7. ROAD MARKINGS, STUDS AND DELINEATORS
Chapter 7 Road Markings, Studs and Delineators

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Chapter 7 Road Markings, Studs and Delineators

7.1 Introduction

7.1.1 Road markings may be defined as markings on the surface of the road for the control, warning, guidance or information of road users. They may be used to supplement kerbside or overhead signs, or they may be used alone.

7.1.2 Road markings have the limitation that they may be obliterated by snow. Their conspicuity is impaired when wet or dirty and their durability depends largely on their exposure to traffic wear. Nevertheless, they serve a very important function in conveying to drivers, information and requirements which might not otherwise be possible by the use of upright signs. They have the advantage that they can often be seen when an erected sign is obscured, and, unlike such signs, they can provide a continuing message to the moving driver.

7.1.3 The continued increase in the volume of traffic using the roads makes extensive use of road markings essential to ensure that full advantage is taken of the available road space. In particular, widespread use of lane markings is desirable. Enhancing lane discipline adds materially to the safety of traffic, besides improving traffic flows. In urban areas considerable advantages accrue from road markings at junctions.

Classes of Marking

7.1.4 Road markings may be classified as follows:

(a) Transverse markings, which are at right-angles (or thereabouts) to the centre line of the carriageway.
(b) Longitudinal markings:
   (i) Centre lines
   (ii) Lane lines
   (iii) Edge lines.
(c) Markings at level crossings.
(d) Markings at roundabouts.
(e) Yellow markings for waiting and loading restrictions.
(f) Worded markings, parking bays, box markings, school markings and bus and cycle tracks.
(g) Junction markings.
(h) Markings at pedestrian crossings
(i) Hatched markings.

7.1.5 It is strongly recommended that road markings be considered in detail at the design stage of new or improved junctions. The markings for existing junctions are best considered on plan before the work is undertaken.

7.2
7.2 Legal

7.2.1 Road markings are provided in accordance with signs regulations or directions of the Minister for the Environment. They may be laid only by, or on behalf of, the roads authority. Attention is drawn to the necessity for the Authority to consult with the Commissioner of the Garda Síochána where regulatory traffic signs or road markings are being provided.

7.3 Materials

7.3.1 Road markings/materials should conform with the guidelines for markings contained in 'Thermoplastic Road Markings - Guidelines and Tender Documentation', available from Westmeath County Council.

7.4 Transverse Markings

Where alternative dimensions for line widths or letter heights are provided, generally the smaller dimensions should be used in urban areas and the larger dimensions in rural areas and at major urban junctions.

7.4.1 The prescribed transverse markings comprise:
(i) Stop Lines
(ii) Yield Lines and
(iii) No entry Lines

STOP Line  Fig. 7.1

7.4.2 A 200 mm (250 mm) wide white line indicates the position beyond which a driver must not proceed when required to stop by signs, or by traffic signals, including signals at level crossings.

Note: Special width of 300 mm for stop line at level crossings.

Junction STOP Line

7.4.3 The marking consists of a single continuous white line 200 mm (250 mm) in width. The edge of the STOP line nearest to the major road should not be closer than 600 mm to the path normally followed by the nearest side of the major road vehicles. Only very rarely should it be sited elsewhere and then it must be sited so as to halt a driver where visibility is best.
Note: Generally the smaller dimensions should be used in urban areas and the larger dimensions in rural areas and at major urban junctions.

FIG. 7.1 Markings for use with STOP sign
NOTE: Line segments and gaps may be reduced to 500mm where restricted lane width does not permit the above pattern to be properly displayed.

FIG. 7.2 Markings for use with YIELD sign
7.4.4 On a two-way road the STOP transverse marking should always be accompanied by a central continuous longitudinal line extending back from the junction for a minimum distance of 20m from the STOP line.

7.4.5 The STOP worded marking, where used, should have letters of height either 1600mm or 2800mm.

**Traffic Signal STOP Line**

7.4.6 The marking consists of a single continuous white line 200mm (250mm) in width.

7.4.7 At traffic signals, including pedestrian signals, the STOP line is normally located 1m to 2m before the nearside primary signal but site conditions may necessitate adjustment for this distance.

**YIELD Line Fig. 7.2**

7.4.8 The recommended marking consists of a broken line 200mm (250mm) wide comprising 1000mm marks and 1000mm gaps. See Fig.7.2 for layout of YIELD sign and associated road markings. Where the width of the approach lane is not sufficient to display the pattern, segments of 500mm marks and 500mm gaps may be used instead.

7.4.9 On two-way minor roads, the marking normally extends to the centre of the carriageway of the minor road; on a one-way road it is carried across the whole width of the minor road. The precise location of the marking nearest to the major road in relation to the edge of the major road is governed by the same considerations as the STOP line.

7.4.10 On two-way roads, the YIELD transverse marking should always be accompanied by a continuous white line extending back from the junction for a minimum distance of 20m from the YIELD line.

**Triangular YIELD Approach Marking Fig. 7.2.**

7.4.11 The hollow triangular marking may only be used when a transverse YIELD line is provided and should be accompanied by a YIELD upright sign. It must not be used elsewhere. The marking should normally be located with its base 2.1m to 2.75m from the transverse marking, but exceptionally this distance may be increased to a maximum of 15m depending on the visibility at the junction, its layout, and the speed of traffic on the minor road. A suitable place to locate it would be with the base of the triangle near the tangent point of the kerbline.
Where triangular markings are used they should be positioned approximately in the centre of the traffic lane. Where the approach to the junction is divided into two or more lanes, then a triangular marking should be provided in each lane.

**NO ENTRY** Fig. 7.3

The recommended marking consists of one continuous white line and one broken line comprising 1000mm marks and 1000mm gaps. The lines are 200mm wide and are spaced 300mm apart. The precise location of the marking nearest to the major road is governed by the same conditions as the STOP line.

The wording NO ENTRY may accompany the above lines. The spacing between the broken line and the lettering is 300mm. The height of lettering is either 1600mm or 2800mm, depending upon the width of the road.

The road markings must be accompanied by the appropriate regulatory signs, i.e. the "NO LEFT TURN" and "NO RIGHT TURN" signs on the approaches to the junction on the intersecting road, and the "NO ENTRY" sign on both sides of the one-way road at its junction with the intersecting road.
FIG. 7.3 Markings for use with NO ENTRY Sign
7.5 Longitudinal Markings: Lane, Centre and Edge of Carriageway Lines (Figs. 7.4 to 7.12)

7.5.1 The benefits to be gained from the use of lane, centre and edge of carriageway lines in both urban and rural areas cannot be stressed too strongly. By guiding and confining traffic to its correct lane, the lines have an important bearing on safety, besides ensuring that all the available carriageway space is used to its maximum capacity. Widespread use of the lines should be made wherever possible and road authorities are strongly recommended to introduce lane, centre and edge lines, where appropriate, on roads in their areas which are not now so marked.

7.5.2 Details of the lines and the circumstances in which they should be used are set out in Table 7.1.

7.5.3 The standard edge of carriageway marking is the 2m mark, 2m gap in yellow. A continuous yellow line is used to indicate that trafficking the shoulder is not permitted (e.g. Motorways).

7.5.4 Where crossing of the centre line is prohibited, the standard longitudinal marking should be the continuous single line or double line system as appropriate. Section 7.6 indicates circumstances where the double line system is not appropriate and where a solid continuous line should be used.

7.5.5 It should be noted that drivers may cross a continuous centre line to enter or leave land or premises on the right hand side of the road. It is not necessary, therefore, to break the line at such locations.
**TABLE 7.1: LANE, CENTRE AND EDGE OF CARRIAGEWAY LINES**

"URBAN" - Restricted to 40m.p.h. (60km/h) or less

<table>
<thead>
<tr>
<th>Marking</th>
<th>Mark (mm)</th>
<th>Gap (mm)</th>
<th>Width (mm)</th>
<th>Stud Spacing (mm)</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Lines</td>
<td>(a) 4000</td>
<td>8000</td>
<td>100</td>
<td>12000</td>
<td>(a) Dual carriageway</td>
</tr>
<tr>
<td></td>
<td>(b) 2000</td>
<td>2000</td>
<td>100</td>
<td>12000</td>
<td>(b) All other roads and approaches to junctions</td>
</tr>
<tr>
<td>Centre of Carriageway Lines</td>
<td>3000</td>
<td>3000</td>
<td>100</td>
<td>12000</td>
<td>Two Lane carriageway</td>
</tr>
<tr>
<td></td>
<td>Continuous</td>
<td></td>
<td>150</td>
<td>6000</td>
<td>Four or more lanes</td>
</tr>
<tr>
<td>Edge of Carriageway Lines</td>
<td>2000</td>
<td>2000</td>
<td>100</td>
<td>24000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(150)</td>
<td>(12000)</td>
</tr>
</tbody>
</table>

"RURAL" - Speed Limit over 40m.p.h. (60km/h)

<table>
<thead>
<tr>
<th>Marking</th>
<th>Mark (mm)</th>
<th>Gap (mm)</th>
<th>Width (mm)</th>
<th>Stud Spacing (mm)</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Lines</td>
<td>4000</td>
<td>8000</td>
<td>100</td>
<td>12000</td>
<td>Division of carriageway into traffic lanes</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>2000</td>
<td>100</td>
<td>12000</td>
<td>Edge of speed change lane of approach to junctions</td>
</tr>
<tr>
<td>Centre of Carriageway Lines</td>
<td>3000</td>
<td>9000</td>
<td>150</td>
<td>12000</td>
<td>Two lane carriageway</td>
</tr>
<tr>
<td></td>
<td>Continuous</td>
<td></td>
<td>150</td>
<td>6000</td>
<td>Four or more lanes</td>
</tr>
<tr>
<td>Edge of Carriageway Lines</td>
<td>2000</td>
<td>2000</td>
<td>150</td>
<td>12000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*(100)</td>
<td></td>
<td>*(100)</td>
</tr>
</tbody>
</table>

*for use on lower category roads
FIG. 7.4 Markings - Two Lane Single Carriageway with Shoulders
FIG. 7.5 Markings - Two Lane Single Carriageway without Shoulders

Note: Dashed yellow edge line may be provided where paved width warrants it, 2m mark 2m gap (100).
NOTE:
The double centre line should extend beyond the start of the taper at each end for a minimum distance equivalent to the stopping sight distance for the design speed of the road

FIG. 7.6 Markings - Single Carriageway with Right-Turn Lane (Not to Scale)
NOTES

1. The taper on the approach to, and at the end of the slow lane should be gradual (min. 1:25) and should approximate to the natural path of the vehicle.

2. The slow lane marking at the end of the lane should be discontinued when the taper width is 2.5m.

3. The line on the single lane side of the centre line should be dashed or continuous depending on the sight distance characteristics of the section.

FIG. 7.7 Markings - Two Lane Carriageway with Slow-lane
FIG. 7.8 Markings - Dual Carriageway
NOTE:
Markings discontinued when taper width is 2.5m.

FIG. 7.9 Markings at Exit Ramps

NOTE 1
Either or both edge markings of chevrons may be provided with 25 to 50mm gaps at irregular intervals where ponding occurs to promote free surface water drainage.

FIG. 7.10 Markings at Entry Ramps
NOTE
On non-motorway roads this line becomes 2m mark / 2m gap (150mm) Yellow

2m mark / 2m gap (150mm) white

NOTE
Markings discontinued when tapered width is 2.5m or less

2m mark / 2m gap (150mm) white

FIG. 7.11 Markings - Roads to Motorway Standard
Marking for Reduction in Numbers of Lanes

Carriageway Lane Reduction

Details of Warning Arrow

FIG. 7.12 Road Markings for Typical Lane Reductions
(3 Lanes to 2 Lanes) and (2 Lanes to 1 Lane)
7.6 Longitudinal Markings: Double Line System

7.6.1 The double line system provides a means of prohibiting overtaking on lengths of road where visibility is restricted. The double line system permits each direction of travel to be separately marked according to the visibility available in that direction. The standard of visibility justifying the use of these lines and hence the lengths of lines themselves is strictly governed by the speeds of vehicles on the road. Where visibility is just above the minimum standard, but overtaking may nevertheless present danger, or where it is impossible to use the double line system (e.g. because of restricted carriageway width) a single continuous line is recommended.

7.6.2 It should be borne in mind that where the visibility standards are not satisfied, it does not automatically follow that double lines must be laid down. Judgement should be exercised in deciding whether, having regard to the topographical and traffic characteristics of the route, it is reasonable to impose the restrictions.

7.6.3 Road authorities should ensure that all newly laid double line markings conform to the criteria set out in the subsequent paragraphs. The emphasis should always be on not using double lines except where they are clearly justified on these criteria, both in relation to the length in question and as part of a route as a whole.

**TABLE 7.2: DOUBLE LINE SYSTEM**

<table>
<thead>
<tr>
<th>Marking</th>
<th>Mark (mm)</th>
<th>Gap (mm)</th>
<th>Width (mm)</th>
<th>Stud Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prohibitory</td>
<td>Continuous</td>
<td>Continuous</td>
<td>100 (150)</td>
<td>6000</td>
</tr>
<tr>
<td>Warning</td>
<td>1000</td>
<td>5000</td>
<td>100 (150)</td>
<td>6000</td>
</tr>
</tbody>
</table>

**Use**

7.6.4 Double line systems consist of a 100 mm wide continuous prohibitory line accompanied either by another continuous line or a broken warning line to provide for the different forward visibilities in opposite directions. On improved roads and roads of more than two lanes, e.g. where a slow lane or hard shoulder is provided, the lines should be 150mm wide. The continuous prohibitory line is installed where the visibility on bends or humps is less than the criteria set down in Table 7.3, the speed being that which includes 85% of drivers and the visibility distance being measured from an eye-height of 1.05m to a target of the same height above the road level.
7.6.5 During the preliminary marking out it will be possible to pin-point obstructions to sight lines on horizontal curves and bends, and these (e.g. bushes, hedges, banks, etc.) should be removed where practicable and the prohibitory line terminals rechecked before lines are painted. Marking out should be done while hedges are in full foliage. In addition, during the marking out operations, special note should be taken of the existence within the restricted section, of bus stops, milk stands, and other movable facilities which would tend to cause vehicles to stop on sections of roads on which double lines are provided. Between the marking out and commencement dates every effort should be made to have them relocated outside such sections.

7.6.6 The approaches to each prohibitory line section should be indicated by a double warning line consisting of 1000mm, segments and 5000mm gaps, with the segments coinciding in the longitudinal direction and separated by a space of not more than 150 mm or less than 100mm wide. The length, in metres, of such warning lines should be equivalent to the distance travelled in two seconds at the 85 percentile speed e.g. for 85 percentile speed 100 km/h, the length of the warning line should be 54m.

7.6.7 During the marking out operations, it should be borne in mind that where the space between successive double line sections is likely to prove inadequate for safe passing, the sections should be connected by a double continuous line where the distance is short and by a single continuous line where the distance is considerable. The double continuous line should be used only where the distance between the end and commencement of successive prohibitory lines is less than the visibility distance in Table 7.3.

**TABLE 7.3: Prohibitory LINE LIMITS**

<table>
<thead>
<tr>
<th>V = 85 per cent speed (Km/h)</th>
<th>100</th>
<th>80</th>
<th>60</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>s = Visibility distance (Meters)</td>
<td>190</td>
<td>130</td>
<td>80</td>
<td>40</td>
</tr>
</tbody>
</table>
Prohibitory line limits may be accurately determined on the road, at both bends and summits, in the following manner:

1. Use the known spacing of existing studs or mark a temporary chainage line with 7.5m or 15m intervals along the road centre, commencing and ending at points which are judged to be in advance of the sight line restriction ('s' Table 7.3). Alternatively, where uniformly spaced road furniture is not in place, the use of a cord or rope suitably marked with the visibility distances can be of assistance.

2. Station one person (observer) at chainage 0 and a second person (leader) at a distance 's' ahead, each being equipped with a 1.05m boning rod.

3. Cause both leader and observer to advance, in unison, along the chainage, and check the intervisibility of the rod tops at each mark; the observer point where the leader-rod first disappears from view is the commencement of the prohibitory line and the point where it reappears again the end, of that section of prohibitory line.

The assumed design speed for each length of road to be marked should be taken as the 85 percentile speed, determined separately for each direction of travel, on the approaches to the bend or summit during off-peak traffic flow.

The prohibitory line should commence at the point where the sight distance becomes less than that specified in Table 7.3 and ends where it becomes greater. Prohibitory line terminals should be located separately for each direction of travel.

All double line sections should be marked with a single row of bi-directional white reflecting studs spaced at 6m intervals. These should be laid between the lines, except that when the lines are splayed to form a hatched area, directional studs should be laid symmetrically in each longitudinal line at 6m intervals arranged so that only the studs on the line nearest the driver reflect back.
Double lines and hatched markings on sharp bends

FIG. 7.13 Double Line System for Bends, Humps, & Dips
7.6.12 According to the physical characteristics of a bend or hump, the solid lines for traffic in opposing directions can either overlap or have a gap between them. If they overlap, there will be a section of double continuous line in the middle. If, however, they do not meet and there is a gap, which is less than the visibility distance for the appropriate 85 percentile speed, the two solid lines should be extended to meet in the centre of the gap. If it is greater than this distance but less than the warning visibility distance for the same speed, a single warning line should be used to join the two sections of double line; beyond that the normal centre line is appropriate, as at any other site where the visibility distance is greater than the warning criterion.

7.6.13 The length of a broken line element within a double line system should not be less than the visibility distance for the appropriate 85 percentile speed. This will prevent overtaking where the distance is insufficient.

Bends (Fig. 7.13)

7.6.14 The continuous line of a continuous/broken line combination should be located along the centre line of the carriageway, giving the driver who is restricted by it, his full share of the carriageway width. Double continuous lines should normally be located symmetrically about the centre line of the carriageway.

7.6.15 On sharp bends where double continuous lines are required, they can be splayed to form a type of central island with a maximum overall outside width of 1.2m, provided there is ample room on either side to enable vehicles to negotiate the bend reasonably without crossing the lines. The area between the lines must be hatched with inclined 150mm wide lines at 2.0m spacings.

Humps and Dips (Fig. 7.13)

7.6.16 A hump should be treated in the same way as a horizontal bend as regards visibility criteria and line markings, except that where splayed double continuous lines are required, the lines should be opened out at an inclination not exceeding 1 in 50 as they approach the point of minimum visibility (often not the highest point) to attain a maximum overall outside width of 1.2m. The lines which enclose these widened areas should be continuous, and the area between the lines must be hatched with the marking shown in Fig. 7.13. The humps either side of a dip should be treated individually.
Road Widths

7.6.17 Having regard to the road width required by public service and commercial vehicles, particularly on sharp bends, double line markings should not normally be used where the carriageway is less than 6.1m in width. When the road width is less than 6.1m, a solid centre line should be used as appropriate.

Exceptional Use of Double Centre Lines

7.6.18 In exceptional circumstances double centre lines may be used, even though the visibility conditions are not less than those outlined in Table 7.3. Such circumstances might include markings carried out in conjunction with traffic calming measures.

7.6.19 Where a slow lane is provided (Fig 7.7), a double centre line should be laid, with a continuous prohibitory line on the side of the two lanes. The line on the side of the single lane will be either continuous prohibitory or broken warning, dependent on the visibility conditions in the direction of travel. The width of the lines in this case is 150mm.

Level Crossings (Fig. 7.14)

7.7.1 The arrangement of carriageway markings, road studs, and other signs associated with level crossings are set out in detail in the Department of Tourism, Transport and Communications “Requirements and Guidelines for the Provision of Automatically Operated Half-Barrier at Railway Level Crossings”. This publication should be referred to where new or upgraded level crossings are contemplated.

NOTE: 300mm width for STOPLINE at level crossings.
Note:
Centre-line studs and road marking should be carried through the crossing:
Discretion should be used in the provision of edge lines so as not to conflict with
the box markings.
7.8 Roundabouts

7.8.1 The most common roundabouts in general use are normal and mini roundabouts. They are defined as follows:

(i) Normal Roundabout:
A roundabout having a one-way circulatory carriageway, around a kerbed central island over 4m in diameter and usually with flared approaches to allow multiple vehicle entry.

(ii) Mini-Roundabout:
A roundabout having a one-way circulatory carriageway around a flush or slightly raised circular marking less than 4m in diameter and with or without flared approaches.

7.8.2 At all roundabouts, the appropriate prescribed YIELD line should be laid at each entry and should connect the central deflection line or traffic deflection island to the nearside kerb, approximately following the line of the inscribed circle, in order to maintain visibility from each approach lane.

7.8.3 It is important to provide adequate vehicular deflections through the roundabout. Where raised traffic deflection islands are provided to achieve such deflection, the vertical surfaces may be painted in alternate black and amber bands 300mm in length to improve their conspicuity.

Normal Roundabouts Fig.7.15

7.8.4 Where the central island is 4m or greater in diameter the recommended line marking is similar to that for NO ENTRY and consists of a solid line and a broken line comprising 1000mm marks and 1000mm gaps. The lines should be 200mm wide and spaced 300mm apart. The lines should be accompanied by the triangular YIELD marking.

7.8.5 Where the approach to the junction is divided into two or more lanes, then a triangular YIELD marking should be placed in each lane.
Mini Roundabouts  Fig. 7.16

7.8.6 The recommended YIELD marking is the same as that used at normal roundabouts but must be accompanied by the following:

(i) A flush or slightly raised, (but capable of being over-run) circular road marking not more than 4m nor less than 1m in diameter.

(ii) Three white road arrow markings arranged symmetrically on the carriageway in the centre of the gyratory area. Two sizes are recommended, Fig. 7.16:

(a) The smaller, (3025mm) is used for circular central islands up to and including 2500mm in diameter.

(b) The larger, (4450mm) is for use with circular central islands more than 2500mm in diameter up to and including 4000mm in diameter.
See Fig. 7.32 for crosshatching details.

100mm broken line
2000mm mark 2000mm gap

200mm broken line
1000mm mark / 1000mm gap

200mm solid line

150mm continuous white line

See Fig. 7.2 for yield sign junction layout

Yield marking as Fig 7.2:

100mm broken line
2000mm mark 2000mm gap

200mm broken line
1000mm mark / 1000mm gap

300
100 (150) solid line

100 (150) solid line including drainage gaps where required

Internal detail as in Fig 7.32

FIG. 7.15 Normal Roundabout

7.28
Flush or slightly raised circular island in white reflectorised material. White reflectorised studs may be used around perimeter if required.

Diameter: 3500-7000 (5000 - 10000) mm.

Circular road markings with arrows:

See Fig. 7.2 for yield marking junction layout.

100 (150mm) solid line for min. distance of 20m.

See detail above:
- 200mm solid line
- 200mm broken line
- 1000 mm mark
- 1000mm gap
- 100 (150) solid line

FIG. 7.16 Mini-Roundabout
7.9 Worded Markings, Parking Restrictions, Parking Bays, Bus Stops, Bus Lanes, Yellow Box Markings and Cycle Tracks.

7.9.1 Various worded markings are prescribed. Some augment kerbside signs, others indicate areas of the carriageway intended for a particular function (e.g. Bus), for classes of vehicle (e.g. Ambulances), or to be kept clear (e.g. School Keep Clear). The markings are either white or yellow in colour.

7.9.2 The basic characters for the capitals, numerals and the apostrophe are from the Transport Medium Alphabet, enlarged and increased in most cases to two standard alphabet sizes. See Figs 7.44 and 7.45. Some worded markings such as 'TAXIS, SCHOOL KEEP CLEAR, etc.' have been enlarged from the Transport Medium Alphabet to give the overall height indicated in the various figures in the document. Abbreviations may be used to reduce the number of letters in a worded marking.

SLOW

7.9.3 This marking may be used to supplement a warning sign on the approach to a hazard or a road junction. Two sizes are prescribed. (See Table 7.4 below). The larger size is to be used on high speed approaches.

7.9.4 Discretion should be exercised in the use of the marking to ensure that its impact is not lost by proliferation. At particularly hazardous situations e.g. on the approach to a bend at the end of a long straight section of high speed road, the marking may be repeated to give added emphasis.

7.9.5 The location of the marking will depend on the nature of the hazard. In general it should be located sufficiently far back to enable a driver travelling at the normal speed of the road to reduce speed in time to negotiate the hazard in safety. In some instances, it is possible to make use of a change in vertical grade to position the marking for increased conspicuity.

TABLE 7.4 ‘SLOW’ MARKINGS

<table>
<thead>
<tr>
<th>Overall Height</th>
<th>Overall Width</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600 mm</td>
<td>2280 mm</td>
<td>Normal speed approach</td>
</tr>
<tr>
<td>2800 mm</td>
<td>2280 mm</td>
<td>High speed approach</td>
</tr>
</tbody>
</table>

7.30
Bus Stop  Fig. 7.17

7.9.6 The markings should only be used to supplement a kerbside bus stop sign. They indicate the area of a bus stop, within which vehicles other than buses, are not to be stopped or parked.

7.9.7 The length of the bus stop bay varies between 21m and 41m but may be extended to cater for stops serving a number of routes.

Box Junction  Fig. 7.18

General

7.9.8 At a box junction, the carriageway should be marked with yellow lines to form a box enclosing yellow cross hatched diagonal lines.

7.9.9 Box markings are an aid to traffic flow at a junction where blocking back affecting a cross flow is a significant problem.

Suitable Junctions

7.9.10 Not all junctions are suitable for treatment and it is necessary to apply certain criteria before deciding whether a particular site should be marked. It will normally be necessary to carry out a traffic survey to determine whether any other remedial measures might be effective (e.g. linking of traffic signals with those at adjacent junctions).
NOTES

1. This drawing shows typical layouts of the markings. The overall shape of the marking & the number of oblique lines should be varied to accord with the circumstances at the site.

2. To set out the markings on the carriageway:
   (A) Set out the diagonals at right angles (or as near as possible) to each other.
   (B) Complete the boundary lines.
   (C) Set out remaining lines parallel to diagonals at grid intervals of 2000mm.

3. Half boxes should be set out as for a full box but with only half the markings shown. See Fig B

4. Markings at more complicated junctions where varying widths of roads produce boundaries which are not rectangles should be constructed as follows:
   (A) Draw transverse lines across the entry arm of the junction approximately at right angles to the flow of traffic.
   (B) Complete the perimeter of the box by following the intervening kerb lines.
   (C) Draw a main diagonal X - Y
   (D) By construction draw in the other diagonal P - Q.
   The two diagonals should intersect as nearly as possible at right angles.
   (E) Complete the box in accordance with Note 2.

The method of constructing this type of markings is illustrated in Figures C & D

5. A full box marking is sometimes required which is much longer than it is wide. In this case it should be constructed as for a half box as illustrated in Figure E.

FIG. 7.18 Box Junction Carriageway Markings

7.32
Half Boxes

7.9.11 The use of half boxes (in which only half the area of the junction is marked) is appropriate at “T” junctions and other junctions where traffic only blocks back from one direction.

Road Markings

7.9.12 Details of the road markings are given in Fig. 7.18. Two diagonal lines join opposite corners, or projected corners, of the box and lines are drawn parallel to each diagonal to form cross hatched marking in yellow. The diagonal lines 150mm wide are spaced 2000mm apart where the shortest boundary line of the box is 9000mm or less, and 2500mm apart where the shortest boundary line of the box is greater than 9000mm. Box junctions should usually have four straight sides transverse to the traffic flow on the approaches, although up to 10% of the length of any side may be cut away as shown in the diagrams to accommodate corner kerbs. The overall shape of the marking and the number of cross hatching lines will vary to accord with the circumstances at the site. Where the intersecting carriageways are of a different width, the shortest boundary line of the box is taken as the determining factor for the spacing (x) between the parallel cross hatching lines. Where the shortest boundary line of the box is 9000mm or less in length, x = 2000mm. Where the shortest boundary of the box is more than 9000mm in length, x = 2500mm. Width of markings: boundary lines 200mm; cross hatching lines 150mm.

To set out the marking on the carriageway:

1. Complete the boundary lines.
2. Set out the diagonals.
3. Set out remaining lines parallel to diagonals.

Half box markings should be designed in the same way as full box markings but only half of the box marked on the road.
Fig. 19(a) Parking area without buffer zones parallel to kerb

Fig. 19(b) Parking area with buffer zones parallel to kerb

Fig. 19(c) Parking area perpendicular to kerb

Fig. 19(d) Parking at angle to kerb

Fig. 19(e) Disc parking area

FIG. 7.19 Markings for Parking Areas
Parking Restrictions - Single Yellow Line

7.9.13 A continuous yellow line 100mm wide extending along the edge of a roadway in a built up area and situated approximately 300mm from that edge indicates that parking of vehicles is prohibited or restricted at certain times on that side of the road.

Parking Restrictions - Double Yellow Line

7.9.14 Two parallel continuous yellow lines approximately 100mm apart extending along the edge of a roadway in a built up area, each line being approximately 100mm wide and the line nearest the edge of the roadway being situated approximately 300mm from that edge, indicates that parking is prohibited at any time on that side of the roadway.

Parking Bays (Fig 7.19)

7.9.15 Two patterns of marking are prescribed, one to indicate the limits for parallel parking and one for angled parking bays. Both types of marking may be used outside or inside controlled parking zones.

Parallel/Perpendicular Parking. (Figs. 7.19a-c)

7.9.16 A double solid terminal marking indicate the limits of the space reserved for vehicle parking which may also be denoted by “P” signs mounted at the kerbside. A single solid transverse line between individual parking spaces is used to denote the buffer zone.

Angled Parking. (Fig 7.19d)

7.9.17 The markings indicate individual parking bays, the angle of which may be varied from about 30 to 90 degrees to the kerb according to the width of road available.

Disc Parking. (Fig 7.19e)

7.9.18 The markings indicate the boundaries within which disc parking is permitted.

Loading Bays (Fig. 7.20)

7.9.19 A loading bay is indicated by the word “LOADING” written on the roadway in white lettering. The recommended height of the lettering is 300mm. It should be repeated at least once in each loading bay and it should be parallel to the kerb and facing towards the centre of the roadway. The terminal points of the loading area should be indicated by solid lines perpendicular to the kerb. The recommended minimum length is 4.8m.

FIG. 7.20 Markings for Loading Bay
School Keep Clear (Fig. 7.21)

The marking consists of the words “SCHOOL KEEP CLEAR” painted on the carriageway in 700 mm yellow letters with a zig-zag pattern of yellow lines the overall length of which should not be less than 25.56m. The overall length of the marking may be increased by increments of 6m by the addition of a complete zig-zag pattern on each side of the marking up to a maximum length of 43.56m. A vehicle may not stop or park where this marking is provided.

The length of the marking needs to be restricted to one which drivers will respect. Where an authority desires to lay a marking with an overall length greater than the maximum 43.56m, e.g. where the marking is to extend across two entrances which are wide apart, then two markings of any of the standard lengths, i.e. 25.56m, 31.56m, 37.56m or 43.56m, may be joined together omitting the transverse bars at the join to form one continuous marking.

Where two separate markings (either single or double as described above) are required to be laid in close proximity for school entrances on the same side of a length of road, a clear space of 7m must be left between the markings.

The marking should not normally be placed on both sides of the road but only the side on which the school entrance is situated.

The markings should not be laid in the controlled areas on the approaches to Zebra crossings, but where waiting restrictions are in force there is no objection to both the School Keep Clear marking and the yellow lines denoting the waiting restrictions being used along the same length of road.

It is not intended that the markings should be used outside all schools, but only where there is a clear need for them because of the hazard to school children due to parked vehicles.
Fire and Ambulance Stations

7.9.26 Where problems of obstructions arise at the entrances to Hospitals, Ambulance Stations or Fire Stations the School Keep Clear marking (Fig. 7.21) may be adapted by the substitution of the word SCHOOL by FIRE or AMBULANCE as appropriate. In these cases the overall minimum size of the marking is reduced to 25.25m and the maximum size 43.25m. The advice given for School Keep Clear layouts and suitability is equally applicable.

Taxis (Fig. 7.22)

7.9.27 Two forms of marking are prescribed for approved taxi ranks according to whether they are at the side or in the centre of the carriageway. The length of the “box” comprising the marking may be varied to suit the requirements. The lettering and border markings are white and should be used with the appropriate regulatory signs.

Look Left / Look Right

7.9.28 This marking is generally intended to warn pedestrians of approaching vehicular traffic on a one-way street. The marking consists of the words LOOK LEFT or LOOK RIGHT painted on the carriageway in 300mm white letters is accompanied by a white arrow pointing in the relevant direction, and is usually provided at sites where pedestrians are encouraged to cross. The provision of centre medians or refuges allows the provision of this marking on two way streets.
Bus Lanes

7.9.29 The markings prescribed for use in lanes reserved for buses without physical separation are shown in Figs. 7.23, 7.24 and 7.25. The associated signs are shown in chapter 5.

7.9.30 Bus lanes may be either (i) With-flow, or (ii) Contra-flow, and typical arrangements of the markings used in each case are illustrated in Figs. 7.23 and 7.24.

With-Flow Bus Lanes (Fig. 7.23)

7.9.31 The outer edge of the bus lane should be marked by a white line 250mm wide, a gap being left in the line adjacent to each side road.

7.9.32 The legend BUS LÁNA should be marked on the carriageway across the lane at its commencement and repeated after each junction. Where junctions are more than 300m apart the road markings should be repeated between junctions at approximately 150m intervals. Warning arrows should be placed on the rear side lane 15m and 30m in advance of the commencement of the bus lane. A 250mm wide broken line should be laid from the kerb to the start of the full width lane to deflect other traffic from the bus lane. The taper at which the line should be laid should not normally exceed 1:10, but in exceptional cases may be reduced to 1:5.

7.9.33 Where a bus lane commences just beyond a junction, adequate length should be left for the taper to commence at the junction so that the inclined line does not extend across the junction mouth.

7.9.34 Similarly, to allow traffic to position itself correctly on the carriageway, the continuous line should end in advance of any junction with a major left-turning flow. In this case the continuous line should be replaced by a broken line and should be preceded by the double headed arrow variant to inform motorists that it is permissible to enter the bus lane prior to making the left-turn.

7.9.35 Beyond each junction carrying emerging traffic, a curved line (Fig.7.25 (d)) should be provided across the bus lane to continue the line of a normal left-turn out of the side road and at the end of a bus lane, the normal double headed arrow (Fig. 7.25 (e)) may be used.
FIG. 7.23 Road Markings for With-Flow Bus Lane

250mm wide
See FIG. 7.25
Angle of Deflection should not exceed 1:10

See FIG. 7.25
Swerve arrow at 15m and 30m in advance of bus lane
FIG. 7.24 Road Markings for Contra-Flow Bus Lane

See FIG. 7.25
FIG. 7.25 Road Markings associated with Bus Lanes
7.9.36 Contra-flow Bus Lanes Fig. 7.24

The road markings are as in Fig. 7.24 with a continuous line separating the bus lane from other lanes.

7.9.37 Road markings together with an appropriate direction arrow should be sited so as to be legible to drivers emerging from side roads. Similarly road markings should be used at known pedestrian crossing points, to warn pedestrians that traffic is not approaching from the normal direction.

7.9.38 Normally a basic width of 3m is required for a bus lane. The distance is measured from the edge of the kerb to the centre of the continuous white line. A narrower bus lane may be a danger to pedestrians on the footway and may also force buses to travel slower than is necessary. At pinch-points, narrower bus lanes may need to be accepted but the lane width should never be less than 2.8m.

7.9.39 Cycle Tracks

The markings prescribed for use in cycle tracks and cycle ways are as outlined in para. 7.9.41 below. They may be used in conjunction with other road markings.

7.9.40 The markings are white and are used to advise cyclists of the route to take where special facilities have been introduced for cyclists.

7.9.41 The outer edge should be marked with a solid white line 100mm (150) mm wide. The cycle symbol should be marked on the carriageway across the cycle track at its commencement and repeated after each junction. The cycle symbol, which is available in 2 sizes, should be repeated at intervals not greater than 100m and may be supplemented by a direction arrow. A 100 mm (150) mm wide broken line should be laid from the kerb to the start of the full width cycle track to deflect other traffic from the cycle track. The taper at which the line is laid should not normally exceed 1:10.

7.9.42 The termination of a cycle way or track should be indicated by the sign shown in Fig. 5.32.

7.9.43 Half size triangular Yield markings and 2000mm long direction arrows may be used where appropriate on cycle tracks.

7.9.44 Cycle tracks crossing minor roads may be indicated on the carriageways by the special road marking shown on Fig. 7.26. This marking is informative and does not give priority to the cyclists.
7.10 Junction Markings—Signal Controlled Junctions (Fig. 7.27)

7.10.1 Adequate and proper marking of the approaches to signal controlled junctions is essential if the junction is to operate at its maximum efficiency.

7.10.2 The requirements are:

(a) The STOP line must be sited as near as practical to the intersection, consistent with vehicle and pedestrian needs, and drivers waiting at the STOP line must have an uninterrupted view of at least one traffic signal.

(b) Lane lines must be arranged to secure the maximum use of available carriageway space consistent with adequate lane width.

(c) Drivers need to be given guidance as to the correct lane to take in good time before reaching the junction.

7.10.3 Fig. 7.27 shows the standard roadmarking at a signal controlled junction having differing numbers of lanes on each approach. It shows a typical arrangement of lane and centre of carriageway markings for a six lane road subject to a 40mph speed limit and a four lane road subject to a 30mph speed limit.

7.10.4 Dealing with the features mentioned:

(i) Stop Lines

The STOP line is normally located 1m to 2m in advance of the left hand side primary signal. It should normally be at right angles to the centre line of the carriageway, even at skew junctions.

(ii) Lane Lines

Two patterns of marking are used. The normal lane and centre of carriageway markings change to closer space markings on the approach to the signals. (See Fig. 7.27)

A solid centre line should be used on roads with four or more lanes.
Pedestrian crossing lines
100mm wide

Stop lines
200mm wide
normally but
may be 250mm

100mm wide
warning lines
2000 mark
2000 gap
(min. 7 marks)

Subject to 30mph
50kph speed limit

150mm wide solid line

100mm lane line.
2000 mark
2000 gap
(min. 5 marks)

100mm wide lane.
4000 mark
8000 gap

150mm wide solid line

Subject to 40mph
60kph speed limit

NOTE

Indicates primary signals

Indicates secondary signals

FIG. 7.27 Road Markings at Signal Controlled Junction & Approaches
(iii) Lane Widths

The normal width of the lanes should be 3m to 3.75m depending on the type and speed of traffic and on the width of carriageway. Exceptionally an absolute minimum width of 2.5m may be accepted alongside refuges at signals and at the STOP line, but not elsewhere. The aim should be to provide the maximum number of lanes on the approach to the intersection but the number of lanes on the leaving side may be reduced due to the dedication of lanes to exclusive turning movements on the approach side. The decision on the number of lanes to adopt will be influenced by safety requirements and will depend on road alignment, traffic movements and the presence of standing vehicles.

(iv) Lane Indication Arrows  Figs. 7.28 and 7.29

In addition to the warning lines on the approaches to junctions, direction arrows should be used to give drivers advance indication of the correct lane to take when approaching busy multi-lane intersections, whether signal controlled or not. Traffic must proceed in the direction of the arrow provided. Generally with speeds less than 40mph the 3.6m length of arrow (Fig. 7.28) should suffice but on open and faster roads the 5m size (Fig. 7.29) should be used.

Normally two arrows should be used in sequence in each lane, occasionally three. The one nearest the junction should be between 15m and 25m from the STOP line, or entrance to the junction and the second should be 30m - 50m further back, the greater distance being used on roads subject to higher average speeds. A third arrow, if used, should be 30m to 50m back from the second arrow. The direction of each arrow head may be varied to suit the circumstances but not more than two directions may be shown on any one arrow stalk.

On two lane approaches to a junction the arrangement of arrows indicating the lanes for straight ahead, left-turn and right turn will depend on the relative traffic volumes making the movements and on the site conditions. Where for instance, there is a very heavy right turn movement, the straight ahead and left-turn arrows should be combined in the nearside lane. Similarly where there is a left filter arrow in the traffic signal installation the filter lane should always be marked by the left arrow marking alone in order to exclude non-filtering traffic.
Lane Indication Arrows

FIG. 7.28 Arrow Details
FIG. 7.29 Arrow Details (based on A40/ECMT)
(v) Lane Destination Markings

At heavily trafficked junctions worded lane destinations repeating the information shown on advance direction signs may, with advantage, be marked on the carriageway on the approaches to junctions. Besides indicating the correct lane to take, the markings also provide drivers with a useful supplementary indication to the advance direction sign in the event of the latter being obstructed by tall vehicles.

The marking should be normally located at least as far back from the junction as the longest peak hour traffic queues, unless intervening junctions would lead to confusion.

Bifurcation Arrows at Deceleration Lanes Fig. 7.28

7.10.5 These markings should be provided at the commencement of deceleration lanes on the approaches to junctions.

7.10.6 Bifurcation arrows serve to guide vehicles into the deceleration lane near its commencement ensuring that the full length of the lane is used to slow down for the junction without impeding through vehicles on the main carriageway.

7.10.7 Three sizes are prescribed. The 16m is generally used on motorways, high speed dual carriageway roads while the 8m is for use on lesser roads. The 32m arrow (derived by doubling the longitudinal dimensions only of the 16m arrow) may be used in exceptional circumstances. The arrow marking may be transposed to suit right-hand movements into deceleration lanes in the central reserve of dual carriageway roads.
7.11. Pedestrian Crossings

Zebra Crossings

7.11.1 The markings used to indicate a zebra pedestrian crossing are as follows:

(i) Pedestrian lines
(ii) Alternate black and white stripes
(iii) YIELD lines

(i) Pedestrian Lines

7.11.2 Pedestrian lines indicate the limits of the pedestrian crossing area. They should be arranged in two lines across the carriageway at a minimum distance of 2.4m apart. The lines are white continuous and 100mm wide.

(ii) Stripes

7.11.3 The stripes should be laid in an alternate black and white pattern across the full width of the carriageway and positioned centrally between the two Pedestrian lines.

7.11.4 The stripe immediately adjacent to the kerb on both sides of the road should be black and should not be less than 500mm wide nor more than 1300mm wide.

7.11.5 The intermediate black and white stripes should be not less than 500mm wide nor more than 715mm wide and should normally be of equal width.

7.11.6 Care must be taken to ensure that the skidding resistance of the striped area does not fall below a value of 45.

(iii) Yield Lines

7.11.7 The YIELD line consists of a single white broken line comprising 500mm mark and 500mm gaps. The marks are 200mm wide.

7.11.8 The YIELD line is normally sited 1m to 2m from and parallel to the pedestrian line used to indicate the limits of the crossing and should extend across the carriageway as indicated in Fig. 7.30.

Pelican Crossings  Fig. 7.31

7.11.9 The carriageway markings used to indicate the presence of a Pelican pedestrian crossing are as follows:
FIG. 7.30 Markings at Uncontrolled Pedestrian Crossing (Zebra Crossing)
(i) Pedestrian Lines

7.11.10 Pedestrian lines indicate the limits of the pedestrian crossing area. They should be arranged in two continuous lines 100mm wide across the carriageway at a minimum distance of 2.4m apart. The width of the crossing is determined by the number of pedestrians.

(ii) STOP Lines

7.11.11 A 200mm (250 mm) wide transverse STOP line is used to indicate where traffic should stop when signalled to do so at a Pelican crossing.

7.11.12 Where the road carries two-way traffic and the crossing is uninterrupted, the STOP line should extend from the edge to the centre of the carriageway parallel to the pedestrian line indicating the limits of the crossing and placed not less than 1.7m nor more than 2m from the pedestrian line.

7.11.13 On a one-way street where the crossing is uninterrupted, the STOP line should extend from one edge of the carriageway to the other edge parallel to the pedestrian line indicating the limits of the crossing and placed not less than 1.7m nor more than 2m from the pedestrian line.
100mm wide double yellow lines
100mm apart, 300mm from kerb

2400 - 5000
Signal Pole
150
910 min

100mm continuous white line

FIG. 7.31 Markings at Pedestrian Operated Signals (Pelican Crossing)
7.11.14 A pedestrian crossing complex is a section of roadway consisting of a pedestrian crossing and parts of the roadway on each side of the crossing.

7.11.15 Within the area of a pedestrian crossing complex, pedestrians are prohibited from crossing the roadway other than on the pedestrian crossing, and the parking or stopping of vehicles is restricted.

7.11.16 This controlled area is marked with the roadway markings to indicate a pedestrian crossing, with the addition of zig-zag lines and terminal lines which indicate the extent of the controlled area.

Zig-Zag and Terminal Lines

7.11.17 On carriageways of less than 6m wide, two longitudinal white zig-zag lines should be laid, one on each side of the carriageway with a solid line placed down the centre. On carriageways 6m or more in width, three longitudinal zig-zag lines should be laid, one on each side of the carriageway and the third laid centrally, replacing the hazard line. The "standard" controlled area includes 8 x 2m zig-zag marks. Where a longer approach warning is required, e.g. due to poor visibility or speed of traffic, the number of marks may be increased to 18. The aim should be to lay at least the standard pattern on both sides of the crossing but because of site difficulties this will not always be possible. See Fig. 7.30 for standard layout details.
7.12  Hatched Chevron - Merging and Diverging Markings

7.12.1  The immediate approaches to channelising and central median islands may be marked by either diagonal hatched markings or by chevron markings.

7.12.2  They can be bounded by a broken line where entry to the hatched area is not prohibited or by a solid line where prohibition is desirable.

7.12.3  Diagonal hatched markings are appropriate on the approaches to a central median island and, in certain circumstances, to an island refuge on a two-way carriageway, with the angle of the hatching arranged to deflect drivers. See Fig. 7.32

7.12.4  Chevron markings are used to deflect drivers from the nose of a channelising island where a traffic stream divides. The chevrons are angled to deflect traffic in either stream. See Fig. 7.33.

7.12.5  Similarly, chevron markings may be used to extend the nose of a channelising island where two traffic streams merge. See Fig. 7.33.

7.12.6  Two sets of dimensions for the thickness and spacing of both diagonal and chevron markings are prescribed. These are shown in Figs. 7.32 and 7.33.

7.12.7  The less emphatic dimensions are recommended for use on urban and narrow rural two-lane roads where 100mm wide centre lines are used. The more emphatic bracketed dimensions are recommended for other roads where 150mm wide centre lines are normally used.

7.12.8  Exceptionally a width of 500mm hatched lines may be used where particular emphasis is required or where it is necessary to discourage traffic e.g. the left shoulder of a motorway slip lane and the hatching for a right-turn lane on a high speed road.

7.12.9  On motorways and high-speed dual carriageways, where traffic merges or diverges at a slip road, a chevron marking of a different pattern is used, (Fig. 7.34). The marking is bounded by a continuous 150mm wide line to indicate to motorists that they should not enter the area except in an emergency.

7.12.10 Details of the diagonal hatched road markings, boundary line and warning arrows used for lane reduction are shown in Fig. 7.12.
FIG. 7.32 Cross Hatchings at Approach to Island
FIG. 7.33 Chevron Hatching at Islands
(A) Diverging Traffic (B) Merging Traffic
FIG. 7.34 Chevron Hatchings at Islands for Major Routes
7.13 Reflecting Road Studs and Delineators

Reflecting Road Studs  Figs. 7.35 - 7.42

7.13.1 Road studs should be of a type approved for use by the N.R.A/D.O.E. Where alternative products are presented they should be accompanied by certification from a competent testing laboratory indicating that the product provides, in use, an equivalent level of safety and suitability.

7.13.2 In the case of rural National roads, all centre lines and lane lines and lines across the mouths of slip roads should have reflecting road studs. In urban, or slow speed situations, discretion should be used as to the amount of studs to be provided, having regard to the traffic pattern and mix.

Lines

(a) Double White Lines

7.13.3 For the standard double line marking, bi-directional white studs should be laid between the lines, but where lines are splayed to form a central island with a hatched marking between them, the studs should be located in both of the lines and should be of the unidirectional type. The stud spacing in all cases should be at 6m centres.

(b) Centre and Lane Lines

White reflecting road studs should be used in those cases as indicated in the relevant figures. Where road curves of substandard radius are present, centre line stud spacing should be 6m.

(c) Edge of Carriageway

Where yellow studs are provided at the edge of carriageway with discontinuous yellow edge markings, they should be bi-directional and placed in the gap between the dashed lines. The continuous yellow line at the edge of motorways should have unidirectional yellow studs at 12m centres.

Delineators  Figs 7.35 - 7.42

7.13.7 The Department of the Environment Technical Circular of June 1982 permitted the use of timber or synthetic materials in delineators. Experience has shown that whilst these were effective, large numbers were either removed or broken by traffic. A number
of flexible type delineators are now on the market and, pending the adoption of a European standard, authorities are free to use their engineering judgement in choosing from those available. The delineator should, however, incorporate a 60mm dia. corner-cube reflector.

7.13.8 Delineators should be located 0.5m from the shoulder edge on improved roads and 1.0m from carriageway edge on unimproved sections.

7.13.9 On divided roads, delineators on the median should be 0.5m from the carriageway edge or immediately adjacent to the median shoulder strip where such exists. The reflective area should be 0.5m above the nearest carriageway edge. They should be placed at a constant distance from the edge of the carriageway and in a smooth alignment.

7.13.10 Delineators are normally single sided reflective white markers spaced at 24m centres (in line with studs) or double sided green/white at 12m centres on the approach to junctions.
FIG. 7.35 Studs & Delineators - Two Lane Single Carriageway with Shoulders

- White delineators at 24m centres
- White delineators at 24m centres
- White/Green studs at 12m centres
- Yellow studs at 12m centres
- Bi-directional white studs at 12m centres
- 13 No. delineators at 12m centres

- Green/white studs at 12m centres
- Green/white studs at 12m centres
- White/green studs at 12m centres
- White/green studs at 12m centres
- White/delineators at 24m centres

- 13 No. delineators at 12m centres
- White/delineators at 24m centres
- Uni-directional delineator
- Bi-directional delineator
- Uni-directional stud
- Bi-directional stud

13 No. delineators at 12m centres
White/green
13 No. delineators at 12m centres
Green/white
13 No. delineators at 12m centres
Green/white studs at 12m centres
White/delineators at 24m centres
White/delineators at 24m centres
FIG. 7.36 Studs & Delineators - Two Lane Single Carriageway without Shoulders

7.61
FIG. 7.37 Studs & Delineators - Single Carriageway with Right - Turn Lane

7.62
FIG. 7.38 Studs & Delineators - Two Lane Carriageway with Slow-Lane

7.63
Uni-directional delineator
- Bi-directional delineator
Uni-directional stud
- Bi-directional stud

![Diagram of road with different types of studs and delineators](image)

FIG. 7.39 Studs & Delineators - Dual Carriageway
- Uni-directional delineator
- Bi-directional delineator
- Uni-directional stud
- Bi-directional stud

**FIG. 7.40 Studs & Delineators at Exit Ramps**

- Green delineators at 12m centres
- White delineators at 12m centres
- White studs at 24m centres
- White studs at 12m centres

- Green studs at 12m centres
- Median shoulder
- Yellow studs at 12m centres

**Chapter 7**

**TRAFFIC SIGNS MANUAL**
- Uni-directional delineator
- Bi-directional delineator
- Uni-directional stud
- Bi-directional stud

FIG. 7.41 Studs & Delineators at Entry Ramps
FIG. 7.42 Studs & Delineators - Roads to Motorway Standard
FIG. 7.43 Position of Markings Relative to Joints in Pavement Construction
FIG. 7.44 Letters & Numerals 1.6m high
FIG. 7.45 Letters & Numerals 2.8m high