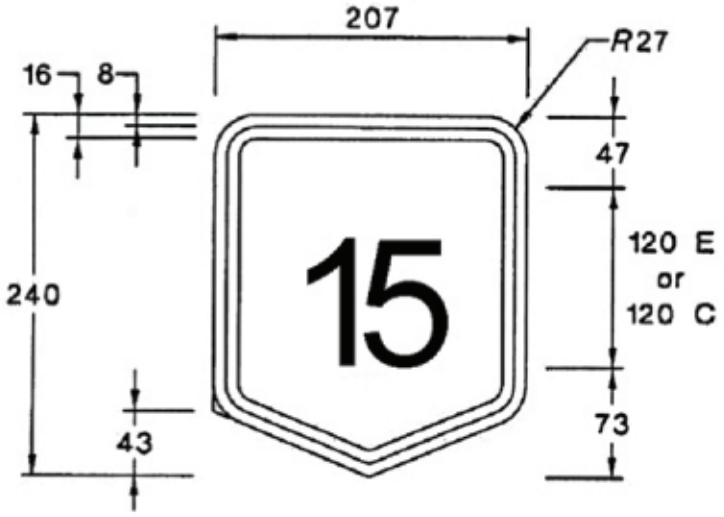
White retro-reflective letters, arrow and border on brown retro-reflective background

G8-4

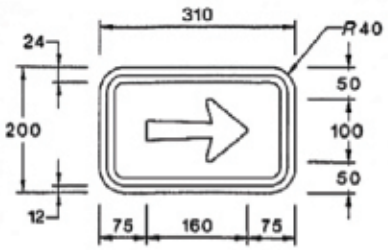


White retro-reflective letters, arrow and border on brown retro-reflective background

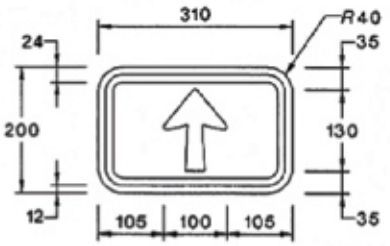
G9-1



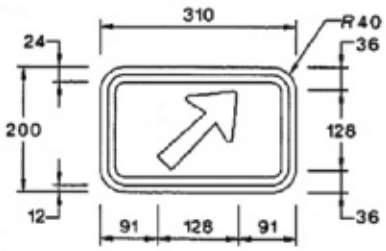
G9-2



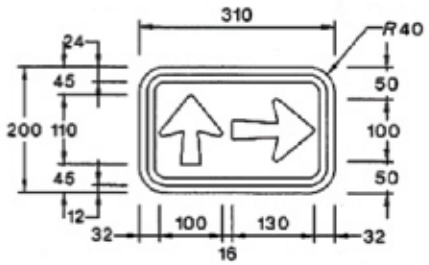
G9-3



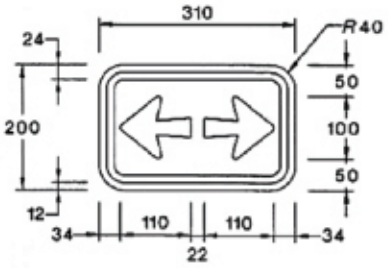
G9-4



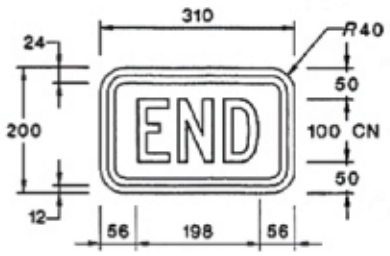
G9-5



G9-6



G9-7



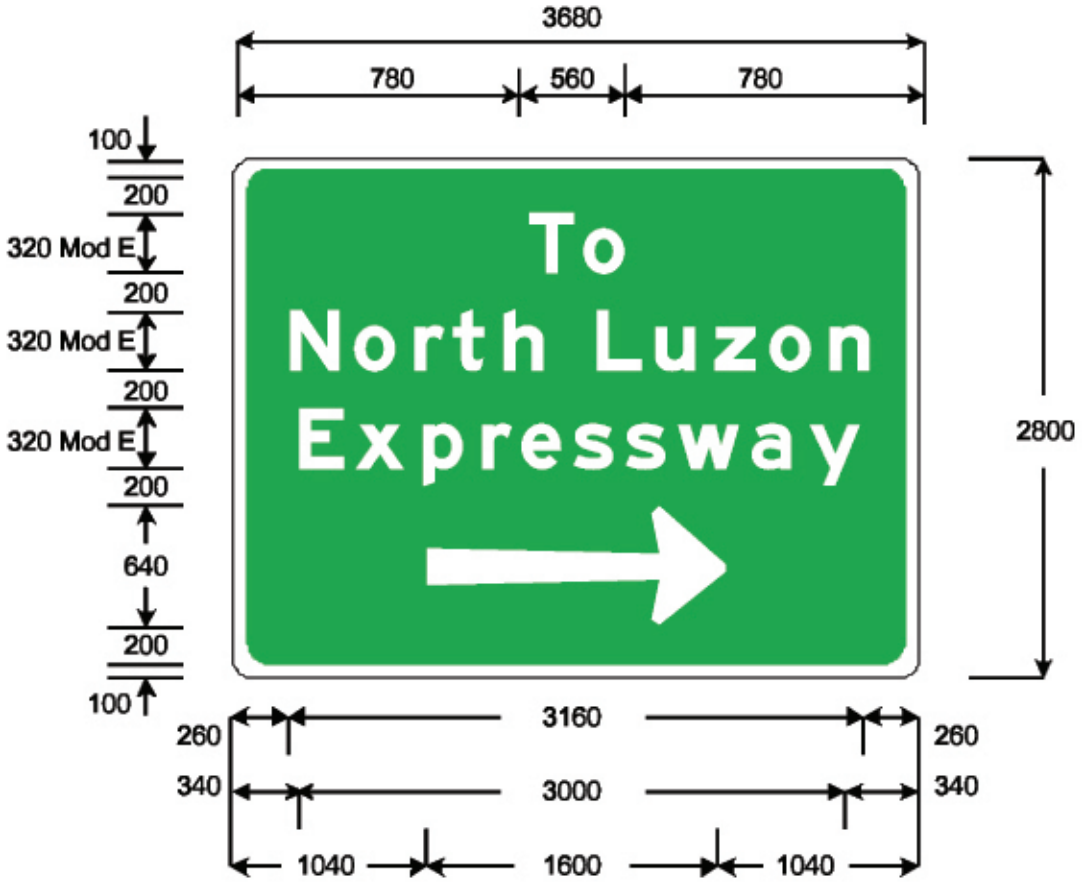
G10-1



	a	b	c	d	e	f	g	h	i	r1	r2	r3	r4
A	600	750	500	30	53	150-6W	87	270-3W	160	75	45	100	70
B	720	900	600	36	64	180-6W	104	720	192	90	54	120	84

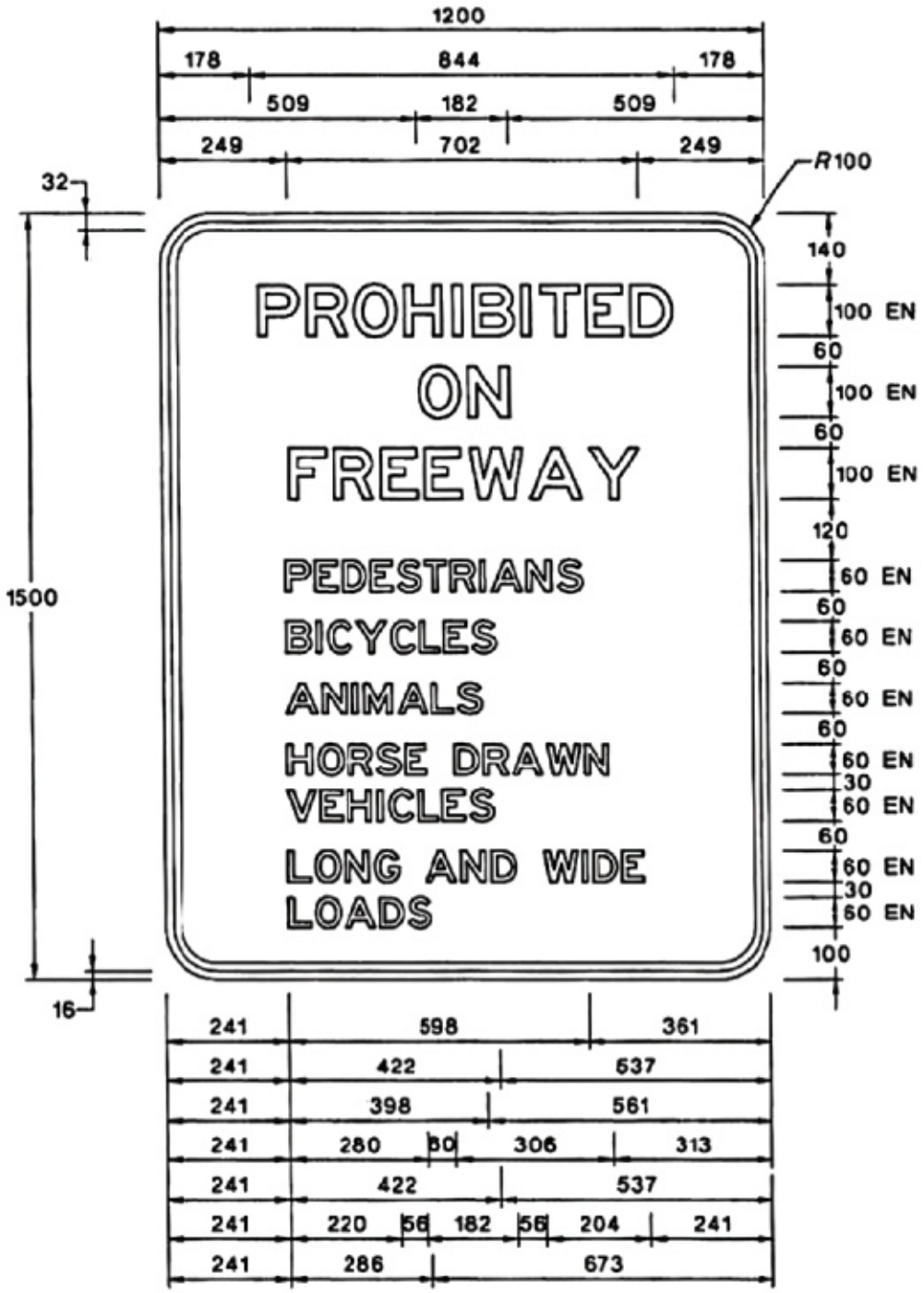
White retro-reflective letters and border on blue retro-reflective background

GE1-1



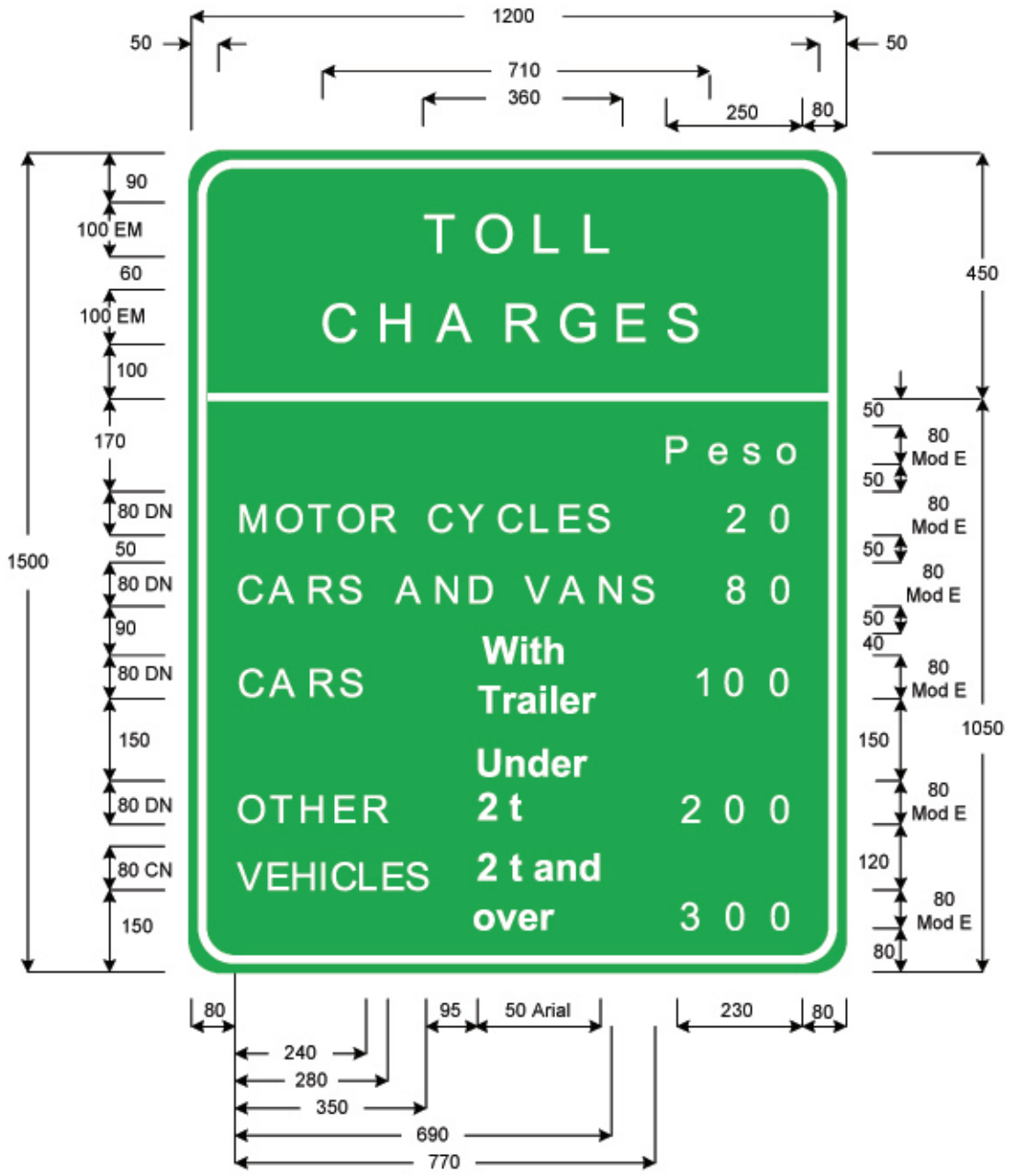
White retro-reflective letters, arrow and border on green retro-reflective background

GE2-1A



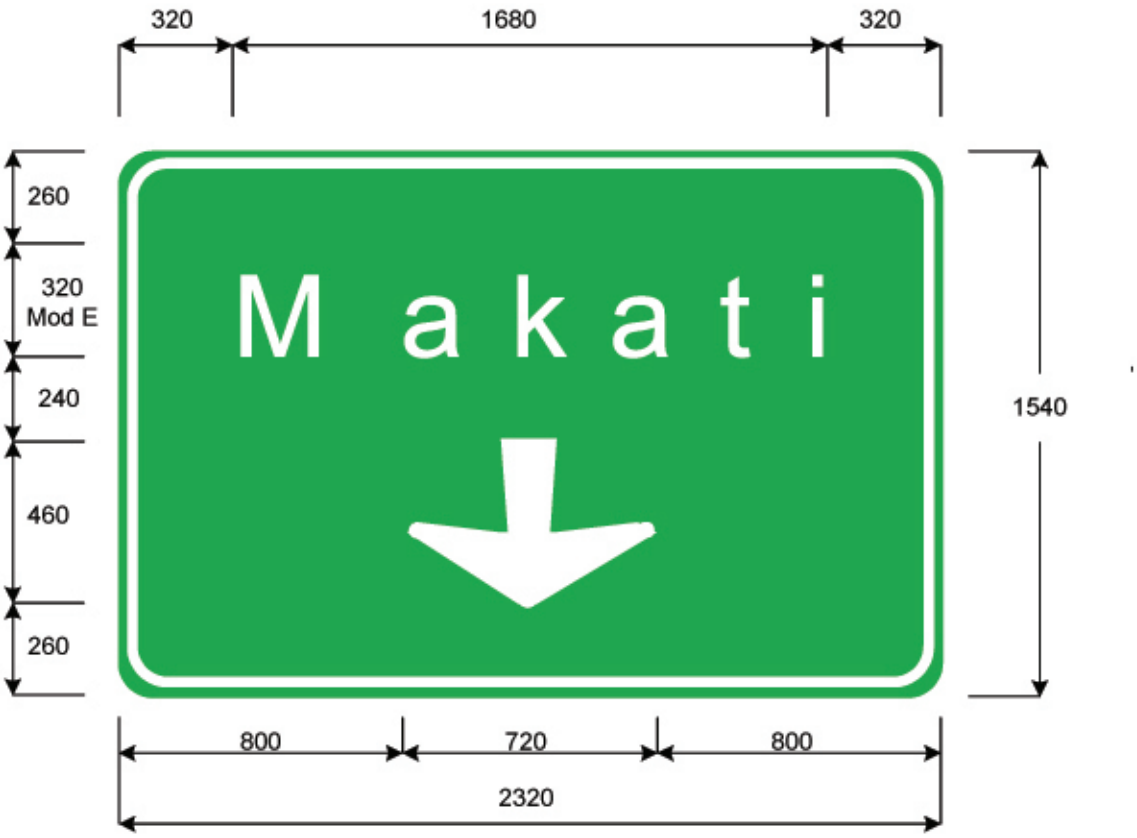
White retro-reflective letters, arrow and border on green retro-reflective background

GE2-2

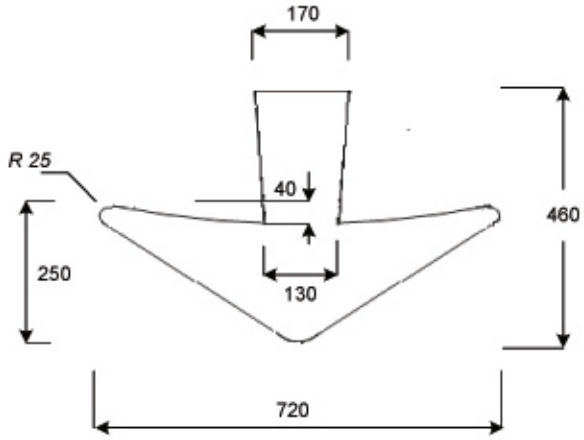


White retro-reflective letters, arrow and border on green retro-reflective background

GE2-3

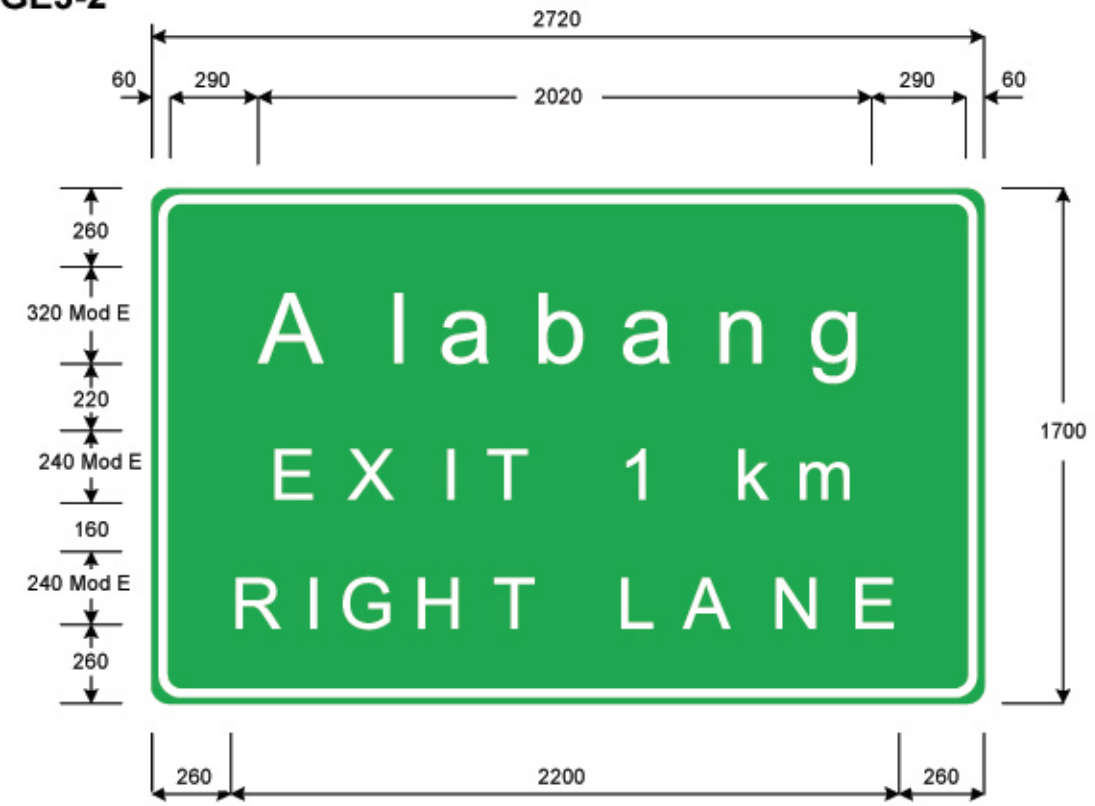


White retro-reflective letters, arrow and border on green retro-reflective background



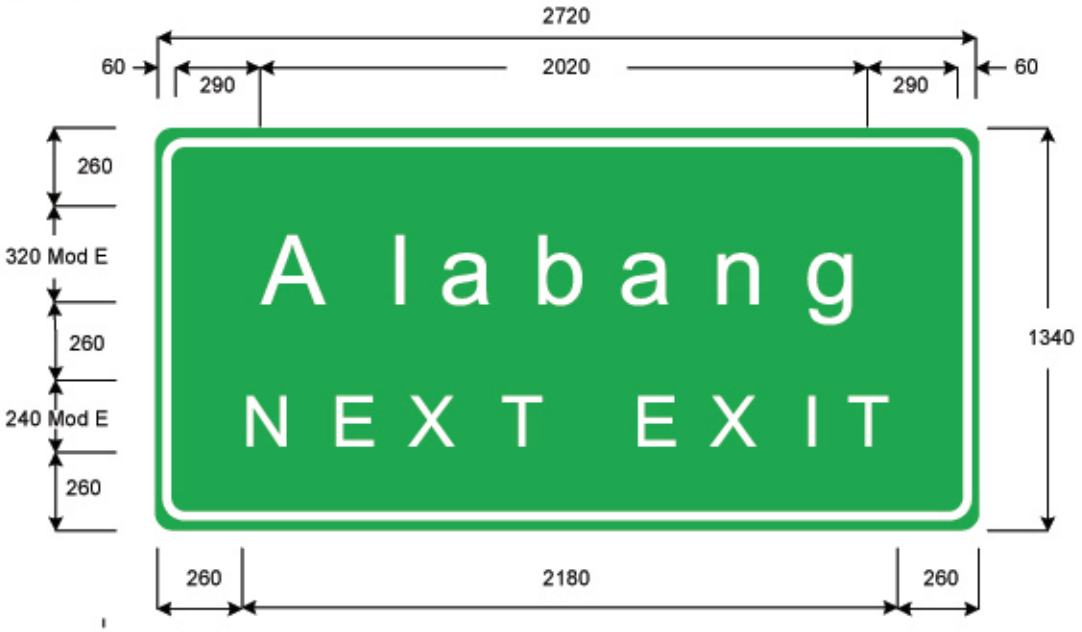
Detail of Arrow

GE3-2



White retro-reflective letters, arrow and border on green retro-reflective background

GE3-3



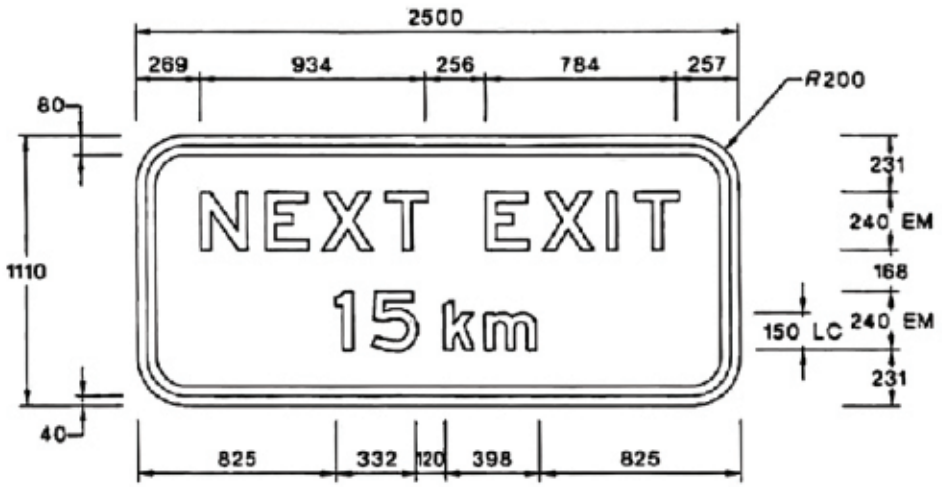
White retro-reflective letters, arrow and border on green retro-reflective background

GE4-1



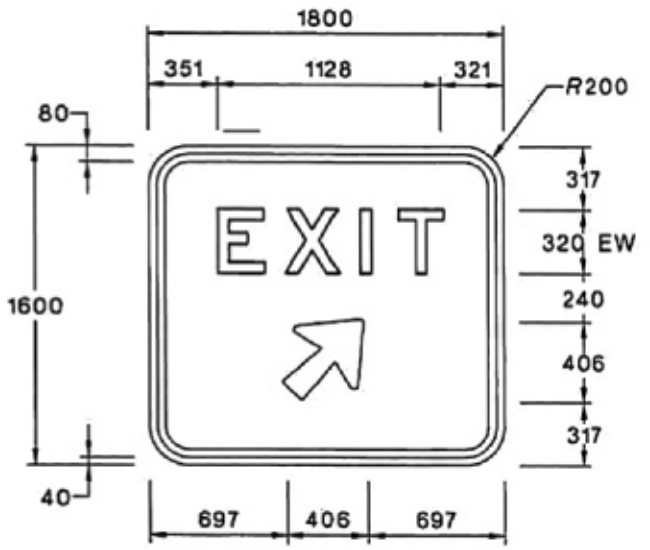
White retro-reflective letters, arrow and border on green retro-reflective background

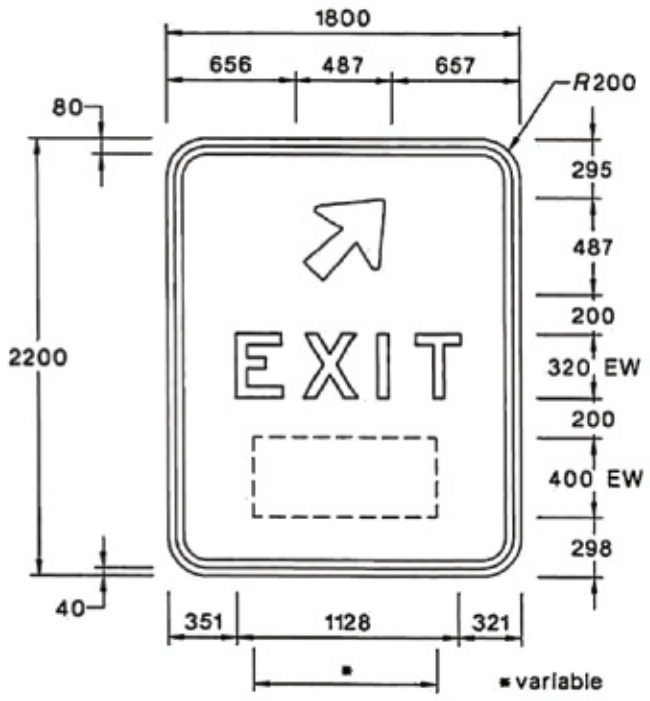
GE4-2



White retro-reflective letters, arrow and border on green retro-reflective background

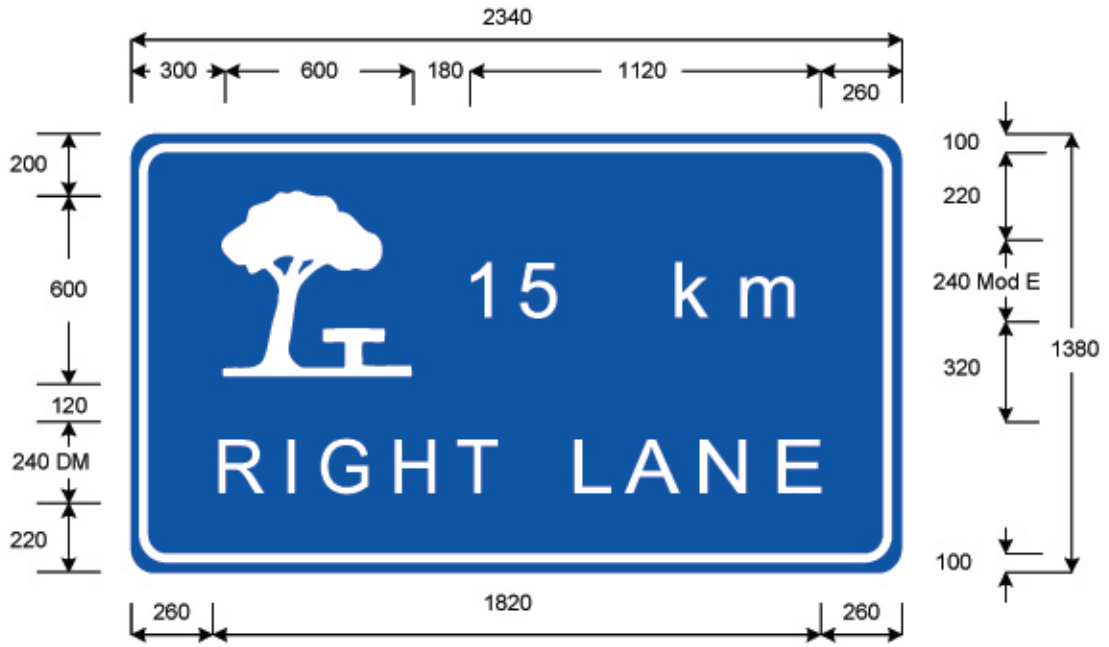
GE4-3 and GE4-3A





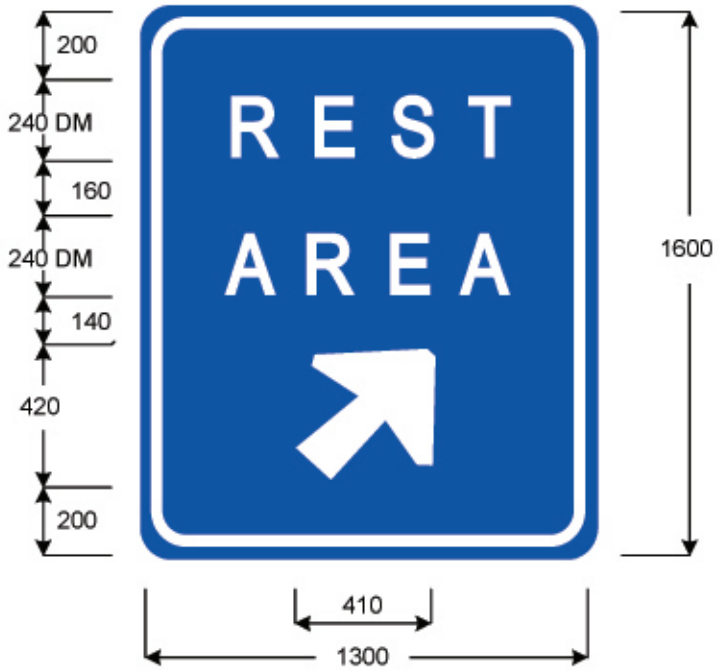
White retro-reflective letters, arrow numerals and border on standard green retro-reflective background

GE5-1A



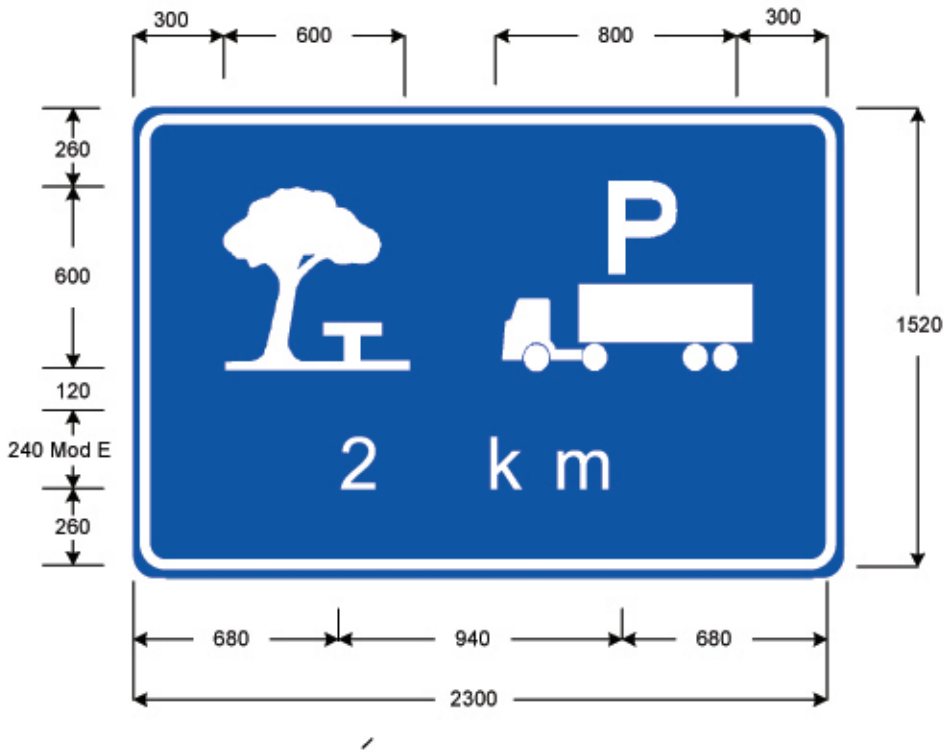
White retro-reflective letters, symbol, numerals and border on blue retro-reflective background

GE5-3



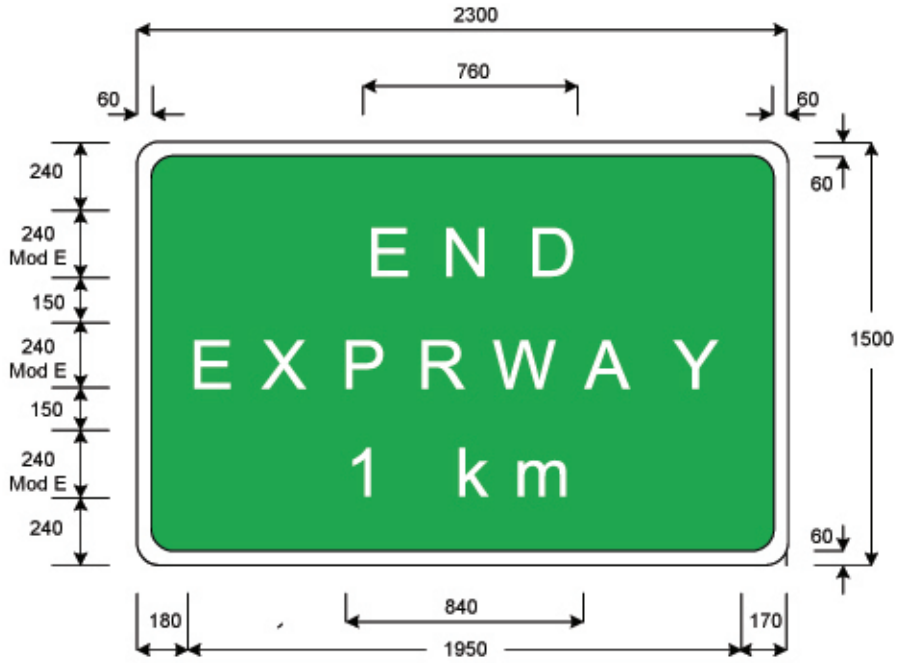
White retro-reflective letters, symbol, numerals and border on blue retro-reflective background

GE5-5



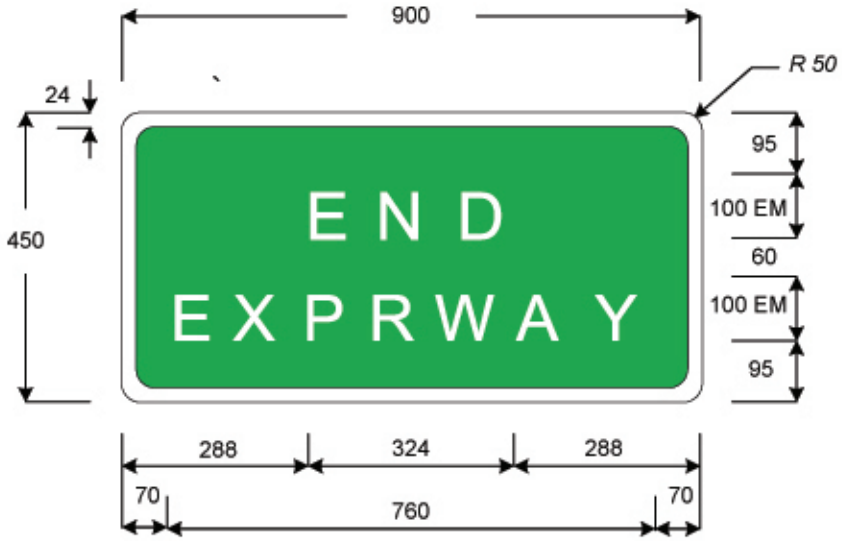
White retro-reflective letters, symbol, numerals and border on blue retro-reflective background

GE6-1



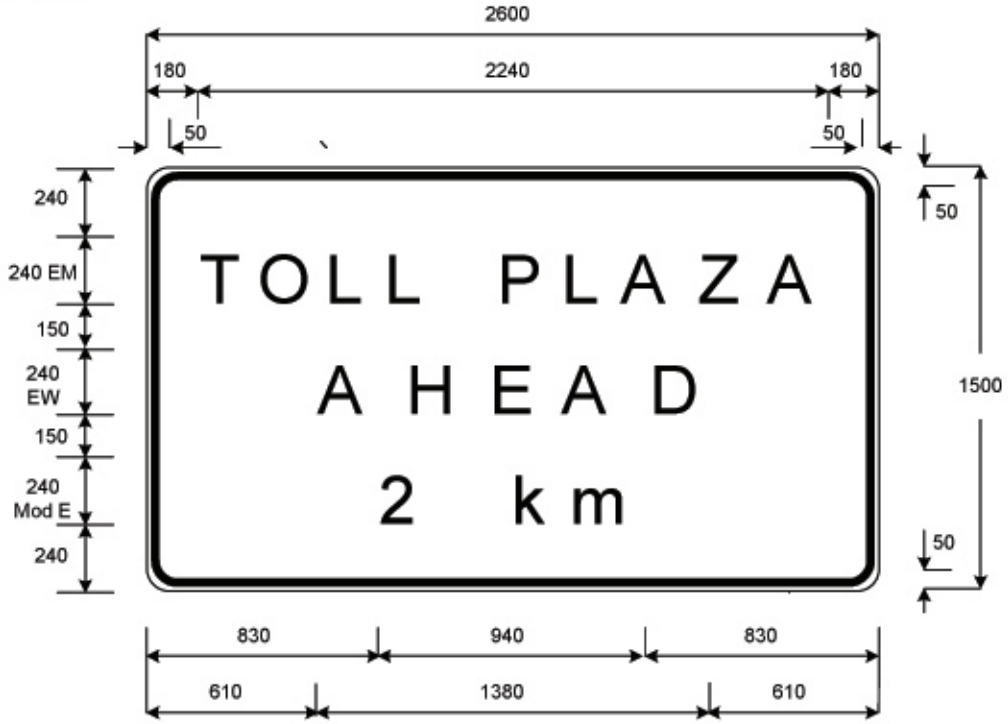
White retro-reflective letters and border on standard green retro-reflective background

GE6-3



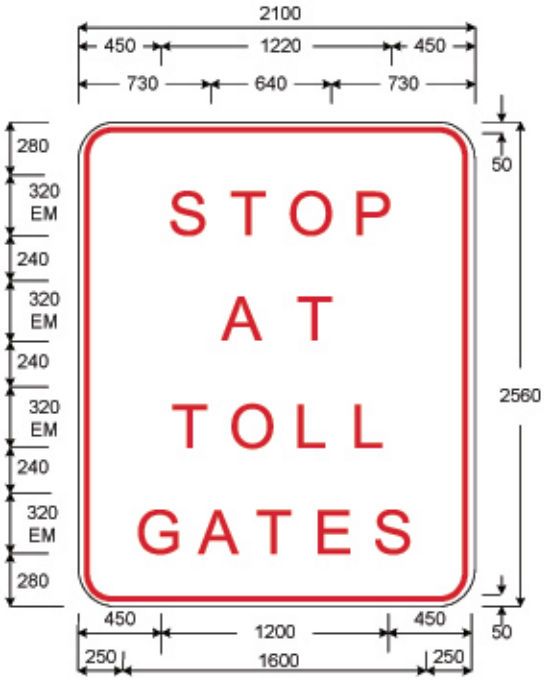
White retro-reflective letters and border on standard green retro-reflective background

GE7-1



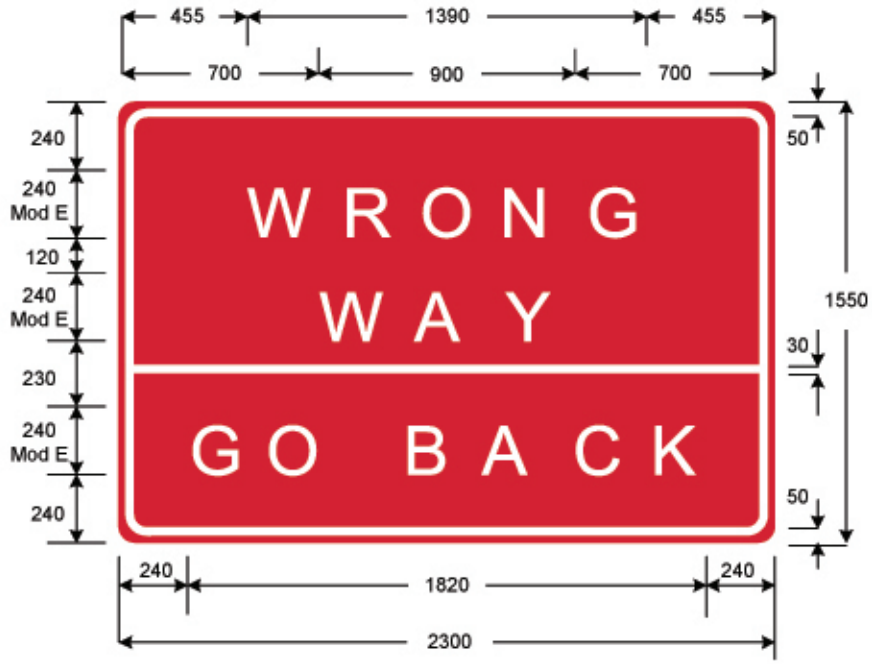
Black letters and border on white retro-reflective background

GE7-2



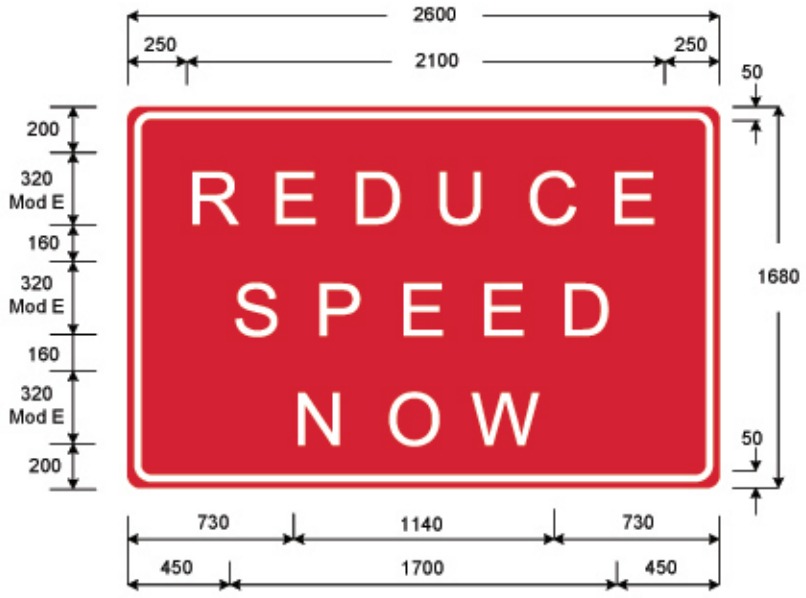
Red retro-reflective letters and border on white retro-reflective background

GE8-1



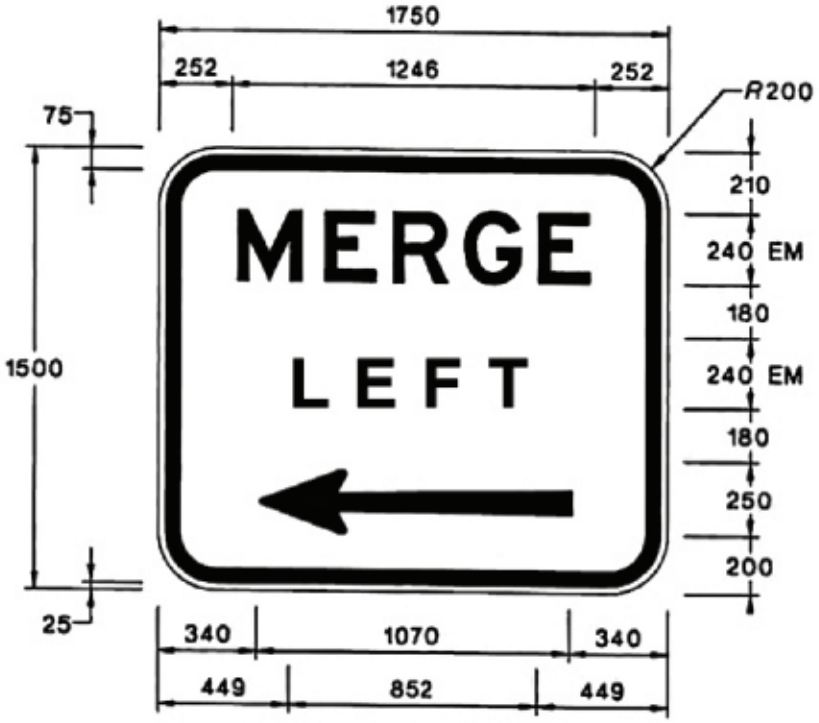
White retro-reflective letters and borders on red retro-reflective background

GE8-2

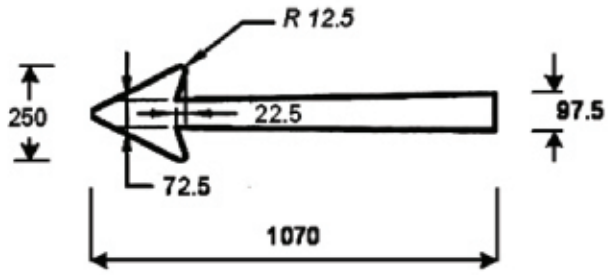


White retro-reflective letters and borders on red retro-reflective background

GE8-6

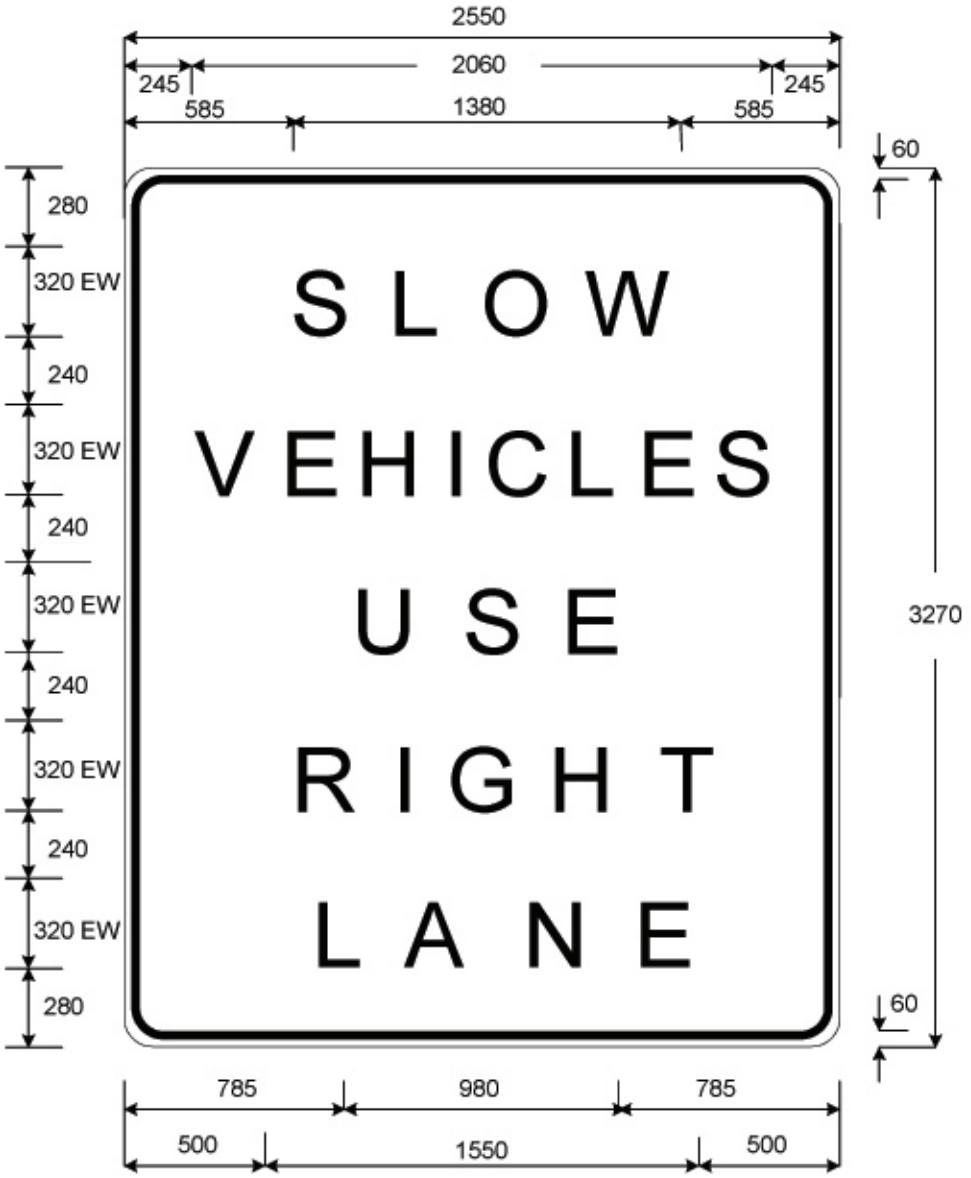


Black letters, arrow and border on white retro-reflective background



Detail of Arrow

GE8-7



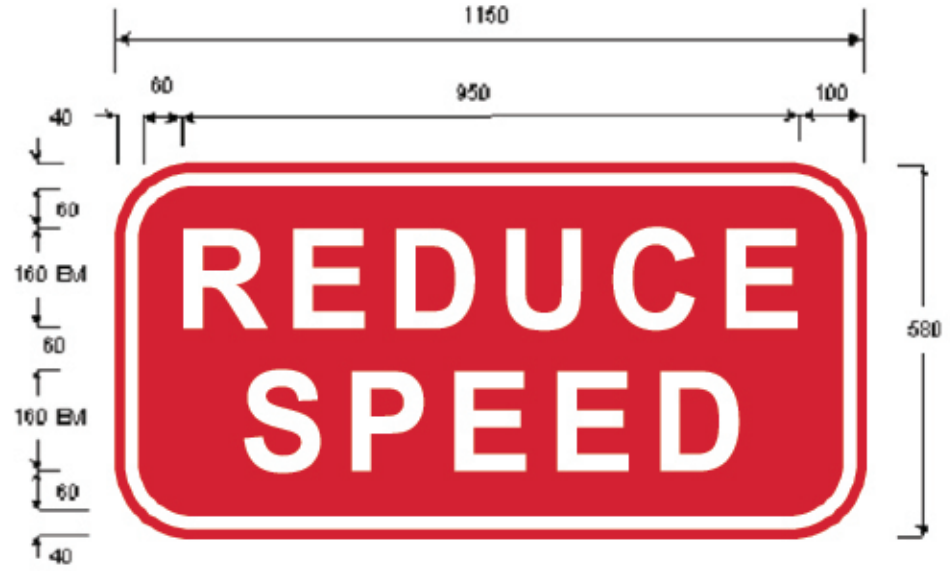
Black letters and border on white retro-reflective background

S1-3



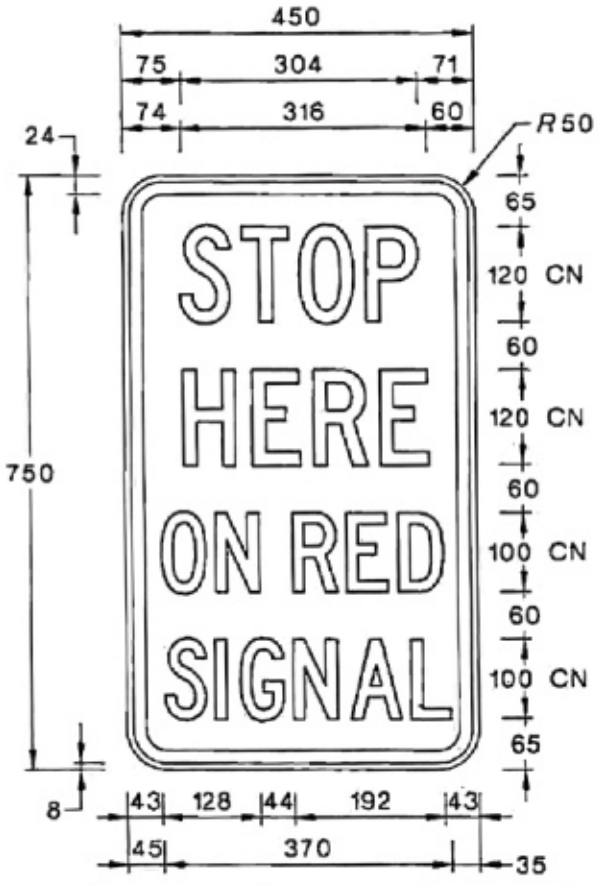
Black letters and border on white retro-reflective background

S2-1



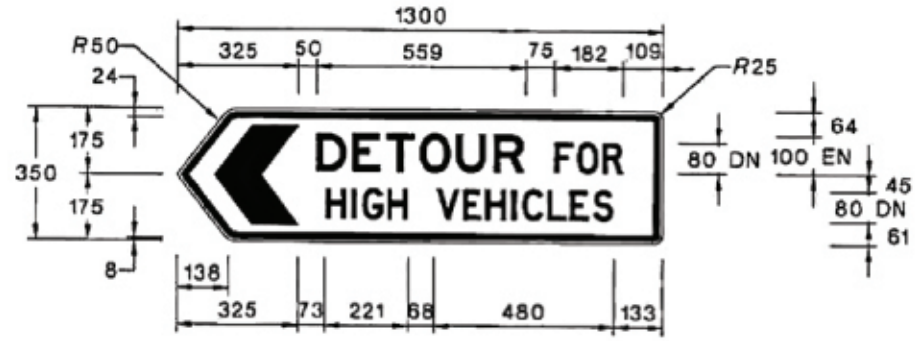
White letters and border on red retro-reflective background

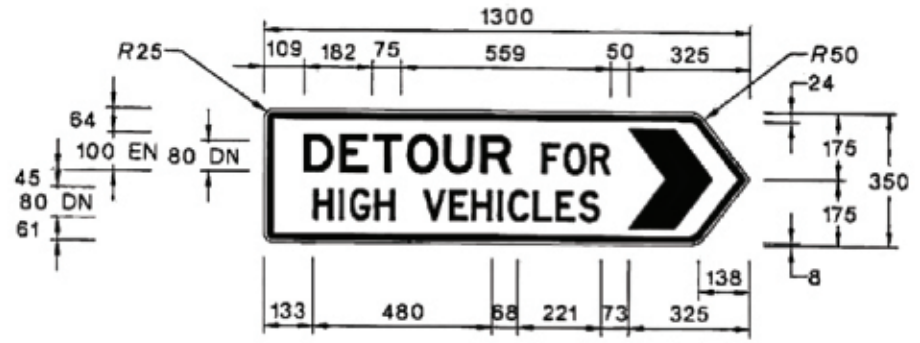
S2-2

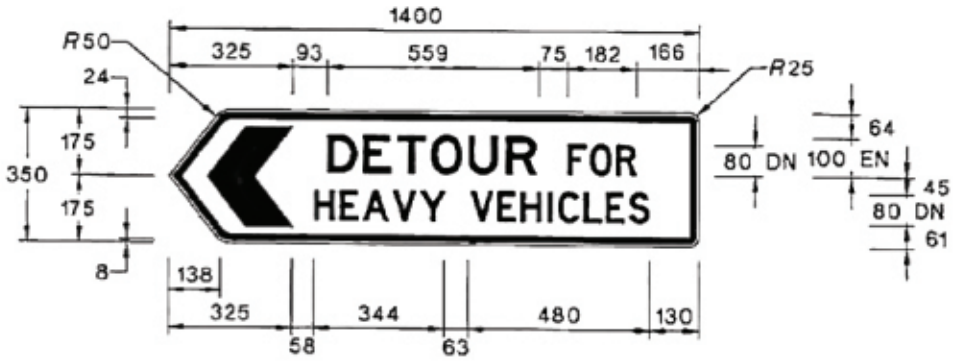


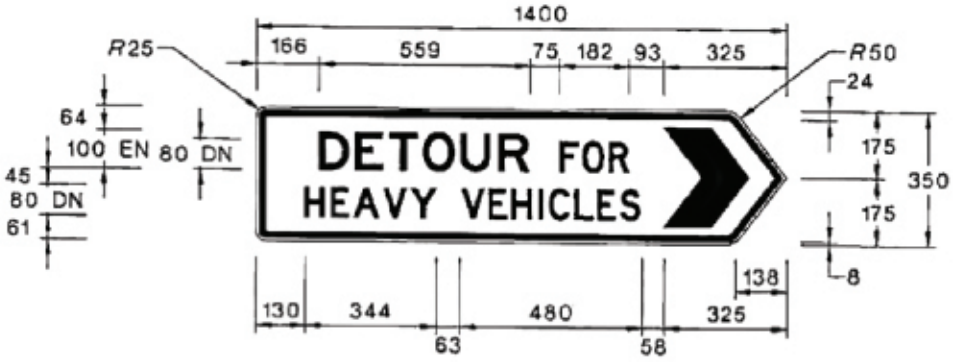
Red letters and border on white retro-reflective background

S2-4A (L & R) and S2-4B (L & R)

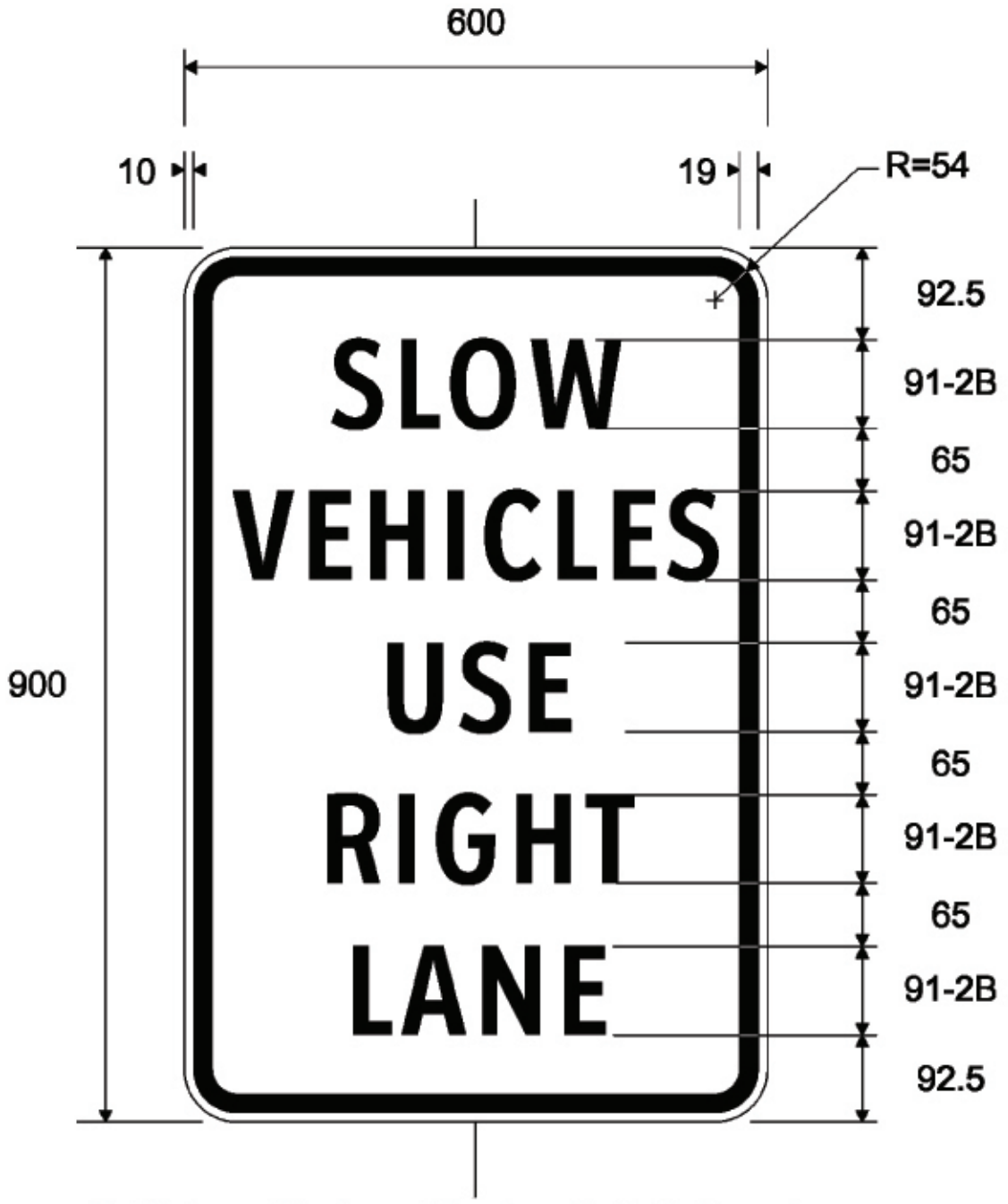








S2-7



Black letters and border on white retro-reflective background

S2-8A



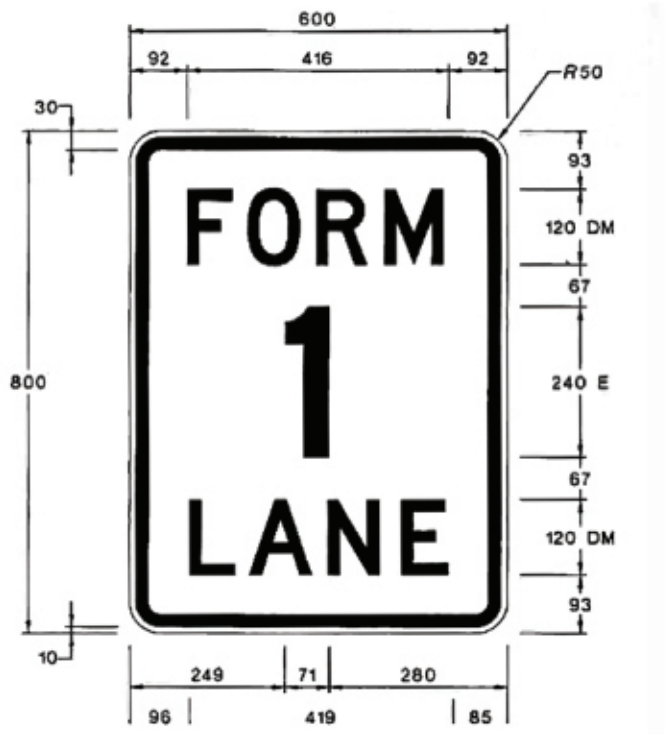
Black letters and border on white retro-reflective background

S2-9



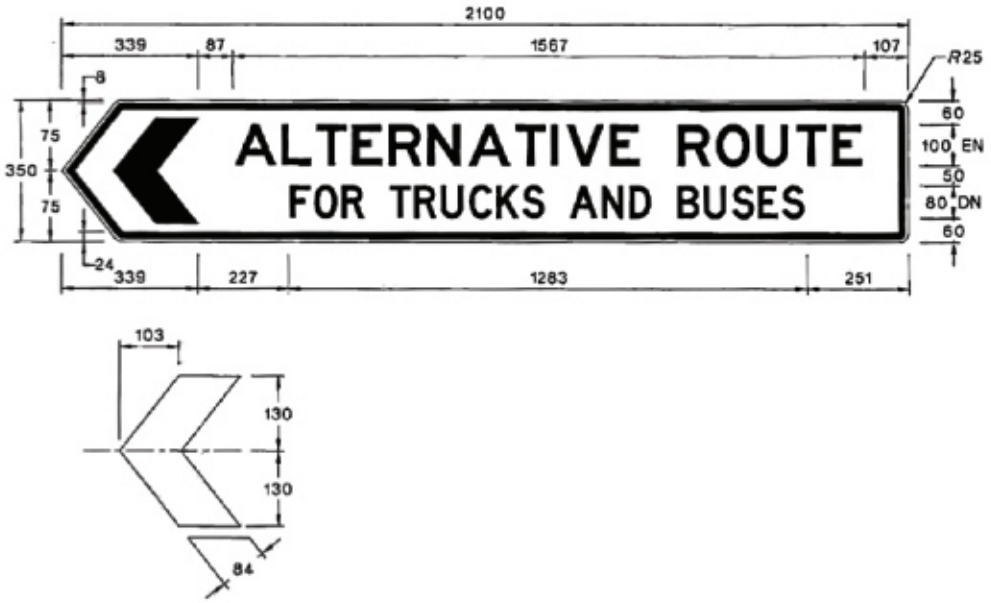
Black letters and border on white retro-reflective background

S2-10



Black letters, numerals and border on white retro-reflective background

S2-11

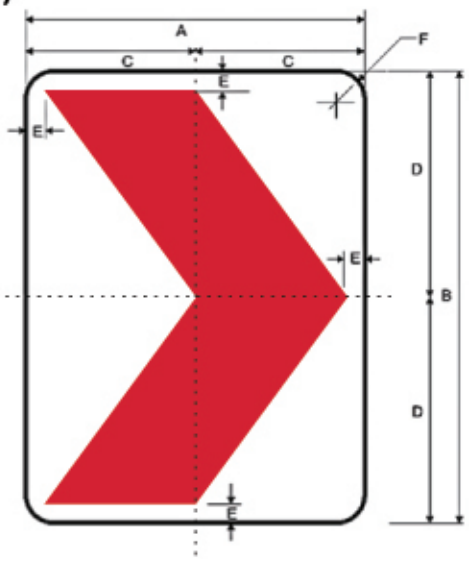


Black letters, chevron and border on white retro-reflective background

HM Series Hazard Markers

HM 1A and HM 1B (illustrated)

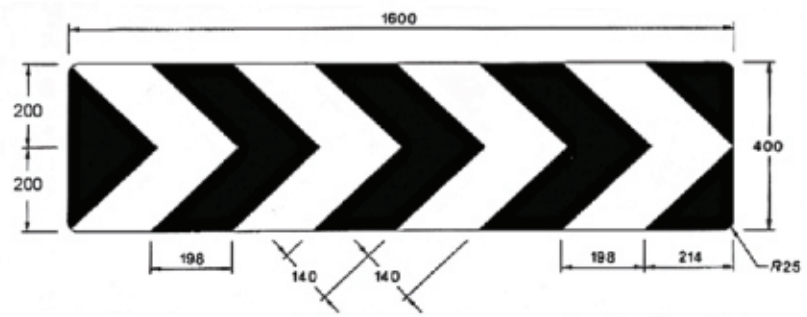




C	A	B	C	D	E	F
	450	600	225	300	20	40
	600	800	300	400	26	53

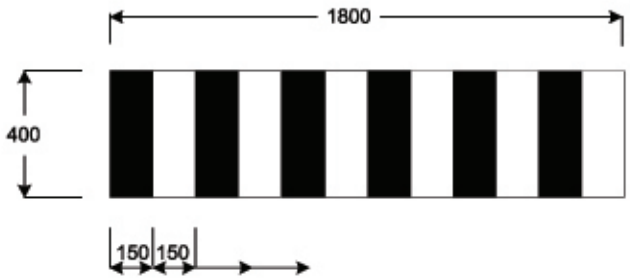
White retro-reflective chevron on black background
or red chevron on retro-reflective white background.

HM 2



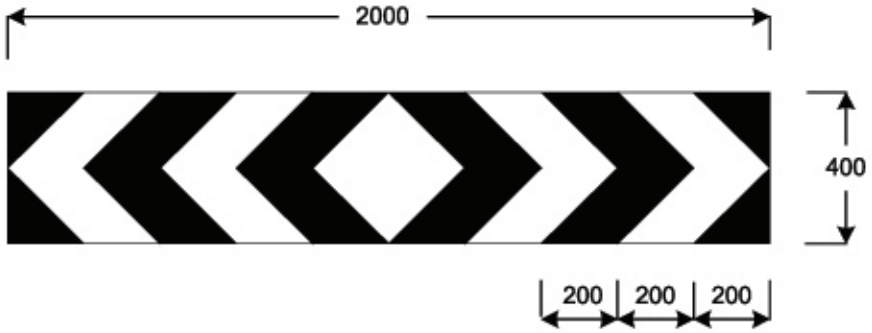
White retro-reflective chevrons on black background

HM 3



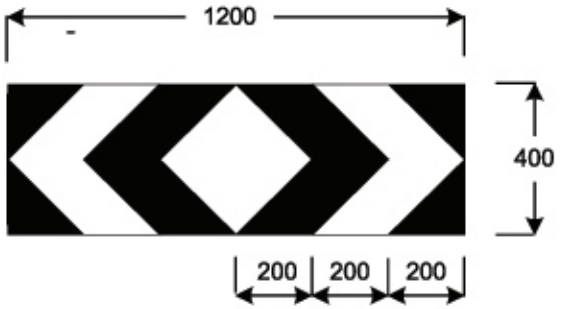
White retro-reflective chevrons on black background

HM 4A



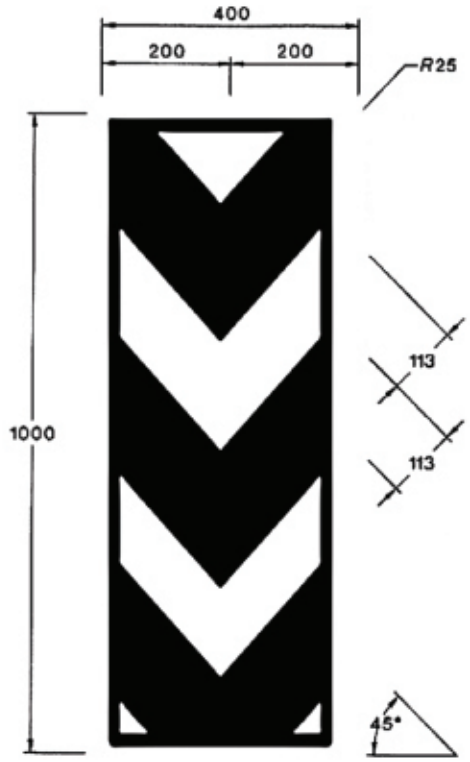
White retro-reflective chevrons on black background

HM 4B



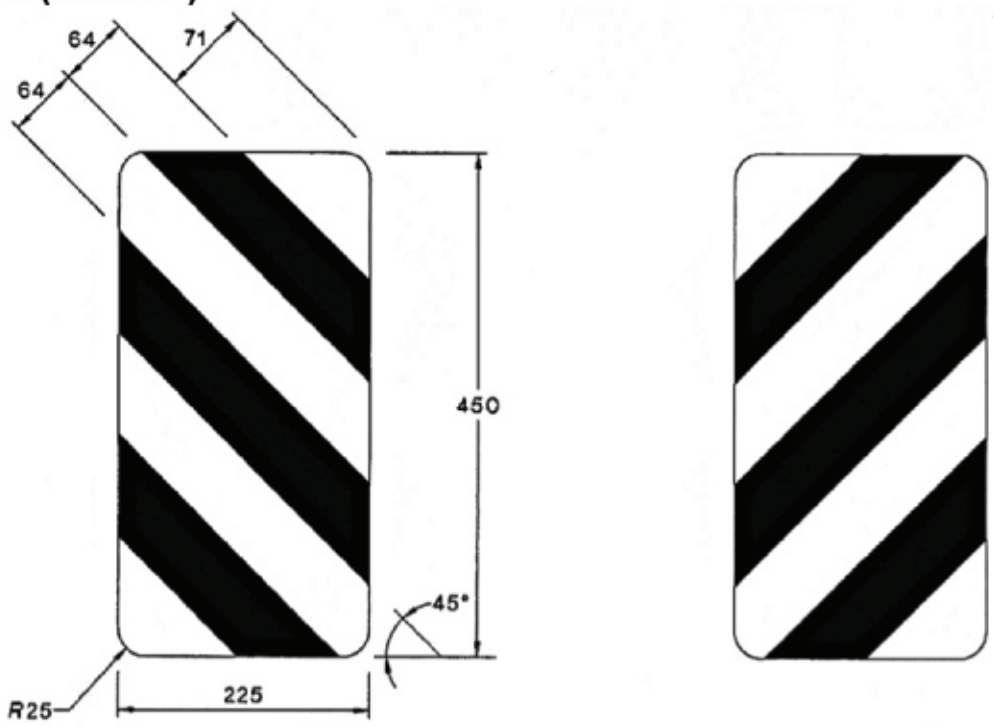
White retro-reflective chevrons on black background

HM 5



White retro-reflective chevrons on black background

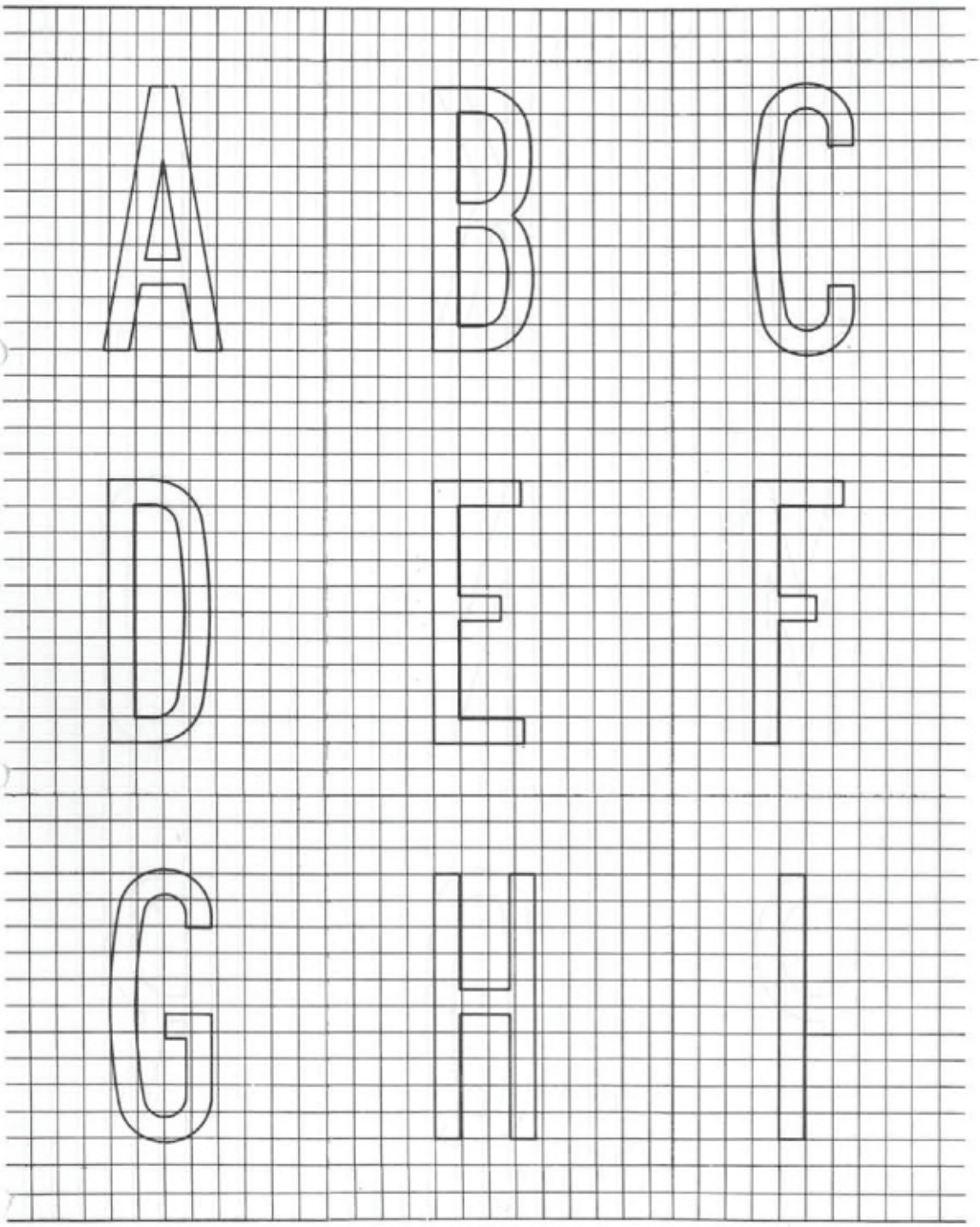
HM 6 (L and R)



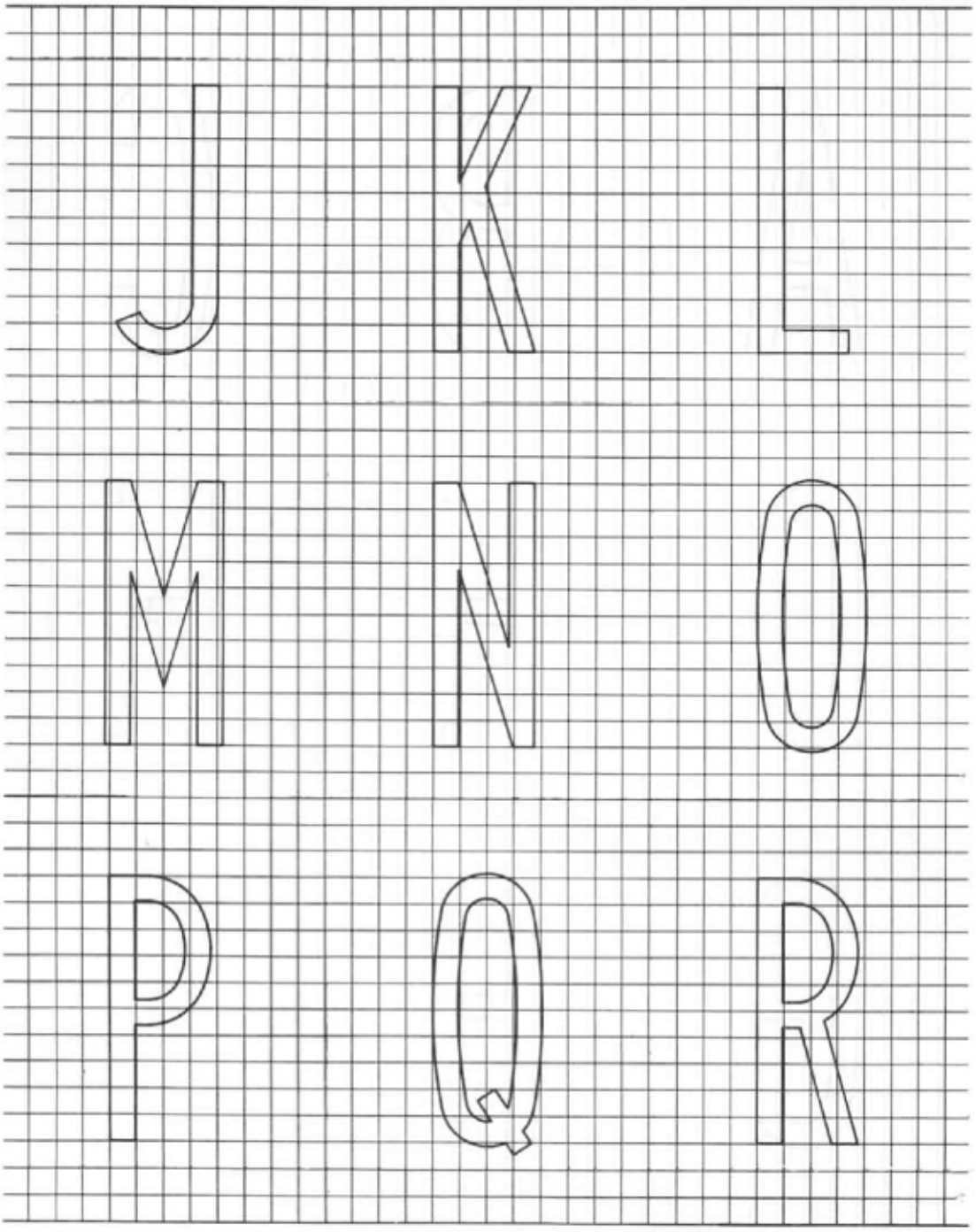
White retro-reflective chevrons on black background

STANDARD ALPHABETS

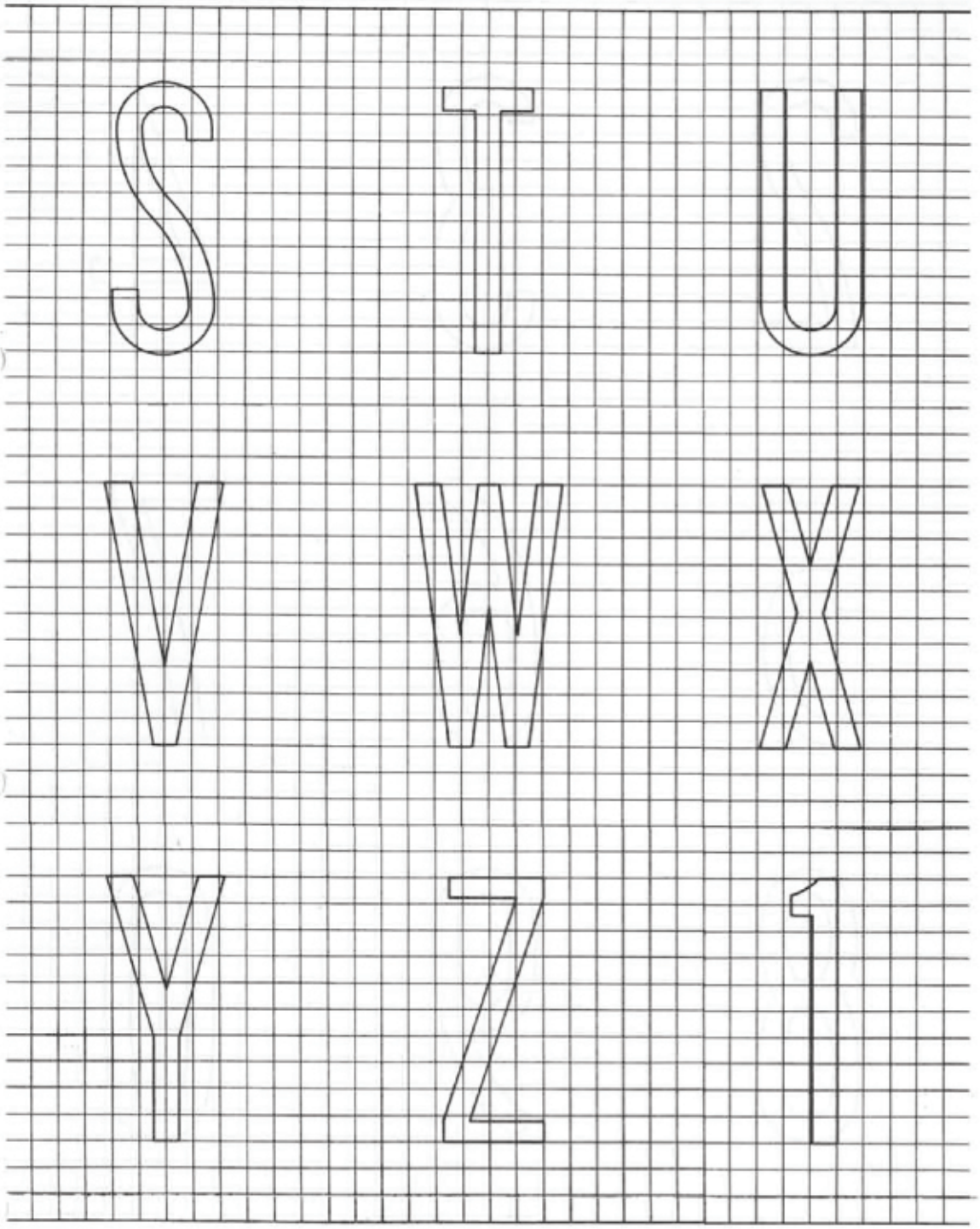
Series A



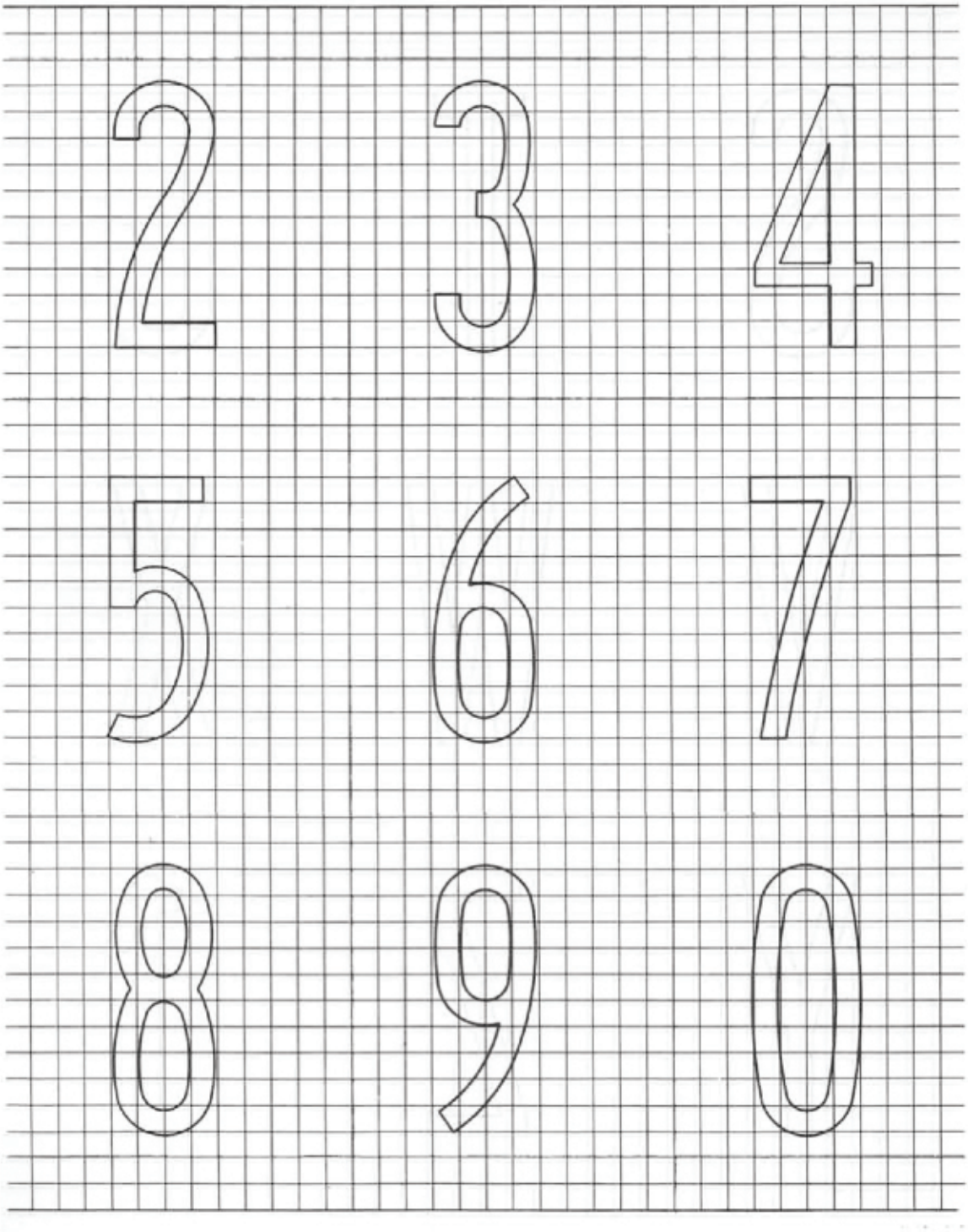
Series A



Series A



Series A



SERIES A LETTER AND NUMERAL DIMENSIONS

millimetres

Letter and numeral height	Letter and numeral width																																	Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	18	15	15	15	13	13	15	15	4	15	15	13	18	15	16	15	16	15	15	13	15	18	22	15	18	15	7	15	15	18	15	15	15	15	15	16	4
60	26	23	23	23	20	20	23	23	6	23	23	20	26	23	24	23	24	23	23	20	23	26	33	23	26	23	10	23	23	26	23	23	23	23	23	24	6
80	35	30	30	30	27	27	30	30	8	30	30	27	35	30	33	30	33	30	30	27	30	35	44	30	35	30	14	30	30	35	30	30	30	30	30	33	8
100	44	38	38	38	34	34	38	38	9	38	38	34	44	38	41	38	41	38	38	34	38	44	55	38	44	38	17	38	38	44	38	38	38	38	38	41	9
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140	61	53	53	53	47	47	53	53	13	53	53	47	61	53	57	53	57	53	53	47	53	61	77	53	61	53	24	53	53	61	53	53	53	53	53	57	13
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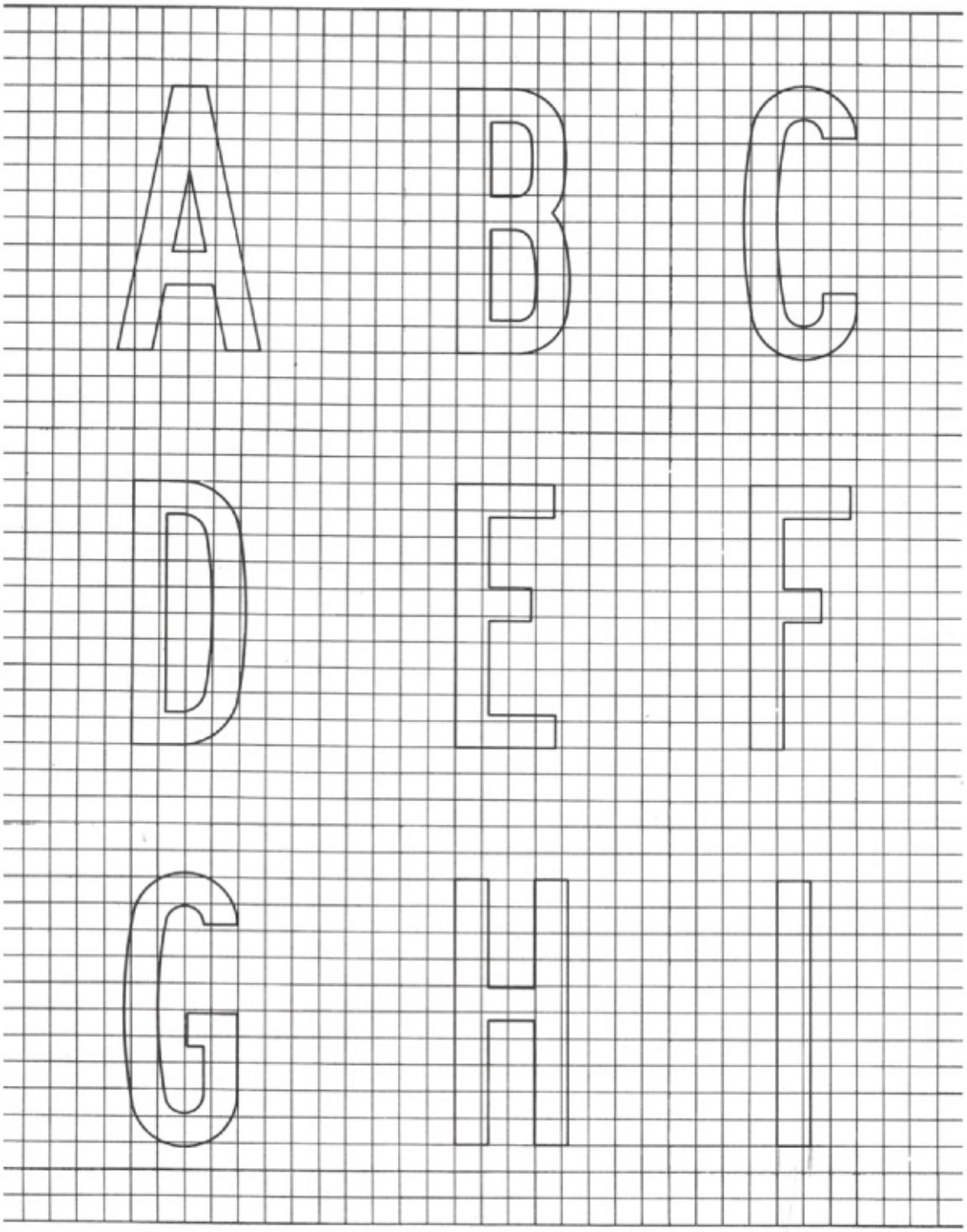
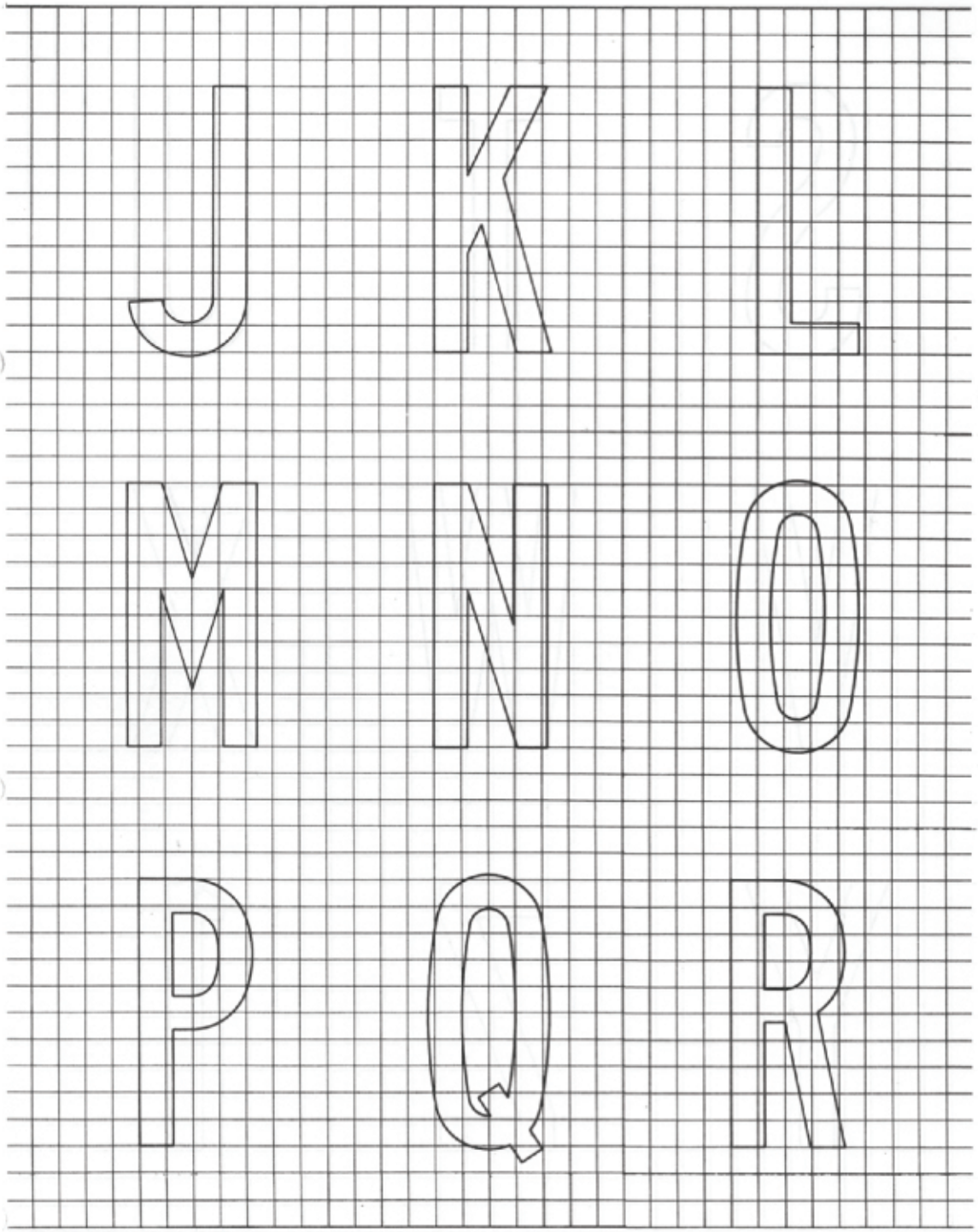
560	245	210	210	210	188	188	210	210	53	210	210	188	245	210	228	210	228	210	210	188	210	245	306	210	245	210	96	210	210	245	210	210	210	210	210	228	53
640	280	240	240	240	215	215	240	240	60	240	240	215	280	240	260	240	260	240	240	215	240	280	350	240	280	240	110	240	240	280	240	240	240	240	240	260	60

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

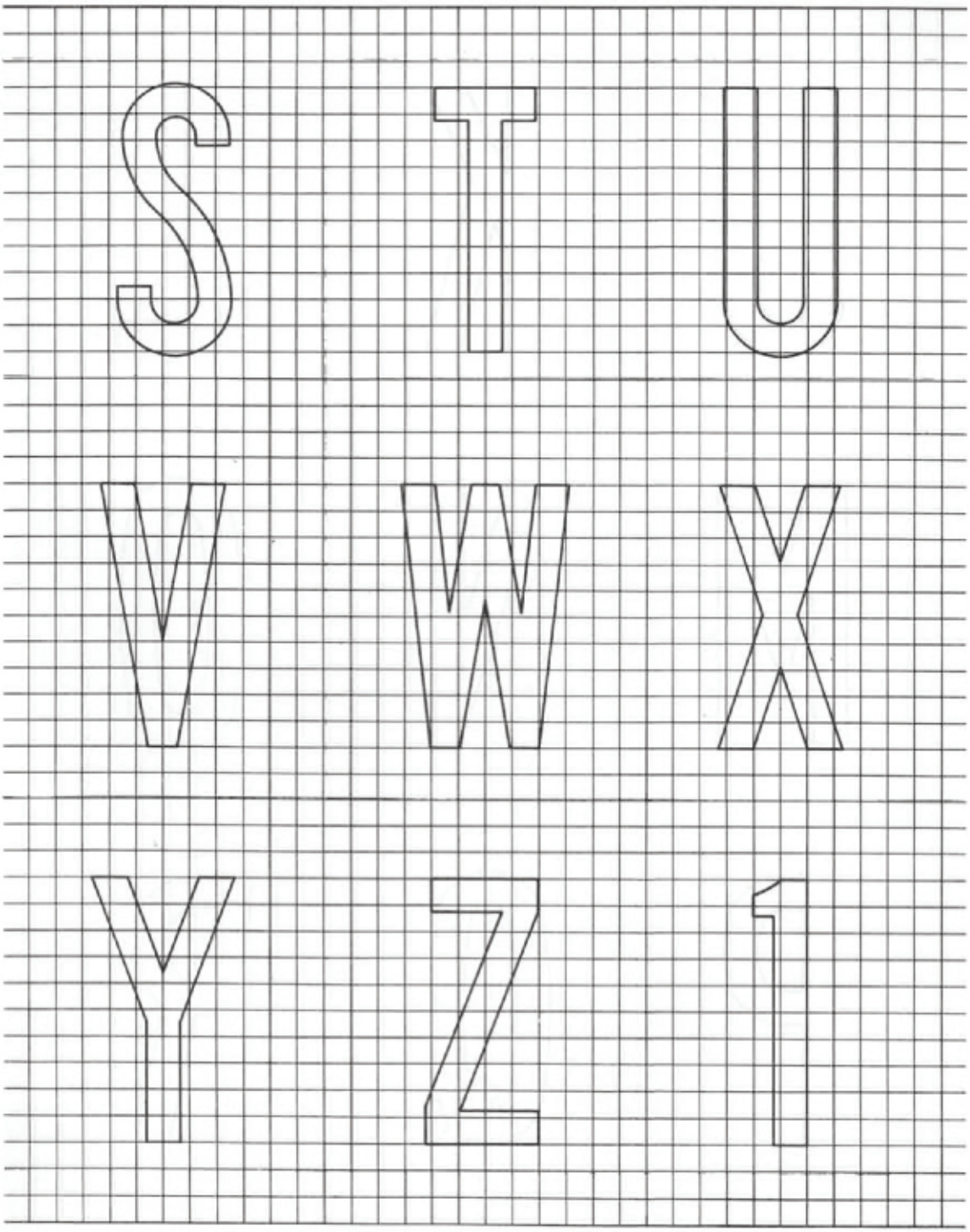
Series B



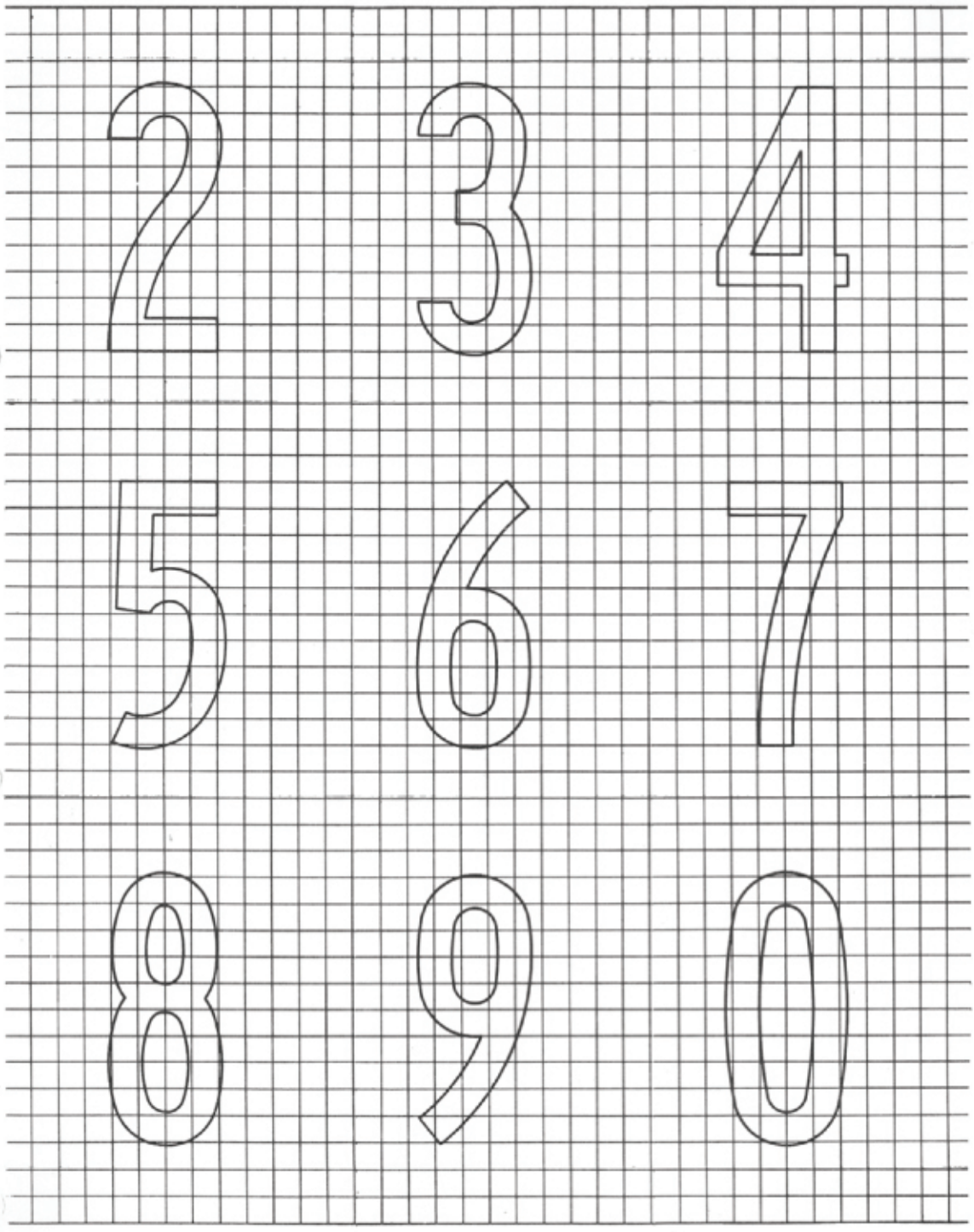
Series B



Series B



Series B



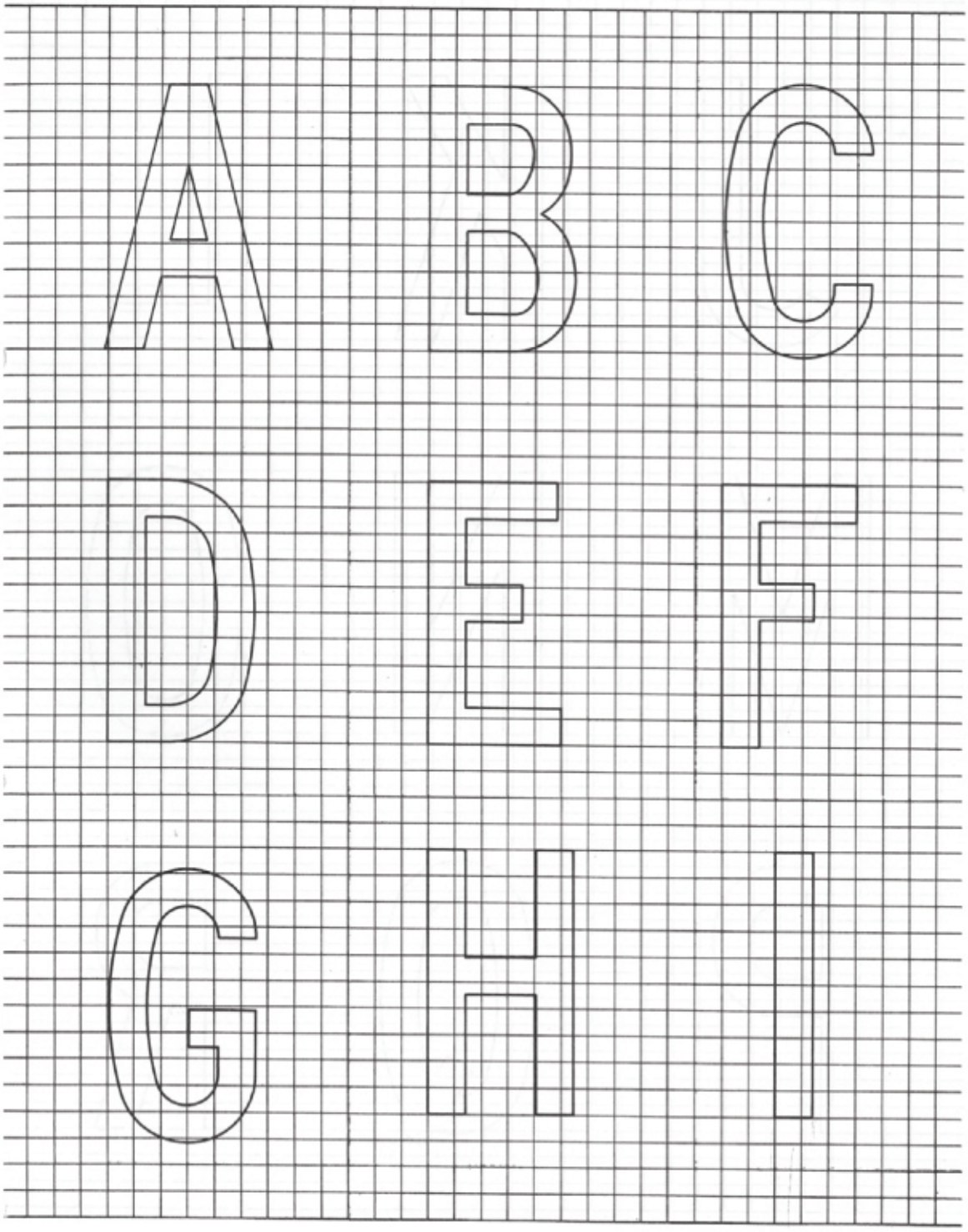
SERIES B LETTER AND NUMERAL DIMENSIONS

millimetres

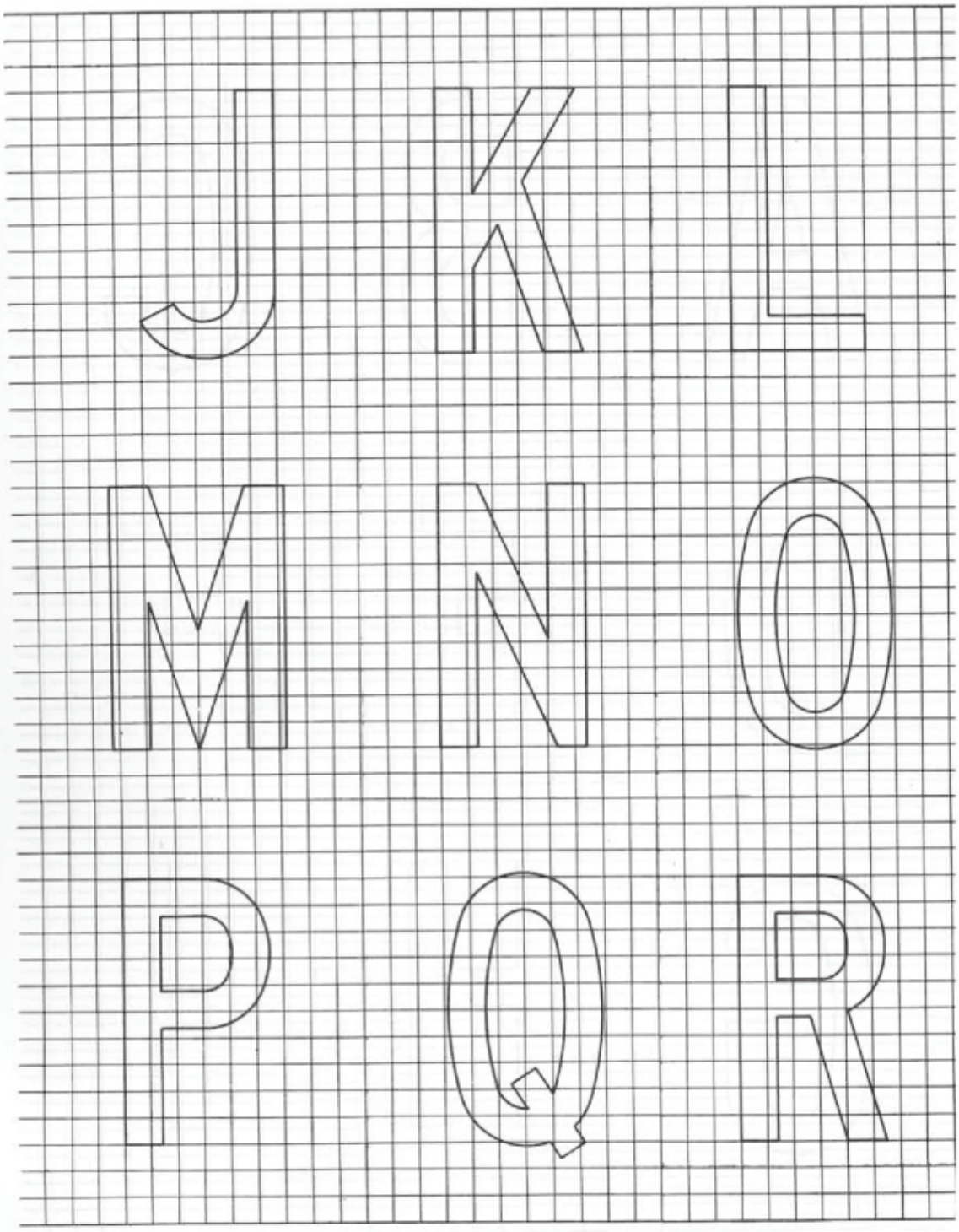
Letter and numeral height	Letter and numeral width																																	Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	21	17	17	17	15	15	17	17	5	18	18	15	19	17	18	17	18	17	17	15	17	19	25	19	21	17	8	17	17	19	17	17	17	17	17	18	5
60	32	25	25	25	23	23	25	25	8	26	26	23	29	25	27	25	27	25	25	23	25	28	38	28	32	25	12	25	25	29	25	25	25	25	25	27	8
80	43	34	34	34	30	30	34	34	10	35	35	30	39	34	36	34	36	34	34	30	34	37	50	37	43	34	16	34	34	39	34	34	34	34	34	36	10
100	53	42	42	42	38	38	42	42	13	44	44	38	48	42	45	42	45	42	42	38	42	46	63	46	53	42	20	42	42	48	42	42	42	42	42	45	13
120	64	51	51	51	45	45	51	51	15	53	53	45	58	51	54	51	54	51	51	45	51	56	75	56	64	51	24	51	51	58	51	51	51	51	51	54	15
140	74	59	59	59	53	53	59	59	18	61	61	53	68	59	63	59	63	59	59	53	59	65	88	65	74	59	28	59	59	68	59	59	59	59	59	63	18
160	85	68	68	68	60	60	68	68	20	70	70	60	78	68	73	68	73	68	68	60	68	74	100	74	85	68	33	68	68	78	68	68	68	68	68	73	20
180	96	76	76	76	68	68	76	76	23	79	79	68	87	76	82	76	82	76	76	68	76	83	113	83	96	76	37	76	76	87	76	76	76	76	76	82	23
200	106	84	84	84	75	75	84	84	25	88	88	75	97	84	91	84	91	84	84	75	84	93	125	93	106	84	41	84	84	97	84	84	84	84	84	91	25
240	128	101	101	101	90	90	101	101	30	105	105	90	116	101	109	101	109	101	101	90	101	111	150	111	128	101	49	101	101	116	101	101	101	101	101	109	30
280	149	118	118	118	105	105	118	118	35	123	123	105	136	118	127	118	127	118	118	105	118	130	175	130	149	118	57	118	118	136	118	118	118	118	118	127	35
320	170	135	135	135	120	120	135	135	40	140	140	120	155	135	145	135	145	135	135	120	135	148	200	148	170	135	65	135	135	155	135	135	135	135	135	145	40
*340	181	143	143	143	128	128	143	143	43	149	149	128	165	143	154	143	154	143	143	128	143	157	213	157	181	143	69	143	143	165	143	143	143	143	143	154	43
400	213	169	169	169	150	150	169	169	50	175	175	150	194	169	181	169	181	169	169	150	169	185	250	185	213	169	81	169	169	194	169	169	169	169	169	181	50
480	255	203	203	203	180	180	203	203	60	210	210	180	233	203	218	203	218	203	203	180	203	222	300	222	255	203	98	203	203	233	203	203	203	203	203	218	60
560	298	236	236	236	210	210	236	236	70	245	245	210	271	236	254	236	254	236	236	210	236	259	350	259	298	236	114	236	236	271	236	236	236	236	236	254	70
640	340	270	270	270	240	240	270	270	80	280	280	240	310	270	290	270	290	270	270	240	270	296	400	296	340	270	130	270	270	310	270	270	270	270	270	290	80

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

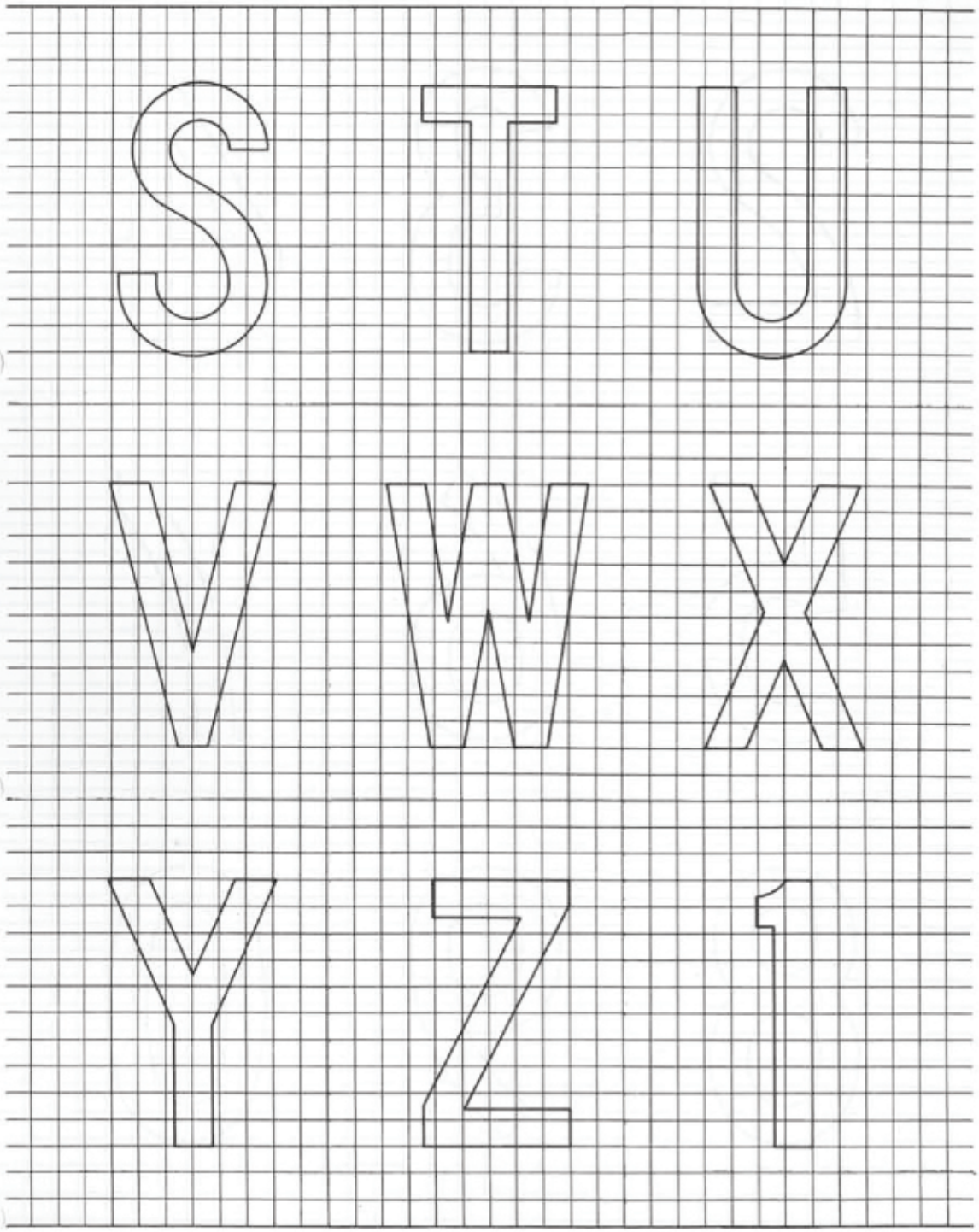
Series C



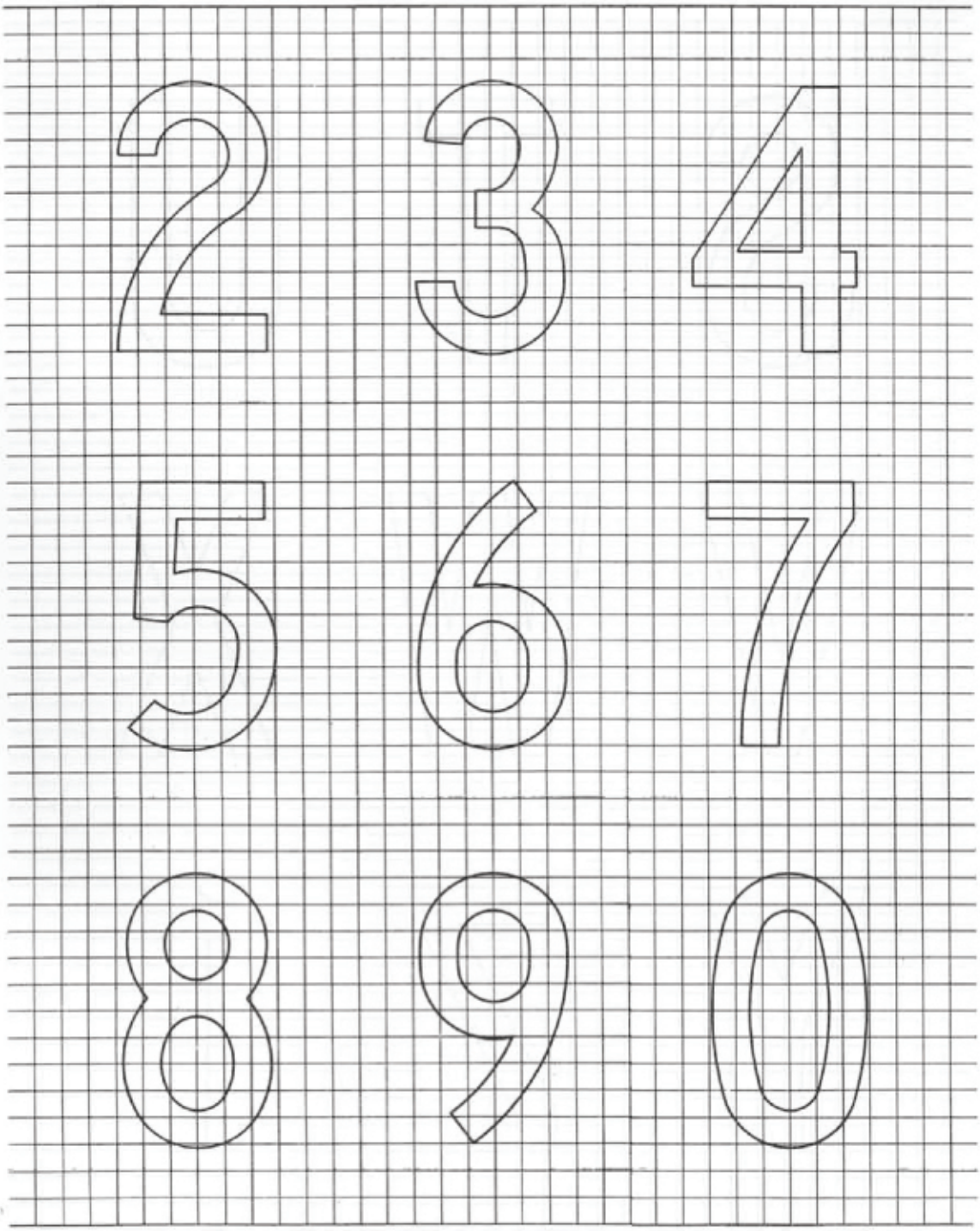
Series C



Series C



Series C



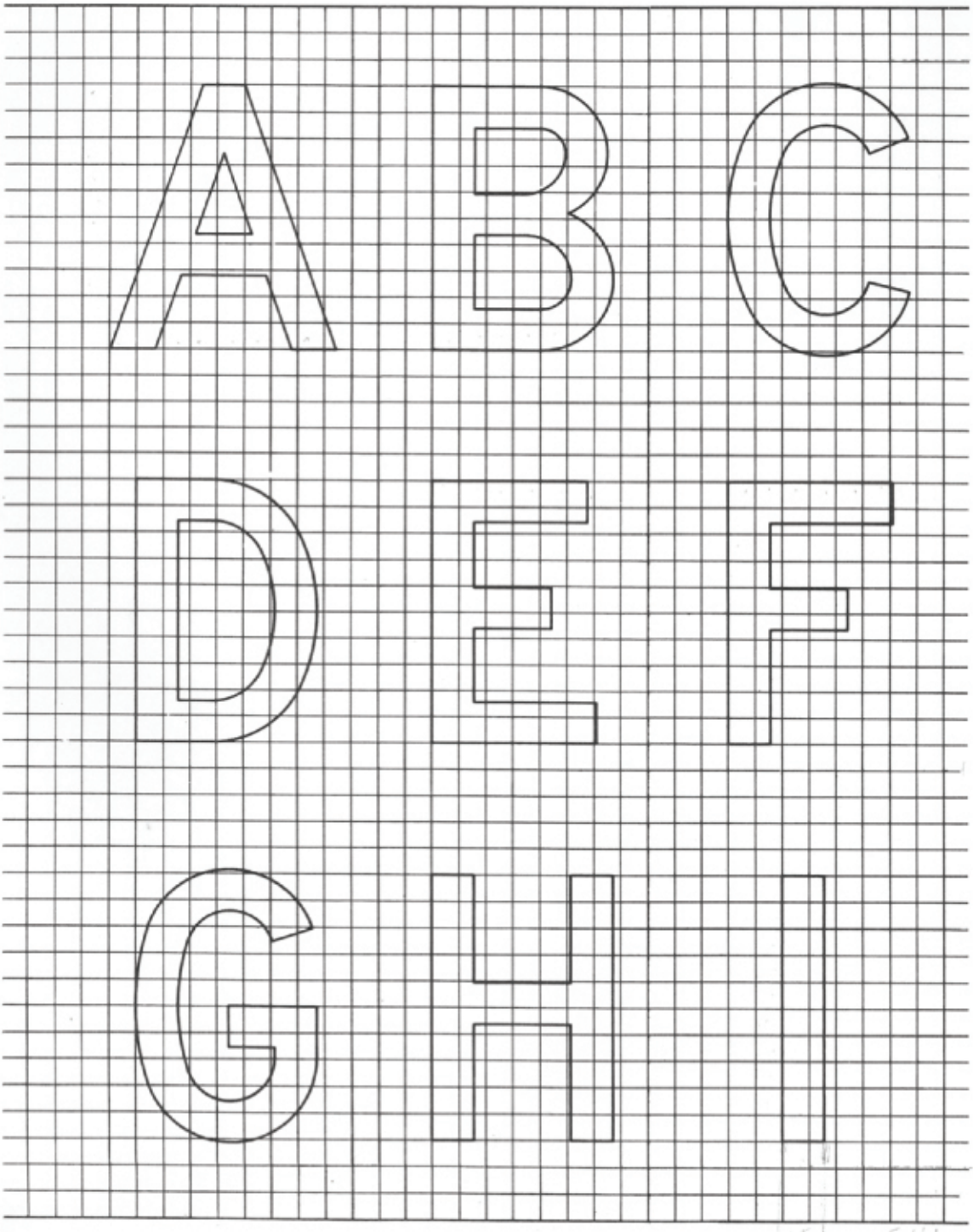
SERIES C LETTER AND NUMERAL DIMENSIONS

millimetres

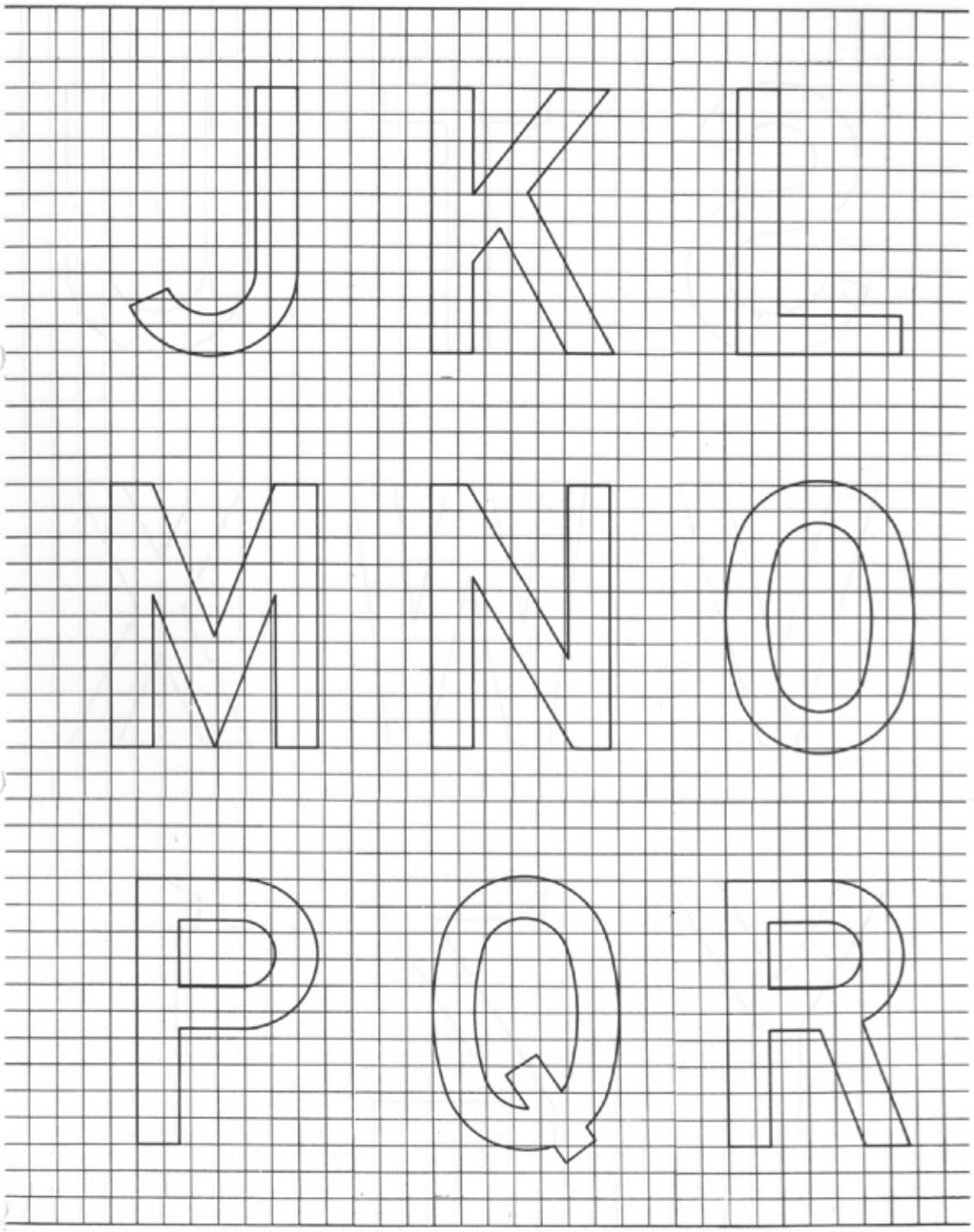
Letter and numeral height	Letter and numeral width																																	Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	25	22	22	22	20	20	22	22	6	20	22	20	26	22	23	22	23	22	22	20	22	24	30	24	25	22	8	22	22	24	22	22	22	22	22	23	6
60	38	33	33	33	30	30	33	33	8	30	33	30	39	33	35	33	35	33	33	30	33	37	45	35	38	33	12	33	33	37	33	33	33	33	33	35	8
80	50	44	44	44	40	40	44	44	11	40	44	40	52	44	46	44	46	44	44	40	44	49	60	47	50	44	16	44	44	49	44	44	44	44	44	46	11
100	63	55	55	55	50	50	55	55	14	50	55	50	65	55	58	55	58	55	55	50	55	61	75	59	63	55	20	55	55	61	55	55	55	55	55	58	14
120	75	66	66	66	60	60	66	66	17	60	66	60	78	66	69	66	69	66	66	60	66	73	90	71	75	66	24	66	66	73	66	66	66	66	66	69	17
140	88	77	77	77	70	70	77	77	20	70	77	70	91	77	81	77	81	77	77	70	77	85	105	82	88	77	28	77	77	86	77	77	77	77	77	81	20
160	100	88	88	88	80	80	88	88	23	80	88	80	104	88	93	88	93	88	88	80	88	98	120	94	100	88	33	88	88	98	88	88	88	88	88	93	23
180	113	98	98	98	90	90	98	98	25	90	98	90	117	98	104	98	104	98	98	90	98	110	135	106	113	99	37	99	99	110	98	98	98	98	98	104	25
200	125	109	109	109	100	100	109	109	28	100	109	100	130	109	116	109	116	109	109	100	109	122	150	118	125	110	41	110	110	122	109	109	109	109	109	116	28
240	150	131	131	131	120	120	131	131	34	120	131	120	156	131	139	131	139	131	131	120	131	146	180	141	150	132	49	132	132	147	131	131	131	131	131	139	34
280	175	153	153	153	140	140	153	153	39	140	153	140	182	153	162	153	162	153	153	140	153	171	210	165	175	154	57	154	154	171	153	153	153	153	153	162	39
320	200	175	175	175	160	160	175	175	45	160	175	160	208	175	185	175	185	175	175	160	175	195	240	188	200	176	65	176	176	196	175	175	175	175	175	185	45
*340	213	186	186	186	170	170	186	186	48	170	186	170	220	186	197	186	197	186	186	170	186	207	255	200	213	186	69	186	186	208	186	186	186	186	186	197	48
400	250	219	219	219	200	200	219	219	56	200	219	200	259	219	231	219	231	219	219	200	219	244	300	235	250	219	81	219	219	244	219	219	219	219	219	231	56
480	300	263	263	263	240	240	263	263	68	240	263	240	311	263	278	263	278	263	263	240	263	293	360	282	300	263	98	263	263	293	263	263	263	263	263	278	68
560	350	306	306	306	280	280	306	306	79	280	306	280	363	306	324	306	324	306	306	280	306	341	420	329	350	306	114	306	306	341	306	306	306	306	306	324	79
640	400	350	350	350	320	320	350	350	90	320	350	320	415	350	370	350	370	350	350	320	350	390	480	376	400	350	130	350	350	390	350	350	350	350	350	370	90

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

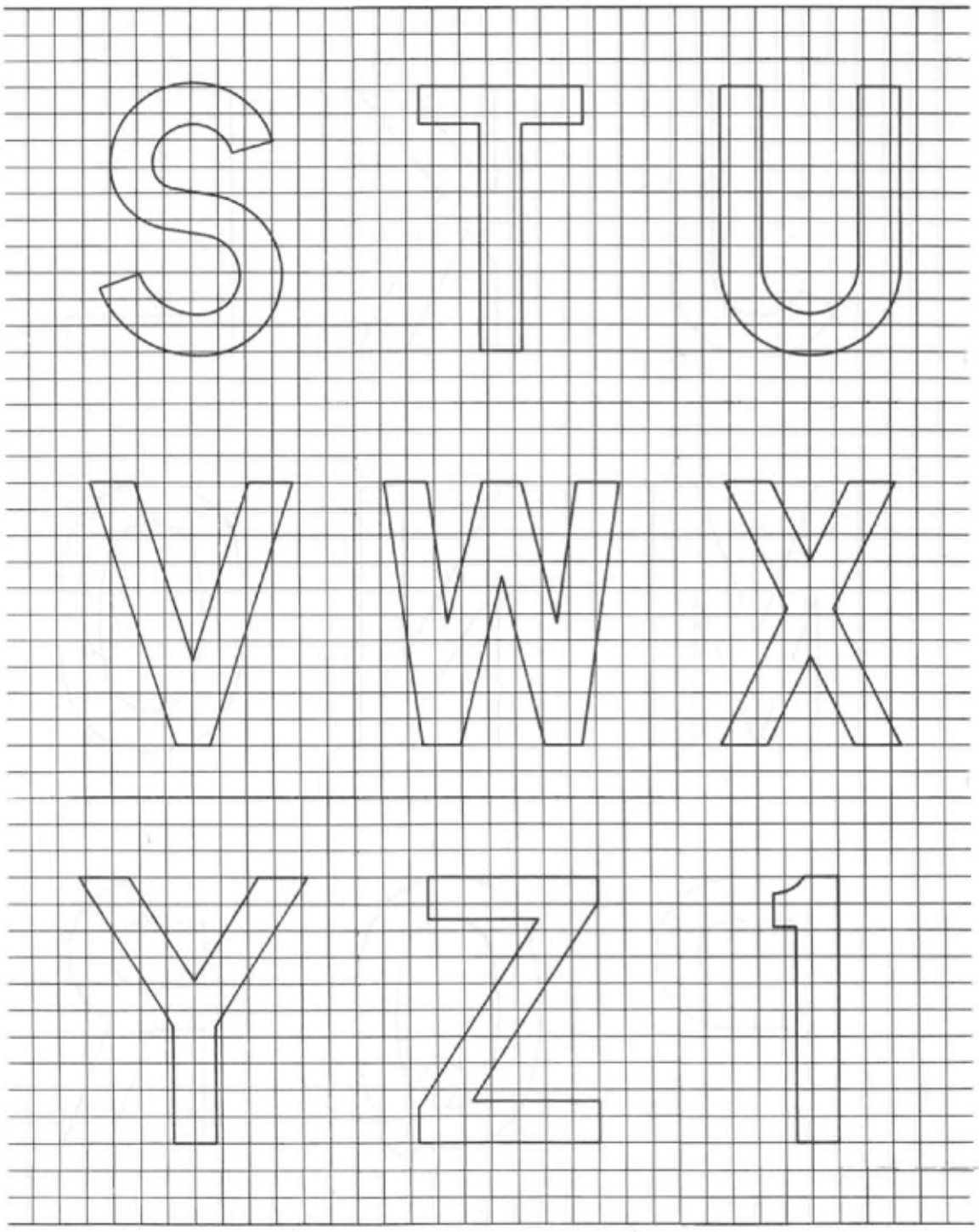
Series D



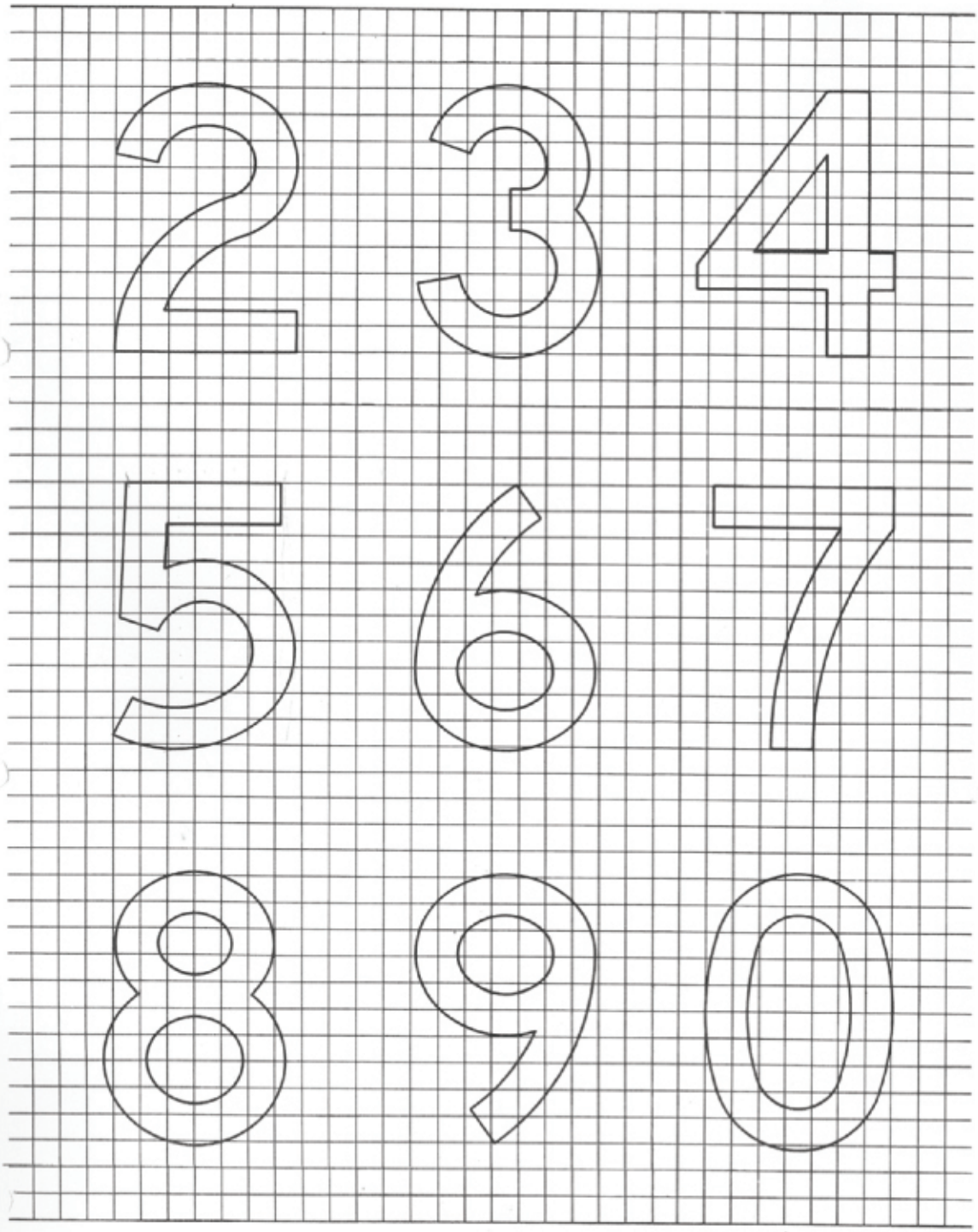
Series D



Series D



Series D



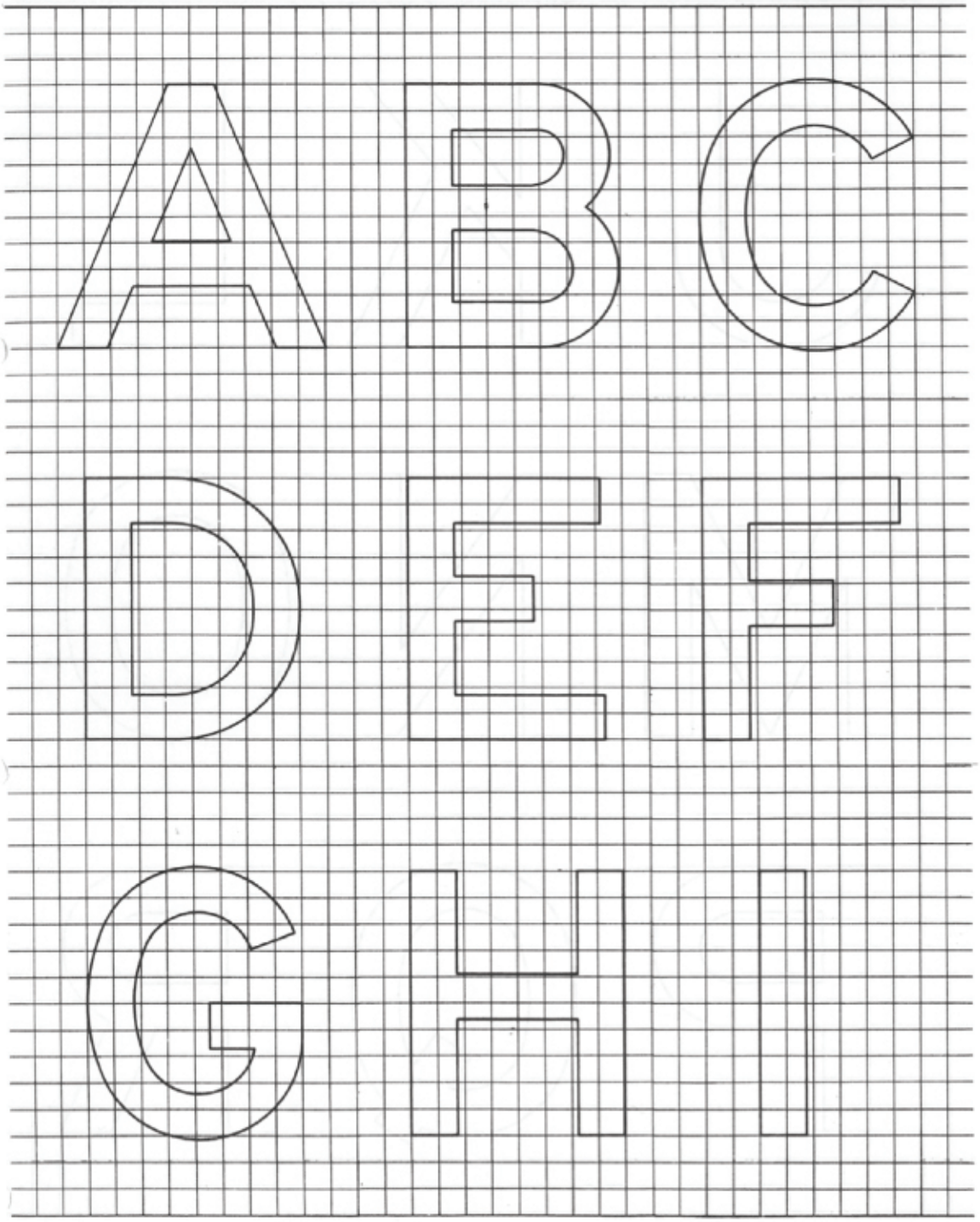
SERIES D LETTER AND NUMERAL DIMENSIONS

millimetres

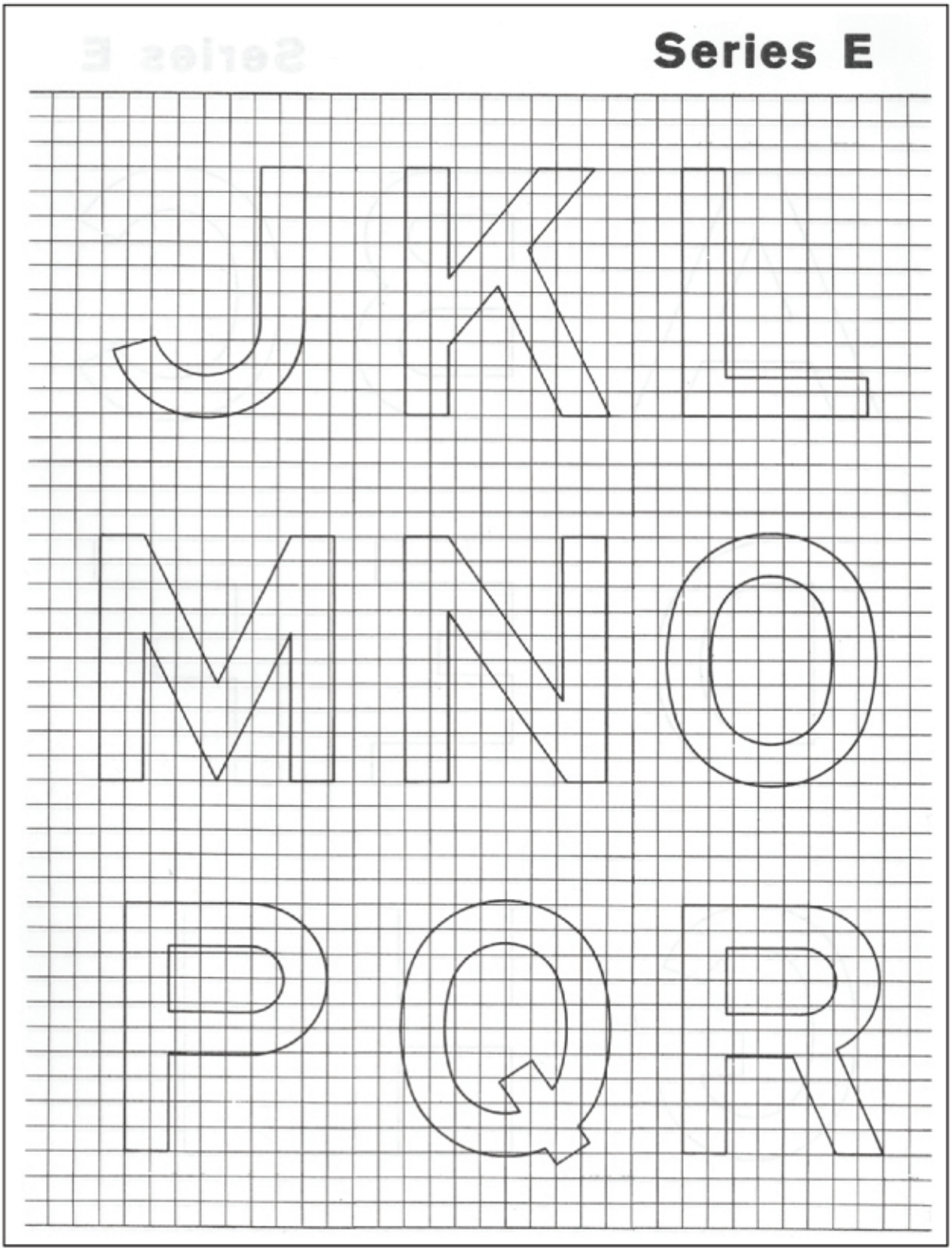
Letter and numeral height	Letter and numeral width																																	Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	34	27	27	27	24	24	27	27	6	25	28	24	31	27	28	27	28	27	27	24	27	30	35	27	34	27	10	27	27	29	27	27	27	27	27	28	6
60	50	40	40	40	37	37	40	40	9	38	41	37	47	40	42	40	42	40	40	37	40	45	53	40	51	40	15	40	40	44	40	40	40	40	40	42	9
80	67	54	54	54	49	49	54	54	13	50	55	49	62	54	56	54	56	54	54	49	54	60	70	54	68	54	20	54	54	59	54	54	54	54	54	56	13
100	84	67	67	67	61	61	67	67	16	63	69	61	78	67	70	67	70	67	67	61	67	75	88	67	84	67	24	67	67	73	67	67	67	67	67	70	16
120	101	81	81	81	73	73	81	81	19	75	83	73	93	81	84	81	84	81	81	73	81	90	105	81	101	81	29	81	81	88	81	81	81	81	81	84	19
140	117	94	94	94	85	85	94	94	22	88	96	85	109	94	98	94	98	94	94	85	94	105	123	94	118	94	34	94	94	103	94	94	94	94	94	98	22
160	134	108	108	108	98	98	108	108	25	100	110	98	124	108	113	108	113	108	108	98	108	120	140	108	135	108	39	108	108	118	108	108	108	108	108	113	25
180	151	121	121	121	110	110	121	121	28	113	124	110	140	121	127	121	127	121	121	110	121	135	158	121	152	121	44	121	121	132	121	121	121	121	121	127	28
200	168	134	134	134	122	122	134	134	31	125	138	122	155	134	141	134	141	134	134	122	134	150	175	134	169	134	49	134	134	147	134	134	134	134	134	141	31
240	201	161	161	161	146	146	161	161	38	150	165	146	186	161	169	161	169	161	161	146	161	180	210	161	203	161	59	161	161	176	161	161	161	161	161	169	38
280	235	188	188	188	171	171	188	188	44	175	193	171	217	188	197	188	197	188	188	171	188	210	245	188	236	188	68	188	188	206	188	188	188	188	188	197	44
320	268	215	215	215	195	195	215	215	50	200	220	195	248	215	225	215	225	215	215	195	215	240	280	215	270	215	78	215	215	235	215	215	215	215	215	225	50
*340	285	228	228	228	207	207	228	228	53	213	234	207	264	228	239	228	239	228	228	207	228	255	298	228	287	228	83	228	228	250	228	228	228	228	228	239	53
400	335	269	269	269	244	244	269	269	63	250	275	244	310	269	281	269	281	269	269	244	269	300	350	269	338	269	98	269	269	294	269	269	269	269	269	281	63
480	402	323	323	323	293	293	323	323	75	300	330	293	372	323	338	323	338	323	323	293	323	360	420	323	405	323	117	323	232	353	323	323	323	323	323	338	75
560	469	376	376	376	341	341	376	376	88	350	385	341	434	376	394	376	394	376	376	341	376	420	490	376	473	376	137	376	376	411	376	376	376	376	376	394	88
640	536	430	430	430	390	390	430	430	100	400	440	390	496	430	450	430	450	430	430	390	430	480	560	430	540	430	156	430	430	470	430	430	430	430	430	450	00

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

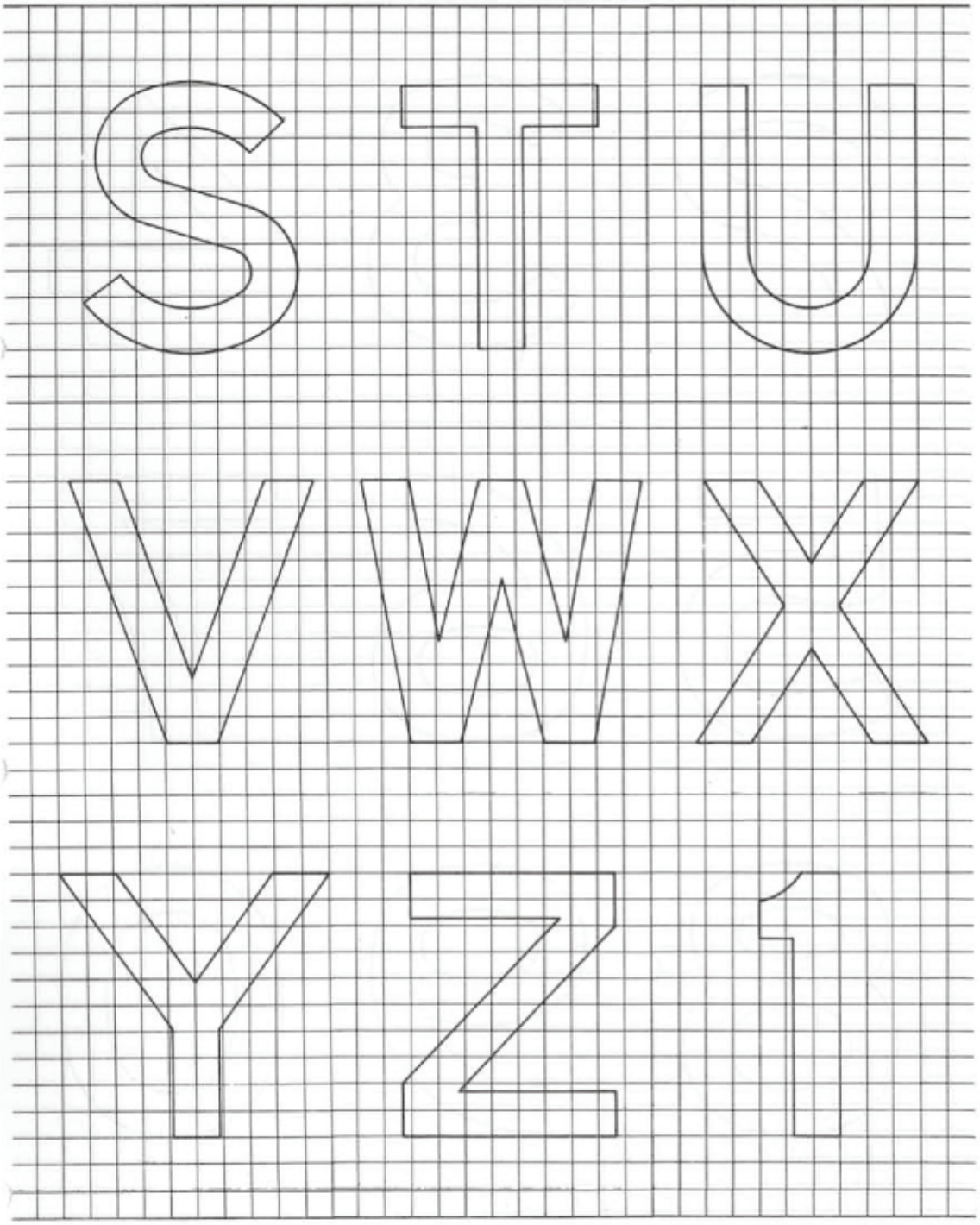
Series E



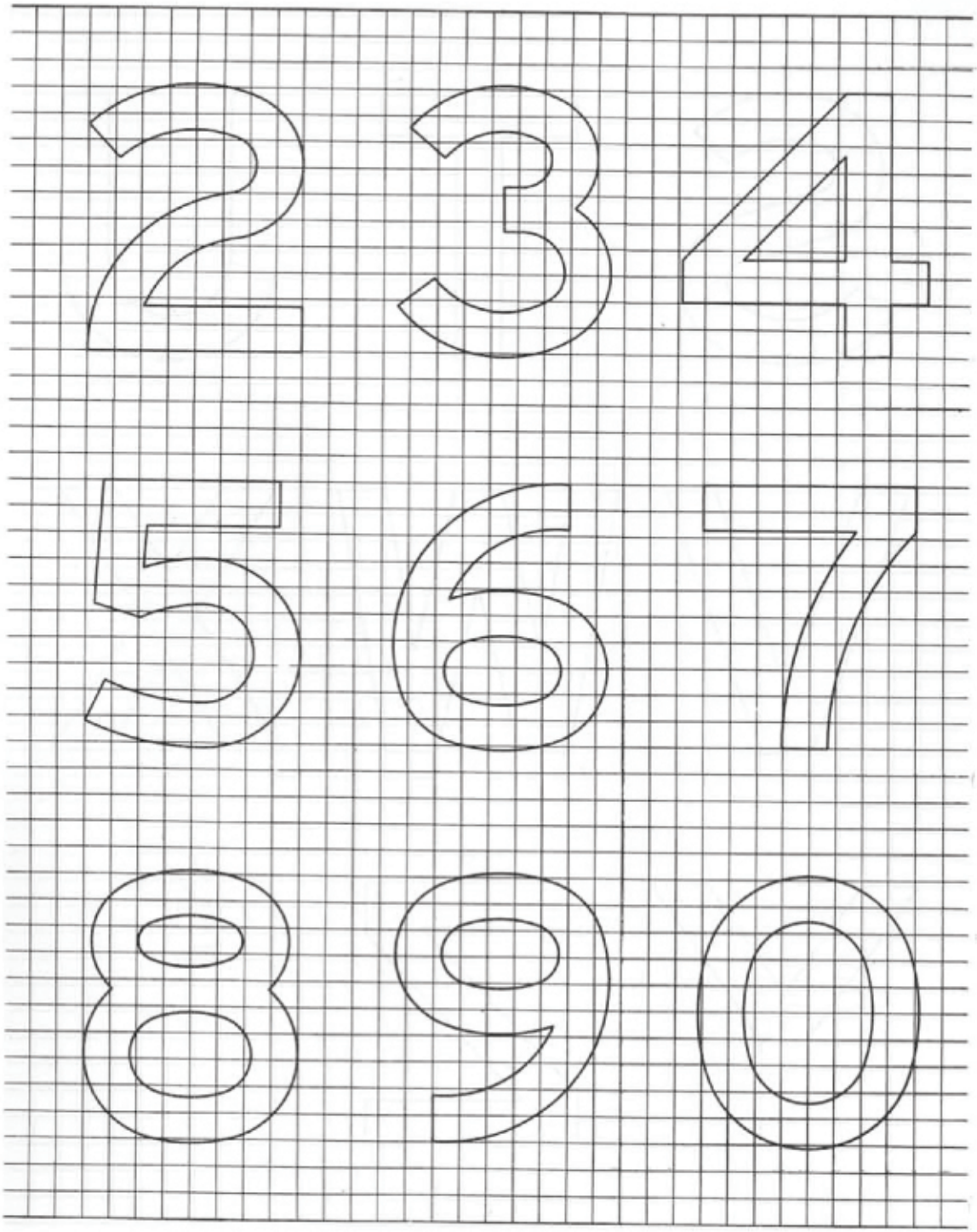
Series E



Series E



Series E



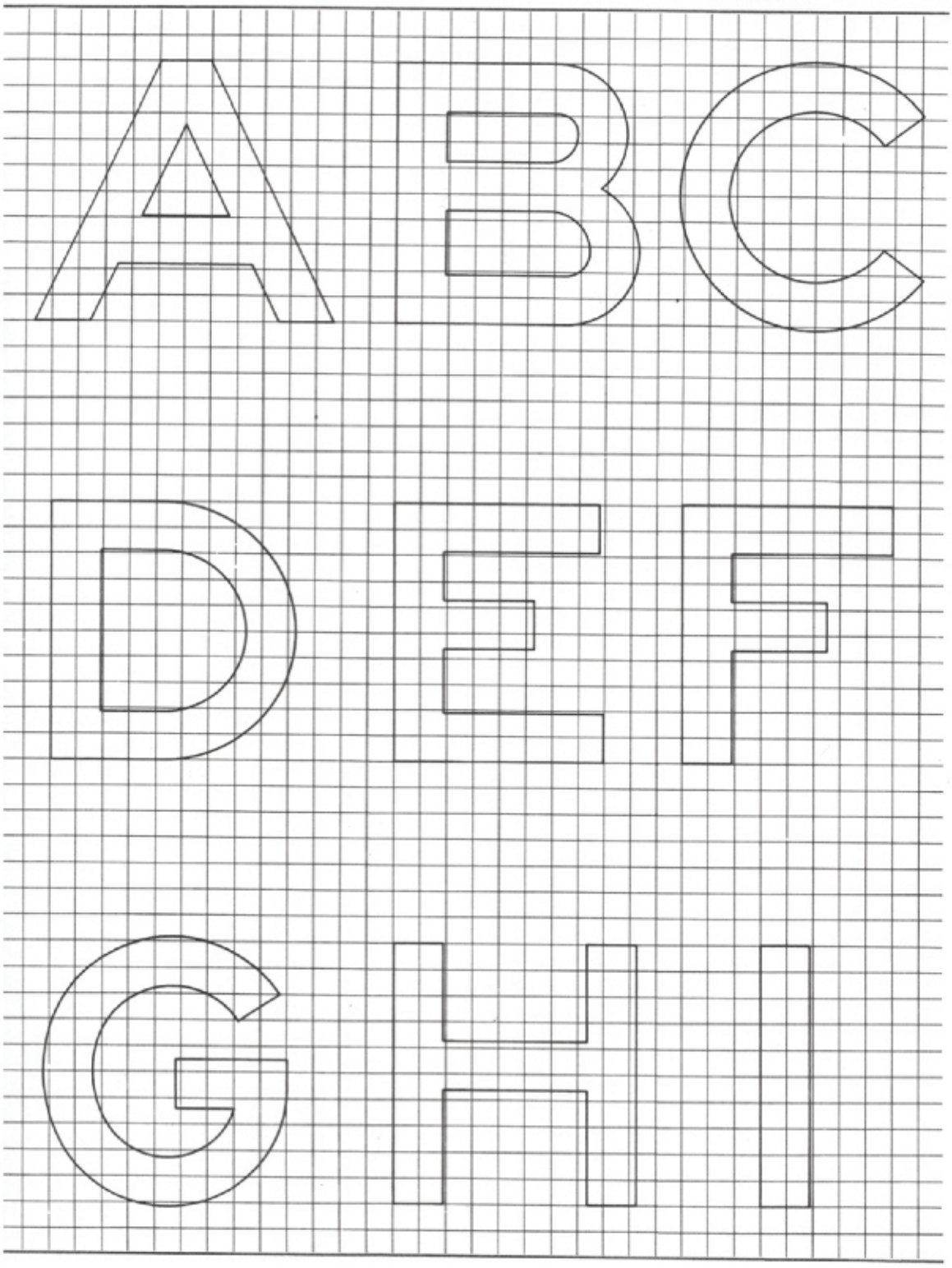
SERIES E LETTER AND NUMERAL DIMENSIONS

millimetres

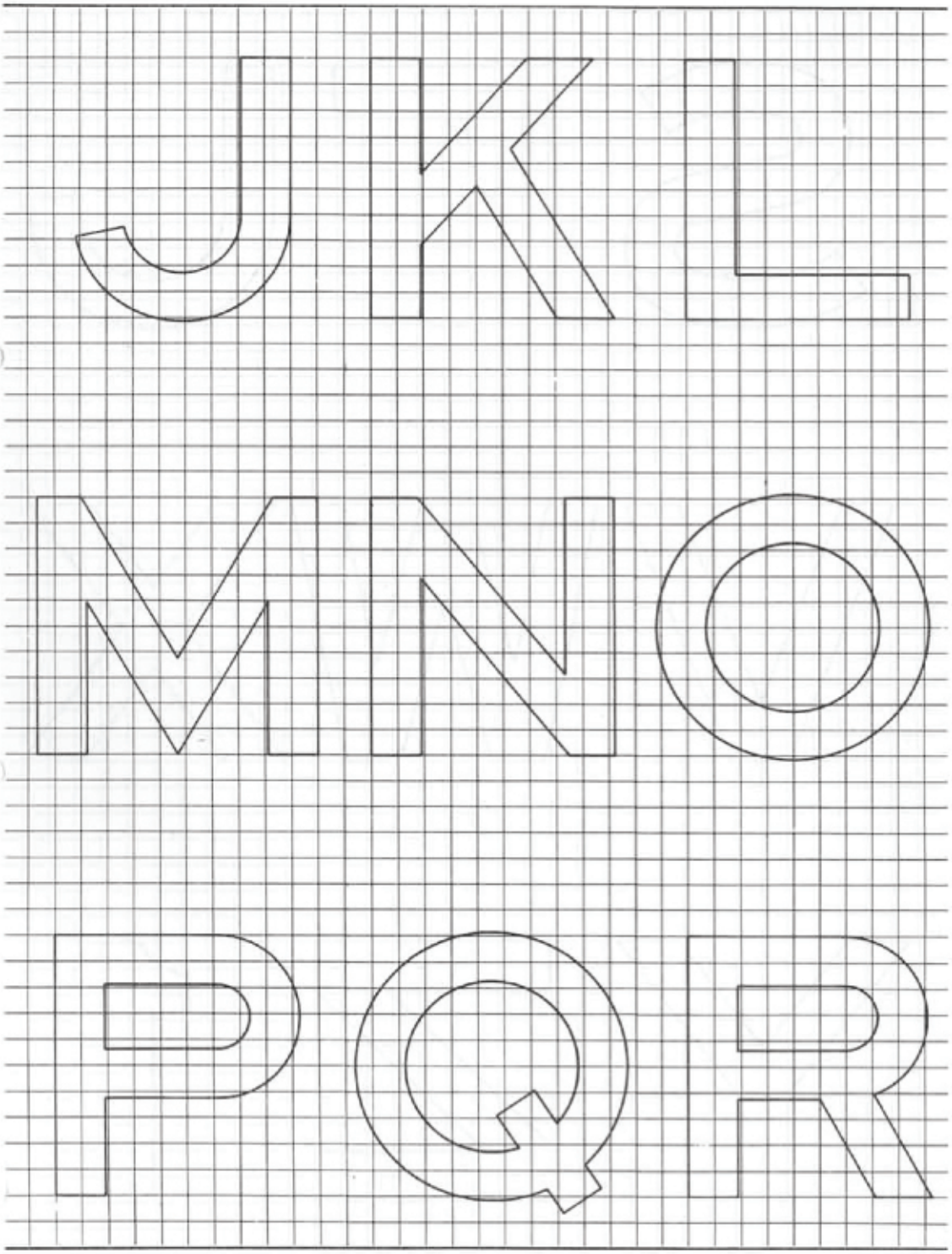
Letter and numeral height	Letter and numeral width																																Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	40	32	32	32	29	29	32	32	7	30	33	29	37	32	33	32	33	32	32	29	32	36	42	34	40	32	12	32	32	37	32	32	32	32	32	33	7
60	60	48	48	48	44	44	48	48	10	45	49	44	55	48	50	48	50	48	48	44	48	54	63	52	60	48	18	48	48	55	48	48	48	48	48	50	10
80	80	64	64	64	59	59	64	64	14	60	65	59	74	64	66	64	66	64	64	59	64	73	84	69	80	64	24	64	64	74	64	64	64	64	64	66	14
100	100	80	80	80	73	73	80	80	17	75	81	73	92	80	83	80	83	80	80	73	80	91	105	86	100	80	30	80	80	92	80	80	80	80	80	83	17
120	120	96	96	96	88	88	96	96	21	90	98	88	111	96	99	96	99	96	96	88	96	109	126	103	120	96	36	96	96	111	96	96	96	96	96	99	21
140	140	112	112	112	103	103	112	112	24	105	114	103	129	112	116	112	116	112	112	103	112	127	147	120	140	112	42	112	112	129	112	112	112	112	112	116	24
160	160	128	128	128	118	118	128	128	28	120	130	118	148	128	133	128	133	128	128	118	128	145	168	138	160	128	48	128	128	148	128	128	128	128	128	133	28
180	180	143	143	143	132	132	143	143	31	135	146	132	166	143	149	143	149	143	143	132	143	163	188	155	180	143	53	143	143	166	143	143	143	143	143	149	31
200	200	159	159	159	147	147	159	159	34	150	163	147	184	159	166	159	166	159	159	147	159	181	209	172	200	159	59	159	159	184	159	159	159	159	159	166	34
240	240	191	191	191	176	176	191	191	41	180	195	176	221	191	199	191	199	191	191	176	191	218	251	206	240	191	71	191	191	221	191	191	191	191	191	199	41
280	280	223	223	223	206	206	223	223	48	210	228	206	258	223	232	223	232	223	223	206	223	254	293	241	280	223	83	223	223	258	223	223	223	223	223	232	48
320	320	255	255	255	235	235	255	255	55	240	260	235	295	255	265	255	265	255	255	235	255	290	335	275	320	255	95	255	255	295	255	255	255	255	255	265	55
*340	340	271	271	271	250	250	271	271	58	255	276	250	313	271	282	271	282	271	271	250	271	308	356	292	340	271	101	271	271	313	271	271	271	271	271	282	58
400	400	319	319	319	294	294	319	319	69	300	325	294	369	319	331	319	331	319	319	294	319	363	419	344	400	319	119	319	319	369	319	319	319	319	319	331	69
480	480	383	383	383	353	353	383	383	83	360	390	353	443	383	398	383	398	383	383	353	383	435	503	413	480	383	143	383	383	443	383	383	383	383	383	398	83
560	560	446	446	446	411	411	446	446	96	420	455	411	516	446	464	446	464	446	446	411	446	508	586	481	560	446	166	446	446	516	446	446	446	446	446	464	96
640	640	510	510	510	470	470	510	510	110	480	520	470	590	510	530	510	530	510	510	470	510	580	670	550	640	510	190	510	510	590	510	510	510	510	510	530	110

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

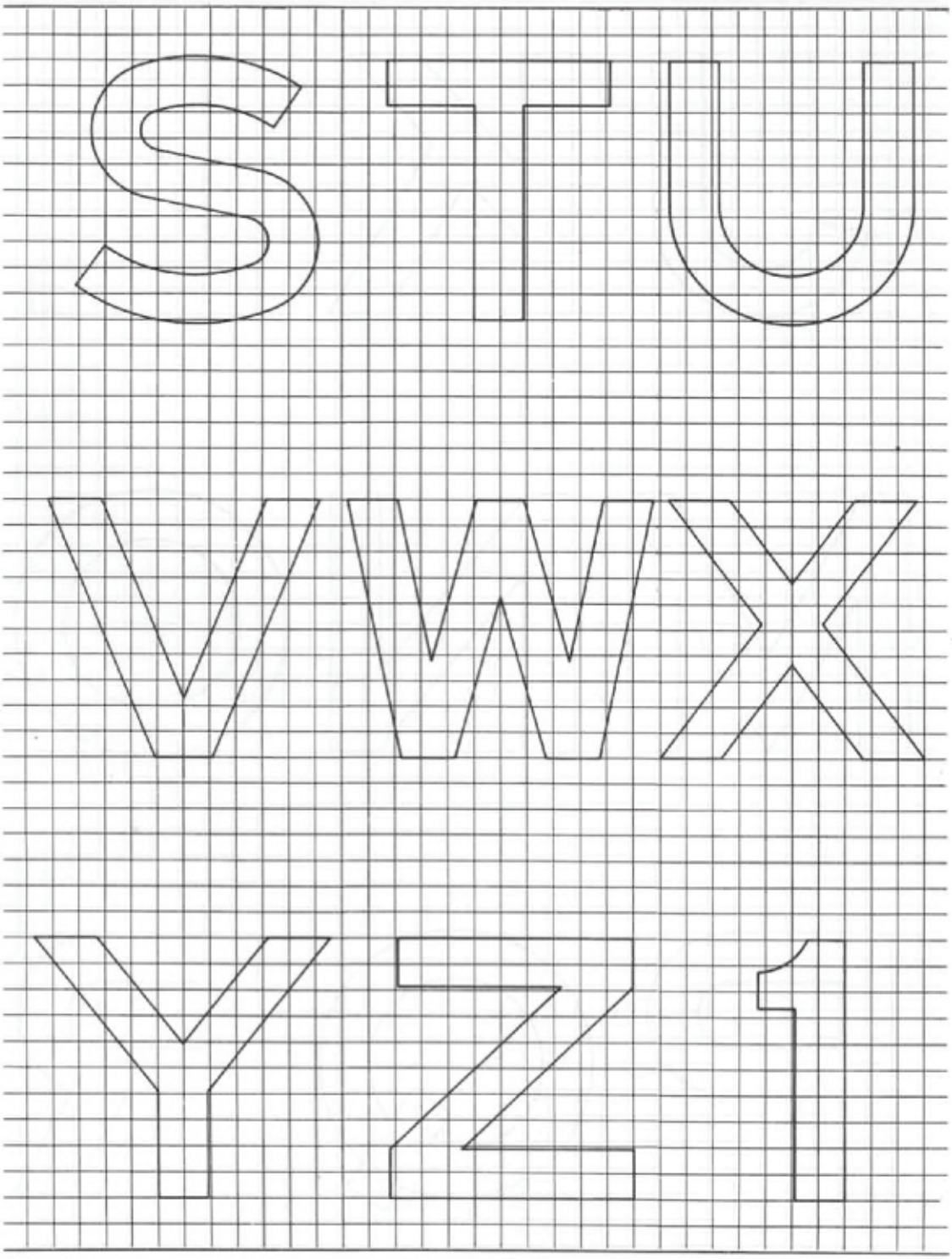
Series F



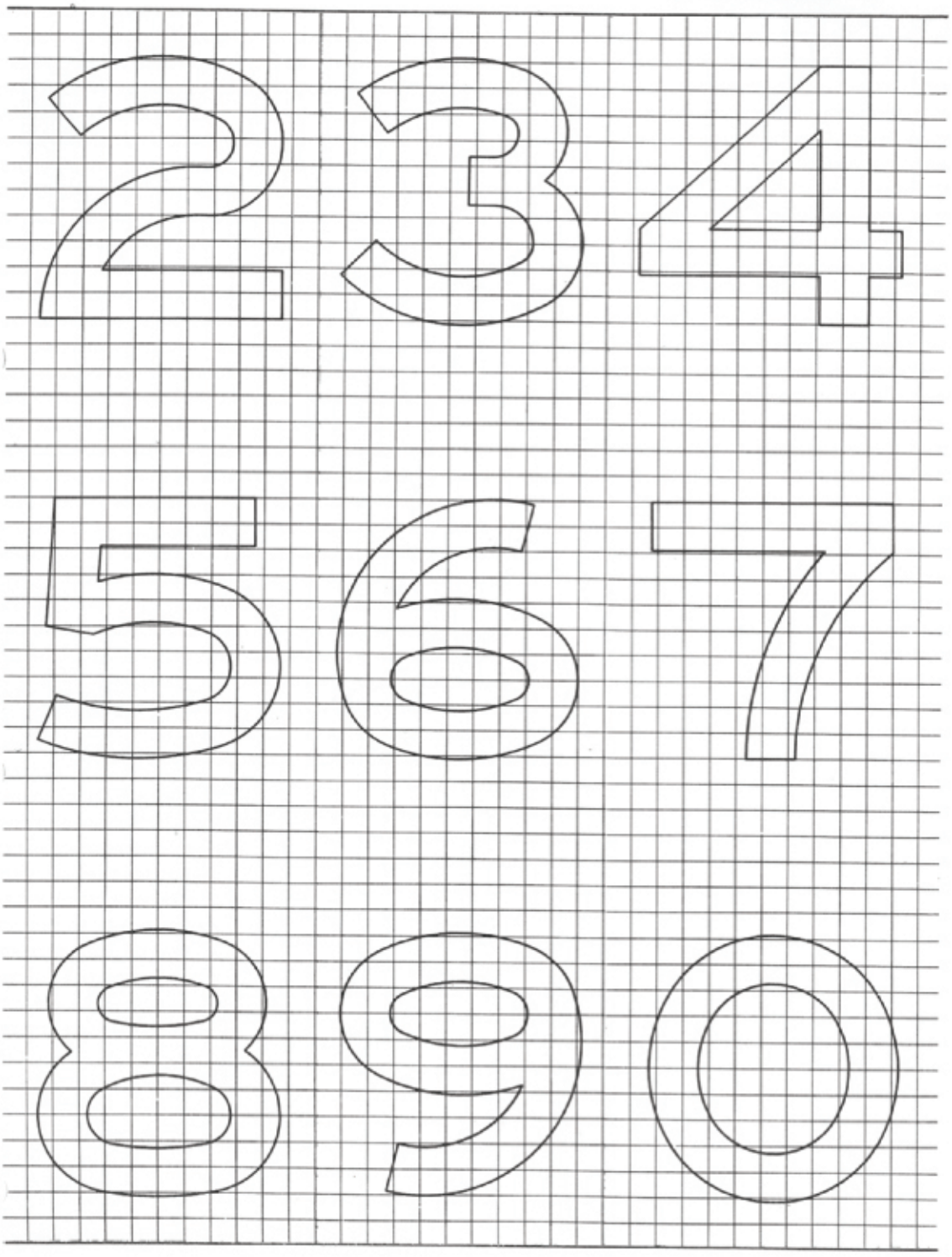
Series F



Series F



Series F



SERIES F LETTER AND NUMERAL DIMENSIONS

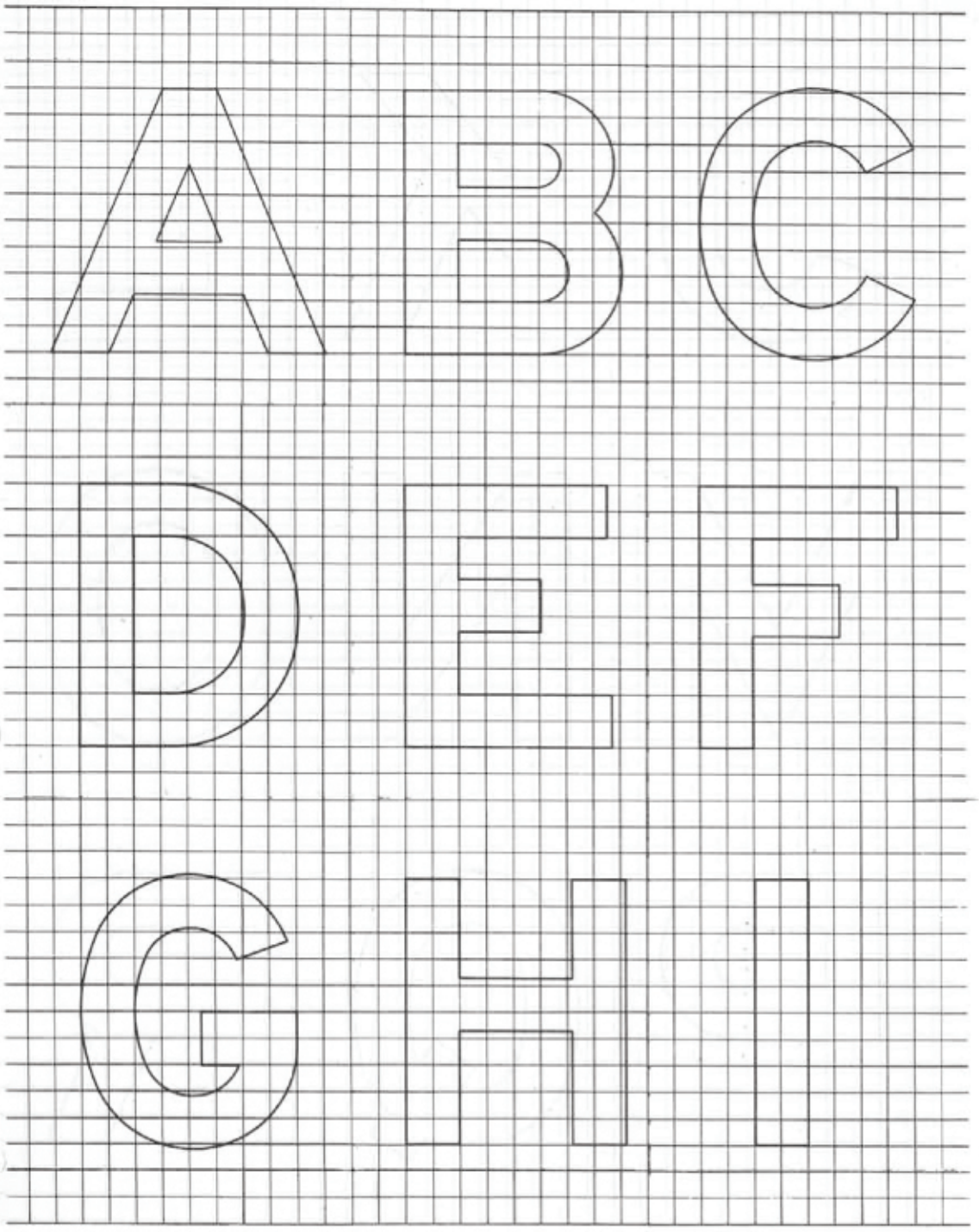
millimetres

Letter and numeral height	Letter and numeral width																																		Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
40	45	37	37	37	32	32	37	37	8	33	37	34	43	37	41	37	41	37	37	34	37	41	46	40	45	37	13	37	37	40	37	37	37	37	37	38	8
60	68	55	55	55	48	48	55	55	11	49	55	51	64	55	62	55	62	55	55	51	55	62	69	60	68	55	20	55	55	60	55	55	55	55	55	57	11
80	90	74	74	74	64	64	74	74	15	65	74	68	85	74	83	74	83	74	74	68	74	83	93	80	90	74	26	74	74	80	74	74	74	74	74	76	15
100	113	92	92	92	80	80	92	92	19	81	92	84	106	92	103	92	103	92	92	84	92	103	116	100	113	92	33	92	92	100	92	92	92	92	92	95	19
120	135	111	111	111	96	96	111	111	23	98	111	101	128	111	124	111	124	111	111	101	111	124	139	120	135	111	39	111	111	120	111	111	111	111	111	114	23
140	158	129	129	129	112	112	129	129	26	114	129	118	149	129	144	129	144	129	129	118	129	144	162	140	158	129	46	129	129	140	129	129	129	129	129	133	26
160	180	148	148	148	128	128	148	148	30	130	148	135	170	148	165	148	165	148	148	135	148	165	185	160	180	148	53	148	148	160	148	148	148	148	148	153	30
180	203	166	166	166	143	143	166	166	34	146	166	152	191	166	186	166	186	166	166	152	166	186	208	180	203	166	59	166	166	180	166	166	166	166	166	172	34
200	225	184	184	184	159	159	184	184	38	163	184	169	213	184	206	184	206	184	184	169	184	206	231	200	225	184	66	184	184	200	184	184	184	184	184	191	38
240	270	221	221	221	191	191	221	221	45	195	221	203	255	221	248	221	248	221	221	203	221	248	278	240	270	221	79	221	221	240	221	221	221	221	221	229	45
280	315	258	258	258	223	223	258	258	53	228	258	236	298	258	289	258	289	258	258	236	258	289	324	280	315	258	92	258	258	280	258	258	258	258	258	267	53
320	360	295	295	295	255	255	295	295	60	260	295	270	340	295	330	295	330	295	295	270	295	330	370	320	360	295	105	295	295	320	295	295	295	295	295	305	60
*340	383	313	313	313	271	271	313	313	64	276	313	287	361	313	351	313	351	313	313	287	313	351	393	340	383	313	112	313	313	340	313	313	313	313	313	324	64
400	450	369	369	369	319	319	369	369	75	325	369	338	425	369	413	369	413	369	369	338	369	413	436	400	450	369	131	369	369	400	369	369	369	369	369	381	75
480	540	443	443	443	383	383	443	443	90	390	443	405	510	443	495	443	495	443	443	405	443	495	555	480	540	443	158	443	443	480	443	443	443	443	443	458	90
560	630	516	516	516	446	446	516	516	105	455	516	473	595	516	578	516	578	516	516	473	516	578	648	560	630	516	184	516	516	560	516	516	516	516	516	534	105
640	720	590	590	590	510	510	590	590	120	520	590	540	680	590	660	590	660	590	590	540	590	660	740	640	720	590	210	590	590	640	590	590	590	590	590	610	120

* These values have been temporarily included in the table to permit manufacturers equipped with templates for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

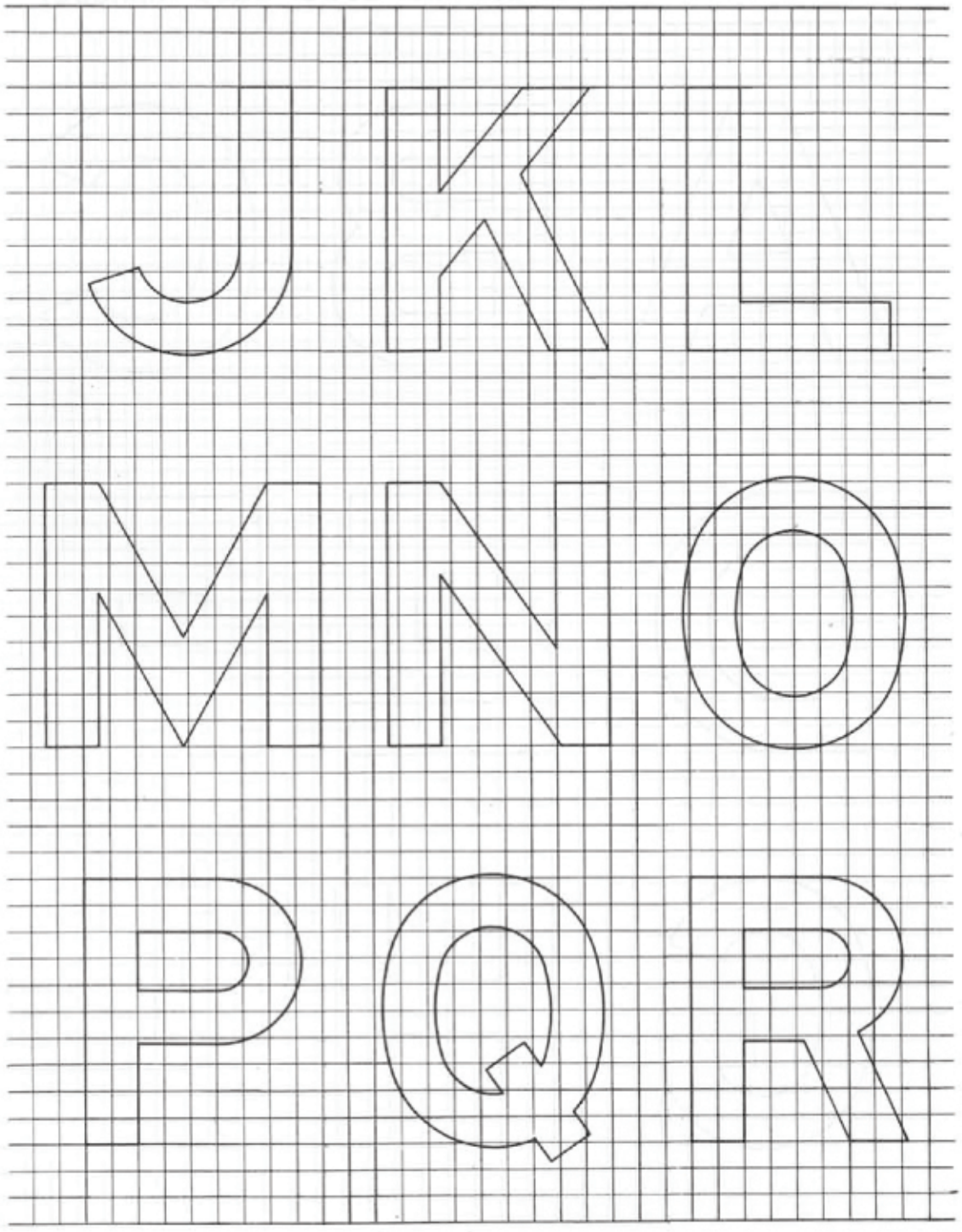
Modified Series E

For use with Lower Case Alphabet



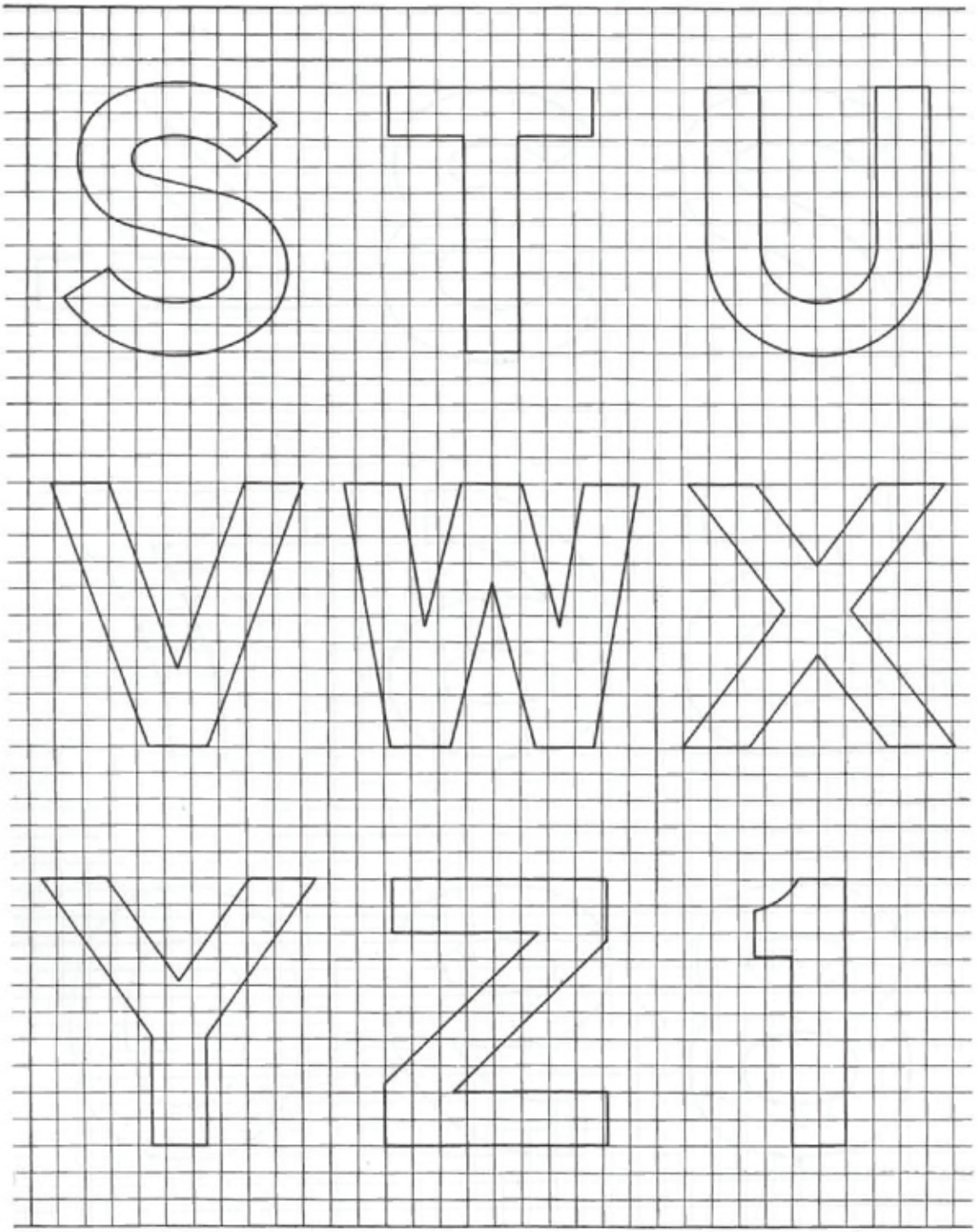
Modified Series E

For use with Lower Case Alphabet



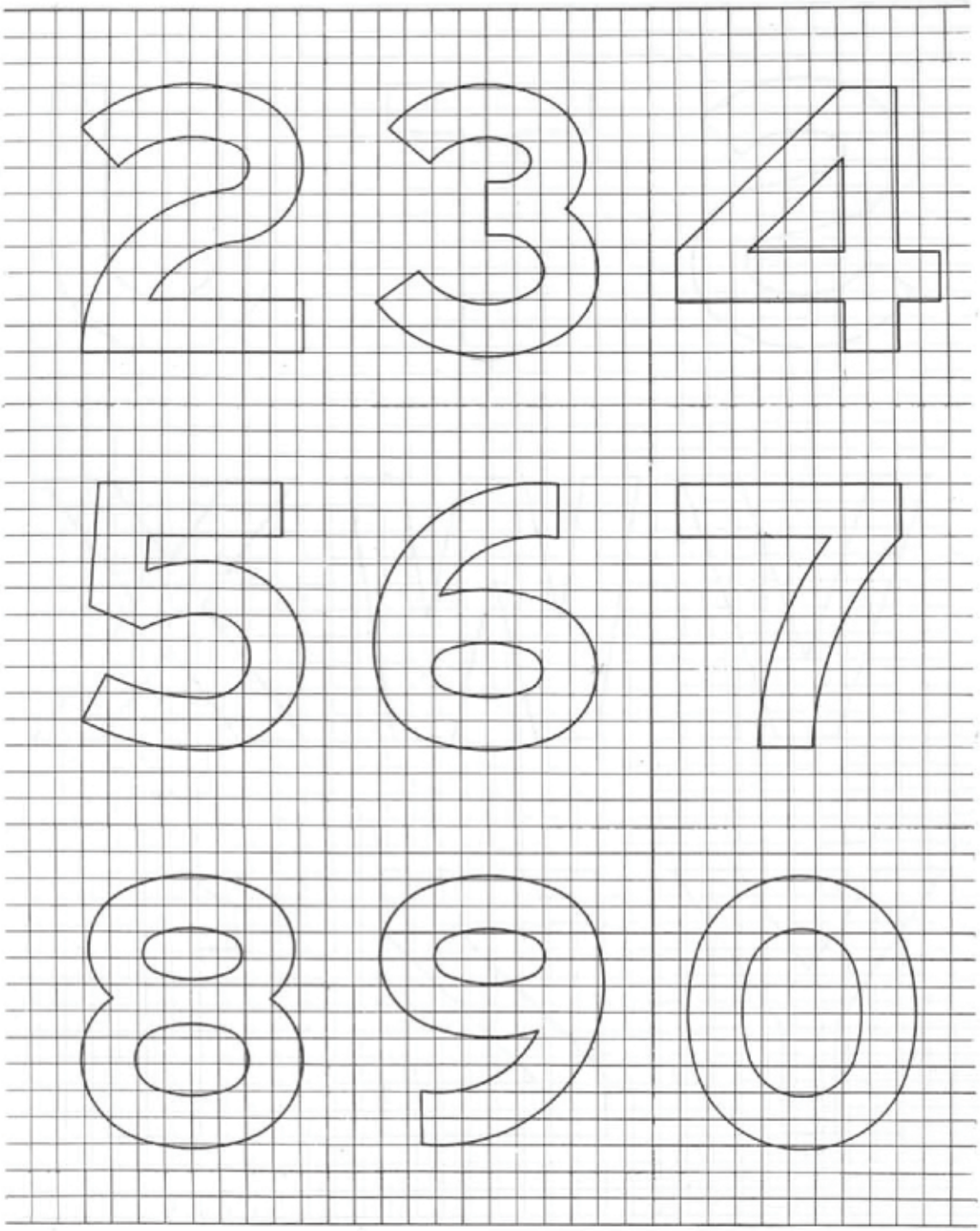
Modified Series E

For use with Lower Case Alphabet



Modified Series E

For use with Lower Case Alphabet

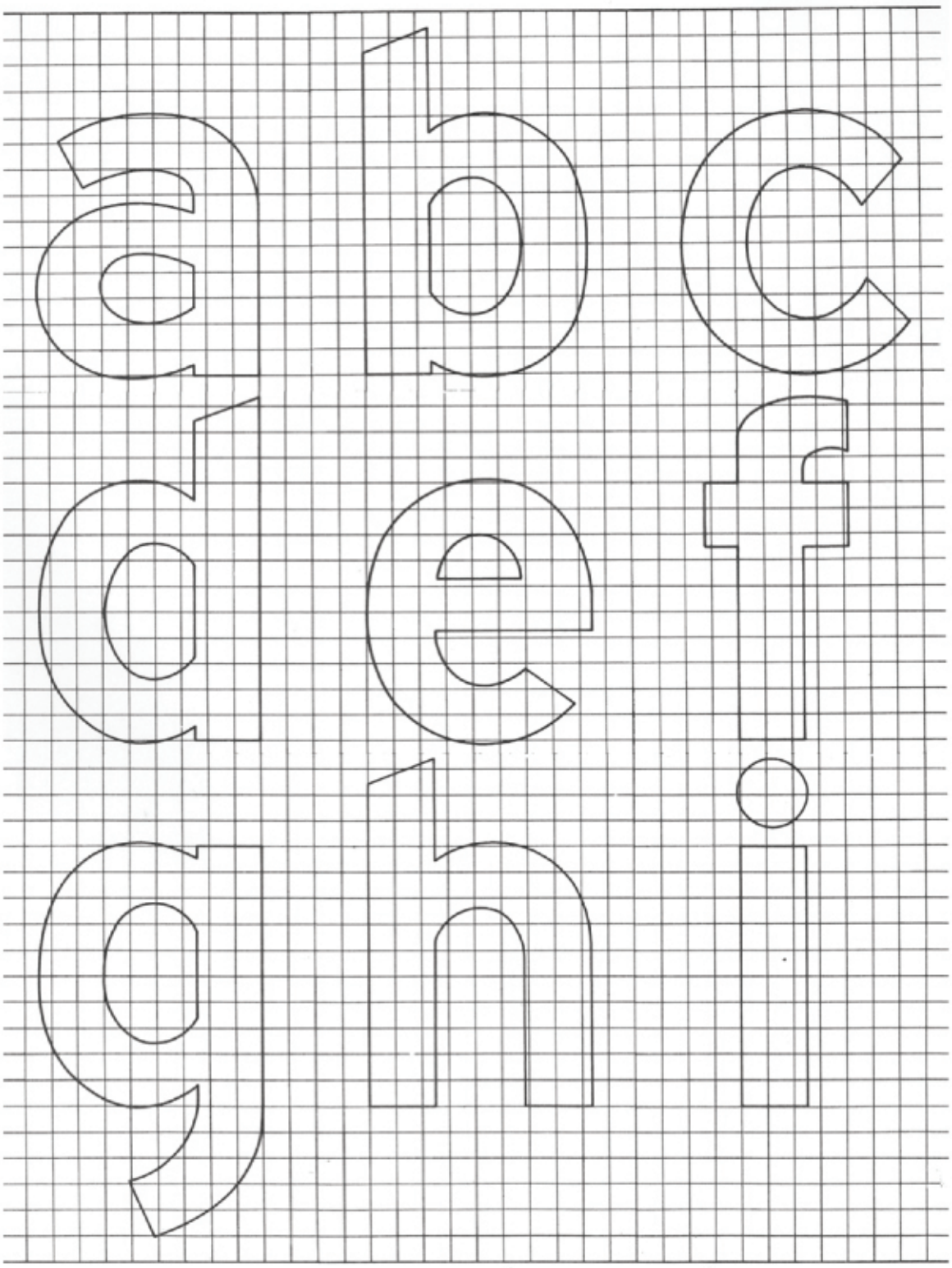


MODIFIED SERIES E LETTER AND NUMERAL DIMENSIONS

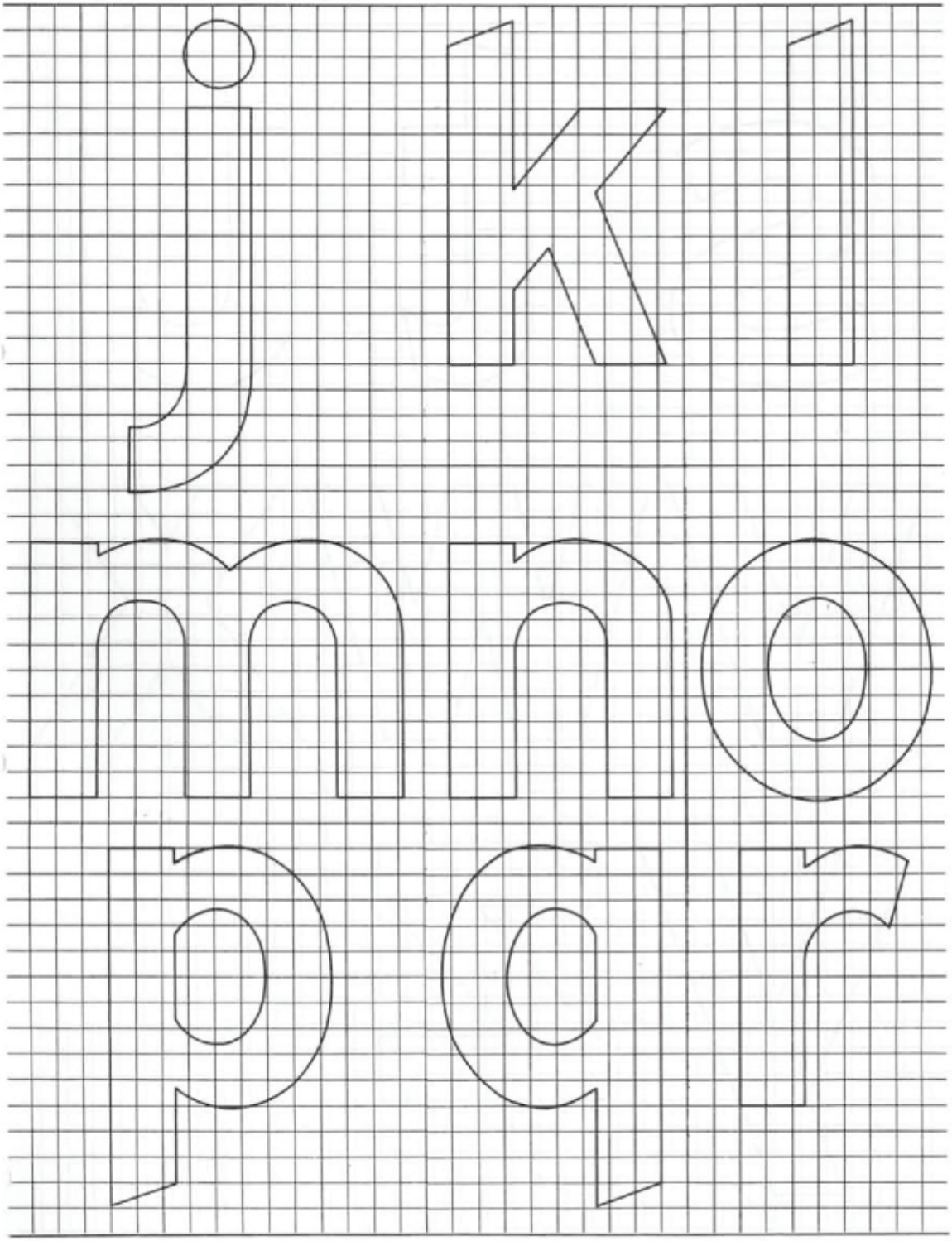
millimetres

Letter and numeral height	Letter and numeral width																																Letter and numeral stroke width
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	
120	122	97	96	97	92	89	96	98	24	92	101	92	124	101	101	98	101	98	98	90	100	110	130	120	120	98	41	98	98	116	98	98	98	98	98	101	24
140	143	113	112	113	108	104	112	115	28	108	118	108	146	118	118	115	118	115	115	105	116	129	151	141	141	115	47	115	115	136	115	115	115	115	115	118	28
160	163	130	128	130	123	119	128	131	32	123	135	123	167	135	135	131	135	131	131	120	133	147	173	162	162	131	54	131	131	155	131	131	131	131	131	135	32
180	183	146	144	146	139	133	144	148	36	139	151	139	187	151	151	148	151	148	148	135	149	166	194	182	182	148	61	148	148	175	148	148	148	148	148	151	36
200	204	162	160	162	154	148	160	164	40	154	168	154	208	168	168	164	168	164	164	150	166	184	216	202	202	164	68	164	164	194	164	164	164	164	164	168	40
240	245	194	192	194	185	178	192	197	48	185	202	185	250	202	202	197	202	197	197	180	199	221	259	242	242	197	81	197	197	233	197	197	197	197	197	202	48
280	285	227	224	227	216	207	224	230	56	216	235	216	292	235	235	230	235	230	230	210	232	258	302	283	283	230	95	230	230	272	230	230	230	230	230	235	56
320	326	259	256	259	247	237	256	263	64	247	269	247	333	269	269	263	269	263	263	240	266	295	346	323	323	263	108	263	263	311	263	263	263	263	263	269	64
340	346	275	272	275	262	252	272	279	68	262	286	262	354	286	286	279	286	279	279	255	282	313	367	343	343	279	115	279	279	330	279	279	279	279	279	286	68
400	408	324	320	324	308	296	320	328	80	308	336	308	416	336	336	328	336	328	328	300	332	368	432	404	404	328	135	328	328	388	328	328	328	328	328	336	80
480	489	389	384	389	370	356	384	394	96	370	404	370	500	404	404	394	404	394	394	360	398	442	518	485	485	394	162	394	394	466	394	394	394	394	394	404	96
560	571	453	448	453	431	415	448	459	112	431	471	431	583	471	471	459	471	459	459	420	465	515	605	565	565	459	189	459	459	543	459	459	459	459	459	471	112
640	652	518	512	518	493	474	512	525	128	493	538	493	666	538	538	525	538	525	525	480	531	589	691	646	646	525	216	525	525	621	525	525	525	525	525	538	128

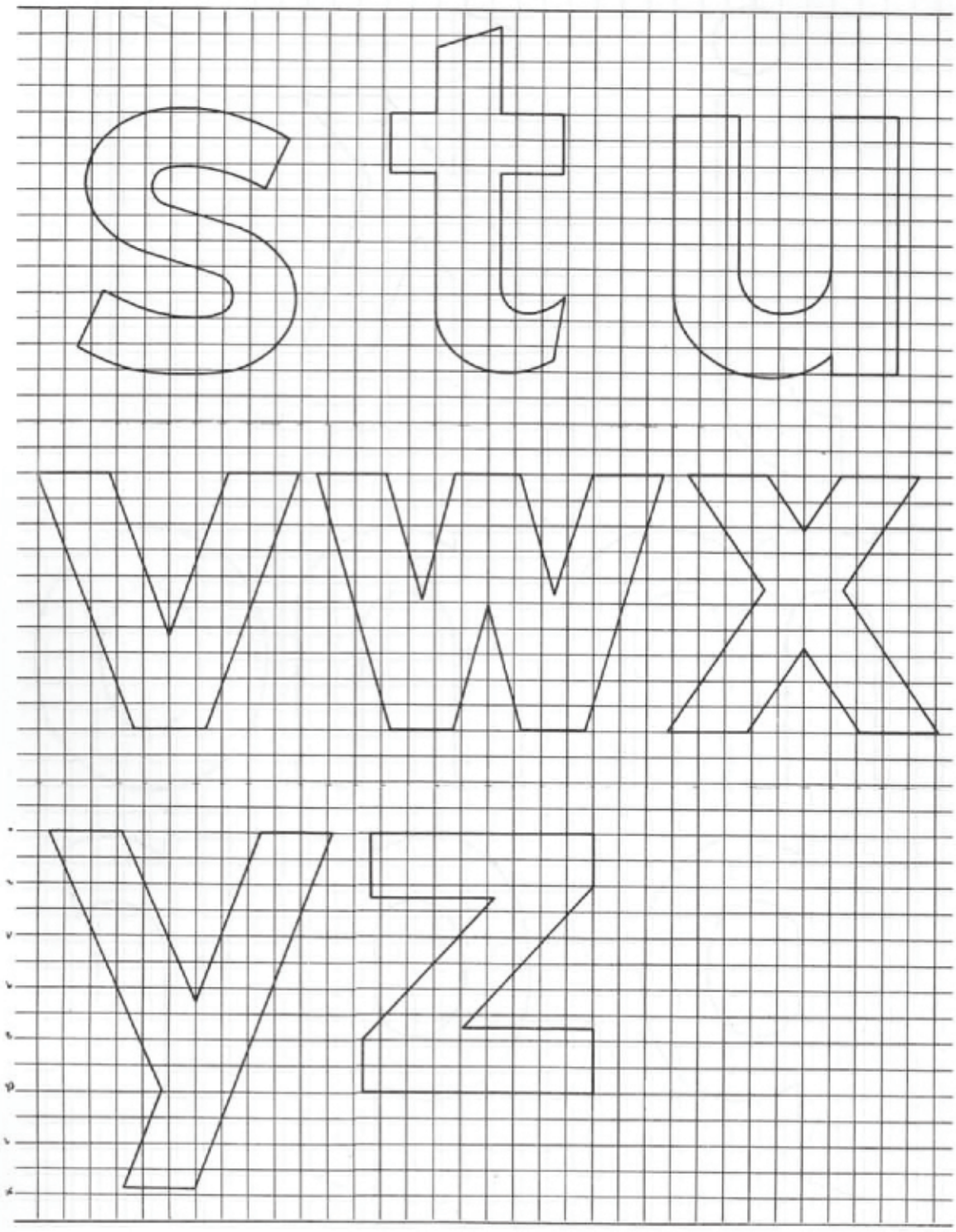
Lower Case



Lower Case



Lower Case



LOWER CASE LETTER DIMENSIONS

millimetres

Letter height	Letter width																									Letter stroke width
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	
90	77	77	77	76	77	50	77	76	22	42	75	22	128	77	79	76	76	59	75	60	77	91	119	92	96	78	22
105	89	90	89	88	89	58	89	88	26	49	87	26	149	89	92	88	88	68	87	70	89	106	139	108	112	91	26
120	102	103	102	101	102	66	102	101	30	57	100	30	171	102	106	101	101	78	100	81	102	121	159	124	129	105	30
135	115	116	115	113	115	74	115	113	34	64	112	34	192	115	119	113	113	88	112	91	115	136	178	139	145	118	34
150	128	129	128	126	128	83	128	126	38	71	124	38	213	128	132	126	126	98	124	101	128	152	198	154	161	131	38
180	153	155	153	151	153	99	153	151	45	85	149	45	256	153	158	151	151	117	149	121	153	182	238	185	193	157	45
210	179	181	179	176	179	116	179	176	53	99	174	53	298	179	185	176	176	137	174	141	179	212	277	216	225	183	53
240	204	207	204	202	204	132	204	202	60	113	199	60	341	204	211	202	202	156	199	161	204	243	317	247	257	209	60
255	217	219	217	214	217	140	217	214	64	120	211	64	362	217	224	214	214	166	211	171	217	258	337	262	273	222	64
300	255	258	255	252	255	165	255	252	75	141	249	75	426	255	264	252	252	195	249	201	255	303	396	309	321	261	75
360	306	310	306	302	306	198	306	302	90	170	299	90	512	306	317	302	302	234	299	242	306	364	476	371	386	314	90
420	357	361	357	353	357	231	357	353	105	198	348	105	597	357	369	353	353	273	348	282	357	424	555	432	450	366	105
480	408	413	408	403	408	264	408	403	120	226	398	120	682	408	422	403	403	312	398	322	408	485	634	494	514	418	120

SERIES A TO F LETTER AND NUMERAL SPACINGS

9.1 Spacings between 640 mm Series E Letters and Numerals with wide spacing.

millimetres

Initial or preceding letter	Followed by							
	AVWX 5	BDEFHIK LMNPRU	CGOQS 24890	J	T7	Y	Z1	3,6
A	165	245	175	145	150	160	230	
B	185	265	185	165	175	180	250	
C	180	260	185	160	165	175	245	
D	175	250	180	150	160	165	240	
E	180	260	185	160	165	175	245	
F	150	230	160	130	135	145	215	
G	130	260	185	160	165	175	245	
H	245	325	250	225	230	240	310	
I	245	325	250	225	230	240	310	
J	245	325	250	225	230	240	310	
K	145	225	150	120	130	135	210	
L	145	225	150	120	130	135	210	
M	245	325	250	225	230	240	310	
N	245	325	250	225	230	240	310	
O	175	250	180	150	160	165	240	
P	175	250	180	150	160	165	240	
Q	175	250	180	150	160	165	240	
R	175	250	180	150	160	165	240	
S	160	240	165	135	145	150	225	
T	150	230	160	130	135	145	215	
U	245	325	250	225	230	240	310	
V	165	245	175	145	150	160	230	
W	165	245	175	145	150	160	230	
X	165	245	175	145	150	160	230	
Y	160	240	165	135	145	150	225	
Z	230	310	240	210	215	225	295	
1	245		250		230		310	260
2	160		165		145		225	175
3	185		195		175		250	200
4	225		230		210		290	240
5	165		175		150		230	180
6	165		175		150		230	180
7	150		160		135		215	165
8	175		180		160		240	185
9	175		180		160		240	185
0	175		180		160		240	185

NOTE: The spacing in Table 9.1 is also applicable to the 640 mm Modified Series E capital alphabet and numerals.

9.2 Spacing Factors

millimetres

Capital letter and numeral height	Series					
	A	B	C	D	E	F
	WIDE SPACING					
40	0.034	0.045	0.051	0.057	0.063	0.068
60	0.051	0.068	0.077	0.085	0.094	0.102
80	0.068	0.091	0.102	0.114	0.125	0.136
100	0.085	0.114	0.128	0.142	0.156	0.171
120	0.102	0.136	0.153	0.171	0.188	0.205
140	0.119	0.159	0.179	0.199	0.219	0.239
160	0.136	0.182	0.205	0.227	0.250	0.273
180	0.153	0.205	0.230	0.256	0.281	0.307
200	0.171	0.227	0.256	0.284	0.313	0.341
240	0.205	0.273	0.307	0.341	0.375	0.409
280	0.239	0.318	0.358	0.398	0.438	0.477
320	0.273	0.364	0.409	0.455	0.500	0.545
340*	0.290	0.386	0.435	0.483	0.531	0.580
400	0.341	0.455	0.511	0.568	0.625	0.682
480	0.409	0.545	0.614	0.682	0.750	0.818
560	0.477	0.636	0.716	0.795	0.875	0.955
640	0.545	0.727	0.818	0.909	1.000	1.091
	MEDIUM SPACING					
40	0.026	0.034	0.038	0.043	0.047	0.051
60	0.038	0.051	0.058	0.064	0.070	0.077
80	0.051	0.068	0.077	0.085	0.094	0.102
100	0.064	0.085	0.096	0.107	0.117	0.128
120	0.077	0.102	0.115	0.128	0.141	0.153
140	0.089	0.119	0.134	0.149	0.164	0.179
160	0.102	0.136	0.153	0.171	0.188	0.205
180	0.115	0.153	0.173	0.192	0.211	0.230
200	0.128	0.171	0.192	0.213	0.234	0.256
240	0.153	0.205	0.230	0.256	0.281	0.307
280	0.179	0.239	0.269	0.298	0.328	0.358
320	0.205	0.273	0.307	0.341	0.375	0.409
340*	0.271	0.290	0.326	0.362	0.398	0.435
400	0.256	0.341	0.384	0.426	0.469	0.511
480	0.307	0.409	0.461	0.512	0.563	0.614
560	0.358	0.477	0.537	0.567	0.656	0.716
640	0.409	0.545	0.614	0.682	0.750	0.818
	NARROW SPACING					
40	0.017	0.023	0.026	0.028	0.031	0.034
60	0.026	0.034	0.038	0.043	0.047	0.051
80	0.034	0.045	0.051	0.057	0.063	0.068
100	0.043	0.057	0.064	0.071	0.078	0.085
120	0.051	0.068	0.077	0.085	0.094	0.102
140	0.060	0.080	0.089	0.100	0.109	0.119
160	0.068	0.091	0.102	0.114	0.125	0.136
180	0.077	0.102	0.115	0.128	0.141	0.153
200	0.085	0.114	0.128	0.142	0.156	0.171
240	0.102	0.136	0.153	0.171	0.188	0.205
280	0.119	0.159	0.179	0.199	0.219	0.239
320	0.136	0.182	0.205	0.228	0.250	0.273
340*	0.145	0.193	0.217	0.242	0.266	0.290
400	0.171	0.227	0.256	0.284	0.313	0.341
480	0.205	0.273	0.307	0.341	0.375	0.409
560	0.239	0.318	0.358	0.398	0.438	0.477
640	0.273	0.364	0.409	0.455	0.500	0.545

* These values have been temporarily included in the table to permit manufacturers equipped with template for the commonly used imperial letters 13.33-inch upper case and 10-inch lower case to continue using them until they need replacing.

NOTE: To calculate the spacing for letter heights and series other than those used in Table 9.1, multiply the values obtained from Table 9.1 by the appropriate factor from Table 9.2 for wide, medium or narrow spacing as required.

Example: To determine spacing between 120 mm E followed by R in Series D with narrow spacing:

From Table 9.1, spacing for E followed by R	= 260
Series D narrow spacing factor	= 0.085
Required spacing	= 260 x 0.085
	= 22 mm approx.

MODIFIED SERIES E AND LOWER CASE LETTER SPACINGS

10.1 Spacings between 640 mm Modified Series E and 480 mm Lower Case Letters

10.1.1 Modified Series E to Lower Case

millimetres

Initial of preceding letter	Followed by							
	acde goq	bhikl mnpru	fw	j	st	vy	x	z
A	150	170	140	95	120	100	120	155
B	180	230	170	120	165	140	140	185
C	170	210	155	110	150	150	160	175
D	165	215	160	105	150	150	160	170
E	170	210	155	110	150	150	160	175
F	80	160	100	80	90	90	95	120
G	170	210	155	110	150	150	160	175
H	220	260	210	170	205	205	215	225
I	220	260	210	170	205	205	215	225
J	215	230	205	165	190	190	200	220
K	130	190	120	75	115	115	125	140
L	130	190	120	75	115	115	125	140
M	220	260	210	170	205	205	215	225
N	220	260	210	170	205	205	215	225
O	165	215	160	105	150	150	160	170
P	155	180	145	80	130	130	140	150
Q	165	215	160	105	150	150	160	170
R	165	215	160	105	150	150	160	170
S	150	205	140	100	135	135	145	155
T	120	190	110	90	120	120	130	140
U	215	230	205	165	190	190	200	220
V	110	180	120	95	135	135	145	155
W	150	170	140	95	120	100	120	155
X	150	170	140	95	120	100	120	155
Y	80	160	100	70	75	75	90	130
Z	200	240	195	140	190	190	200	210

10.1.2 Lower Case to Lower Case

millimetres

Initial of preceding letter	Followed by							
	acde goq	bhikl mnpru	fw	j	st	vy	x	z
a	195	245	185	140	180	180	190	200
b	140	195	130	85	125	125	135	145
c	150	200	140	95	135	135	145	155
d	195	245	185	140	180	180	190	200
e	150	200	140	95	135	135	145	155
f	140	195	130	85	125	125	135	145
g	195	245	185	140	180	180	190	200
h	195	245	185	140	180	180	190	200
i	195	245	185	140	180	180	190	200
j	195	245	185	140	180	180	190	200
k	140	195	130	85	125	125	135	145
l	195	245	185	140	180	180	190	200
m	195	245	185	140	180	180	190	200
n	195	245	185	140	180	180	190	200
o	140	195	130	85	125	125	135	145
p	140	195	130	85	125	125	135	145
q	195	245	185	140	180	180	190	200
r	95	150	90	40	80	80	90	100
s	140	195	130	85	125	125	135	145
t	145	200	135	90	130	130	140	150
u	195	245	185	140	180	180	190	200
v	125	180	115	70	110	110	120	130
w	130	180	120	75	115	115	125	135
x	135	185	125	80	120	120	130	140
y	125	180	115	70	110	110	120	130
z	145	200	135	90	130	130	140	150

10.2 Spacing Factors

millimetres

Letter height, mm		
Lower case	Capitals	
90	120	0.188
105	140	0.219
120	160	0.250
135	180	0.281
150	200	0.313
180	240	0.375
210	280	0.438
240	320	0.500
255	340	0.531
300	400	0.625
360	480	0.750
420	560	0.875
480	640	1.000

NOTES:

1. To obtain spacings for letter height combination other than those used in Tables 10.1.1 and 10.1.2, multiply the value from Tables 10.1.1 and 10.1.2 by the appropriate factor from Table 10.2.
   For capitals and numerals to capitals and numerals use spacing given in Table 9.1 and factors in Tables 9.2 and 10.2.
2. The spacing dimensions and factors in Table 10.2 are for wide spacing only. See Clause 4.3.
3. The spacing factors shown in Table 10.2 for capital letter heights (and attached lower case letter heights) are the same as those shown in Table 9.2 for the corresponding series E letter heights with wide spacing.
4. The lower case letter height is 0.75 times the capital letter height.

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

097.7 DPWH
DP. 23-2004

AUG 23 2004

DEPARTMENT CIRCULAR
No. 09
Series of 2004
DP-09-23-04

FOR/TO ALL : Undersecretaries
Assistant Secretaries
Bureau Directors
Service Directors
Project Managers
Regional Directors
District Engineers
Heads of Attached Agencies
This Department

SUBJECT : **Road Safety Manuals and Handbooks**

Under the Road Infrastructure Safety Project - Capacity Building Component of the 6th ADB Road Project, there are four (4) new technical manuals and two (2) new handbooks on road infrastructure safety which have been prepared and made available. This is in line with the Department's objective to improve the road safety situation of the country under its traffic accident prevention and reduction program.

The four (4) new manuals on road infrastructure safety are:

- Road Safety Audit Manual
- Road Works Safety Manual
- Highway Safety Design Standards Manual – Part 1: Road Safety Design Manual
- Highway Safety Design Standards Manual – Part 2: Road Signs and Pavement Markings Manual

The two (2) new handbooks that have been prepared to serve as reference material for the development and prioritization of projects for the accident prevention and reduction programs are:

- Accident Blackspot Investigation Handbook
- Project Evaluation Handbook

The use of these manuals and handbooks will contribute to maximizing road safety on the national road network in our country. The standards in the above mentioned manuals shall replace other standards that are currently being used in relation to road design, construction and maintenance.

1. ROAD SAFETY AUDIT MANUAL

   This manual shall serve as the official reference for all Road Safety Audit activities to be undertaken by DPWH. The manual contains Road Safety Audit policies and procedures and includes pre-design and design activities, monitoring and post-construction site inspection.

2. ROAD WORKS SAFETY MANUAL

   This manual shall be used as the official reference for defining temporary signing, traffic devices and traffic management for maintenance and construction works on roads and bridges. The manual also defines the circumstances under which these devices should be arranged to provide appropriate warning and guidance for various types of works and environments.

3. HIGHWAY SAFETY DESIGN STANDARDS MANUAL – PART 1: ROADSAFETY DESIGN MANUAL

   This manual shall be used in conjunction with the DPWH Highway Design Guidelines. The manual includes standards and guidance for safety planning, safety design and for road safety risk assessment. The manual shall be used as the official reference for the planning, design and management of our national road network. It includes safety design principles based on best international practice applicable to our country.

4. H IGH WAY SAFETY DESIGN STANDARDS MANUAL – PART 2: ROAD SIGNS AND PAVEMENT MARKINGS MANUAL

   This manual shall be used as the official reference for the design and installation of road signs and pavement markings on national and local roads. The manual includes standards and guidance for the use of regulatory signs, warning signs, guide signs (including direction, street name and tourist signs), expressway signs, traffic instruction signs, hazard markers and pavement markers.

5. ACCIDENT BLACKSPOT INVESTIGATION HANDBOOK

   The Accident Blackspot Investigation Handbook contains information on the use of accident data, reports and maps from the Traffic Accident Recording and Analysis System (TARAS) to identify hazardous locations and assist with the analysis of accident patterns and causal factors at particular sites.

The Handbook provides guidance on the critical steps required to investigate and develop a project comprising engineering countermeasures that will have a high probability of improving road safety at an accident blackspot location.

6. PROJECT EVALUATION HANDBOOK

The Project Evaluation Handbook details the processes that shall be followed for evaluating candidate projects that are submitted for funding. It also includes the process of screening road safety projects to ensure compliance with the criteria for acceptable road accident reduction works, economic appraisal using cost benefit analysis and prioritization using a multi-criteria analysis methodology.

The corresponding guidelines on the adoption and use of these manuals and the responsibilities of each office in relation to these Manuals and Handbooks are detailed in Annex – A (Attached).

In the interest of uniformity, all offices concerned shall adopt these manuals to works under their area of responsibilities.

The Circular shall take effect immediately and supersede all previous Department Orders and other issuances or any provision thereof that are inconsistent herewith.

FLORANTE SORIQUEZ
Acting Secretary

ANNEX – A (Department Circular No. 09)3• 2004

IMPLEMENTING GUIDELINES ON THE STANDARDS, POLICIES AND PROCEDURES AND USE OF THE NEW ROAD SAFETY MANUALS AND HANDBOOKS

1. ROAD SAFETY AUDIT MANUAL

A Road Safety Audit (RSA) is a formal process where an independent and qualified audit team examines and reports on the traffic accident potential and safety performance of:

- A future road project (through design plans), or
- A traffic management scheme, or
- An existing road.

Road Safety Audit focuses on traffic accident prevention, rather than accident reduction that is the focus of improvement programs at accident blackspots with a history of traffic accidents.

The RSA process applies mainly to new road designs, although it may also apply to existing roads, to identify potential safety hazards with the primary objective of preventing future traffic accidents. The Road Safety Audit approach is based on the principle that **"Prevention Is Better Than Cure"**.

Project Selection Criteria for Road Safety Audit

All new road projects will benefit from having road safety audits undertaken during the design and construction stages. However, in recognition of the need to apply resources to where they can have maximum effect, road safety audits are required by this policy at selected stages according to the relative cost of the road project.

The criteria for road projects that are to be audited at various stages are detailed in Table 1 below:

ROAD SAFETY AUDIT STAGE	Audit Criteria - Cost of Road Project		
	Major 1/ Projects	**Medium 2/ Projects**	**Minor 3/ Projects**
Stage 1: Feasibility	All projects	Not Required	Not Required
Stage 2: Draft Design	All projects	All projects 4/	At the discretion of the District Engineer 5/
Stage3: Detailed Design	All projects		
Stage 4: Pre-opening	All projects	All projects	
Stage 5: Roadwork Traffic Schemes	Any road work traffic scheme that is to remain in place for more than two months		
Stage 6: Existing Roads	National Highway sections are to be audited each year at the direction of the District Engineer, and as resources permit.		

Table 1: Project Audit Criteria for Road Safety Audit

Notes:

1/ **Major projects** are those with a total cost exceeding PHP 50 million.

2/ **Medium projects** are those with a total cost between PHP 10 million and PHP 50 million.

3/ **Minor projects** are those with a total cost under PHP 10 million.

4/ These projects may be audited at either of the stages shown.

5/ These projects may be audited at any of the stages shown. Suggested projects may include those where conflicts between vehicles and other road users will be high (intersections), where speeds will be high, or where substantial changes to the existing traffic situation are expected.

Responsibilities for Road Safety Audit

Responsibilities in relation to the Road Safety Audit are detailed in Table 2 below:

Office	Responsibilities
Project Evaluation Division, Planning Service (PED, PS)	• Provide strategy direction, technical support and recommend policy; • Establish procedures; • Maintain and review road safety design standards; • Carry out Road Safety Audits when requested by other offices coordinating road projects; • Maintain and update the Road Safety Audit Manual; and • Provide training and seminars within and outside DPWH, (e.g consultants and contractors).
Highways Division, Bureau of Design Regional Offices District Engineering Offices Project Management Offices	• Organize and/or conduct RSA on road projects under their control; • Include reference in all Terms of Reference for design or construction of road projects, indicating that Road Safety Audit requirements are to be in accordance with the Road Safety Audit Manual; • Ensure that auditors are independent of the project and appropriately skilled and experienced; • Liaise with PED, PS on road safety requirements for designs; • Participate in training courses and seminars; and • Report annually to the PED, PS on road safety audits carried out.

Table 2: Responsibilities relating to the Road Safety Audit

2. ROAD WORKS SAFETY MANUAL

The Manual is to be used as the primary reference for defining temporary signing, traffic devices and traffic management for maintenance and construction works on roads and bridges, as well as the circumstances under which these devices should be arranged to provide appropriate warning and guidance for various types of works and in various road environments.

The safe and effective control of road users through or around a roadwork site is an essential component of road and bridge construction works, maintenance activities or works relating to utilities within the road right of way. It is also essential to provide for the safety of workers at a roadworks site.

To maximize safety and provide appropriate and necessary advice to drivers encountering unexpected works on the road network, it is important to maintain a consistent standard for signs and traffic control devices. The Manual is to be used by all roadworks engineers and supervisors in the planning or undertaking of works and be the source of reference during works, whether these are by contract or direct management.

The principles contained in this Manual should also be used in the training of workers involved with roadworks so they become familiar with the requirements and so they are aware of the dangers and the need for safety when working near traffic.

Responsibilities for Road Works Safety

Responsibilities in relation to the Road Works Safety are detailed in Table 3 below:

Office	Responsibilities
Project Evaluation Division, Planning Service (PED, PS)	• Provide strategy direction, technical support and recommend policy; • Review road works safety standards; • Maintain and update the Road Works Safety Manual; and • Provide training and seminars within and outside DPWH, (e.g consultants and contractors).
Highways Division, Bureau of Design Regional Offices District Engineering Offices Project Management Offices	• Apply the requirements of the Road Works Safety Manual on all road projects under their control; • Train workers on their projects so that they are familiar with the requirements of the Manual; • Include reference in all Terms of Reference for design or construction of road projects, indicating that signs and traffic management for construction of the project are to be in accordance with the Road Works Safety Manual; • Liaise with the PED, PS on road safety requirements included in the Manual; and • Participate in training courses and seminars.

Table 3: Responsibilities relating to the Road Works Safety

3. HIGHWAY SAFETY DESIGN STANDARDS MANUAL - PART 1: ROAD SAFETY DESIGN MANUAL

This Manual is to be used in conjunction with the DPWH Highway Design Guidelines (currently in draft form). The Manual includes standards and guidance for safety planning, safety design and for road safety risk assessment. The Manual is to be used as a primary reference for the planning, design and management of National Highways.

To maximize safety, it is essential to maintain a consistent standard for road and intersection design by application of the standards in the Manual. The principles contained in this Manual should also be used in the training of DPWH staff involved in road planning, design, roadworks project management and traffic management.

The Manual includes safety design principles based on best international practice applicable to the Philippines. Specific areas of design where changes to past practice are expected to lead to significant safety improvements include:

- Choice of intersection type and layout. This is particularly related to the design and use of roundabouts and the form of channelization to reduce potential conflicts and the severity of traffic accidents (includes avoiding use of Y junctions and T junctions with triangular islands);
- Safety of the roadside (includes the choice and design of median and roadside barriers and the use of frangible lighting poles); and
- Safety of unprotected road users such as pedestrians and cyclists.

Responsibilities for Road Safety Design

Responsibilities in relation to the Road Safety Design are detailed in Table 4 below:

Office	Responsibilities
Project Evaluation Division, Planning Service (PED, PS)	• Provide strategy direction, technical support and recommend policy; • Review road safety design standards; • Maintain and update the Road Safety Design Manual; and • Provide training and seminars within and outside DPWH, (e.g consultants and contractors).
Highways Division, Bureau of Design	• Incorporate the road safety principles and standards from the Road Safety Design Manual into the DPWH Highway Design Guidelines (currently being revised). • Review road safety design standards; • Maintain and update the Road Safety Design Manual

Highways Division, Bureau of Design Regional Offices District Engineering Offices Project Management Offices	• Apply the requirements of the Road Safety Design Manual on all road projects under their control; • Include reference in all Terms of Reference for design or construction of road projects, indicating that the design standards of the project are to be in accordance with the Road Safety Design Manual; • Liaise with PED, PS on road safety requirements included in the Manual; and • Participate in training courses and seminars.

Table 4: Responsibilities relating to Road Safety Design

4. HIGHWAY SAFETY DESIGN STANDARDS MANUAL - PART 2: ROAD SIGNS AND PAVEMENT MARKINGS MANUAL

The Manual includes standards and guidance for the use of regulatory signs, warning signs, guide signs (including direction, street name and tourist signs), expressway signs, traffic instruction signs, hazard markers and pavement markings.

The Manual is to be used as the primary reference for the design and installation of road signs and pavement markings on National Highways and local roads. To maximize safety and provide credible advice to drivers, it is essential to maintain a consistent standard for signs and pavement markings. In the interests of uniformity, Local Government Units, traffic management and enforcing authorities, project managers and consultants are requested to apply the requirements of this Manual to provide appropriate road signs and pavement markings on roads in the Philippines.

The principles contained in this Manual should also be used in the training of DPWH and other traffic management personnel involved in design and construction works. This will enable all future road signs and pavement markings to be of a consistent and uniform standard.

Responsibilities for Road Signs and Pavement Markings

Responsibilities in relation to the Highway Safety Design Standards Part 2: Road Signs and Pavement Markings are detailed in Table 5 below:

Office	Responsibilities
Project Evaluation Division, Planning Service (PED, PS)	• Provide strategy direction, technical support and recommend policy; • Review road signs and pavement markings standards; • Maintain and update the Road Signs and Pavement Markings Manual; and • Provide training and seminars within and outside DPWH, (e.g consultants and contractors).

Highways Division, Bureau of Design Regional Offices District Engineering Offices Project Management Offices	• Apply the requirements of the Road Signs and Pavement Markings Manual on all road projects or road maintenance activities under their control; • Include reference in all Terms of Reference for design or construction of road projects, indicating that the design standards of the project are to be in accordance with the Road Signs and Pavement Markings Manual; • Liaise with PED, PS on road safety requirements included in the Manual; and • Participate in training courses and seminars.

Table 5: Responsibilities relating to Road Signs and Pavement Markings

The standards in the above Manuals shall replace other standards that are currently being used in relation to road design, construction and maintenance.
Copies of these Manuals may be obtained from the Division Chief Project Evaluation Division, Planning Service.

5. ACCIDENT BLACKSPOT INVESTIGATION HANDBOOK AND PROJECT EVALUATION HANDBOOK FOR ROAD ACCIDENT REDUCTION PROGRAM

These Handbooks describe procedures for identifying and investigating hazardous (accident blackspots) locations and developing road accident reduction projects. These projects are generally localized, relatively low-cost infrastructure and traffic management projects specifically designed to make the roads safer to use. The procedures are designed to provide a systematic approach to the identification and investigation of accident blackspots and the development of candidate projects that can be considered for inclusion in the road accident reduction program.
The objective of the projects resulting from application of these procedures is to reduce the incidence and / or severity of major accidents at the worst accident locations on the national road network. The procedures are to be used to guide in the selection of sites and improvement proposals, to determine the cost-effectiveness of individual road safety proposals and to prioritize projects that are being considered for funding.

Accident Investigation Handbook

The Accident Investigation Handbook contains information on the use of accident data, reports and maps from the Traffic Accident Recording and Analysis System (TARAS) to identify hazardous locations and assist with the analysis of accident patterns and causal factors at particular sites. It does not provide guidance on the use of TARAS, so staff should refer to the TARAS Users Manual for this purpose (also refer to DO No. 40 in relation to implementation of TARAS).

The Handbook provides guidance on the critical steps required to investigate and develop a project comprising engineering countermeasures that will have a high probability of improving road safety at an accident blackspot location. It therefore is aimed at developing an understanding of the factors that contribute to road accidents as well as knowledge of which treatments will be the most effective in addressing different accident types and patterns.

The scope of this Handbook extends to the point in the project cycle at which a road accident reduction project has been developed to the concept design stage with a preliminary cost estimate. Beyond this point, candidate projects will be submitted for evaluation.

Project Evaluation Handbook

The Project Evaluation Handbook details the processes that shall be followed for evaluating candidate projects that are submitted for funding, including screening to ensure compliance with the criteria for acceptable road accident reduction works, economic appraisal using cost-benefit analysis and prioritization using a multi-criteria analysis methodology.

Responsibilities for Accident Blackspot Investigation, Project Development and Project Evaluation

Responsibilities relating to Accident Blackspot Investigation and Project Evaluation are detailed in Table 6 below:

Office	Responsibilities
Project Evaluation Division, Planning Service (PED, PS)	• Evaluate project proposals for accident blackspots / hazardous locations in accordance with the Project Evaluation Handbook; • Recommend priorities for funding of accident blackspot / hazardous location projects; • Provide road safety strategy direction, technical support and recommend policy; • Review accident blackspot investigation and evaluation procedures; • Maintain and update the Accident Blackspot Investigation Handbook and Project Evaluation Handbook; and • Provide training and seminars within DPWH.

Regional Offices District Engineering Offices Project Management Offices	• Apply the principles in the Accident Blackspot Investigation Handbook for project preparation activities under their control; • Submit project proposals to the PED, PS for evaluation. • Include reference in all new Terms of Reference for project preparation or design relating to accident blackspots or treatment of hazardous locations, indicating that the principles for evaluation are to be in accordance with the Handbooks; • Liaise with PED, PS on road safety requirements included in the Handbooks; and • Participate in training courses and seminars.

Table 6: Responsibilities relating to Accident Blackspot Investigation Handbook and Project Evaluation Handbook

097.13 DPWH
03.19.2008

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

MAR 18 2008

DEPARTMENT ORDER)	SUBJECT :	**GUIDELINES IN THE PROCUREMENT AND INSTALLATION OF ROAD SAFETY DEVICES AND FACILITIES**
No, 13)		
Series of 2008 03.19.08)		

In line with the Department's objective to improve road safety in the national road network, the standards and guidance for safety planning, safety design, road safety and for risk assessment provided in the ***DPWH Highway Safety Design Standards Manual, Part 1: Road Safety Design***, and the standard specifications for road signs, pavement markings and other road safety devices as provided in the ***DPWH Highway Safety Design Standards Part 2: Road Signs and Pavement Markings Manual*** are hereby prescribed for all road safety projects, road construction and maintenance activities. This directive also applies to all newly completed road improvement projects or on road sections identified as hazardous locations and/or on road sections with potential road hazards where safety devices are needed.

The ***DPWH Highway Safety Design Standards Manual, Parts 1 and 2*** developed under the ADB-assisted Road Infrastructure Safety Project should be used in conjunction with the DPWH Highway Design Guidelines to maximize road safety.

This Department Order is supplementary to Department Circular No. 09 Series of 2004, copy attached, which prescribed the guidelines on the adoption and use of the road safety manuals.

This order shall take effect immediately.

HERMOGENES E. RAÑANE, JR.
Secretary

WIN8Q03764

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

897.13 DPWH
03.24.2009

MAR 2 2 2009

DEPARTMENT ORDER)
No. 15)
Series of 2009)

SUBJECT: INSTALLATION OF ROUTE MARKERS & DIRECTIONAL SIGNS ALONG THE ASIAN HIGHWAY – ROUTE AH26 (DAANG MAHARLIKA)

The Asian Highway (AH) Network was conceived by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) for a coordinated development and upgrading of existing regional highways system among the member countries. It is one of the three pillars of Asian Land Transportation Infrastructure Development (ALTID) project, endorsed by the ESCAP commission at its forty-eight session in 1992, comprising Asian Highway, Trans-Asian Railway (TAR) and facilitation of land transport projects.

The Philippines, as one of the 32 member countries of ESCAP, has been assigned the Asian Highway route number AH26. The Asian Highway (AH26) route links the major seaports and cities in this country. The Asian Highway (AH26) route comprising mostly segments of the Daang Maharlika commences from Laoag City and finally ends at the international seaport in Zamboanga City with a total length of 3,517 kilometers.

To bring the network in conformity with the Asian Highway classification and design standards, Asian Highway routes are required to conform to minimum standards of classification and design in terms of construction, improvement and maintenance.

OBJECTIVES:

1. Implement the installation of Route Markers and Directional Signs along the Asian Highway (AH26) – Daang Maharlika in accordance with the Asian Highway classification and design standards and facilitate navigation along the routes.

2. Promote trade and tourism to local and international travelers.

SCOPE OF WORKS:

1. Preparation of Guidelines

A. Project Evaluation Division (PED), Planning Service (PS) to:

1. Formulate Guidelines to:
   a. identify appropriate locations for the (AH26) route markers and other pertinent directional signs;
   b. determine type of markers and signs at specific location classification;
2. Disseminate these guidelines to the Planning and Design Division (PDD) of Regional Offices concerned.
3. Evaluate and consolidate identified location of route markers and directional signs submitted by the respective PDDs

2. Conduct of Reconnaissance Surveys

A. Project Evaluation Division (PED), Planning Service to:

1. Conduct a pilot survey in Region I to identify the appropriate locations for the (AH26) route markers and other directional signs.

B. Regional Office Planning and Design Division (PDD) to:

1. Conduct survey to identify the appropriate locations for the Route Markers along the Asian Highway within their respective areas.
2. Submit to PED-PS the list of locations/sites for the Route Markers and Directional Signs of their respective districts or regions.

3. Procurement of AH26 Route Markers and Directional Signs

A. Central Office (CO) to:

- Set the standard design and specification of the Route Markers and Directional Signs based on the DPWH Road Signs and Pavement Markings Manual (Revised 2008).
- Designs and materials to be supplied/used for AH Route Markers and other directional signs should be approved by the Planning Service before installation.

B. Regional /District Engineering Offices (RO/DEO) to:

- Include the procurement of the AH26 markers and directional road signs in the Programs of Work of road projects within the Asian Highway routes.
- Adopt the specification/standard design of the Route Markers.

4. Project Delivery/Implementation of Project

- RO/DEO to install Route Markers and Directional Signs.
- RO to see to it that the standard design and specifications for the Route Markers and other directional signs are incorporated in the Bidding Documents and are strictly followed during the procurement.
- RO to reject/dismantle all Route markers and other directional signs procured and/or installed along the AH26 found to be not in accordance with the DPWH approved standard design and specification.
- RO to require the winning contractor to replace those rejected and/or dismantled route markers with those with standard design and specification.
- The AH26 Route Markers and Road Signs shall be installed in 2 phases starting Fiscal Year 2009 – 2010:

Phase I	- Regions I, II, III, NCR, IV-A and V	Year 2009
Phase II	- Regions VIII, IX, X, XI, XII and XIII	Year 2010

- RO to submit to the Planning Service a monthly accomplishment report on the status of the installation of Asian Highway (AH26) route markers and other directional signs in their respective regions until its completion.
- Planning Service to monitor and oversee the implementation of the project.

The installation of Route Markers and Directional Signs along AH26 is in compliance with the Philippines' commitment to the UN-ESCAP to promote trade, international as well as local tourism, by providing reliable and efficient road information about routes, directions, destinations and points of interest and enhance cooperation in the development of a harmonized and coordinated regional land transport infrastructure network and in the improvement of the interconnectivity of land transport.

This order shall take effect immediately.

HERMOGENES E. EBDANE, Jr.
Secretary

WIN9Q06069

0497.13 DPWH
08-13-2009

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

AUG 12 2009

DEPARTMENT ORDER) SUBJECT : USE OF PAVEMENT STUDS (RAISED AND FLAT) ON CONCRETE AND ASPHALT PAVED ROADS.
No. 36)
Series of 2009) 08.13.09

It has been observed that raised pavement studs specifically designed for concrete pavement are also being installed on asphalt paved roads, which are easily dislodged from position or pressed/pushed down by heavy vehicles, especially during hot weather. This leads to decreased illumination as well as depression and eventual dilapidation of the asphalt pavement.

In view hereof and in order to prevent the occurrence of the above-mentioned damage to asphalt pavements, all concerned DPWH Project Implementing Offices are hereby instructed to use raised pavement studs with anchor only on concrete pavements. Broad based flat pavement studs shall be used on asphalt paved roads, provided that the supplier will extricate and reinstall the same should there be overlay/rehabilitation works on the said pavement.

This Order supersedes Department Order No. 57, Series of 2000 and shall take effect immediately.

For strict compliance.

HERMOGENES E. [illegible]E, JR.
Secretary

WIN9U00363

897.13 DPWH
03-01-2011

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

FEB 21 2011

DEPARTMENT ORDER)
No. 10)
Series of 2011)

SUBJECT : **DPWH Standard Specification for Chevron Signs, Item 620**

In line with the mandate of the Department of providing effective standards for application in the implementation of various infrastructure projects and in view of the need of setting standard specifications for chevron signs, the attached **DPWH Standard Specification for Chevron Signs, Item 620,** is hereby prescribed, for the guidance and compliance of all concerned.

This specification shall form part of the revised edition of the DPWH Standard Specifications (Volume II – Highways, Bridges and Airports).

This Order shall take effect immediately.

ROGELIO L. SINGSON
Secretary

WIN1U00484

Encl: As stated.

VMG/rpc

ITEM 620 – DPWH STANDARD SPECIFICATION FOR CHEVRON SIGNS

620.1 Description

This Item shall consist of furnishing and installing chevron signs in accordance with this Specification and to the details shown on the Plans, or as required by the Engineer.

620.2 General

620.2.1 Function

The chevron signs shall be used to guide drivers through a change in horizontal alignment of the road such as curves and less than sharp turns. Chevron signs shall also be used to supplement any of the advance warning signs, the horizontal alignment signs (W-types) or the standard guide posts and delineators.

620.2.2 Design

The chevron sign shall be a vertical rectangle. No border shall be used on the chevron sign.

The point of the arrow or chevron shall indicate the direction of travel. They shall be visible for at least 150 m to provide the road user with adequate time to react to the change in alignment. The minimum lateral offset of the chevron sign shall be 1.8 m from the edge of pavement.

The chevron signs shall be installed on the outside of the curve, set up aligned with the approaching traffic at right angle to a driver's line of sight. Two-sided chevron signs may be used on two-lane, two-way roads to guide drivers travelling in both directions.

It is recommended that the spacing of the chevron signs should allow the driver to see at least three (3) signs in view while negotiating the curve, until the change in alignment eliminates the need for the signs. (See Figure 2)

Chevron signs shall be mounted clear of roadside vegetation and clearly visible under headlight illumination by night. Chevrons should be installed 1.5m above the ground in the rural areas and 2.2m in the urban areas. The recommended spacing for the chevrons within a curve are shown in Table 620.1.

Table 620.1 - Recommended Spacing for Chevron Signs

Advisory Speed Limit (kph)	Radius (m)	Chevron Spacing (m)
≤ 20	≤ 60	12
30-50	60-120	24
60-70	120-210	36
80-90	210-300	48
> 90	> 300	60

The above spacing distances shall apply to points within the curve. Approach and departure spacing distances shall be twice those shown above. (See Figure 3 for sample illustration of the above data)

620.2.3 Types of Chevron Signs

Two (2) types of chevron signs are provided for in this Item and each type shall be used as called for on the plans. The typical sizes are shown in Table 620.2.

Table 620.2 - Types of Chevron Signs

	Type		Typical Size		Application
a.	HM-1A	-	450mm x 600mm		≤ 60 kph design speed with no visible problem
b.	HM-1B	-	600mm x 800mm		> 60 kph design speed and/or with no visibility problem (e.g. fog)

620.3 Material Requirements

620.3.1 Sign Panels

It shall conform to the requirements of Subsection 605.2.1, Sign Panels of Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.3.2 High Performance Reflective Sheeting

The reflective sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing or dimensional change after two (2) years of unprotected outdoor exposure.

The reflective sheeting shall have high reflectivity normal to vehicle headlight dependent on the angle of incidence. The reflective material shall be sharp, no glare, and directed towards the light source of approved angle of incidence.

The reflective sheeting shall perform effectively for a minimum of seven (7) years from date of fabrication.

The reflective sheeting must retain at least 70% of its original brightness for regular and fluorescent sheeting respectively at the end of seven years. All chevron signs used for the road projects should be warranted by the sheeting manufacturer for above-stated performance.

Chevron signs shall be dated at the time of installation in order to initiate the 7-year performance warranty. A sign-dating sticker that indicates the manufacturer's name, material type/brand name with the month and year of installation should be placed at the back of the sign face.

The reflective sheeting shall consist of full cube micro-prismatic lens sheeting with an interlocking diamond seal pattern with pre-coated adhesive backing protected by a removable liner. The minimum reflective brightness value of reflective sheeting shall be in accordance with the following table.

Table 620.3 - Reflective Brightness of Traffic Signs Surfaces

	Observation Angle[2] (degrees)		
	0.2^0	0.5^0	1.0^0
For -4^0 Entrance Angle[1]			
White	570	400	120
Yellow	425	300	90
Red	114	80	24
Green	57	40	12
Blue	26	18	5.4
Fluorescent Yellow	340	240	72
Fluorescent Yellow Green	460	320	96
Fluorescent Orange	170	120	36
For 30^0 Entrance Angle[1]			
White	215	150	45
Yellow	160	112	34
Red	43	30	9
Green	21	15	4.5

Blue	10	6.8	2
Fluorescent Yellow	130	90	27
Fluorescent Yellow Green	170	120	36
Fluorescent Orange	64	45	14
For 45^0 Entrance Angle[1]			
White	100	50	25
Yellow	75	37	19
Red	20	10	5
Green	10	5	3
Blue	4.5	1.5	0.8
Fluorescent Yellow	60	30	15
Fluorescent Yellow Green	80	40	20
Fluorescent Orange	30	15	7

All units are expressed in terms of cd/lux/sq.m.

[1] Entrance Angle - The angle from the illumination axis to the retro-reflector axis. The reflector axis is an axis perpendicular to the retro-reflective surface.

[2] Observation Angle - The angle between the illumination axis and observation axis.

620.3.3 Post and Attachments

It shall conform to the applicable requirements of Subsection 605.2.3, Posts and Frames. (See Figure 1 for typical/prescribed design)

Posts required for the erection of signs shall be made of galvanized steel pipes not less than 75mm (outside diameter) x 3.25mm thick, or other sections of equivalent strength. Aluminum alloy may be used. Plastics may be considered, provided they have been suitably evaluated.

Attachments shall provide for the positive and robust connection of signs to their mounting posts. Consideration shall be given to distributing attachment loads, e.g., by the provision of suitably shaped saddles and clamps or brackets for a round post.

620.3.4 Nuts and Bolts

It shall conform to the requirements of Subsection 605.2.4, Nuts and Bolts, Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.3.5 Concrete Foundation Blocks

It shall conform to the requirements of Subsection 605.2.5, Concrete Foundation Blocks, Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.4 Construction Requirements

620.4.1 Excavation and Backfilling

It shall conform to the requirements of Subsection 605.3.1, Excavation and Backfilling, Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.4.2 Erection of Posts

It shall conform to the requirements of Subsection 605.3.2, Erection of Posts, Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.4.3 Sign Panel Installation

It shall conform to the requirements of Subsection 605.3.3, Sign Panel Installation, Item 605 – Road Sign, DPWH Standard Specifications, Volume II.

620.5 Method of Measurement

The quantities of chevron signs shall be the number of such sign of the size specified, including the necessary posts and supports, erected and accepted.

620.6 Basis of Payment

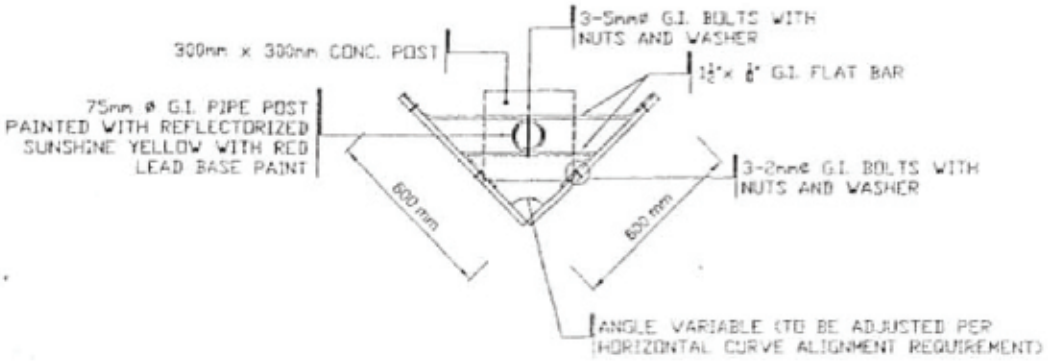
The quantities measured as determined in Section 620.5, Method of Measurement, shall be paid for at the contract unit price shown in the Bid Schedule which price and payment shall be full compensation for furnishing and installing chevron signs, for excavation, backfilling and construction of foundation blocks, and all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under :

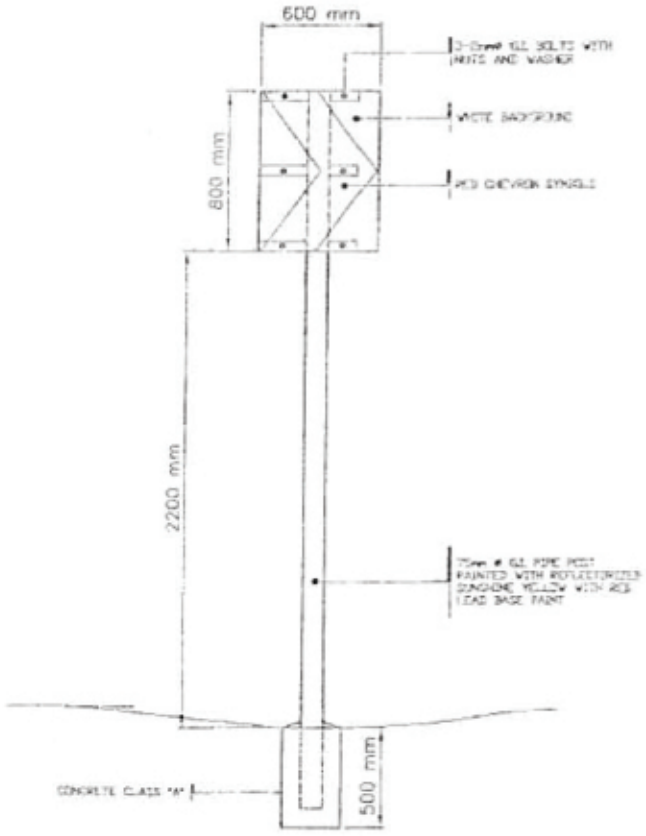
Pay Item Number	Description	Unit of Measurement
620	Chevron Signs	Each

References:

1. Road Signs and Pavement Markings Manual, 2009 Edition, Highway Safety Design Standards, DPWH
2. DPWH Standard Specifications for Highways, Bridges and Airport, Volume II, 2004 Edition
3. Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, Federal Highway Administration, U.S. Department of Transportation
4. Internet Article: Guiding Motorists through Turns and Curves, Technology Transfer Center, New Hampshire, U.S.A.
5. Vulcan Signs Website, Vulcan, Inc.



PLAN



ELEVATION

FIGURE 1 . Detailed drawing for two (2) adjacent Chevron alignment on one (1) instead of two (2) G.I. pipe posts

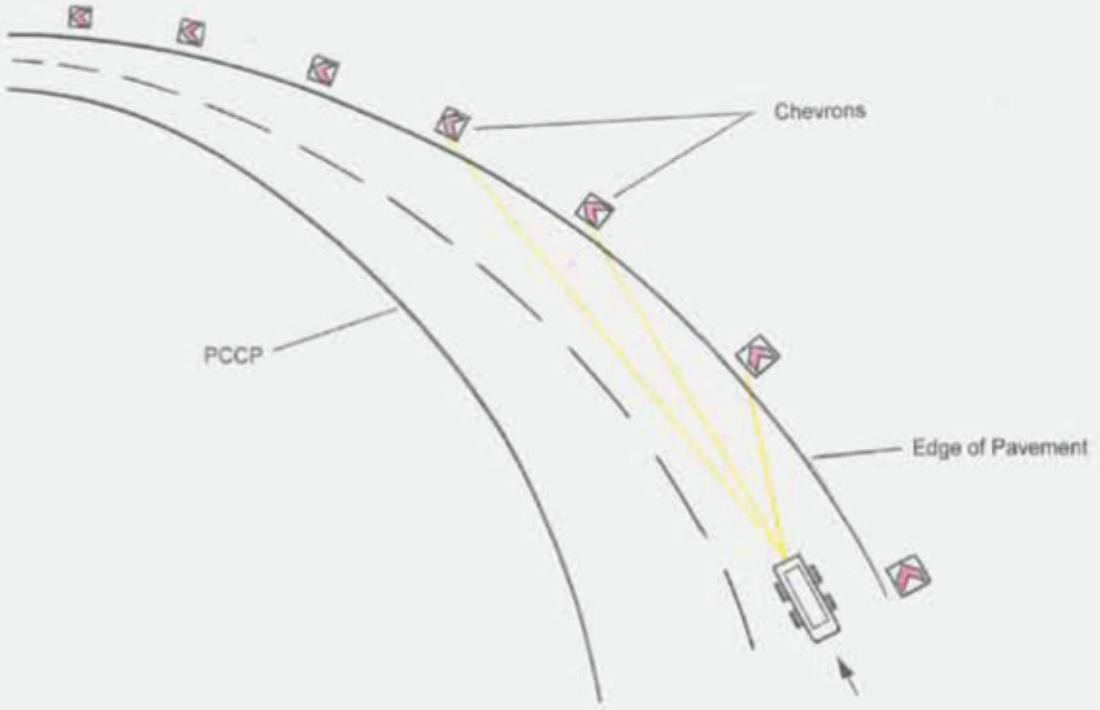


FIGURE 2 - Showing that the spacing of the Chevron Signs allow the driver to see at least three (3) signs in view while negotiating the curve until the change in alignment eliminates the need for the signs as contained in the 4th paragraph of Section 620.2.2, Design for Item 620 – Chevron Signs

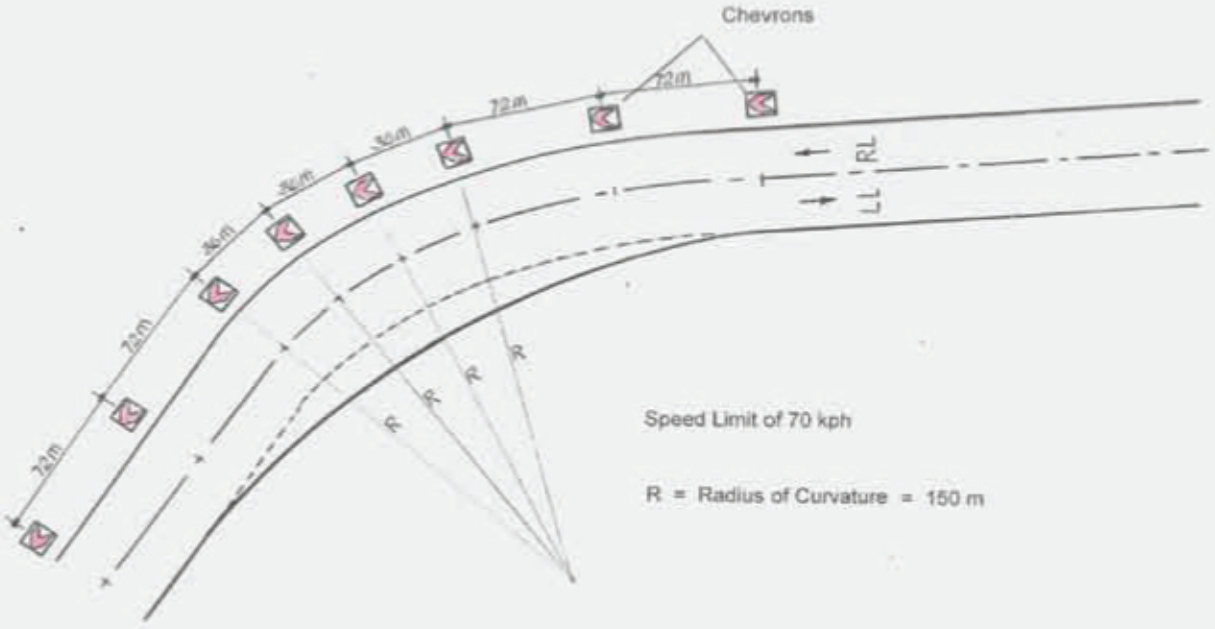


FIGURE 3 - The recommended spacing distances for the Chevron Signs within the curve and approach/ departure of the road as shown in Table 620.1 – Recommended spacing for Chevron Signs and as contained in the 6th paragraph of Section 620.2.2, Design for Item 620 – Chevron Signs

097. 13 DPWH
06-16-2010

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

JUN 15 2010

DEPARTMENT ORDER)
)
No. 31)
Series of 2010 - 06.14.10)

SUBJECT : **DPWH Standard Specification for Reflectorized Thermoplastic Rumble Strips, Item 618**

In line with the mandate of the Department of providing effective standards for application in the implementation of various infrastructure projects and in view of the need of setting standard specifications for reflectorized thermoplastic rumble strips, the attached **DPWH Standard Specification for Reflectorized Thermoplastic Rumble Strips, Item 618,** is hereby prescribed, for the guidance and compliance of all concerned.

This specification shall form part of the revised edition of the DPWH Standard Specifications (Volume II – Highways, Bridges and Airports).

This Order shall take effect immediately.

VICTOR A. DOMINGO
Acting Secretary

Attachment: As stated.

WIN0U00412

DPWH STANDARD SPECIFICATION FOR ITEM 618 - REFLECTORIZED THERMOPLASTIC RUMBLE STRIPS

618.1 Description

618.1.1 Scope

This Item shall consist of furnishing and applying reflectorized thermoplastic rumble strips on the surface of the pavement in accordance with this Specification and at the locations shown on the Plans, or as required by the Engineer.

618.1.2 Uses of Reflectorized Thermoplastic Rumble Strips

Reflectorized thermoplastic rumble strips shall be bonded to typical asphalt or concrete surfaces to provide the following traffic controls:

a. Warn/alert drivers of upcoming roadway condition such as intersections, sharp horizontal curves, narrow bridge approaches, toll plazas/gates, and tunnels.
b. Use as complementary/enhancement to advance warning signs such as the Stop Ahead or the various Curve signs.
c. Use to prevent/lessen the effect of drowsiness during long drive, inattention and highway hypnosis.

618.2 Material Requirements

618.2.1 Reflectorized Thermoplastic Pavement Material and Glass Beads (Pre-Mix)

Both materials shall conform to their respective requirements of Section 612.2, Materials requirements, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.3 General Requirements

618.3.1 Design

618.3.1.1 General

Reflectorized thermoplastic rumble strips shall have the following dimension:

Height	:	4.0 mm to 13 mm
Width	:	50 mm to 100 mm
Spacing	:	200 mm to 500 mm

As much as possible, placement of reflectorized thermoplastic rumble strips shall be limited to rural locations and shall not be installed near residential areas because of the noise it can generate. It should not be placed through pedestrian crossings or on bicycle routes.

The recommended length of road section where reflectorized thermoplastic rumble strips are to be installed shall be from 20 m to 30 m depending on the advisory speed limit of the road section.

The color of reflectorized thermoplastic rumble strips shall be either white or yellow.

Reflectorized thermoplastic rumble strips placed in the travelled way should not be overused. If used at too many locations, reflectorized thermoplastic rumble strips may lose their ability to gain the motorist's attention.

618.3.1.2 Pattern

The Contractor shall lay out a reflectorized thermoplastic rumble strips test pattern prior to the start of construction for approval by the Engineer. Pattern shall be balanced to provide adequate warning to drivers without being so severe that they startle drivers or upset motorcycles.

The pattern of reflectorized thermoplastic rumble strips shall finish within 50 m of any hazard it is associated with.

618.3.2 Composition

It shall conform to the requirements of Subsection 612.3.1, Composition, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.3.3 Qualitative

It shall conform to the requirements of Subsection 612.3.2, Qualitative, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.4 Application Properties

It shall conform to the applicable requirements of Section 612.4, Application Properties, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

Reflectorized thermoplastic rumble strips shall be placed transverse to motor vehicle traffic movement. It shall not adversely affect overall pavement skid resistance under wet or dry conditions and shall not be placed on sharp horizontal or vertical curves. It shall not be applied over deteriorating existing reflectorized thermoplastic rumble strips or pavement surface.

A sign warning the drivers of the onset of reflectorized thermoplastic rumble strips may be placed in advanced of rumble strips installation.

618.5 Sampling

It shall conform to the requirements of Section 612.5, Sampling, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.6 Testing

It shall conform to the requirements of Section 612.6, Testing, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.7 Packing and Marking

It shall conform to the requirements of Section 612.7, Packing and Marking, Item 612 – Reflective Thermoplastic Stripping Materials (Solid Form).

618.8 Method of Measurement

The area to be paid for under this Item shall be the number of square meters (m^2) of reflectorized thermoplastic rumble strips applied and accepted.

618.9 Basis of Payment

Payment shall constitute full compensation for furnishing and application of reflectorized thermoplastic rumble strips including all labor, equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
618	Reflectorized Thermoplastic Rumble Strips	Square meter (m^2)

References:

1. DPWH Standard Specifications for Highways, Bridges and Airport, Volume II, 2004 Edition
2. Standard Specifications for Construction of Road and Bridges on Federal Highway Projects (FP-03, Metric Units), Federal Highway Administration, U. S. Department of Transportation
3. American Society for Testing and Materials (ASTM)
4. American Association of State Highways and Transportation Officials (AASHTO)
5. Wikipedia Encyclopedia
6. Thomas Grinding, Inc. Internet Webpage
7. Road Signs and Pavement Markings Manual, DPWH-Planning
8. Manual on Uniform Traffic Control Devices for Street and Highways, 2003 Edition, Federal Highway Administration, U.S. Department of Transportation

9. National Cooperative Highway Research Program (NCHRP) Report 476, Transportation Research Board of the National Academies, Washington, D.C., U.S.A.
10. Rumble Strips and Stripes, Federal Highway Administration Internet Webpage
11. Transverse Rumble Strips – Engineering Policy Guide, Internet Webpage
12. Transverse Rumble Strips – Transportation Research Synthesis (August 2007), Minnesota Department of Transportation
13. Section 614 - Rumble Strips (Grinding), Colorado Department of Transportation Internet Webpage

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