# SIGNING FOR RAILWAY CROSSINGS

**SECTIONS**



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**CHAPTER 7**

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**KEYWORDS**


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# CHAPTER 7:
# SIGNING FOR RAILWAY CROSSINGS

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# CHAPTER 7:
# SIGNING FOR RAILWAY CROSSINGS

## 7.1 INTRODUCTION

### 7.1.1 General

1 The purpose of this chapter is to illustrate, and give guidelines on, how road traffic signs i.e. road signs, road markings and traffic signals, may be utilised collectively at railway crossings.

2 A range of circumstances may affect the level of signing recommended at road/rail crossing points. The most relevant factors are:

(a) a poor accident record;

(b) the approach speed of motor vehicles;

(c) the approach speed of rail traffic;

(d) visibility of approaching trains by vehicle drivers;

(e) the presence of overhead electrical power cables;

(f) the vehicle and train traffic volumes;

(g) the number of rail lines;

(h) proximity to a station;

(i) conditions of agreement between the rail operator and the applicant for the railway crossing.

3 Due to the extremely high risk of fatal and serious injury casualties in a motor vehicle - train collision it must be the objective of all authorities concerned to achieve firstly the highest measure of conformity with recommended standard signing practices at railway crossings, and secondly high standards of maintenance of signs, markings and signals once installed.

4 It should be noted that trains in South Africa are now capable of operating at what can be termed as "high" speeds in comparison to past practices. The speed of a train is very difficult for the driver of a vehicle to judge. An increase in operating speed will not be obvious to drivers and their perception of speed differential between a high speed train or a slower train is likely to be poor. It is therefore important that signing relevant to railway crossings be of a very high standard and that authorities have an on-going commitment to maintain the awareness of drivers to the risks involved.

5 There has for some time been a policy to eliminate the most hazardous railway crossings. Whilst there is no less a commitment to creating a safe road environment economic pressures are likely to be such that in the foreseeable future new grade separations will be limited to those that are budgeted as part of a larger development plan. This makes it even more relevant to ensure that the quality and effectiveness of signing practices is of a high standard.

6 The terms "shall", "should" and "may" used throughout this chapter carry the same interpretation as used throughout the manual, namely:

(a) "SHALL" - a mandatory condition - when this word is used it means that the condition or conditions referred to must be complied with;

(b) "SHOULD" - an advisory condition - when this word is used it is advisable or recommended to comply with the conditions referred to (if "RECOMMENDED" is used it is a stronger advisory statement);

(c) "MAY" - a permissive condition - the conditions referred to are optional.

### 7.1.2 Responsibility for Signing and Maintenance

1 In terms of Section 57(7) of the Road Traffic Act, Act 93 of 1996, the South African Transport Services, now represented by Transnet and the South African Rail Commuter Corporation (SARCC), have the authority to authorise a railway crossing. Transnet and the SARCC may provide such railway crossings for which they are responsible, after consultation with the road authority. Spoornet and Metro, as agents for Transnet and the SARCC, may use the services of a road or local authority for the erection and maintenance of road signs and signals and for the provision and maintenance of road markings.

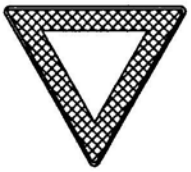
2 In addition to railway crossings provided by Transnet and SARCC a limited number of railway crossings will occur between private railway lines and public roads. The majority of these are likely to occur within or close to urban areas and are mainly likely to involve industrial sidings or historic lines. Private railway crossings may also occur in connection with lines serving large developments such as sugar or timber plantations. All private railway operators shall ensure that the road approaches to the railway crossings under their control are effectively signed, in conjunction with the relevant road authority.

3 It is also the responsibility of the railway operator to ensure that railway crossings, including relevant signs, signals and markings are effectively maintained.

4 When a new road is constructed over a railway line the cost of new road traffic signs shall be borne by the road authority.

5 Road authorities and railway operators should enter into agreements for the maintenance of the road sections of railway crossings. Road authorities should not carry out maintenance on the road, on the section between points 3 m outside each outer rail of the crossing, without protection being supplied by the railway operator.

(continued on page 7.1.5)



R2 YIELD sign
Ref:Vol1-2.2.10 Vol4-2.2.5


R1 STOP sign
Ref:Vol1-2.2.1 Vol4-2.2.1

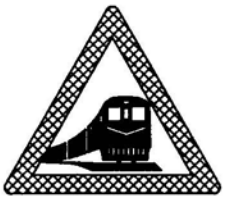

R1 STOP Sign + FLASHING
RED DISC Signal

Slow Down

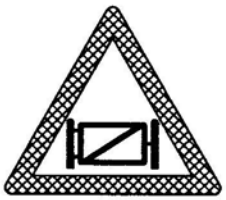
Stop

Proceed

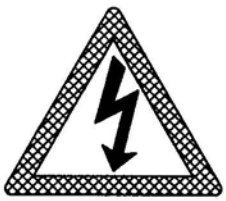
SS2 FLAG signals
Ref:Vol1-6.7.3



W318 RAILWAY CROSSING
Ref:Vol1-3.4.14

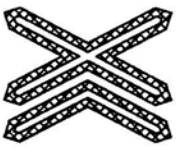


W314 GATE
Ref:Vol1-3.4.12 Vol4-3.4.14



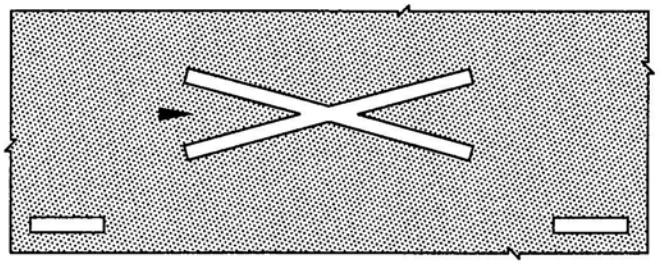
W361 ELECTRICAL SHOCK
Ref:Vol1-3.4.27 Vol4-3.4.61

ONE LINE



TWO OR MORE LINES

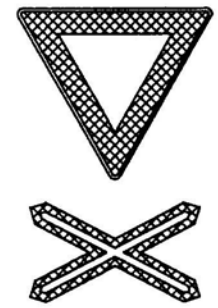
W403 RAILWAY CROSSING W404
Ref:Vol1-3.5.3 Vol4-3.5.2



WM1 RAILWAY CROSSING AHEAD
Ref:Vol1-7.3.1 Vol4-12.4.7

► = direction of travel of road traffic

**Fig 7.1 Signs, Markings and Signals Most Commonly Used at Railway Crossings**

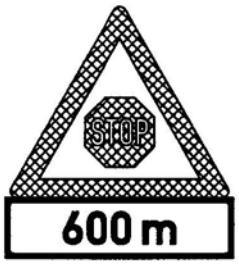


R2/W403 Combination

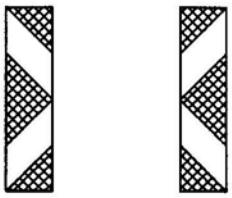

R1/W404 Combination


R1/FRD/W403 Combination

W202-W211

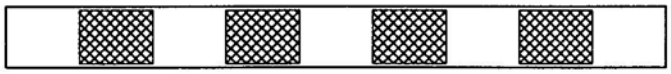



W302 + 1N11.3



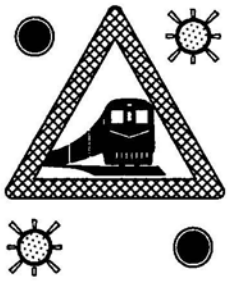
W401 W402

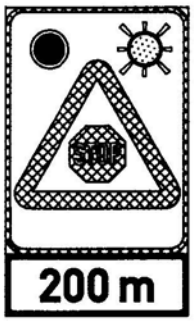
DANGER PLATES

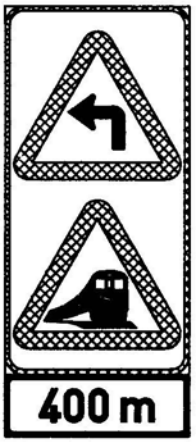


W411 RAILWAY CROSSING BOOM BARRICADE

Ref: Vol1-3.5.10 Vol4-3.5.7

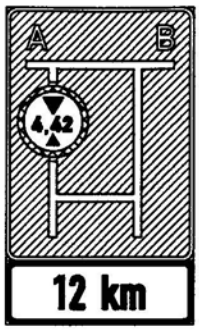





HIGH VISIBILITY AND/OR FLASHING YELLOW WARNING LIGHTS SS3

**Fig 7.2 Additional Signs and Sign Combination Options - 1**




GD9

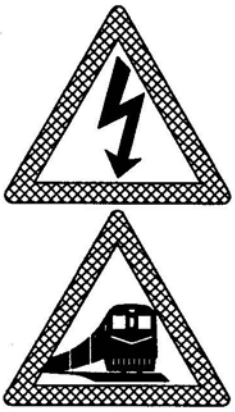

W320


R204

WW7


W361+IN11.4

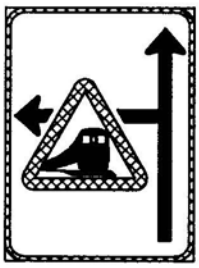

W361+IN11.4



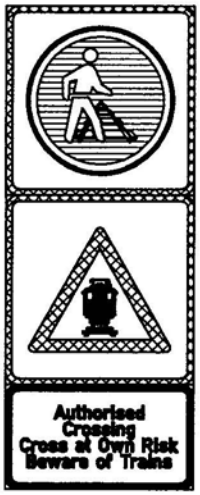
W318+W361

NOTE:
Sign WW7 is an SABS warning class sign


W404+IN11.4



GS901




RR2/WR3+IN11.4

NOTE:
Signs RR2/WR3 are not road traffic signs but are used on railway property.

**Fig 7.3 Additional Signs and Sign Combination Options - 2**

**TABLE 7.1 RAILWAY CROSSING CLASSIFICATION TABLE 7.1**

| Class (1) | Description | Sight Distance (2) | Minimum (3) Protection | Accident (4) Upgrade |
|---|---|---|---|---|
| SSH | Single Shunt | n/a | 1 | 3B |
| MSH | Multiple Shunt | n/a | 1 | 3B |
| SLS | Single ≤ 60 km/h | Excellent | 2A | 4C |
| | | Adequate | 2A/3A | 4C |
| | | Restricted | 4A | 4C |
| MLS | Multiple ≤ 60 km/h | Excellent | 3A/3B | 4C |
| | | Adequate | 3C | 4C |
| | | Restricted | 4A/4B | 4C/4D |
| SHS | Single ≥ 60 km/h | Excellent | 3A | 4C |
| | | Adequate | 3C/3D | 4D/5 |
| | | Restricted | 4A/4B | 4D/5 |
| MNS | Multiple ≥ 60 km/h | Excellent | 3A | 4D |
| | | Adequate | 3C/3D | 4D/5 |
| | | Restricted | 4C/4D | 5 |

**NOTES:**

(1) The railway crossing class designations are abbreviations of the broader class descriptions as follows:
SSH = single shunt line MLS = multiple low speed lines
MSH = multiple shunts lines SHS = single high speed line
SLS = single low speed line MHS = multiple high speed lines

(2) Sight distance gradings are defined as follows:
Excellent = visibility distance for vehicle drivers along rail line exceeds that given for Yield control in Table 7.3 with no likelihood of occasional reduction due to vegetation growth.
Adequate = visibility distance for vehicle drivers along rail line conforms to that given in Tables 7.3 and 7.4 as dictated by the choice of crossing contol with no likelihood of occasional reduction due to vegetation growth.
Restricted = visibility distance for vehicle drivers along rail line cannot be made to comply with the requirements of Tables 7.3 or 7.4 – Class 4 or 5 crossing protection is appropriate.

(3) Refer to Table 7.2 for details of the classification of different levels of railway crossing line protection by means of signs, signals and markings.

(4) A bad history of accidents may warrant an upgrade to a higher level of protection. The recommended upgrade level is Given in this column. Upgraded protection levels should continue to be monitored to assess acceptable performance.

(continued from page 7.1.1)

## 7.1.3 Railway Crossing Protection

1 Road traffic signs provided at railway crossings for the protection of users fall into two basic functional groups:

(a) warning signs and/or markings comprising a range of advance warning signs, which may be varied according to the specific site circumstances, together with various hazard marker warning signs;

(b) regulatory control signs, markings and signals for the control of vehicular traffic at crossings.

2 Figures 7.1 to 7.3 show a range of appropriate signs, markings and signals which may be used in various combinations according to the relative hazard level of a crossing. Classifications of railway crossing protection and modes of control is given in Section 7.2.

3 A relevant aspect of the warning and therefore safety system appropriate to railway crossings is the requirement, in terms of the "Rule of the Road" given in Section 106 of Act 29, that locomotive drivers shall give sufficient warning to users of the roadway that they intend to cross the roadway. This warning is normally given by a whistle, hooter or other sounding device. The relevant figures in this chapter show the positions of whistle boards for the locomotive driver's attention.

## 7.1.4 Railway Crossing Classification

1 The following descriptions give a broad classification of types of railway crossing:

(a) station/shunting yard environment;

(b) low speed rail traffic

- industrial sidings;
- private lines (often narrow gauge);

(c) normal rail traffic - involving trains with a maximum approach speed of 60 km/h;

(d) high speed rail traffic

- involving high speed trains of up to 120 km/h
- involving a wide range of train speeds

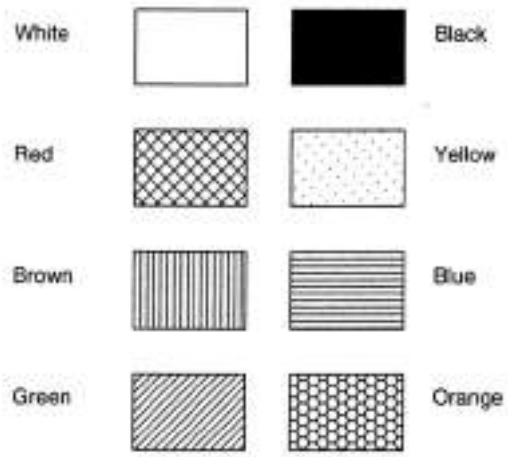
2 These descriptive classes of crossing are developed into a formal classification of railway crossings for purposes of establishing the required level of signing protection and mode of control. This formal railway crossing classification is detailed in Table 7.1.

3 Modes of control, and particularly the level of advance warning signing, may be upgraded to a higher level of protection according to the presence of one or more of the factors listed in paragraph 7.1.1.2. Examples of typical railway crossing situations illustrating combinations of warning signs and modes of control are given in Sections 7.3. and 7.4.

## 7.1.5 Road Traffic Sign Colour Indication

1 The chapters of Volume 2 of the South African Road Traffic Signs Manual (SARTSM) are not prepared in colour. Relevant examples used to illustrate appropriate signs, signals and markings are shaded in a black and white coding which is illustrated below.

2 The basic principles of the road traffic sign colour coding system are shown, in colour, in the SADC-RTSM Volume 1, Chapter 1, Section 1.4, and in the Contents sections of relevant Volume 1 and 4 Chapters.



# 7.2 MODES OF CONTROL

## 7.1.2 Control Options

1 The signing for vehicles at a railway crossing, comprising the crossing protection, consists of either warning signs or combinations of warning signs and regulatory signs. It is recommended that all railway crossings be provided with a regulatory mode of control when a train is operational within sight of the crossing. The basic options for vehicle control are:

(a) flagman;

(b) YIELD sign R2;

(c) STOP sign R1;

(d) FLASHING RED DISC (FRD) signals plus STOP sign R1.

2 The flagman and FLASHING RED DISC options are only operational when a train is within sight of the crossing. Control by signs R1 or R2 is a permanent form of control requiring a stop or priority action on the part of drivers in all situations.

3 All railway crossings shall be marked by RAILWAY CROSSING hazard marker sign W403 or W404. Advance warning signs and/or markings should normally also be provided except in the case of station, shunting and low rail speed crossings.

## 7.2.2 Flag Control

1 Control of vehicular traffic at railway crossings may be exercised using FLAG signals SS2. FLAG signals may be used as follows:

(a) as a temporary form of control during construction or during equipment failure; or

(b) during shunting operations.

## 7.2.3 Sign Control

1 Vehicular control at a railway crossing may be exercised by use of either of the two following signs subject to the criteria listed below:

(a) YIELD sign R2; or

(b) STOP sign R1.

2 Signs R2 and R1 should always be displayed in conjunction with the appropriate RAILWAY CROSSING hazard marker warning sign W403 (single rail line) or W404 (two or more rail lines). The signs should always be mounted on the same support with the regulatory sign above the warning sign.

3 YIELD sign R2 should only be used at a railway crossing under the following circumstances:

(a) if there is no history of accidents at the crossing; and

(b) if the sight distance of drivers to trains, from either approach side, is at least within the requirements given in Table 7.3; and

(c) train operations on the line are infrequent (a maximum of three per day); and

(d) no train operations occur during the hours of darkness; and

(e) the maximum train approach speed will not exceed 60 km/h.

4 STOP sign R1 may be used, with adequate advance warning signs, to control vehicles at a railway crossing under the following conditions:

(a) if a railway crossing controlled by a YIELD sign R2 is subject to even a single vehicle/train accident; and/or

(b) when the sight distance requirements for a YIELD sign R2 given in Table 7.3 are not met; and/or

(c) if any of the conditions given in paragraphs 7.2.3.3(c), 7.2.3.3(d) or 7.2.3.3(e) are not met.

5 **Whether or not a railway crossing is controlled by a YIELD sign R2 or a STOP sign R1 the sight distance available at the YIELD or STOP line to either side of the crossing must comply with the requirements given in Table 7.4 in order that drivers, having stopped at the crossing, can make a safe decision as to whether they may proceed or not.**

6 The requirements given in Table 7.3 assume that drivers on the approach to a railway crossing controlled by a YIELD sign R2 will reduce speed, **at the distance "X" from the crossing,** as follows:

(a) on a rural road with a speed limit of 80 km/h or higher – to approximately 60 km/h; or

(b) on an urban street with a speed limit of 80 km/h or less – to approximately 25 km/h.

**These assumptions and the values given for "X" allow for drivers to stop their vehicles if they should make the decision to stop.**

7 If it is required to design a mode of control and level of protection for higher vehicular approach speeds significantly larger sight triangles (see Figures 7.5 and 7.15) must be available. Such a design should be the subject of a detailed engineering analysis of the specific site under consideration.

## 7.2.4 Flashing Red Disc Signal Control

1 The control of vehicles at railway crossings may alternatively be provided by FLASHING RED DISC (FRD) signals in conjunction with STOP sign R1. A pair of FLASHING RED DISC signals may be switchable by a signalman or by means of automatic controls to be illuminated in an alternating flashing mode.

2 The use of FLASHING RED DISC signals should, in conjunction with adequate advance warning signs, be used to control vehicles at a railway crossing when warranted by one or more of the following conditions:

(a) when a crossing has an accident history involving at least three vehicle/train accidents in one year, or alternatively five vehicle/train accidents in three years; and/or

(b) the sight distance requirements in Table 7.4 are not met; and/or

(c) train operations involve reversals of movement across the crossing.

3 Control by FLASHING RED DISC signals differs from that using STOP sign R1 in that drivers may not proceed until the signals cease to flash, whereas drivers may use their discretion as to whether it is safe to proceed or not, having stopped for sign R1 on its own. The combination of FLASHING RED DISC signals with STOP sign R1 presents a measure of failsafe operation. If the FRD's should fail, control reverts to that of STOP sign R1 on its own, which has the effect of still requiring all drivers to sop and is therefore a "safe" condition. It is permitted for emphasis, or to improve the safety performance of an FRD installation, for FLASHING RED DISC to be mounted on both sides of the approach road. The flashing frequency of FLASHING RED DISC signals should be between one and two flashes per second and the two signals should flash alternately.

4 On remote railway lines the implementation of FLASHING RED DISC signals may be impractical due to the non-availability of electricity. In such instances STOP sign R1 control shall be installed and the approach signing enhanced to the highest practical level. If such a site is still subject to accidents the STOP control sight distance given in Table 7.4 shall be ensured. The frequency of accidents shall be recorded and a medium term plan must be made to provide electricity to the site.

## 7.2.5 Boom Operation

1 Safety boom operation, either in a half-road width form or a full road width form, should be considered as a high visibility hazard marker warning device and not as a form of railway crossing control. Safety booms once lowered, however, also function to warn against the early release of vehicular traffic. For additional safety boom operation may be combined with the sounding of a loud bell.

2 Since booms require to be lowered either manually or automatically, their use is only recommended as a supplement to FLASHING RED DISCS signal control. In exceptional circumstances booms may be used at a railway crossing controlled by STOP sign R1.

## 7.2.6 Protection Classification

1 The various options for railway crossing vehicular traffic warning and control are arranged in a hierarchal classification in Table 7.2 and illustrated in Figure 7.4. The different levels of control are linked to a railway crossing classification in Table 7.1.

2 As noted in paragraph 7.1.3.3 the requirement of locomotive drivers to "whistle" prior to crossing a roadway forms an important safety aspect of all levels of railway crossing protection.

3 The recommended sizes and positions of advance warning signs are given in Table 7.5 and the recommended positions of RAILWAY CROSSING marking WM1 are given in Table 7.6. The information given should be considered as a standard which is subject to careful assessment on a site specific basis. Personnel responsible for providing warning signs must take note of local conditions and be prepared to adjust sign or marking positions.

(continued on page 7.2.4)

**TABLE 7.2 PROTECTION CLASSIFICATION TABLE 7.2**

| Class | Sub-Class | Mode of Control(1) | Advance Warning | | |
|---|---|---|---|---|---|
| | | | Level 1 | Level 2 | Level 3 |
| **1** | | Flagsman (SS2) | -- | -- | -- |
| **2** | | Locked Gates | -- | -- | -- |
| | A | YIELD R2 | W318 | -- | |
| | B | YIELD R2 | W318 + WM1 | -- | -- |
| | C | YIELD R2 | W318 + WM1 | WM5 | -- |
| **3** | A | STOP R1 | W318 + WM1 | -- | -- |
| | B | STOP R1 | W318 + WM1 | GM7(2) | -- |
| | C | STOP R1 | W318 + WM1 | W302 +GM7 | -- |
| | D | STOP R1 | W318 + WM1 | W302 +GM7 | Flashing Light SS3(3) |
| **4** | A | 2 x FRD+STOP R1 | W318 + WM1 | -- | -- |
| | B | 2 x FRD+STOP R1 | W318 + WM1 | GM7 | -- |
| | C | 2 x FRD+STOP R1 | W318 + WM1 | W302 +GM7 | -- |
| | D | 2 x FRD+STOP R1 | W318 + WM1 | W302 +GM7 | Flashing Light SS3 |
| **5** | | 2 x FRD+STOP R1 plus BOOM | W318 + WM1 | W302 +GM7 | Flashing Light SS3 |

**NOTES:**
(1) All modes of control to be supported by the appropriate RAILWAY CROSSING hazard marker sign W403 or W404.
(2) GM7 WORD MESSAGE “STOP AHEAD”.
(3) Flashing warning light signal SS3 is a yellow flashing warning light (or several) used in conjunction with an advance warning sign (see Figures 7.2 and 7.4).
(4) **At high frequency accident locations additional measures such as site specific advance warning signs, HIGH VISIBILITY signs or RUMBLE STRIPS may be warranted.**

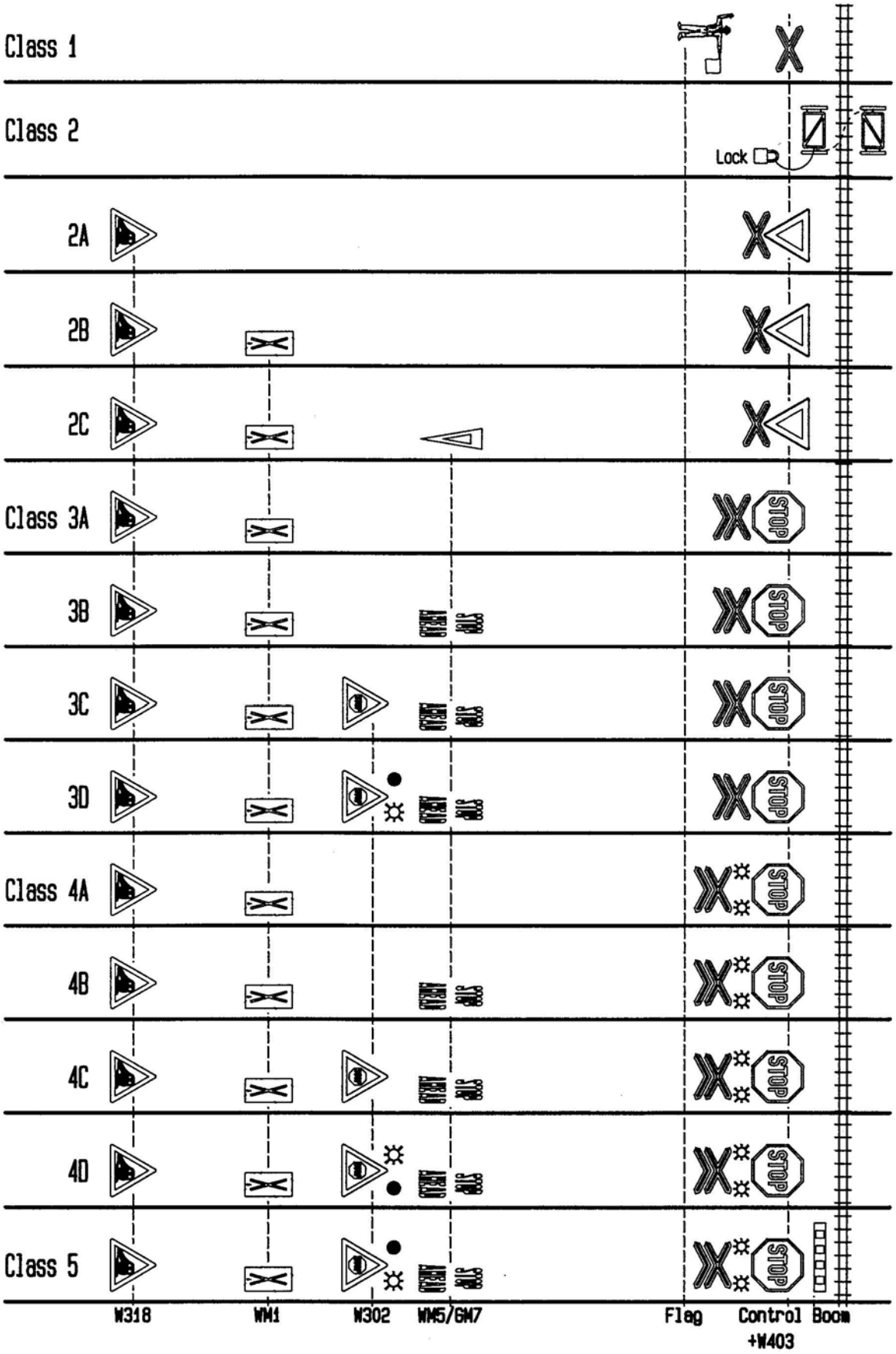



**Fig 7.4** **Classes of Railway Crossing Protection**

**TABLE 7.3 VISIBILITY DISTANCE ALONG RAIL LINE FOR YIELD CONTROL TABLE 7.3**

| Train Speed (km/h) | Vehicle Speed (km/h) | | X (m) | | S (m) |
|---|---|---|---|---|---|
| | rural | urban | rural | urban | |
| 120 | 60 | 25 | 45 | 24 | 280 |
| 100 | 60 | 25 | 45 | 24 | 235 |
| 80 | 60 | 25 | 45 | 24 | 185 |
| 60 | 60 | 25 | 45 | 24 | 140 |
| 40 | 60 | 25 | 45 | 24 | 95 |
| 20 | 60 | 25 | 45 | 24 | 50 |

**NOTES:**

(1) In terms of YIELD sign warrants given in paragraph 7.2.3.3 only train speeds of 60 km/h or less are relevant. Other values are given for information.

(2) Distance X (m) is the distance from the near side of the crossing from which drivers must be able to see for distance S (m) along the rail line (see Figures 7.5 and 7.15)

(3) S (m) is the sight distance for drivers of single unit trucks plus trailers (SU+T)

**TABLE 7.4 VISIBILITY DISTANCE ALONG RAIL LINE FOR STOP CONTROL TABLE 7.4**

| Train Speed (km/h) | X (m) | S (m) | |
|---|---|---|---|
| | | 7.5 m | 15 m |
| 120 | 5 | 460 | 500 |
| 100 | 5 | 385 | 420 |
| 80 | 5 | 310 | 335 |
| 60 | 5 | 230 | 250 |

**NOTES:**

(1) Distance X (m) is the distance from the near side of the crossing from which drivers must be able to see distance S (m) along the rail line (see Figures 7.5 to 7.8 and, 7.15 and 7.16).

(2) S (m) is the sight distance for drivers of single unit trucks and trailers for 7.5 m and 15 m wide crossings.

(3) These conditions also apply for drivers who have stopped at a YIELD sign R2.

Typical factors, some of which are illustrated in Sections 7.3 and 7.4, which may require such adjustments include (see also Volume 1, Chapter 1, Section 1.6);

(a) horizontal or vertical curvature in the approach road within the viewing distance to the warning sign;

(b) obstruction by trees or other street furniture including other road traffic signs;

(c) regular obscuration by other (heavy) vehicles.

4 The figures given in Sections 7.3 and 7.4 of various typical railway crossing situations include examples of additional measures which can be taken to enhance the effectiveness of advance warning of the crossings. The decision whether or not to use such measures should result from a detailed engineering assessment of a specific site which presumably has a worse than average accident history. Some of the signs which may be used in such circumstances are illustrated in Figures 7.2 and 7.3.

**TABLE 7.5 RECOMMENDED POSITIONS AND SIZES OF ADVANCE WARNING SIGNS TABLE 7.5**

| Operating Speed (km/h) Road Traffic [1] | Size (mm) | D2 (m) (2) | D3 (m) | D4 (m) |
|---|---|---|---|---|
| 120 | 1500 | 330 | 120 | 120 |
| 100 | 1500 | 240 | 100 | 100 |
| 80 | 1200 | 160 | 80 | 80 |
| 60 | 900[4] | 120 | 60 | 60 |

**NOTES:**
(1) "Operating speed" refers to the 85%ile (or estimated 85%ile) speed on the roadc approach to the crossing and not to the road design speed.
(2) Distance D1 in Figure 7.5 indicates a site specific distance between the near end of a curve and a crossing. If D1 is less than the appropriate value of D2 above, the sign should be located before the curve.
(3) The distance given in the table refer as follows:
D2 recommended minimum distance from hazard to advance warning sign (see Figure 3.1 – Volume 1, or Chapter 3)
D3 minimum separation between consecutive regulatory or warning signs (see Volume 1, Chapter 1)
D4 minimum clear visibility distance to an advance warning sign
(4) A road authority may elect to use the maximum 1500 mm size at all railway crossing.

**TABLE 7.6 RECOMMENDED POSITIONS FOR RAILWAY CROSSING MARKING WM1 TABLE 7.6**

| Operating Speed (km/h) Road Traffic [1] | C1 (m) (2) | C2 (m)* optional (2) |
|---|---|---|
| 120 | 250 | 400 |
| 100 | 180 | 300 |
| 80 | 125 | 200 |
| 60 | 90 | 150 |

**NOTES:**
(1) "Operating speed" refers to the 85%ile (or estimated 85%ile) speed on the roadc approach to the crossing and not to the road design speed.
(2) Distance C1 and C2 are from the hazard to the centre of marking WM1.
(3) A further WM1 marking may be provided 60 m (rural) or 45 m (urban) from a YIELD or STOP LINE.

# 7.3 SIGNING APPLICATIONS FOR RURAL SITUATIONS

## 7.3.1 General

1 The signing applications illustrated in Figures 7.6 to 7.9 are generally appropriate in rural situations. The principle factors pertaining in rural situations, which are less likely to occur in urban situations, are train and/or vehicle approach speeds in excess of 60 km/h. These higher approach speeds will have an effect on the choice of control to be used at the railway crossing and on the size and number of advance warning signs to be provided. Typical urban situations are dealt with in Section 7.4 whilst enlarged details of the actual rail/road crossing area are given in Section 7.5.

2 The examples in this section cover applications ranging from a minor private farm road (Class "E" - Figure 7.5) to a major numbered route (Class "B"). In addition the effects on signing of such situations as the presence of overhead electrical power cables or a poor accident history are illustrated. **These latter conditions may, in principle, occur on any of the road categories and do not specifically relate to the class of road illustrated.**

3 Most figures show minimum signing requirements and optional additional signs. An indication is given, where appropriate, of the classification of the railway crossing (see Table 7.1) and the level of protection or protection classification (see Table 7.2 and Figure 7.4). From an economic standpoint optional signs will generally only be specified on a reactive basis i.e. as a result of a history of incidents or accidents. However, if an area or region is known to have a poor record of observance of safety rules at railway crossings by drivers, standard installations should include the additional optional signs. Exercising the option to provide certain additional signs and/or markings will obviously raise the class of protection offered.

4 In terms of what observed are common signing practices at railway crossings it is relevant to consider improving the visual impact of all railway crossings as a standard practice. In many cases the position of the actual crossing may be difficult for a driver to judge, not with-standing the presence of control signs. This in turn may result in drivers searching in the wrong direction for approaching trains. It is not uncommon for some sort of road furniture to intrude into the road/rail "intersection" area. To improve the definition of this area sets of three or more DANGER PLATE hazard marker warning signs W401 and W402 may be specified on each side of the roadway. Figure 7.16 illustrates an example of this optional treatment. Signs W401 and W402 may also be used to mark other hazards such as height gauge supports. The recommended size for signs W401 and W402 is 200 mm x 800 mm.

## 7.3.2 Class "E" or Farm Road Railway Crossing

1 Figure 7.5 shows the typical level of protection for a private Class "E" or farm road railway crossing. Such a road will most commonly be a gravel road. The railway operator shall enter into an agreement with the owner/occupier of the property served by the road to ensure that gates, required on both sides of the rail line in terms of Class 2 level of protection, are only unlocked for individual vehicle movements across the rail line.

2 Notwithstanding such an agreement the railway operator should take action to implement higher levels of protection and control if the private road becomes, for whatever reason, well used by the public. Such action should also occur in the event of a poor accident record even if road traffic volumes are very low.

3 If the private Class "E" or farm road crosses the railway line below overhead electrical power lines, it is recommended that ELECTRICAL SHOCK warning signs W361 be provided on each approach, in addition to the locked gates.

**Checklist**

When preparing a specification for a new railway crossing, or when reviewing the need for signing of an existing crossing, use of the following checklist is recommended:

- ❑ is the rail line provided with overhead electrical power lines?
- ❑ is sight distance adequate for Yield sign R2?
- ❑ is the crossing free from accidents?
- ❑ if the sight distance is not acceptable for sign R2 is it adequate for STOP sign R1?
- ❑ will sight triangles be maintained year round?
- ❑ is there sufficient sight distance to the crossing to permit safe stopping by drivers? if not, is an advance warning sign required?
- ❑ is there adequate clear sight distance to the chosen position for an advance warning sign?
- ❑ is the crossing clearly identifiable as a crossing? - if not, consider use of three DANGER PLATE signs on each side of each approach;

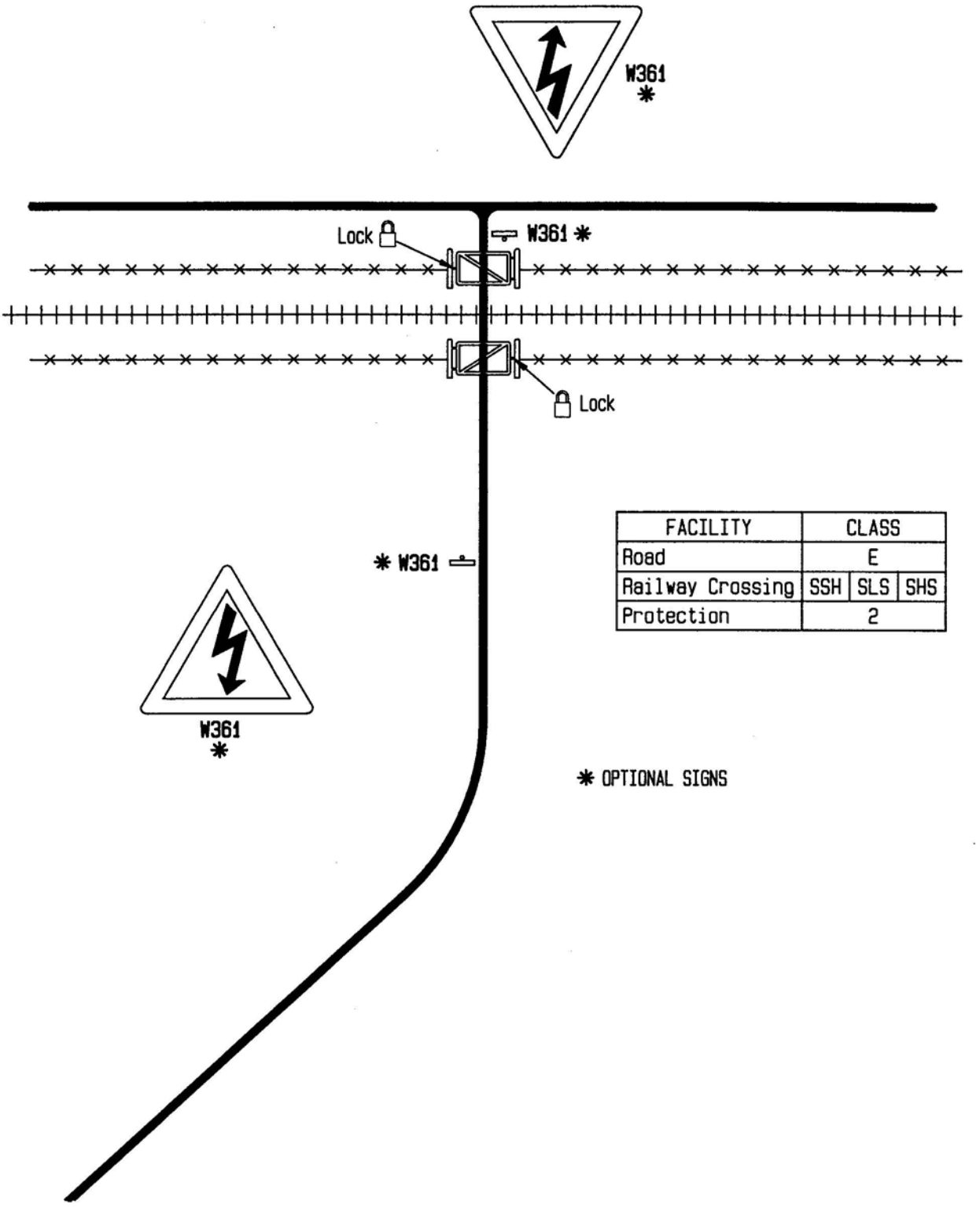



**Fig 7.5** **Class “E” or Farm Road Railway Crossing**

## 7.3.3 Class "C" or "D" Rural Road Crossing

1 Figure 7.6 shows a typical signing arrangement for a surfaced rural road which can range from a minor public road serving no public destination to well-used roads carrying up to approximately 300 vehicles per day (see Figure 7.5 for private (farm) roads). The figure shows crossing control measures involving YIELD sign R2, STOP sign R1, or FLASHING RED DISC signals as preferred options for this class of road. These options represent Class 2A to Class 4C levels of protection (see Table 7.2 and Figure 7.4). Provided the requirements for a YIELD sign R2 can be met, the use of sign R2 represents the lowest level of control. Aside from any accident record, the decision on the use of sign R1 or sign R2 is likely to rest on the available sight distance as indicated in Tables 7.3 and 7.4. For local details on the actual crossing see Figure 7.16 in Section 7.5. Warrants for the use of FLASHING RED DISC signals are given in Subsection 7.2.4.

2 The following are the minimum signs required per approach to this category of railway crossing, subject to the class of protection (see Figure 7.4):

(a) R2 - YIELD control sign; OR

(b) R1 - STOP control sign; OR

(c) R1 - STOP sign plus FLASHING RED DISC signals; **PLUS**

(d) W403 - RAILWAY CROSSING hazard marker warning sign (single line); OR

(e) W404 - RAILWAY CROSSING hazard marker warning sign (two or more lines); **PLUS**

(f) RTM1 - STOP LINE road marking;

(g) RM1 - NO OVERTAKING road marking;

(h) WM1 - RAILWAY CROSSING warning marking;

(i) W318 - RAILWAY CROSSING advance warning sign.

3 Advance signs are more likely to be considered advisable for this class of crossing mainly on the basis of the volume of road traffic. Advance warning signs should be positioned in accordance with the details given in Table 7.5 with due regard to any of the following road or rail features:

(a) poor road sight distance either, horizontally or vertically;

(b) road curvature;

(c) poor crossing sight distance to trains;

(d) overhead electrical power cables;

(e) boom protection;

(f) difficult stopping sight distance judgement.

The following signs may therefore be specified in addition to, or instead of, those indicated above:

(g) W202 - W211 - ROAD CURVE advance warning sign;

(h) W302 - STOP CONTROL AHEAD advance warning sign;

(i) W314 - GATE advance warning sign;

(j) W361 - ELECTRICAL SHOCK advance warning sign;

(k) W401 - DANGER PLATE hazard marker warning sign (left side);

(l) W402 - DANGER PLATE hazard marker warning sign (right side);

(m) IN11 - SUPPLEMENTARY PLATE information signs;

(n) RM2 - NO CROSSING LINES road marking;

(p) WM5 - YIELD road marking symbol;

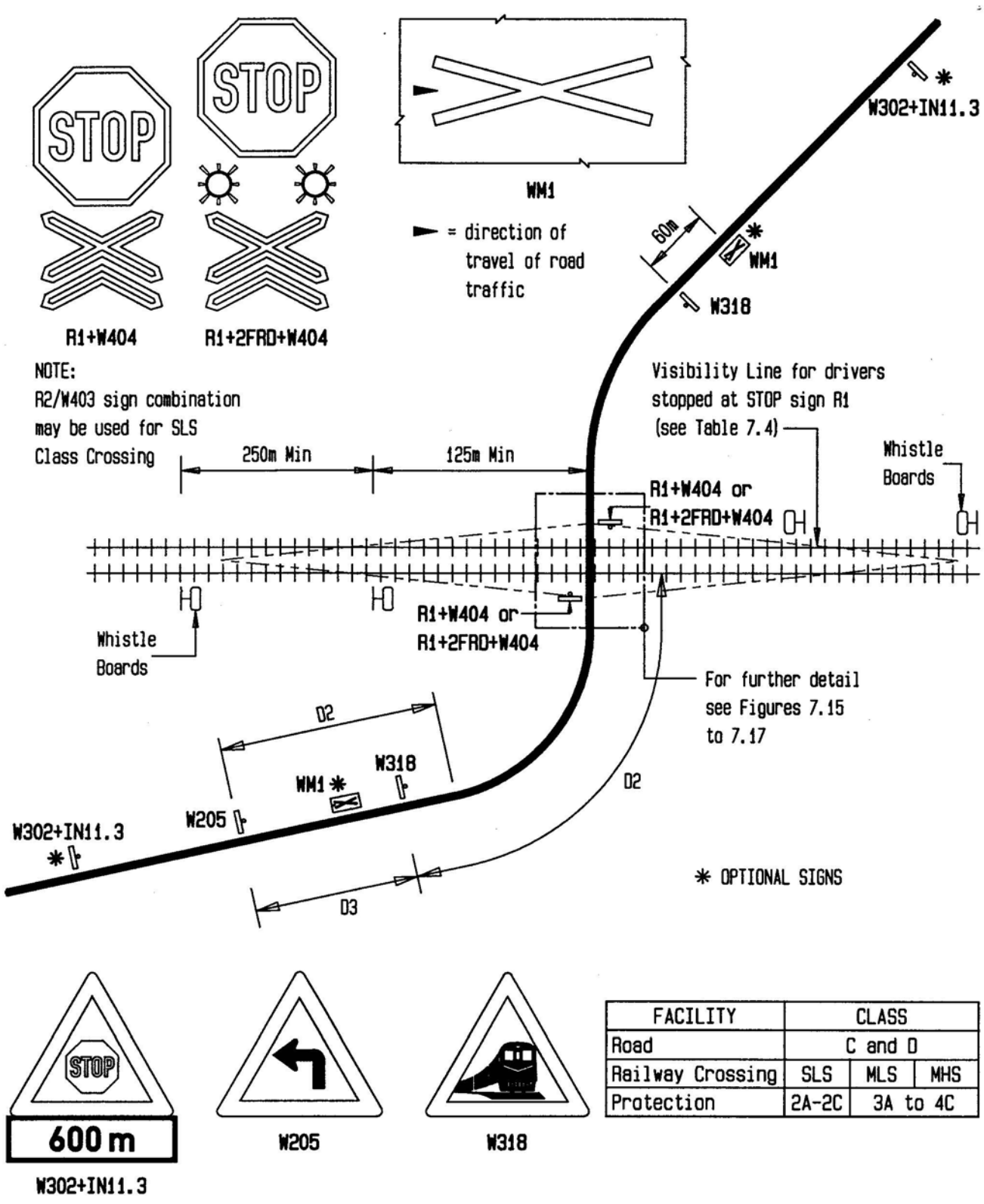
(q) GM7 - WORD road marking ("STOP").

4 When assessing sight distance along the line of rail **allowance should be made for the annual "worst case" situation** when vegetation may significantly restrict sight distance.

**Checklist**

When preparing a specification for the signing of a new railway crossing, or when reviewing the signing of an existing crossing, use of the following checklist is recommended:

- ❑ is sight distance adequate for Yield sign R2?
- ❑ is the crossing free from accidents?
- ❑ if the sight distance is not acceptable for sign R2 is it adequate for STOP sign R1?
- ❑ if the answer to the previous questions is "NO" can sight distance be cleared at a lower cost than the cost of installing FLASHING RED DISC signals?
- ❑ will sight triangles be maintained year round?
- ❑ is there sufficient sight distance to the crossing to permit safe stopping by drivers? if not, is an advance warning sign required?
- ❑ is there adequate clear sight distance to the chosen position for an advance warning sign?
- ❑ is the crossing clearly identifiable as a crossing? - if not, consider use of three DANGER PLATE signs on each side of each approach;
- ❑ if a STOP control is provided and approach speeds are likely to be in excess of 60 km/h consider the provision of a W302 advance warning sign;
- ❑ if distances are difficult to judge due to road alignment, horizontally or vertically, use SUPPLEMENTARY PLATE signs IN11.3 with advance warning




| FACILITY | CLASS | | |
|---|---|---|---|
| Road | C and D | | |
| Railway Crossing | SLS | MLS | MHS |
| Protection | 2A-2C | 3A to 4C | |

**Fig 7.6 Class “C” or “D” Rural Road Railway Crossing**

## 7.3.4 Class "B" Rural Road Crossing

1 Class "B" rural roads are numbered routes generally carrying significant volumes of traffic. Railway crossings on such roads are commonly grade separated. Crossings that do exist are most likely to be on the regional numbered routes with lower traffic volumes. Figure 7.7 illustrates very much the same principles as Figure 7.6. Due to traffic volumes and the possibility of roadside development restricting sight distance, however, the use of FLASHING RED DISC signals is likely to be more commonly warranted on this class of road.

It should be noted that the actions drivers are required to take at a railway crossing differ significantly according to the form of control used. The use of STOP sign R1 requires all drivers to stop, irrespective of whether there is rail traffic or not. It is then the drivers responsibility to judge when it is safe to proceed. Drivers must therefore have adequate sight distance available to make this decision, then move off and clear the crossing safely. The driver of a heavy vehicle will normally take more time to achieve this sequence of actions than the driver of a motor car. When facing FLASHING RED DISC signals, used with STOP sign R1, a driver must remain stationary until the flashing red disc signals stop flashing and are no longer illuminated. The driver then may make a decision whether it is safe to proceed or not, as he would at any STOP sign. This combination of signs thus provides an effective failsafe operation should the flashing red disc signals fail for any reason. If such signals are manually switched the signal control box must include a pair of well-maintained FLAG signals SS2. This figure illustrates Class 3A or Class 4C level of protection (see Table 7.2 and Figure 7.4).

The following are the minimum signs required per approach to a railway crossing:

(a) R2 - YIELD control sign; OR

(b) R1 - STOP control sign; OR

(c) R1 - STOP sign plus FLASHING RED DISC signals; **PLUS**

(d) W403 - RAILWAY CROSSING hazard marker warning sign (single line); OR

(e) W404 - RAILWAY CROSSING hazard marker warning sign (two or more lines); **PLUS**

(f) RTM1 - STOP LINE road marking;

(g) RM1 - NO OVERTAKING road marking;

(h) WM1 - RAILWAY CROSSING warning marking;

(i) W318 - RAILWAY CROSSING advance warning sign.

3 Advance signs are likely to be considered advisable for this class of crossing mainly on the basis of the volume of road traffic. Overhead electrical power cables are more likely at this class of crossing. For details see Figure 7.8. For an example of a boom protected crossing see Figure 7.17 in Section 7.5.

Advance warning signs should be positioned in accordance with the details given in Table 7.5 with due regard to any of the following road or rail features:

(a) poor road sight distance either, horizontally or vertically;

(b) road curvature;

(c) poor crossing sight distance to trains;

(d) overhead electrical power cables;

(e) boom protection;

(f) difficult stopping sight distance judgement.

The following signs may therefore be specified in addition to, or instead of, those indicated above:

(g) W202 - W211 - ROAD CURVE advance warning sign;

(h) W302 - STOP CONTROL AHEAD advance warning sign;

(i) W314 - GATE advance warning sign;

(j) W361 - ELECTRICAL SHOCK advance warning sign;

(k) W401 - DANGER PLATE hazard marker warning sign (left side);

(l) W402 - DANGER PLATE hazard marker warning sign (right side);

(m) IN11 - SUPPLEMENTARY PLATE information signs;

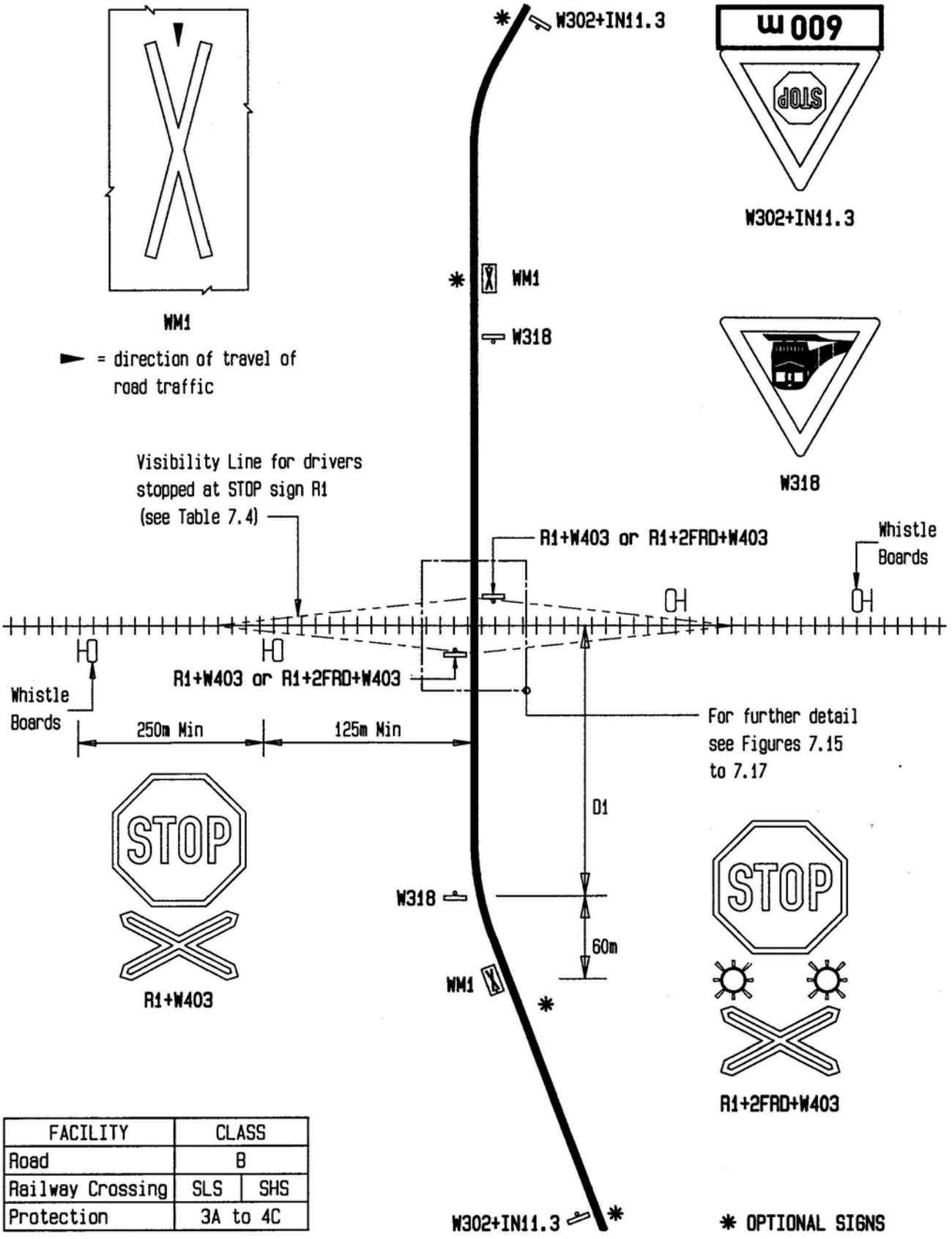
(n) RM2 - NO CROSSING LINES road marking;

(o) WM5 - YIELD road marking symbol;

(p) GM7 - WORD road marking ("STOP").

**Checklist**

When preparing a specification for the signing of a new railway crossing, or when reviewing the signing of an existing crossing, use of the checklist given in Section 7.3.3 is recommend




| FACILITY | CLASS | |
|---|---|---|
| Road | B | |
| Railway Crossing | SLS | SHS |
| Protection | 3A to 4C | |

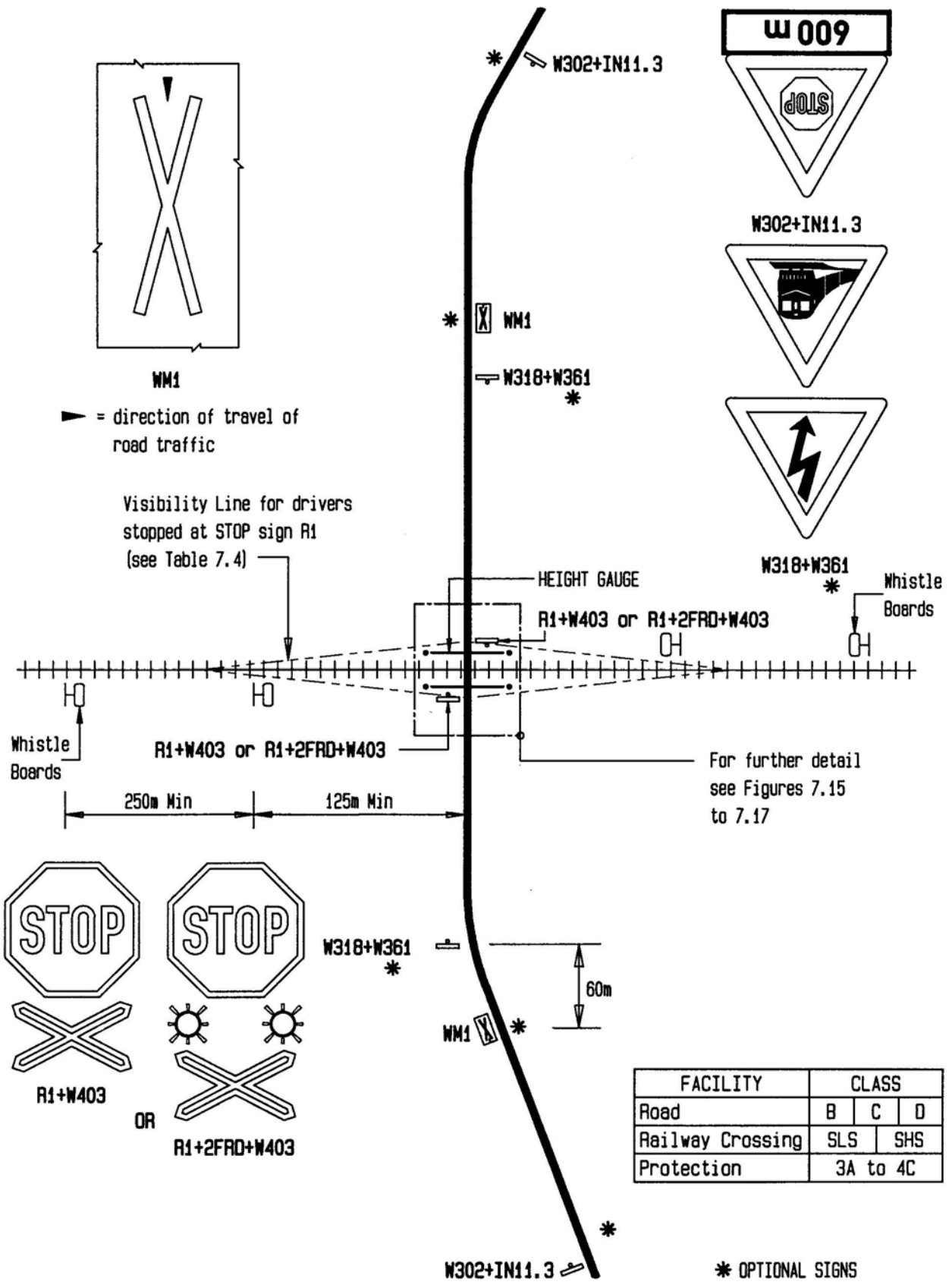
**Fig 7.7 Class “B” or Rural Road Railway Crossing**

### 7.3.5 Overhead Electrical Power Cables

1 The detail in Figure 7.8 is as given in Figure 7.6 but for the addition of optional ELECTRICAL SHOCK advance warning sign W361 and the provision of height gauges in advance of the actual power cable at the crossing. It is recommended that, when both are used, advance warning signs W318 and W361 be mounted on the same support to gain benefit from the message association of the two signs. The additional signs illustrated are appropriate irrespective of the road class, railway crossing class or other level of protection or control provided (see Table 7.2 and Figure 7.4).

For further details see Sections 7.3.4 and 7.3.6, and Figures 7.16 to 7.18 in Section 7.5.

2 It should be noted that sign W361 is provided as a warning to road users including drivers, their passengers, and pedestrians, about the risk of raised objects contacting the overhead electrical power cables. SABS sign WW7 (see Subsection 7.3.6 and Figure 7.19) gives the same message to service workers attending to the overhead electrical power cables and is a very small sign not clearly visible to road users on the ground.




| FACILITY | CLASS | | |
|---|---|---|---|
| Road | B | C | D |
| Railway Crossing | SLS | | SHS |
| Protection | 3A to 4C | | |

**Fig 7.8** **Signing for Overhead Electrical Power Lines**

## 7.3.6 Height Restricted Overhead Electrical Power Cables

1 Full details on the provision of height gauges is given in Section 7.5.

2 When overhead electrical power cables are present the following signing should be provided **in relation to the power cable and the preceding height gauge**:

(a) when the power cable is above 5,1 m use SABS sign WW7 on the height gauge;

(b) when the power cable is between 4,7 m and 5,1 m above rail level use SABS sign WW7 and two W401 signs (pointing "downwards") **on the height gauge** and sign W320 in advance of the crossing;

(c) when the power cable is below 4,7 m above rail level use sign R204 and WW7 plus two W401 signs on the height gauge and sign W320 in advance of the crossing.

3 Figure 7.9 illustrates the need to warn drivers well in advance of such a situation so that they may choose an alternative route. MAP-TYPE DIRECTION sign GD9 may be designed to illustrate the specific detail of the alternative route when this is simple. If the alternative route is complex, supplementary guidance signs may be necessary. This signing treatment is recommended for any road carrying over 300 vehicles per day (Class B). Sign GD9 should carry a SUPPLEMENTARY PLATE sign IN11.3 indicating the distance to the height restriction.

4 For further details of the basic and optional signing for the actual rail crossing see Subsection 7.3.4.

5 Advance warning ELECTRICAL SHOCK sign W361 may be specified in addition in all cases. It should be noted that sign W362 is provided as a warning to road users, including drivers, their passengers, and pedestrians about the risk of raised objects contacting the overhead electrical power cables. SABS sign WW7 gives the same message to service workers attending to the overhead electrical power cables and is a very small sign not clearly visible to road users on the ground.

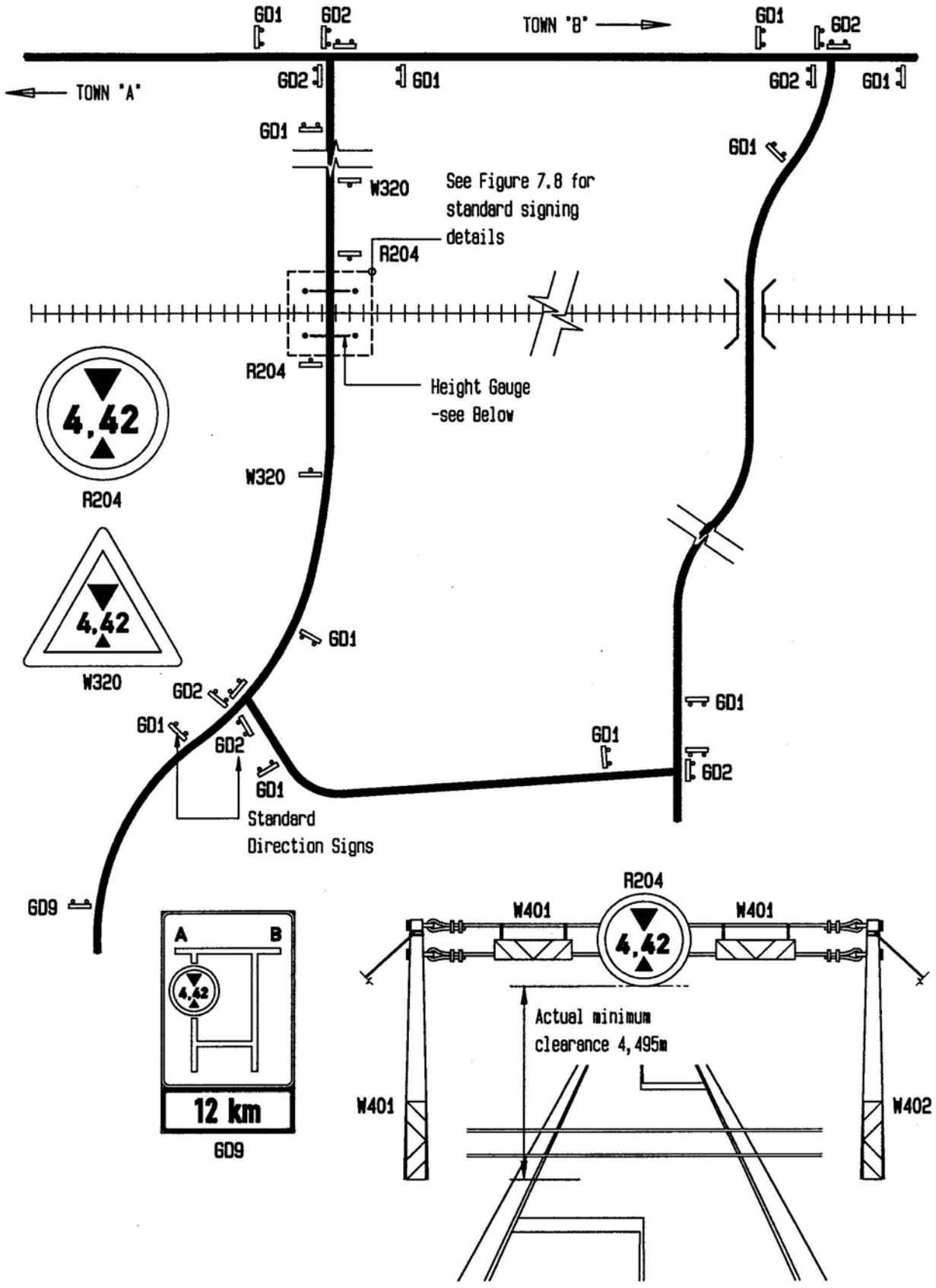


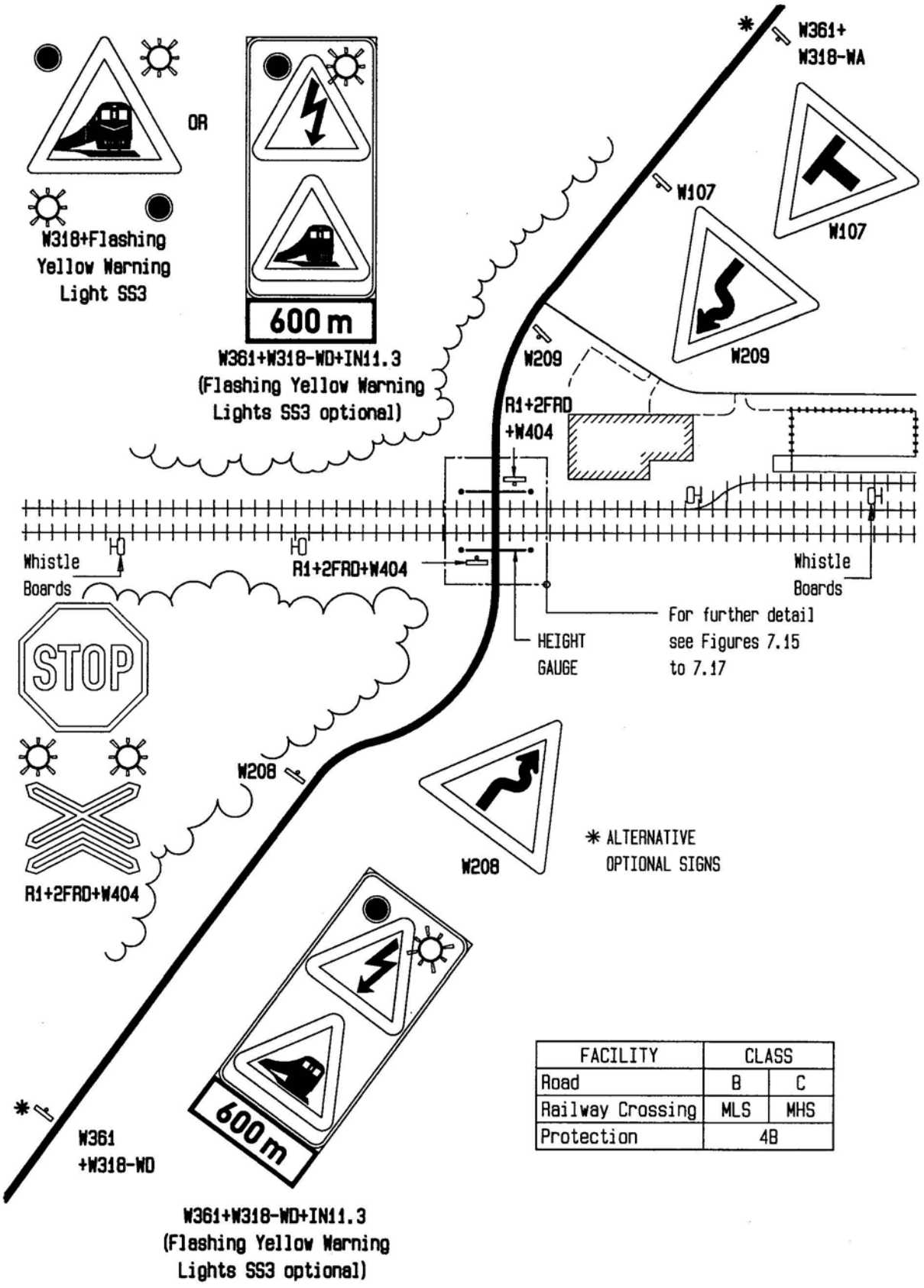

**Fig 7.9 Signing for Low Level Overhead Electrical Power Lines**

## 7.3.7 High Accident Frequency Crossings

1 Figure 7.10 shows examples of high visibility signs which may be used at railway crossings which are classified as above average hazards. Such signing treatments represent cost-effective interim safety solutions until such time as grade separation of the crossing may be possible. This type of treatment is equally applicable in an urban area even though vehicle approach speeds are likely to be lower. The use of FLASHING YELLOW warning signals SS3 with such signs is recommended.

The additional signs illustrated are appropriate on safety grounds irrespective of the class of road. They are most likely to be warranted at SHS or MHS classes of railway crossing (see Table 7.1) and/or at crossings with a protection classification of 4A or higher (see Table 7.2 and Figure 7.4).

For details of the actual crossing area see Figures 7.15 to 7.18.




| FACILITY | CLASS | |
|---|---|---|
| Road | B | C |
| Railway Crossing | MLS | MHS |
| Protection | 4B | |

**Fig 7.10 Signing for High Accident Frequency Locations**

# 7.4 SIGNING APPLICATIONS FOR URBAN SITUATIONS

## 7.4.1 General

1 The applications of signs illustrated in Figures 7.11 to 7.14 are appropriate to very specific types of urban rail/road crossing situations. These examples should be considered as additional to the signing and control methods given in Section 7.3 for rural situations which are equally relevant in many urban circumstances provided due note is taken of train and vehicle operating conditions and their effects on the choice of signs and the sign positions. Individual isolated crossings, particularly if they are located in the outskirts of an urban area on urban Class "D", "C" or "B" streets, can be treated as covered by Figures 7.6 and 7.7. The balance of figures in Section 7.3, are also appropriate in principle for situations such as the presence of overhead electrical power cables or high accident locations.

2 The choice of the mode of control for an urban railway crossing will be dictated by a combination of the following factors:

(a) road traffic volumes;

(b) road to rail visibility (which will commonly be limited by development around the road/rail crossing);

(c) frequency and speed of train movements.

It is likely that urban railway crossings will operate with significantly lower train and vehicle approach speeds than rural crossings, but are conversely likely to have higher road and rail traffic volumes. The net result of these operational characteristics is that a large percentage of **mainline** railway crossings in urban areas will require the installation of FLASHING RED DISC signals plus STOP sign R1 control.

3 Since the potential for train/vehicle conflicts is somewhat greater at urban crossings than rural crossings the level of signing at main line urban crossings should commonly include the signs classified as optional for rural crossings.

4 As Figures 7.11 and 7.14 illustrate, however, many railway crossings in urban areas will only be provided with the minimum hazard marker signs and no permanent form of vehicle control. This situation is only acceptable when train movements such as industrial area shunting are supported by flagmen or when the operations are within a railway station or marshalling yard environment. Where appropriate, an indication is given of the likely road classification, rail crossing classification (see Table 7.1) and the level of protection or protection classification (see Table 7.2 and Figure 7.4).

5 The generally visually "busy" environment common in urban areas may make the position of a railway crossing difficult for drivers to determine. It should therefore be a primary objective to ensure that all crossings are adequately visible. The use of sets of DANGER PLATE hazard marker warning signs W401 and W402 is a very economical and effective means of achieving higher visibility. In particularly hazardous locations, where there are numerous night-time train movements, it may ultimately be necessary for the safe operation of a crossing to install street lighting. Lighting located at the crossing only should not be provided on an isolated basis, without properly designed approach lighting

## 7.4.2 Industrial Siding Railway Crossings

1 All industrial sidings which cross roads shall be appropriately identified on each approach by a RAILWAY CROSSING hazard marker warning sign W403 or W404. These signs may be provided with a rectangular backing board for greater resistance to damage. The backing board may be provided with a semi-matt grey finish. If it is evident that drivers misjudge the number of rail lines to be crossed a SUPPLEMENTARY PLATE information sign IN11.4, with a message such as "4 lines" should be fixed below sign W404. Figures 7.11 and 7.14 illustrate these basic signing principles. This type of crossing will normally be classified as SSH or MSH (see Table 7.1) although it is also possible that such a crossing could include a mainline with shunting lines. The level of protection commonly appropriate at industrial crossings is Class 1 (see Table 7.2 and Figure 7.4).

2 Traffic control should normally be achieved at this type of railway crossing using FLAG signals SS2. This means that at all other times that a FLAG is not displayed vehicle drivers may cross the lines without stopping. All individual train shunting operations should be accompanied by a flagman capable of acting for both road approaches. If this is not practical then two flagmen should be used, one for each approach. All flags must be clean and of a bright red or red-orange colour. A flag may be replaced by a portable RED light signal if night time shunting is required and vehicular traffic volumes are low.

3 If manual control of such crossings is not safely manageable, at night-time for instance, then traffic control must be automated using STOP signs R1 plus FLASHING RED DISC signals in addition to signs W403 or W404.

4 The only additional signing which may be required is the use of DANGER PLATE hazard marker warning signs W401 and W402 to better define the width and position of the crossings, or standard advance warning signs appropriate to a particular roadway approach condition such as a sharp bend (see Figure 7.16).

5 If individual sidings or shunting lines are provided with overhead electrical power cables height gauges and advance warning signs W356 should be installed.

**Checklist**

The following factors should be checked when signing a new industrial siding railway crossing or when reviewing existing signing:

- ❑ is FLAG control going to be manageable in terms specific site conditions and train and vehicle traffic volumes and manpower resources?
- ❑ if multiple lines are present is more than one line likely to be in use at one time?
- ❑ will night-time shunting operations occur?
- ❑ are height gauges required due to presence of overhead electrical power cables?
- ❑ are crossing positions adequately identified by W403 or W404 signs?
- ❑ are there any conditions which require the provision of advance warning signs e.g.:
  - a sharp bend (with possibly hidden queues of waiting vehicles at a crossing);
  - boom protection (see Figure 7.17);
  - overhead electrical power cables (see Figures 7.8 and 7.19);

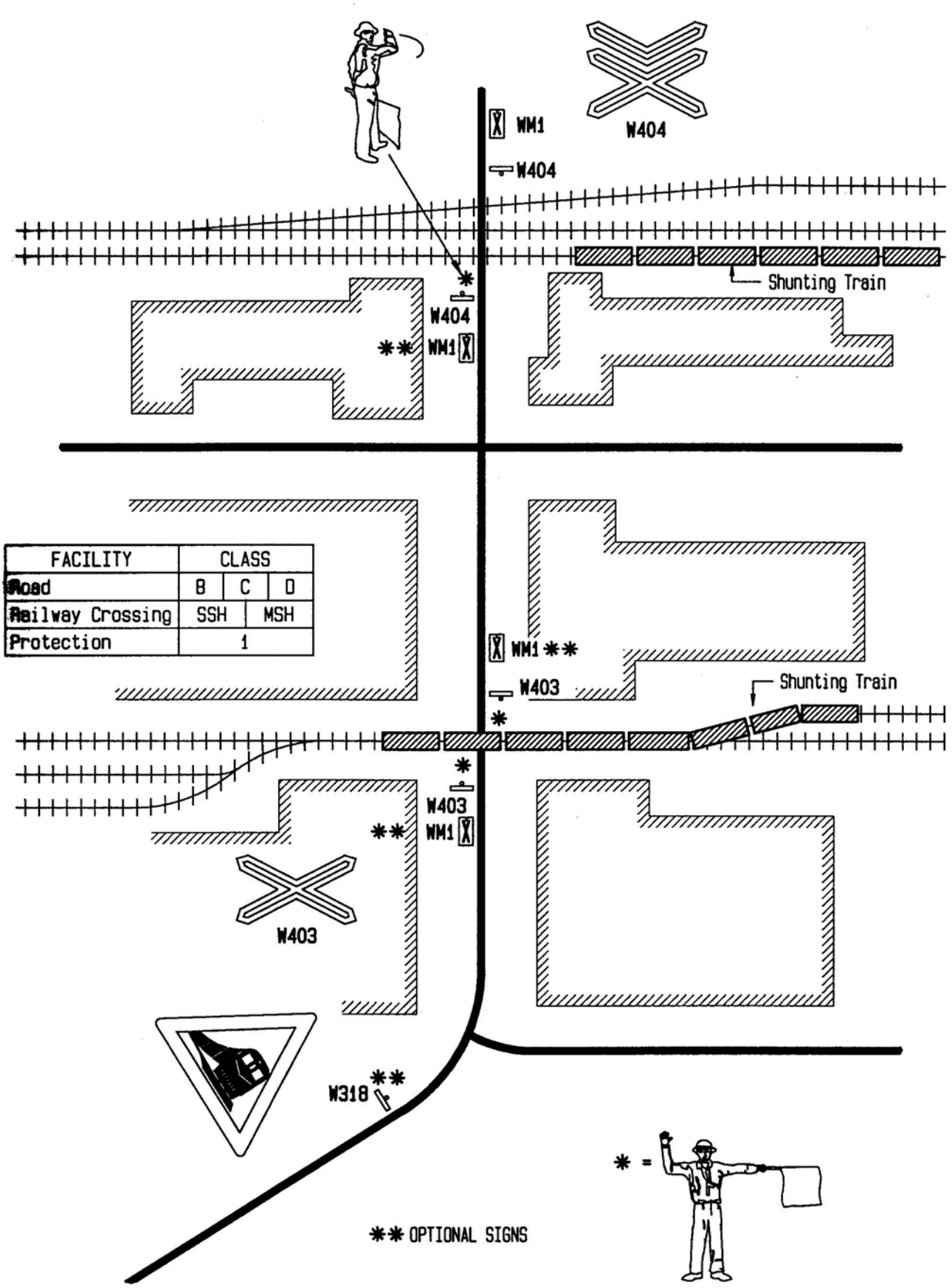



**Fig 7.11** **Industrial Siding Railway Crossing**

## 7.4.3 Class "B" Urban Street Crossings

1 Railway crossings involving Class "B" numbered urban routes are not likely to occur frequently. However, in large towns or cities, crossings on such routes will almost certainly be subject to large volumes of vehicular traffic and in smaller towns the vehicular traffic will probably include significant percentages of long-distance travellers who will not be familiar with local conditions. Visibility of such crossings must therefore be optimised and operational safety maximised by use of the most effective control facilities practicable.

Urban Class "B" routes may commonly be multi-lane roadways. This will add to the complexity of crossing control measures. Figure 7.12 shows a typical four-lane urban road/rail crossing.

2 Traffic control at a Class "B" urban street railway crossing should conform to the principles given in Subsection 7.3.4 for similar rural crossings, subject to adjustment in the positions of signs to take into account different orders of vehicle approach speeds. The use of STOP sign R1 plus FLASHING RED DISC signal control will almost always be required for a Class "B" street crossing, particularly if the street is a multi-lane street. This represents a Class 4C or Class 4D level of protection (see Table 7.2 and Figure 7.4). Only if full visibility of approaching trains is available in accordance with the requirements of Tables 7.3 and 7.4 and other factors influencing driver performance are favourable (see Volume 1, Chapter 1), may a lower level of control be considered.

3 A high volume urban railway crossing may well warrant the installation of boom protection. Boom protection increases the visual impact of the crossing to the first drivers to approach it and also controls the release of vehicles when the lines are once more clear for crossing (Class 5 protection). In addition to FLASHING RED DISC signals and booms it may also be beneficial to install alarm bells, although the environmental impact of such a measure will have to be carefully assessed.

The use of high visibility signs may also be warranted as indicated in Figure 7.12. A multi-lane approach will reduce the effectiveness of standard sized advance warning signs. The signs displayed should take into account the prevailing conditions, such as:

(a) overhead electrical power cables (see Figures 7.17 and 7.19);

(b) boom protection ("gates" - see Figure 7.17);

(c) high speed trains;

(d) low level power cables (see Figure 7.19).

Additional road markings are also recommended. Multi-lane approaches should be treated as for a standard multi-lane signalised junction. RAILWAY CROSSING warning marking WM1 may be used several times, in each lane, to improve awareness of the approaching crossing.

**Checklist**

When considering the use of optional signs at a Class "B" urban street railway crossing the following checklist may be of assistance:

- ❑ is train visibility such that a mode of control other than STOP sign R1 plus FLASHING RED DISC signals is being considered? - if so additional advance warning may be warranted;
- ❑ if the crossing is an existing one under review does it have a poor accident record? - if so provision of boom protection should be considered;
- ❑ are overhead electrical power cables in place? - if so advance warning must be given and a height gauge provided;
- ❑ do pedestrians cross the railway lines in significant numbers? - if so separate footpaths should be provided with specific signing for pedestrians (see Figure 7.18);
- ❑ if the road has multiple lanes, and there is a significant percentage of trucks and buses, consider providing high visibility advance warning signs (see Volume 1, Section 1.8).

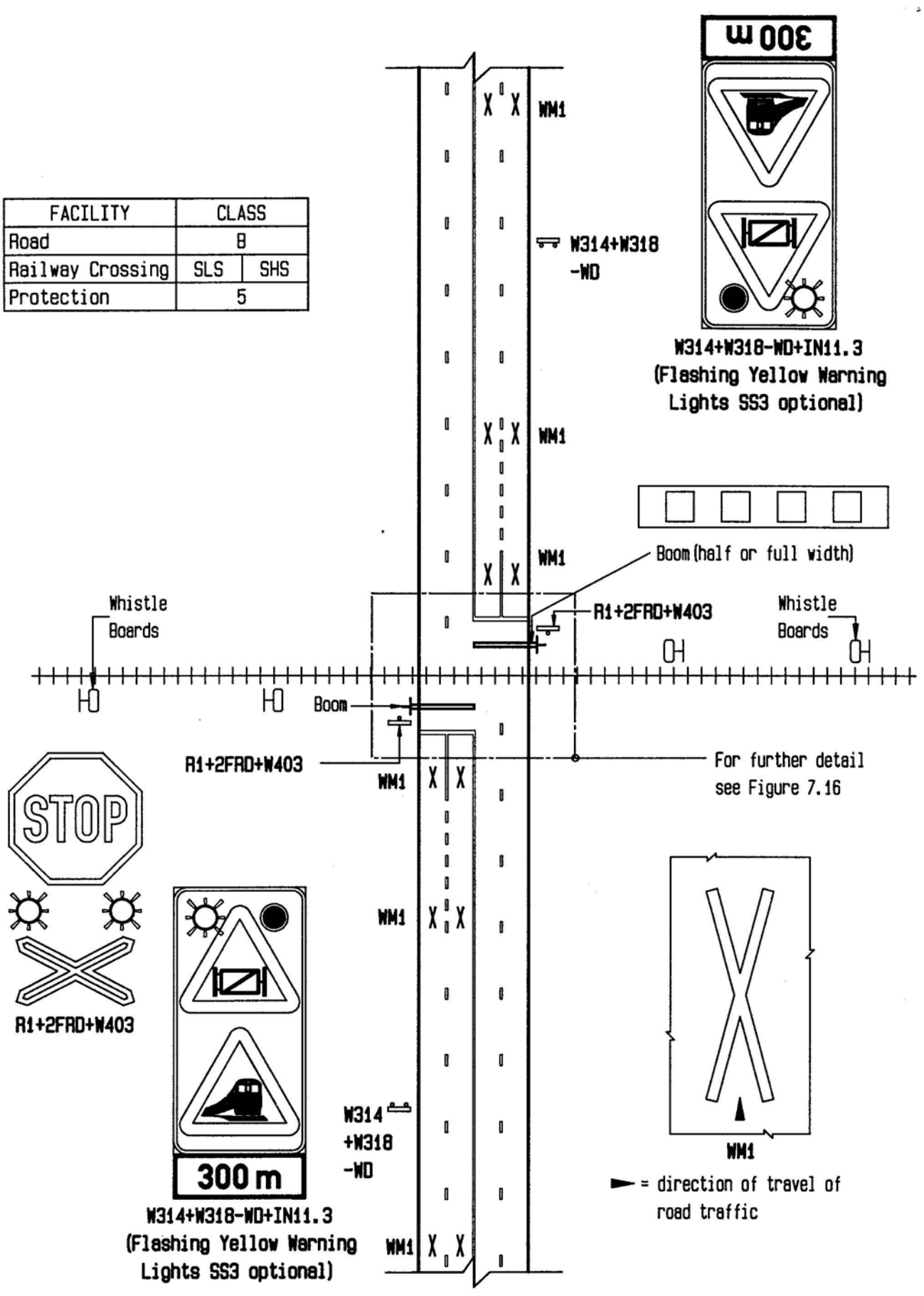



**Fig 7.12 Class “B” Urban Street Road Railway Crossing – Multi-lane Street**

### 7.4.4 Urban Crossing of Parallel Railway Lines

1 Figure 7.13 shows an urban situation which is particularly difficult to sign with clarity. The railway lines are commonly very close to the parallel road so that very little warning can be given on one of the crossing road approaches if the presence of the lines is not obvious from the parallel road. Special attention must therefore be given to the need for optional signing.

2 The mode of traffic control must conform to the normal requirements for the use of YIELD sign R2, STOP sign R1, or STOP sign R1 plus FLASHING RED DISC signal. A crossing of this nature could occur on almost any Class "B", "C" or "D" urban street although it is less likely on a Class "B" street. The class of railway crossing could range from an SSH to an MLS (see Table 7.1) and the level of protection from a Class 3A, which is illustrated, to a Class 5 (see Table 7.2 and Figure 7.4).

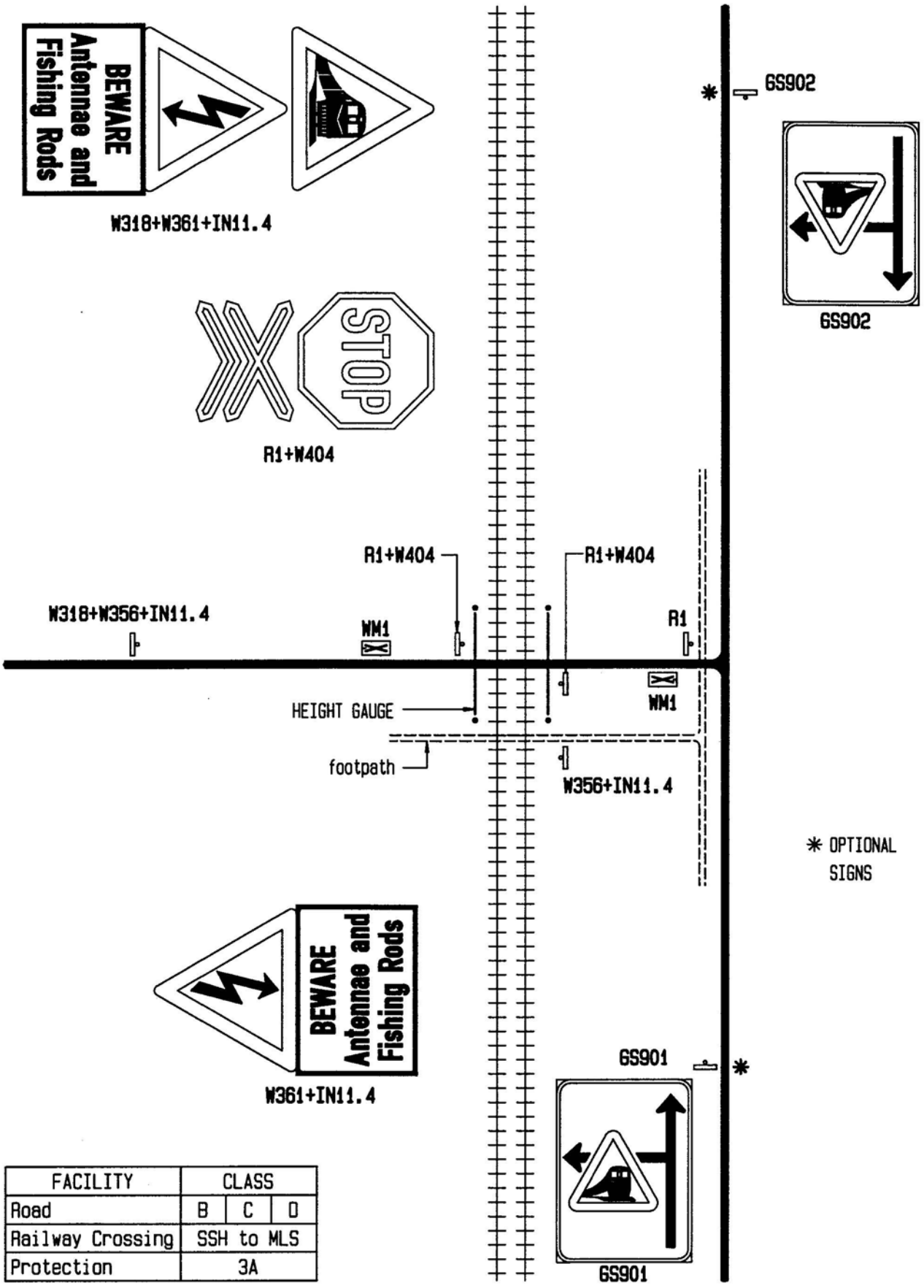
3 When parallel road and rail lines are close together it may be advisable to provide a specially designed DIAGRAMMATIC sign to inform drivers of the junction/railway crossing configuration. This sign may be warranted for a junction with a closely spaced railway line when otherwise the junction itself would not normally warrant an advance warning sign.

4 Special attention must also be paid to warning pedestrians **and other crossing users** if overhead electrical power cables are present. This may require a very specific supplementary text message on SUPPLEMENTARY PLATE signs IN11.3 such as "BEWARE - Antennae and Fishing Rods". This circumstance may occur in a number of railway crossing situations for both pedestrians and vehicles. The relevant authorities should adhere to a standard treatment so that users of such crossings can become familiar with a consistent message.

**Checklist**

All standard aspects appropriate to the installation of signs at a railway crossing should be checked (see checklists in Subsections 7.3.2 or 7.3.3). In a situation similar to that illustrated in Figure 7.13, the following aspects should also be considered:

- ❑ can drivers travelling on the parallel road reasonably be expected to know there is a railway crossing immediately around the corner?
- ❑ are overhead electrical power cables likely to be a risk because of limited approach sight distance?
- ❑ do pedestrians represent specific hazard circumstances?




| FACILITY | CLASS | | |
|---|---|---|---|
| Road | B | C | D |
| Railway Crossing | SSH to MLS | | |
| Protection | 3A | | |

**Fig 7.13** **Urban Crossing of Parallel Railway Lines**

### 7.4.5 Railway Station or Siding Environments

1 Whilst not widely accessible to the public, railway station or siding environments do commonly have internal roadways used by vehicles which cross railway lines, often under sub-standard circumstances compared to those found at public railway crossings. Personnel charged with the safety of such environments should consider the principles covered in this chapter and, if risks to vehicle drivers are particularly higher than normal, limited signing should be considered. Generally the lowest level of protection, namely Class 1, is appropriate.

2 For example, a specific hazard, which may never be obvious to drivers, is that some lines may carry fast or even relatively fast trains (compared to the rest of the general siding environment). The speed differential between different such trains and normal shunting trains may be difficult to determine, making the provision of appropriate signs justifiable. Alternatively, when several lines are to be crossed the space to accommodate vehicles between sets of lines may be limited. For safety, vehicles must be able to fully clear multiple line crossings. In such instances it may be advisable to add specific text messages to the W403 or W404 hazard markers. Typical messages are illustrated in Figure 7.14.

3 When overhead electrical power cables are present, even if not over all lines, the use of ELECTRICAL SHOCK advance warning signs W361 with SUPPLEMENTARY PLATE signs IN11.4 carrying a message such as "BEWARE - Electrified area" is recommended. Height gauges should also be positioned at the beginning and end of such an access road (see Figures 7.3 and 7.14).

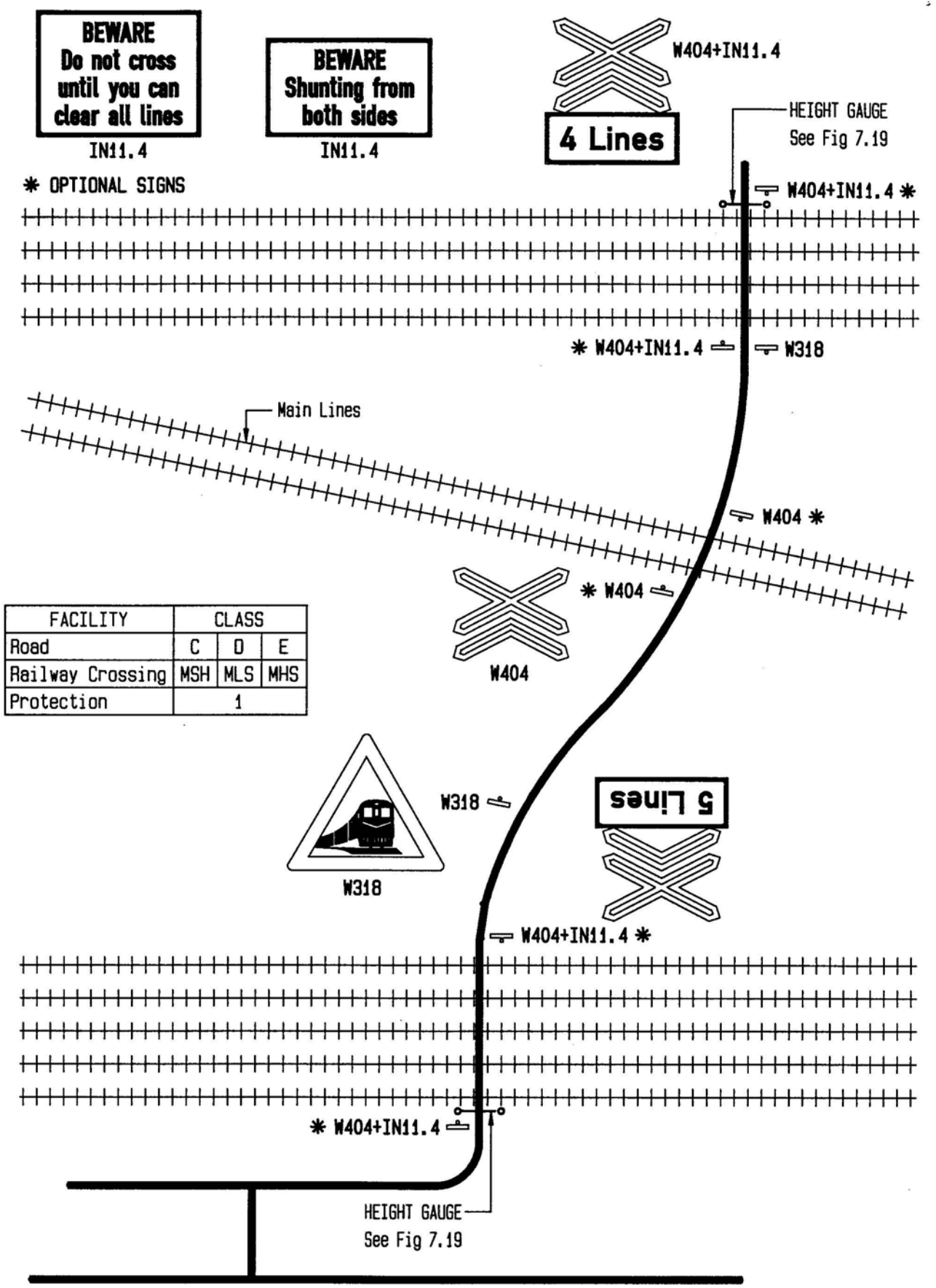



**Fig 7.14** **Signing for Railway Siding Environments**

# 7.5 ENHANCED STANDARD DETAILS

## 7.5.1 General

1 The details in this section apply to the examples covered in Sections 7.3 and 7.4. They provide details appropriate to the localised area of rural and urban railway crossings. In effect this means approximately the area contained within the intersecting road and rail reservations.

2 The road signs, road markings and traffic signals within this area are there essentially to perform one of two functions:

(a) firstly to identify clearly to drivers the potential hazard that the railway crossing represents and to indicate accurately its position;

(b) secondly to provide a mode of vehicular control for use at the crossing.

As indicated in the earlier figures all railway crossings must have sufficient signs to fulfil the first function. Signs for the second function may be omitted for low speed, low frequency crossings which are controlled by flagmen but should be provided in accordance with the crossing and protection classifications given in Tables 7.1 and 7.2.

3 Figures 7.15 to 7.18 are typical situations. Many variable factors may be involved which will call for detailed changes, but the basic principles illustrated should be noted and adhered to. The classes of road , crossing, and protection illustrated are as follows:

(a) Figure 7.15:
Class "D" or "E" gravel road, Class SLS crossing, and Class 2A, 2B or 3A level of protection;

(b) Figure 7.16:
Class "B" or "C" road, Class MLS crossing and Class 3A to 3D level of protection;

(c) Figure 7.17:
Class "B" road, Class MHS crossing, and Class 5 level of protection.

4 The following road markings are recommended on all surfaced road approaches to railway crossings:

(a) the dividing line between opposing traffic streams shall be marked as a NO OVERTAKING LINE marking RM1 or a NO CROSSING LINE marking RM2 for a minimum of 96m in rural environs and 48m in urban areas - the lines shall commence at the transverse STOP LINE or YIELD LINE and shall not continue over the railway crossing - longer lengths of line may be used;

(b) STOP LINE marking RTM1 or YIELD LINE marking RTM2 should be marked a minimum of 4,5m from the nearest edge of the line of rail - lines RTM1 or RTM2 may be placed further from the rail lines but this will affect sight distance to approaching trains;

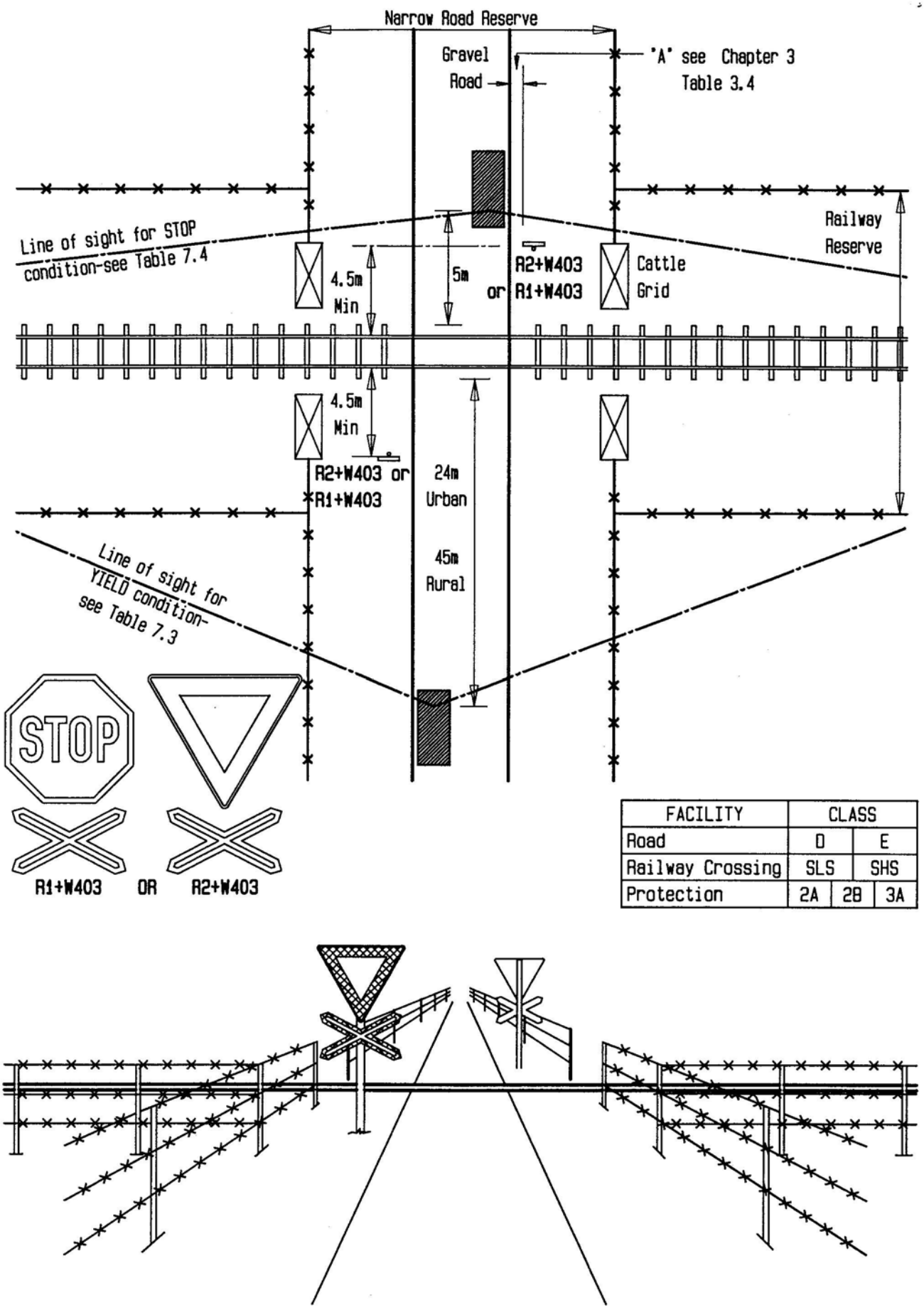
(c) for roads provided with shoulders EDGE LINE marking RM4.1 should be continuous over the crossing to provide visual continuity of the road;

(d) "STOP" WORD marking GM7 may be provided between 1m and 5m prior to the STOP LINE marking - the marking may be repeated in the form "STOP AHEAD", for emphasis, approximately at the appropriate stopping sight distance for the approach speed from the STOP LINE;

(e) RAILWAY CROSSING warning marking WM1 should be provided according to the distances given in Table 7.6 (distance C1) - the marking may be repeated for emphasis near the start of the RM1 or RM2 marking to further inhibit overtaking on the approach to the crossing.

5 Figure 7.18 shows two typical situations in which signs may be required to control or warn pedestrians. Detail 7.18.1 shows a typical pedestrian footpath railway crossing with signs provided specifically for the attention of pedestrians. The example of a pedestrian crossing in a station environment between platforms, Detail 7.18.2, utilizes signs developed by the South African Rail Commuter Corporation for pedestrian signing at stations.

6 Figure 7.19 gives details of the construction and signing of a height gauge.




| FACILITY | CLASS | | |
|---|---|---|---|
| Road | D | | E |
| Railway Crossing | SLS | | SHS |
| Protection | 2A | 2B | 3A |

**Fig 7.15 Local Detail at a Gravel Road Railway Crossing**

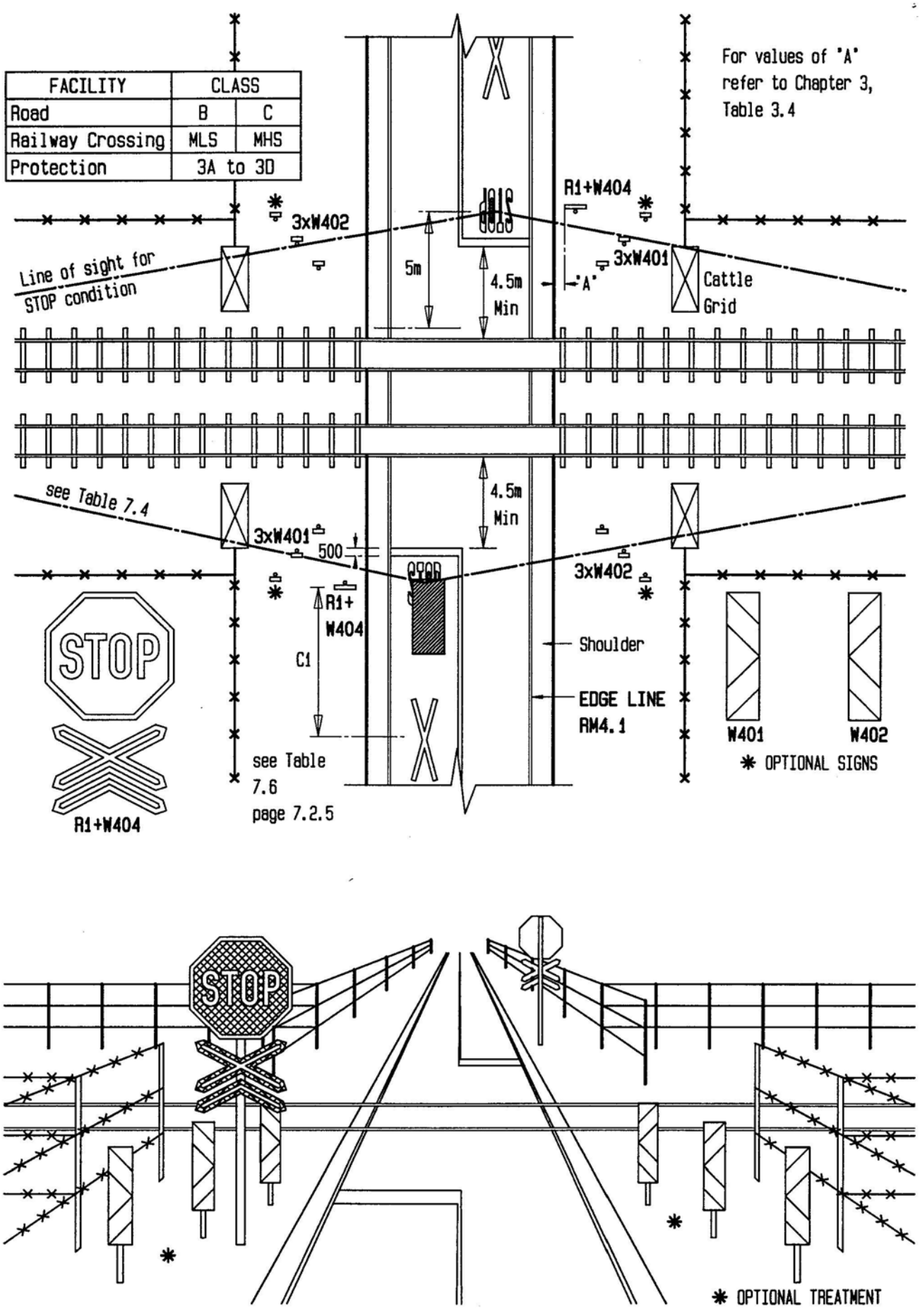
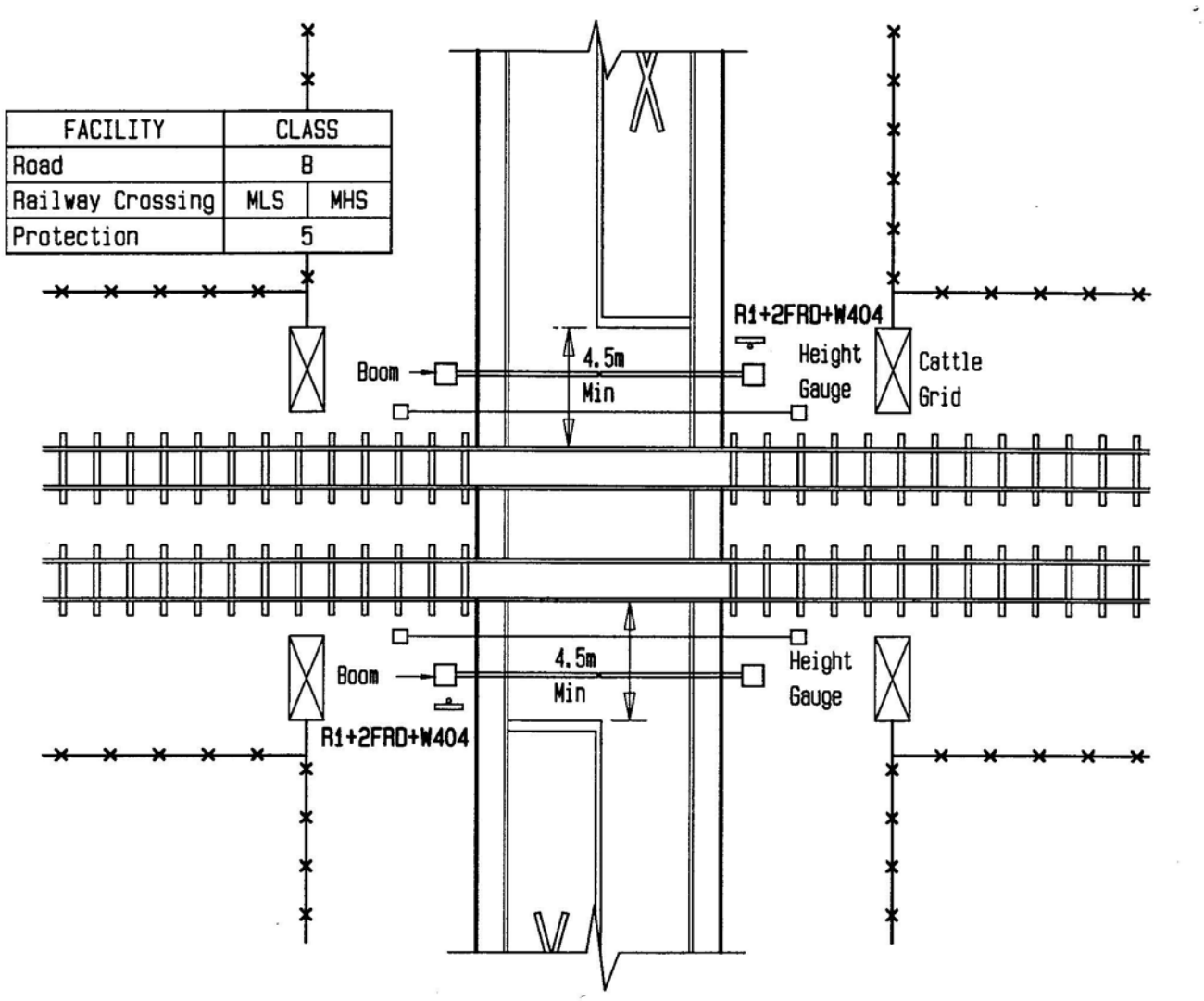



**Fig 7.16 Local Detail at a Rural Surfaced Road Railway Crossing**



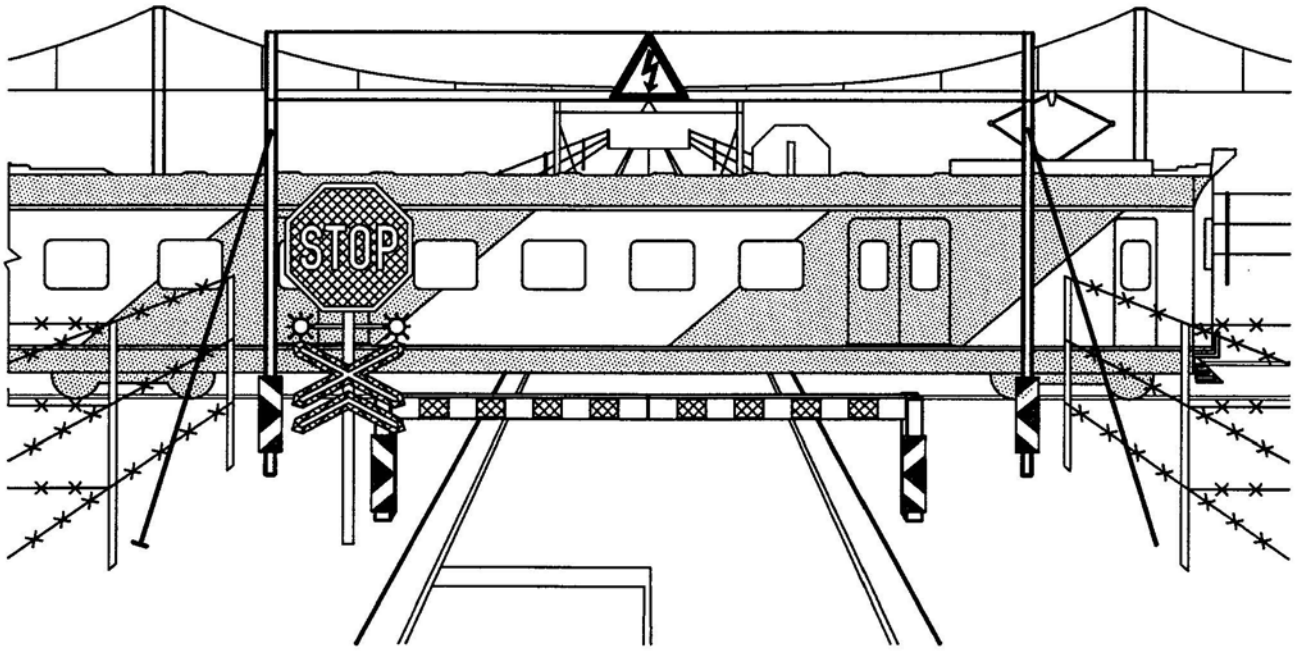
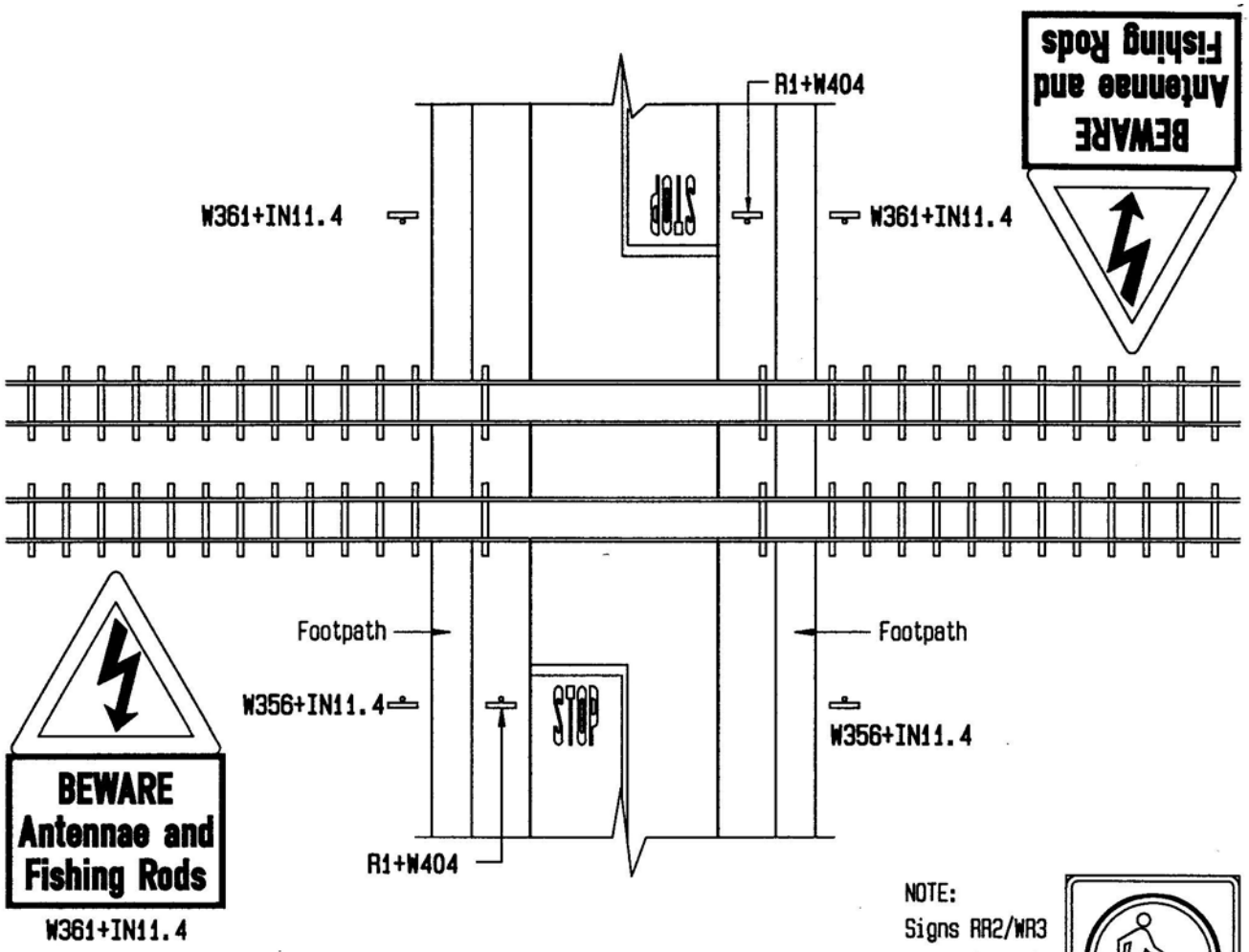
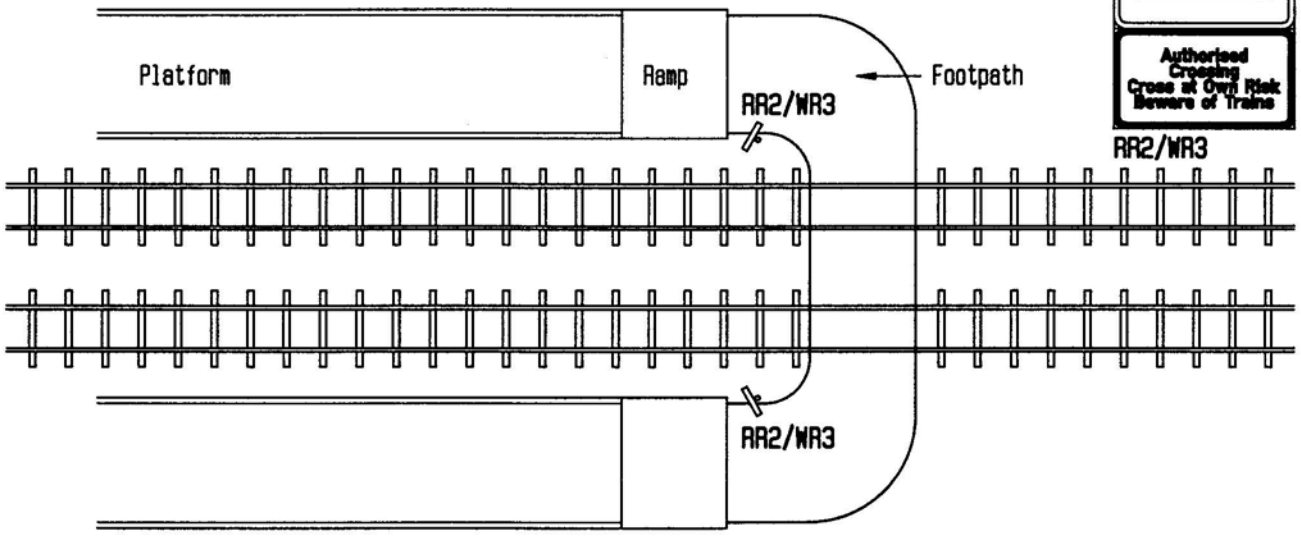




**Fig 7.17 Local Detail at Boom Protected Railway Crossing**




Detail 7.18.1 Typical Pedestrian / Rail Crossing

NOTE:
Signs RR2/WR3 are not road traffic signs but are used on railway property.


Detail 7.18.2 Typical South African Rail Commuter Corporation Pedestrian Signs

**Fig 7.18 Signing for Pedestrians at Railway Crossings**

## 7.5.2 Height Gauges and Sign Display Details

1 Details 7.19.1 to 7.19.3 in Figure 7.19 give various criteria for the provision of a height gauge and the correct placing of retroreflective signs.

2 The Road Traffic Act, Act 93 of 1996, Section ** requires the provision of a height gauge in advance of any overhead electrical power cable over a railway crossing. The principle purpose of this gauge is to make drivers aware that high aerials or similar devices may cause a flash-over from the power cable. The gauge should positioned between STOP LINE RTM1 and the railway line(s).

3 The height gauge wires must be positioned 300 mm below the level of the lowest point of the overhead electrical power cable for a 3 kV DC or a 25 KV AC power cable, and 500 mm below the lowest point of the overhead electrical power cable for a 50 KV AC power cable.

4 When the power cable has a minimum clearance H1 in excess of 5,1 m only SABS Symbolic Sign WW7 need be provided on the height gauge over each lane.

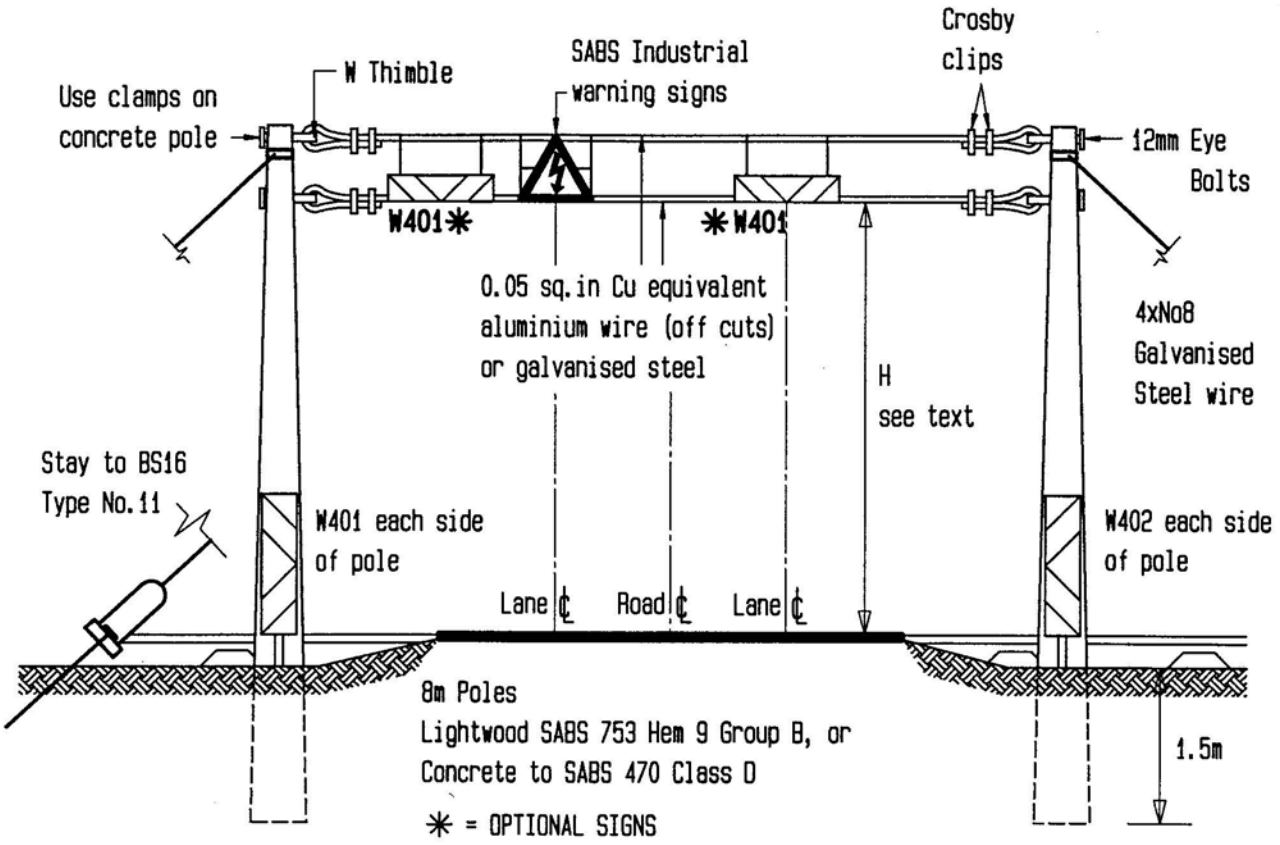
5 When clearance is between 5,1 m and 4,7 m two hazard marker signs W401 should be provided approximately 2 m either side of sign WW7. The height gauge should be preceded by advance warning sign W320.

6 If the power cable is lower than 4,7 m an appropriate prohibition HEIGHT LIMIT sign R204 plus two W401 signs shall be displayed on the height gauge and the installation should be preceded by advance warning sign W320. In this case, wherever possible, an alternative route should be signed to divert high vehicles around such a crossing (see Figure 7.9).

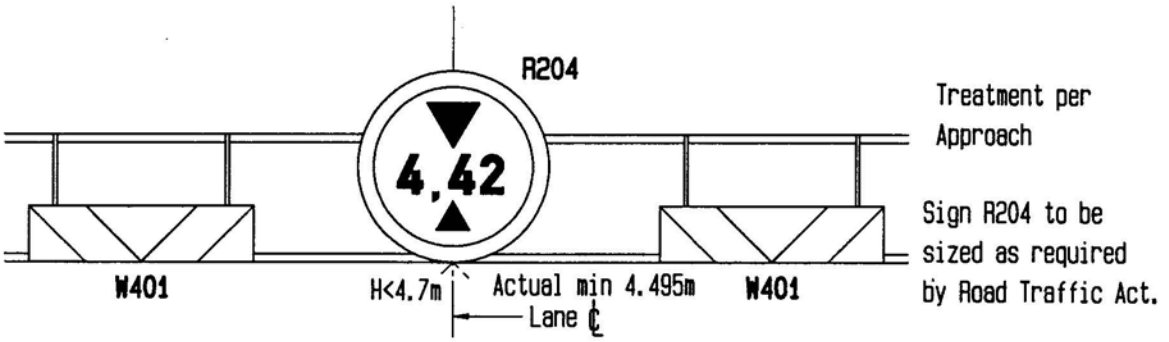
7 All measurements of H1 shall be made to the highest part of the road or rail surface.

8 In order to avoid specular reflection from fully retroreflective regulatory and warning signs all such signs must be rotated 3° away from an imaginary line taken at 90° from the road dividing line. Detail 7.19.3 indicates the amount of the offset required to achieve this degree of rotation for the common regulatory and warning sign sizes.

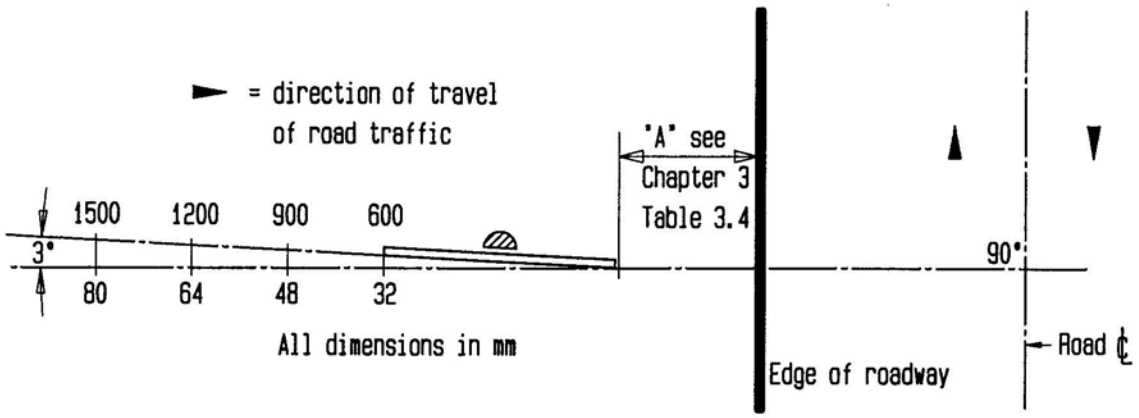
9 It should be noted that sign W361 is provided as a warning to road users including drivers, their passengers, and pedestrians, about the risk of raised objects contacting the overhead electrical power cables. SABS sign WW7 (see Subsection 7.3.6 and Figure 7.19) gives the same message to service workers attending to the overhead electrical power cables and is a very small sign not clearly visible to road users on the ground.




**Detail 7.19.1 Standard Height Gauge Construction Details**




**Detail 7.19.2 Signing for Low Level Overhead Power Lines**




**Detail 7.19.3 Standard Offset for Small Road signs**

**Fig 7.19 Height Gauges and Sign Display Details**

# PUBLIC TRANSPORT SIGNING

**SECTIONS**



**MAY 2012**




**CHAPTER 8**

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# CHAPTER 8:
# PUBLIC TRANSPORT SIGNING

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### 8.0.1 Sections and Subsections

### 8.0.2 Figures

# CHAPTER 8:
# PUBLIC TRANSPORT SIGNING

## 8.1 INTRODUCTION

### 8.1.1 General

1 The purpose of this chapter is to give guidelines on, and illustrate how, road traffic signs i.e. road signs, road markings and traffic signals, may be utilized collectively to sign for a wide variety of traffic management and control situations designed to satisfy the needs of users and operators of public transport.

2 Signing for public transport is primarily an exercise in the application of regulatory signs. Individual regulatory road signs and their functions are detailed in Volume 1, Chapter 2. Section 2.10 of that chapter summarises the principles involved and signs available.

3 So far as the content of this chapter is concerned the following classes of vehicle are included in the general description of road based "public transport":

(a) taxi (motor car, motor tricycle or motor quadrucycle);

(b) minibus;

(c) midi-bus;

(d) bus or Bus Rapid Transit (BRT);

(e) tour bus;

(f) tram or Light Rail Transit (LRT);

(g) high occupancy vehicle (HOV);

(h) "Authorized (Public Transport) Vehicles" indicated by permit.

4 **Taxis**, which are commonly metered, are included because, although they are not strictly a form of "mass" public transport, they tend to be subject to similar on-street management and control as the more traditional public transport vehicles. Taxi ranks are also commonly included at major transport modal transfer facilities.

5 This chapter uses the term **minibus** throughout since this is the legally defined term. All such references do, however, include what are colloquially known as "taxis" or "minibus-taxis". A **minibus** is defined in the Regulations to the Road Traffic Act, Act 29 of 1989, as a motor vehicle designed or adapted solely or principally for the conveyance of more than nine, but not more than 16 persons, including the driver.

6 A **bus** is defined in the Road Traffic Act as a motor vehicle designed or adapted for the conveyance of more than 16 persons including the driver (if any). A **midi-bus** is therefore a type of bus since it is designed to convey more than 16 persons and it can, unless required for management or operational purposes, automatically travel where a bus is permitted to travel and stop where a bus is permitted to stop. A **midi-bus** is, however, defined for signing purposes in Regulation 407 of Act 29 as a **bus** designed or adapted solely for the conveyance of not more than 35 persons, excluding the driver. Due to their chassis characteristics midi-buses can be manoeuvred in spaces which buses cannot negotiate. If an authority or operator wish to segregate classes of vehicle for any control or operational reasons signs are available for such purposes.

7 In a similar way a **tour bus** is a type of **bus** which is used solely or principally to convey tourists and, if required, specific signing may be used for the management or operation of tour buses.

8 There are no **trams,** or street-running light rail vehicles, operating at present. However, their use is under consideration and limited details of signing for LRT operations are included to assist designers.

9 **High occupancy vehicle** signing is also included although **HOV** operation may include private vehicles running within the specific local requirements of an HOV scheme. It should be noted that the definition of a **high occupancy vehicle**, given in Regulation 407 of the Act for signing purposes, describes a motor vehicle in which the number of occupants equals or exceeds the number indicated on the appropriate road traffic sign. Such a sign is HIGH OCCUPANCY VEHICLE RESERVATION regulatory sign R320. The number displayed on the sign may be as low as 3 (or even 2 if this is what the designers of the facility consider will result in an effective overall increase in vehicle occupancy). This display would therefore permit use by private motor cars with such a number of occupants. Alternatively a much higher number may be used to limit entry to an HOV facility to vehicles with large passenger capacities. The choice of occupancy level to be displayed is therefore entirely at the discretion of the designers of the HOV scheme. However, in terms of the definition, an HOV lane cannot be used in a peak hour "return cycle" mode by empty HOV's (see Subsection 8.5.3).

10 "Public transport" vehicles are not defined in road traffic legislation as such. If an authority wishes to provide a facility for use by vehicles which it considers to be "public transport" vehicles such a facility may be signed for use by "Authorized Vehicles". This application of public transport signing is likely to involve several classes of authorized vehicle, although the signing available does not preclude use of a facility by one class of vehicle only. AUTHORIZED VEHICLE RESERVATION signs R324, R353 or

R354 may also be used for all vehicles run by one "operator". An
"Authorized Vehicle" is defined in Regulation 407 of of the Act for signing purposes as a vehicle of an organization indicated by means of a crest, logo or other device displayed on the relevant regulatory sign. In order to manage such a facility and provide enforcement of the regulations, when deemed necessary, vehicles using the facility should be "permitted" by being required to display the same crest, logo or device used on the relevant regulatory signs. For individual identification these permits should carry a permit number unique to the vehicle. This will have the effect that the driver of a vehicle without an authentic crest, logo or device displayed shall not use the facility. This mode of operation has the advantage over the similar HOV system in that it excludes private vehicles (without permits) and it can be used for returning empty vehicles without contravening the signs.

11 By comparison the Regulations define a **motor car** as a motor vehicle, other than a motor cycle, motor tricycle or motor quadricycle designed or adapted solely or principally for the conveyance of not more than nine persons, including the driver.

12 Public transport schemes which include bus lanes or a busway within already built-up environments are likely to present complex access problems for general traffic. Such problems, in turn, are likely to require complex signing solutions. SELECTIVE RESTRICTION regulatory signs, made up as two-part signs involving the combination of a secondary regulatory message which modifies the applicability of the primary regulatory message above it, may offer acceptable solutions to many such problems (see Subsection 8.5.3 and Figures 8.30 and 8.31). The principles of SELECTIVE RESTRICTION signs are covered in Volume 1, Chapter 2 and in particular in Sections 2.1 and 2.7.

13 In order to simplify the visual information provided by road traffic signs in complex circumstances recognised symbol messages should be used wherever possible. However, some message just cannot be satisfactorily represented by symbol and limited text messages may offer the only means to communicate with drivers.

## 8.1.2 Typical Public Transport Environments

1 The signing needs of public transport extend over a wide range of environments. The following basic situations are covered in this chapter:

(a) stops and laybys;

(b) ranks;

(c) terminals (and stations);

(d) holding or parking areas;

(e) reserved lanes

(i) tram lanes;

(ii) bus/minibus lanes;

(iii) high occupancy vehicle lanes;

(iv) "authorized vehicle" lanes;

(f) dedicated roadways.

2 The need for such facilities can occur anywhere in the greater road network, including rural areas. The greatest concentration and variety is, however, likely to occur within a metropolitan area where the need to provide an attractive and effective public transport system is greatest. Figure 8.6 illustrates the manner in which many of these facilities may be distributed throughout a metropolitan area. Lanes and roadways dedicated to public transport may be used almost anywhere within the route network. As a result details and operational characteristics are likely to be very site specific. It is not practical to cover all variations which can occur. The examples given in this chapter deal with as wide a range of examples as possible. Individual schemes should be developed from the principles illustrated.

## 8.1.3 Road Traffic Signs Available

1 A large number of road traffic signs have been created to cater for the broadest needs of public transport authorities and operators. The development of this chapter has highlighted a need for several new road traffic signs. The use of these signs is included in the examples. Individual details of new signs have been incorporated into the regulations and Volume 1 and dimensional details into Volume 4. The range of road traffic signs is illustrated in Figures 8.1 to 8.5.

2 Road traffic signs for public transport facilities are provided in the following categories:

(a) road signs:

(i) regulatory signs;

(ii) warning signs;

(iii) guidance signs - including diagrammatic and occasionally direction signs;

(iv) information signs;

(v) pedestrian signs;

(b) traffic signals including special aspects for rapid transit facilities;

(c) road markings;

(i) regulatory markings;

(ii) warning markings;

(iii) guidance markings.

3 As can be seen from the applications covered by the examples in Sections 8.2 to 8.5 the road traffic signs most commonly used tend to be dictated by the type of environment in which they are required (see paragraph 8.1.2.1).

4 The large range of signs available, particularly of regulatory signs, can make selection of the appropriate sign difficult on occasions. The examples in Sections 8.2 to 8.5 should clarify the options available. However, it may be particularly difficult to decide whether the signs required should come from:

(a) the mandatory COMMAND R100 series (circular signs with a blue background and white symbol(s) and border); or

(b) the conditional RESERVATION R300 series (rectangular signs with a blue background and white symbol(s) and border, plus the letter "R").

5 The functional difference between these sign series' is indicated by the use of the terms "mandatory" and "conditional".

Simply, the use of **the mandatory sign means that the class or classes of public transport vehicle concerned must pass the sign and not proceed on any other road or portion of road.** The road or portion of road covered by the sign **must also not be used by any other class of vehicle than that displayed.**

**The reservation sign has a very similar meaning but allows drivers of the class of public transport vehicle indicated on the sign to choose between using the reserved section of roadway or the rest of the roadway** (they may wish to turn to the right for instance, which may not be possible from the reserved position). **The road or portion of road covered by a reservation sign must, however, still not be used by any other class of vehicle than that displayed.**

6 The choice between using R100 series signs or R300 series signs therefore tends to rest on the degree of exclusivity of the public transport facility. As a general rule the R300 series should be preferred as it offers a wider operational flexibility, including shared facilities, if required.

7 Since SELECTIVE RESTRICTION signs are likely to be commonly used for public transport signing a selection of typical selective restriction signs is given in Figure 8.4.

8 In metropolitan areas it is likely that sophisticated and complex demands will be placed on the road traffic signing system by public transport schemes. These demands are likely to stem from the development of rapid transit systems which allocate portions of streets or whole streets for the exclusive use of public transport vehicles. Where such schemes are superimposed on an existing street network one or both of two operational factors will commonly occur, namely:

(a) the so-called "exclusive" street or portion of street will, in fact, have to be shared:

(i) by more than one class of public transport vehicle (see Figure 8.3); and/or

(ii) with local residents (or other members of the public needing access to the properties otherwise cut-off by the mode of operation);

(b) the very nature of "rapid transit" operation makes the risk of conflict between public transport vehicles and pedestrians potentially significantly greater than under normal traffic conditions.

9 The sharing of a facility by more than one class of public transport vehicle can be catered for by the available range of appropriate regulatory signs or by use of selective restriction signs tailored to the specific needs of local access circumstances (see Figures 8.3 and 8.4). **It may be necessary in some situations to display two complementary signs to achieve a clear, legally enforceable message.**

10 Rapid transit schemes are also likely to require special traffic signal control at junctions in the system. In order to allow for signal phasing catering for specific vehicle types additional signal aspects have been provided for bus control and light rail vehicle control respectively. These signal aspects retain the format of existing traffic signals S1 to S10 and S13 to S15 but if they include aspects for buses or trams (light rail vehicles) should be identified by the addition after the number of the letter B (bus) or T (tram) e.g. S1B (see Figure 8.5).

11 When a lane, instead of a whole street, is allocated to public transport **the legal force of this provision is given by an appropriate regulatory sign and road marking together.** One or the other on their own will not have the correct legal significance (see Figures 8.26, 8.29 and 8.31). Figure 8.5 shows a selection of road markings appropriate to public transport operation.

12 Concentrations of public transport vehicles into platoons, possibly moving relatively quickly, or even in a "contra-flow" situation make gap judgement and speed judgement difficult for pedestrians. High levels of control may therefore have to be exercised over pedestrian crossing movements. Such design features may require special signing directed at pedestrians. Examples of typical diagrammatic signs are given in Figure 8.4. In addition signing specifically for pedestrians will be particularly relevant within and adjacent to transport terminals, in particular those terminals offering a change of transport mode (see Figure 8.21).

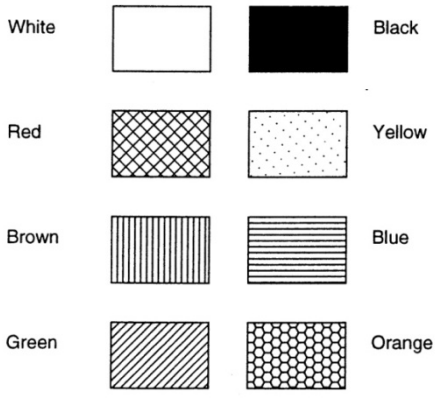
13 The signing system available has sufficient flexibility that, if an authority wishes to control different public transport operators using the same route or facility, this may be achieved by means of secondary message signs used with regulatory signs (selective restriction signs). Bus stop signs in particular may realise this objective by means of the display of the operators logo on the signs.

14 A limited number of information signs are also available to supplement the more frequently used regulatory or guidance signs. The use of SUPPLEMENTARY PLATE signs IN 11 may commonly be warranted and other signs may be used to identify facilities such as park-and-ride areas (see Volume 1, Chapter 5). Details 8.4.4 to 8.4.6 in Figure 8.4 illustrate a range of options for the use of supplementary text messages to, particularly, assist pedestrians. Such use of text messages is optional. The use of English language messages is likely to have the most universal effectiveness, however, the use of other official languages is not precluded.

## 8.1.4 Road Traffic Sign Colour Indication

1 The chapters of Volume 2 of the South African Road Traffic Signs Manual (SARTSM) are not prepared in colour. Relevant examples used to illustrate appropriate signs, signals and markings are shaded in a black and white coding which is illustrated below.

2 The basic principles of the road traffic sign colour coding system are shown, in colour, in the SADC-RTSM Volume 1, Chapter 1, Section 1.4, and in the Contents sections of relevant Volume 1 and 4 Chapters.




R118


R119


R120


R121

R129


R134


R135


R136


R138


R139


R140

Detail 8.1.1 Public Transport Mandatory Command Signs
(including those for shared facilities)


R224


R225


R226


R227

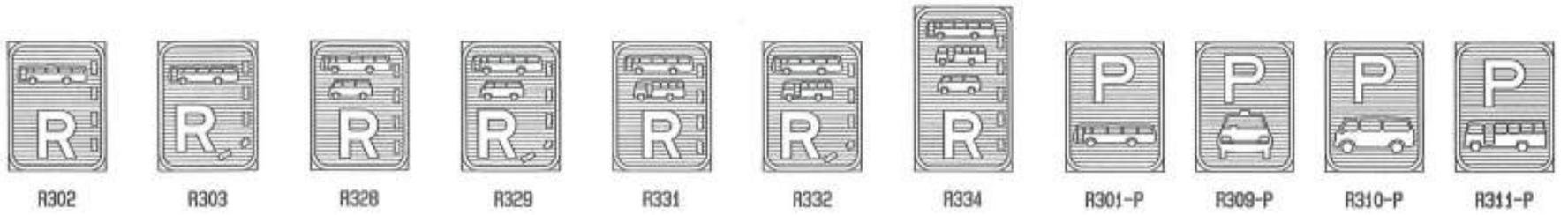
R235

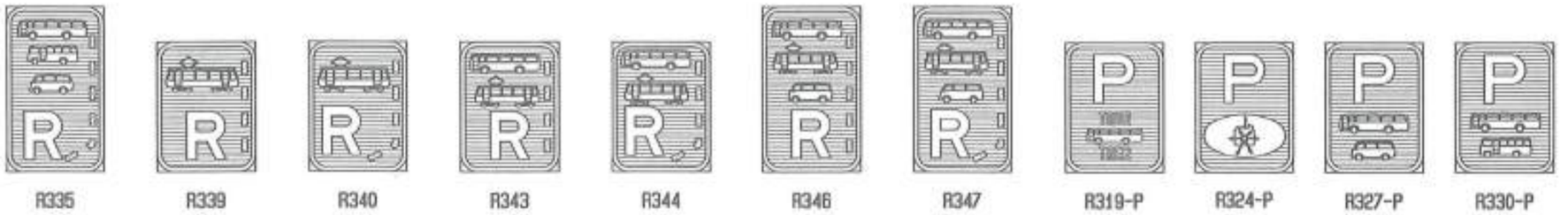
Detail 8.1.2 Public Transport Mandatory Prohibition Signs

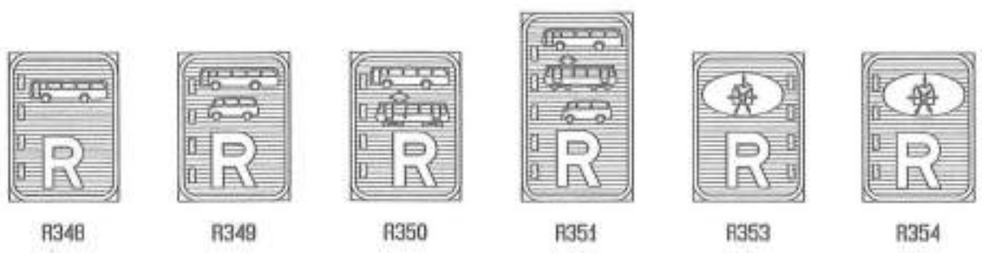
**Fig 8.1 Mandatory Regulatory Public Transport Signs**


Detail 8.2.1 Public Transport - Basic Reservation Regulatory Signs


Detail 8.2.2 Public Transport Reservation Regulatory Signs - Shared Facilities

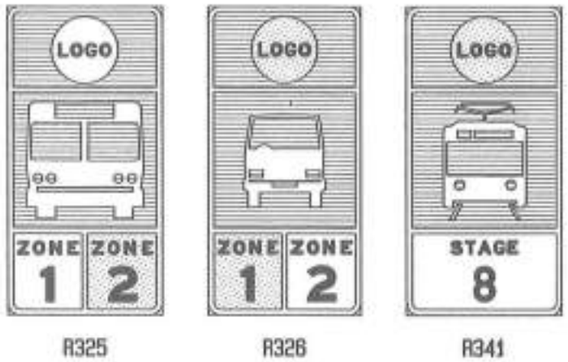


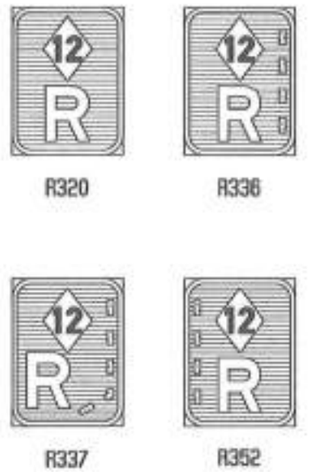




Detail 8.2.3 Public Transport Reservation Regulatory Signs for Lane use Control


Detail 8.2.5 Parking Reservation Signs




Detail 8.2.4 Stopping Place Signs

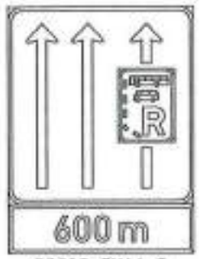



NOTES:

1. The above signs are not exclusively for public transport vehicles. Subject to the number displayed on the sign, private vehicles may use the facility provided they are carrying the appropriate number of passengers.
2. 'Beginning of Lane' signs are not shown for right side lanes since these lanes will commonly be signed using overhead signs (see Figure 8.3). If such signs are required they can be produced as a mirror image of the left lane sign (see also Volume 4).
3. Refer also to Subsection 8.1.1

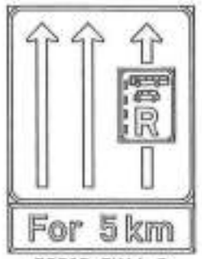
Detail 8.2.6
High Occupancy Vehicle Reservation Regulatory Signs

**Fig 8.2**
**Reservation Regulatory Signs**



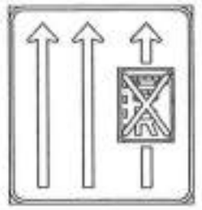

GS309+IN11.3

Typical sign used in advance of start of exclusive use lane




GS309+IN11.2

Typical sign used at intervals along an exclusive use lane



GS309-600

Typical sign to indicate the end of an exclusive use lane

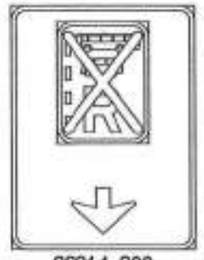
Detail 8.3.1 Typical Ground Mounted Diagrammatic Lane Use Control Signs


GS613

Typical sign used in advance of start of exclusive use lane


GS612

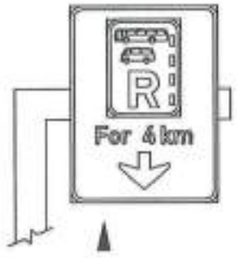
Typical sign used at intervals along an exclusive use lane



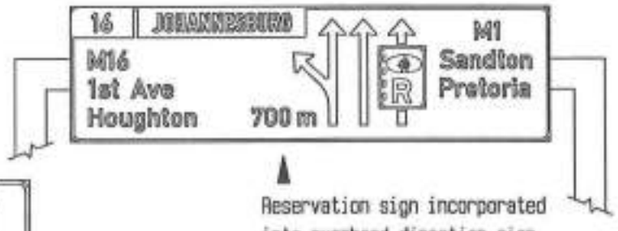
GS614-600

Typical sign to indicate the end of an exclusive use lane

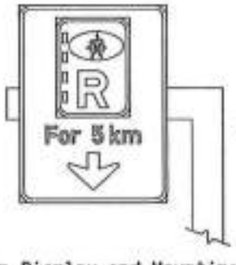
Detail 8.3.2 Typical Overhead Diagrammatic Lane Use Control Signs




Left side lane sign - cantilever mounted overhead




Reservation sign incorporated into overhead direction sign on gantry




Right side lane sign - cantilever mounted overhead

Detail 8.3.3 Overhead Sign Display and Mounting Options

**Fig 8.3 Other Public Transport Regulatory Signs**


R129-502


R201-583

R210-560


R301-501


R301-522


R301-534

Detail 8.4.1 Typical Selective Restriction Signs

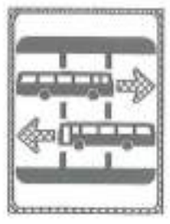
W361

W362

Detail 8.4.2 Advance Warning Signs

GS701

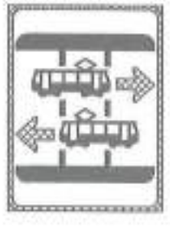
GS702



GS703

GS704

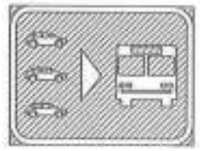
GS705



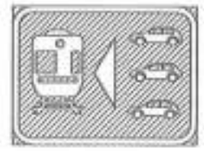
GS706

Detail 8.4.3 Diagrammatic Signs

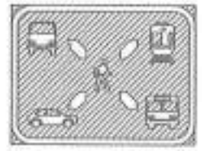

IN16



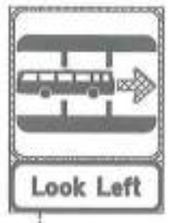
IN9



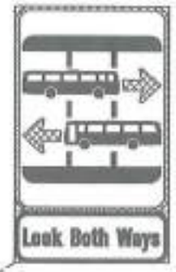
IN10



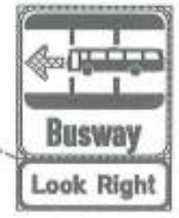
IN19

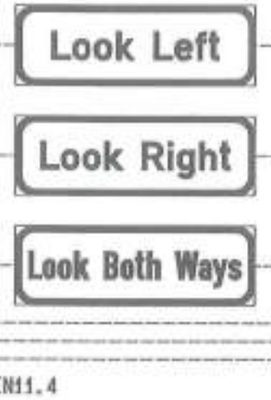











IN11.4

Detail 8.4.4 Information Signs


R301-522/IN11.4

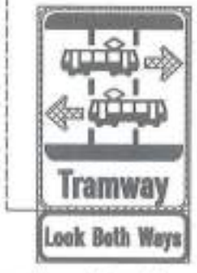
Selective Restriction/
Information


GS702


GS704

Diagrammatic/
Information

Detail 8.4.5 Sign Combinations-1

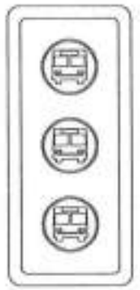



Examples of Supplementary Plate IN11
Options - Primarily for Pedestrains

Detail 8.4.6 Sign Combination-2

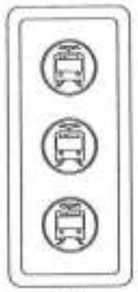
**Fig 8.4**
**Other Road Traffic Signs for Public Transport - 1**

Buses

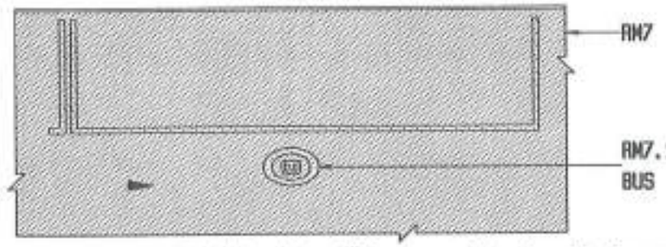


S1B

Trams

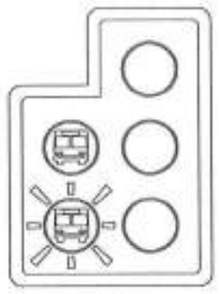


S1T

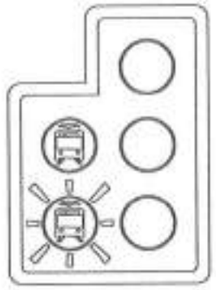



EXCLUSIVE PARKING BAY marking RM7 appropriate for all classes of public transport vehicle

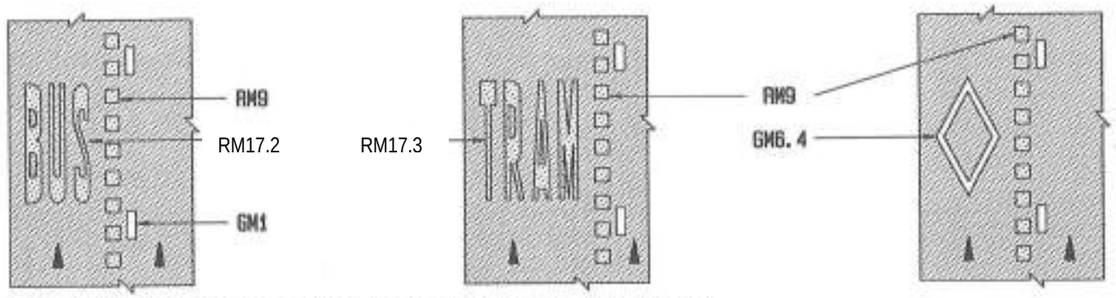

Mini Bus Taxi



S9B

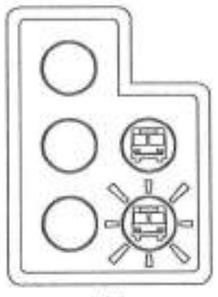


S9T



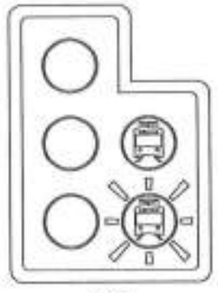

EXCLUSIVE USE LANE LINE RM9 appropriate for Bus Lanes, Shared Public Transport Lanes, Tram Lanes or High Occupancy Vehicles (HOV) Lanes (and Bicycle Lanes)

Special Signal Heads For Busway Control



S8B

Special Signal Heads For Tramway Control

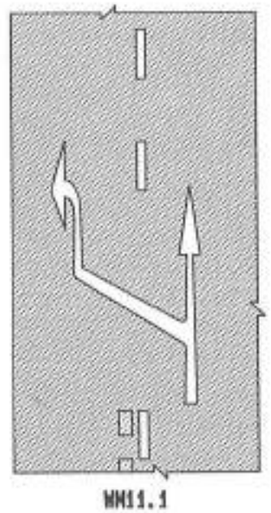


S8T

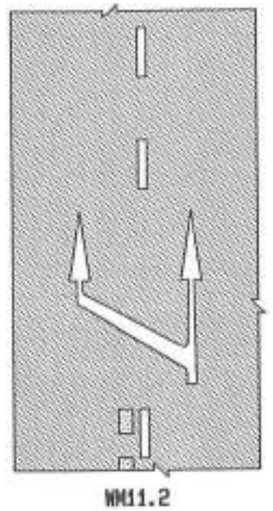
Detail of Signal Aspect Symbol - Buses

Detail of Signal Aspect Symbol - Trams

Detail 8.5.1 Special Traffic Signals for Public Transport



WM11.1

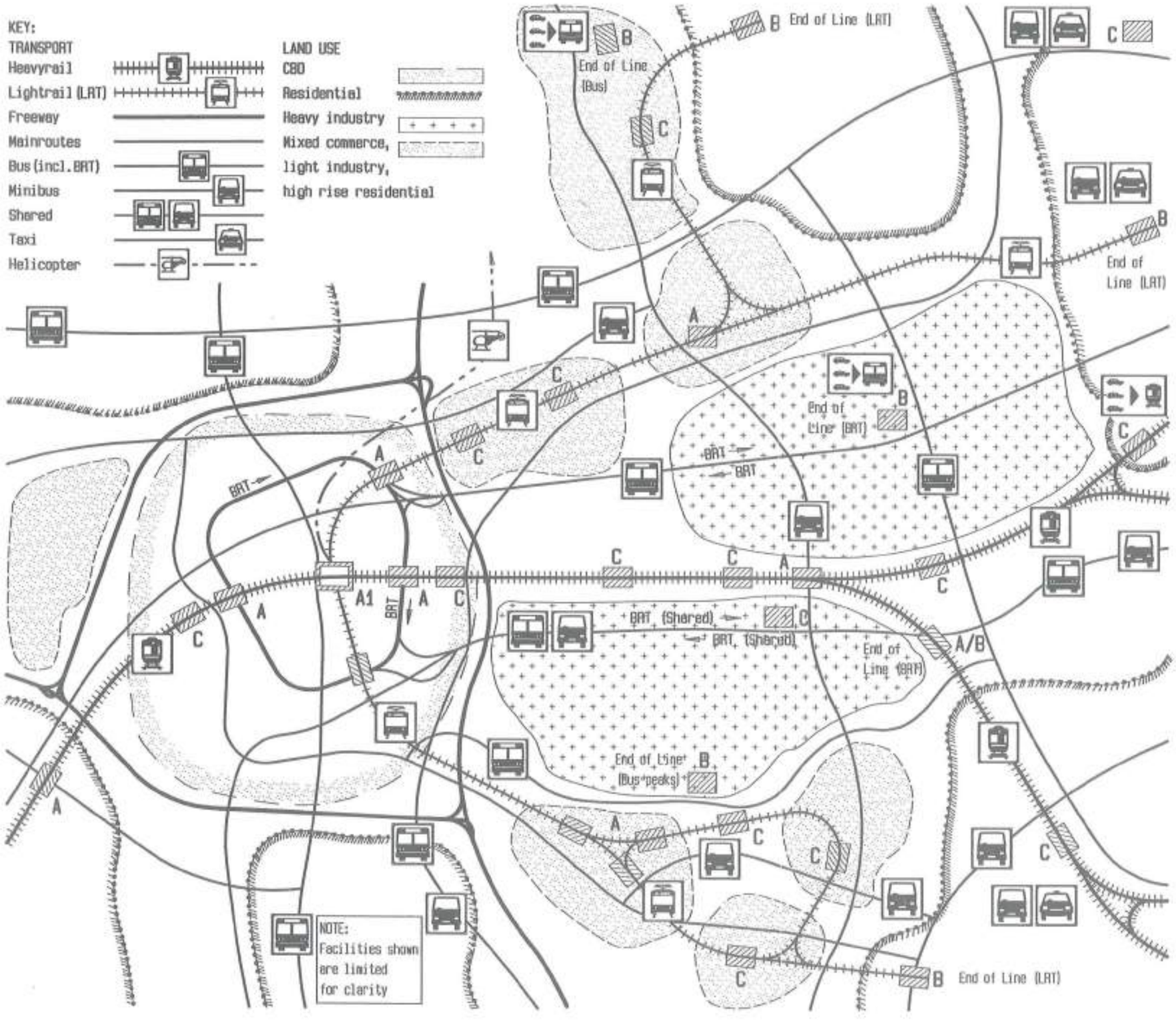


WM11.2

END OF EXCLUSIVE USE LANE arrow markings WM11.1 and WM11.2
WM11.1 for local interruptions of lane - WM11.2 for final end of lane

Detail 8.5.2 Road Markings for Public Transport

**Fig 8.5**
**Other Road Traffic Signs for Public Transport - 2**




## 8.1.5 Notes on Figure 8.6

1 This figure illustrates many of the characteristics of a well-developed public transport system in a large metropolitan area. It shows how various types of public transport may be integrated to provide a conglomerate public service.

2 The transport system illustrated includes the following elements:

(a) heavy rail lines;

(b) light rail lines (LRT);

(c) bus rapid transit (BRT);

(d) bus routes;

(e) minibus services;

(f) taxi ranks.

3 Where these various modes interconnect a terminal facility designed for modal interchange is provided (identified by **A**). In addition each line of the more formal service modes has a remote "end of line" terminal (identified by **B**). The balance of the system is serviced by strategically located terminals (identified by **C**) and conventional stops (not indicated).

4 Terminal types **A** and **B** in particular may also be commercial centres in which the transport facilities are integrated with shops. The signing needs within such a terminal will therefore be largely pedestrian oriented but they will utilize the same symbols as are used on road traffic signs. Road traffic signing as illustrated by the examples in this chapter will occur in the streets and ranks around the periphery of such a terminal. When the terminal, such as **A1**, is served by virtually all modes of transport it is likely that vehicle class control will be common at street level in order to operationally segregate the different road based modes. In a large terminal it may be necessary to provide regional or area directions.

5 Road traffic signing requirements at "end of line" terminals of type **B** are likely to be limited to the provision of bus and minibus stop signs. However as soon as more than one mode utilizes a facility the need for a measure of segregation by class is likely to occur.

6 The formal (rail, LRT, BRT) and informal (minibus, taxi) modes will interface most directly at type **C** terminals where facilities such as park'n'ride are likely to be encouraged. Commercial development at these terminals is likely to be more informal.

7 Components of public transport infrastructure which are likely to require the greatest concentration and complexity of signing are road based formal routes. In particular the signing levels will be high when the transport mode is given some degree of priority over other traffic or in a shared or exclusive mode of operation.

**Fig 8.6**
**Typical Distribution of Public Transport Facilities**

# 8.2 SIGNING APPLICATIONS FOR STOPS

## 8.2.1 General

1 Public transport stops may be required almost anywhere along a recognised route. Policy on the siting of stops is outside the scope of this chapter. For convenience generally in this text reference is made to bus stops. Such references are equally appropriate for minibus stops or tram stops. **A "stop" is considered to be a place where passengers are picked up or dropped off but at which buses do not wait for any significant period of time between services.**

2 Public transport stops shall be formally identified by regulatory signs R325 (Bus), R326 (Minibus) or R341 (Tram). These signs reserve the use of the stopping place for the class of vehicle indicated on the signface. If it is desired to permit more than one class of public transport vehicle to stop at a specific place two or more signs, one for each class of vehicle, should be erected. In practice separation of stops for different classes of vehicle, by at least twice the length of a typical vehicle, is recommended. A bus stop sign may be used on its own or it may be supplemented, where necessary, by appropriate road markings (see Figures 8.10 and 8.11). Bus stop signs may be located within a section of street designated as "No Stopping" without any supplementary information, either to the bus stop sign or any NO STOPPING signs R217.

3 Public transport routes commonly commence and end at a terminus. In its simplest form a terminus can be a BUS STOP sign R325 supplemented by a plate displaying the word "TERMINUS". Buses may stand or wait at such stops in order to start their service at a scheduled time. A single terminus stop must therefore be sited with this requirement in mind. **Otherwise public transport vehicles should be discouraged from standing, waiting or parking at a bus stop sign** (see Figures 8.7 and 8.9).

4 Bus stop signs may be reserved for use by one, or perhaps two service operators, or may be made available to "ALL BUSES" (see Volume 4 - Figure 2.8). Bus stop signs may also be utilised by buses on different services operating on coincident sections of route. Such provisions must always be subject to operational safety assessment, particularly with respect to the possibility of more than one bus arriving at the stop at the same time.

5 The requirements for BUS STOP sign R325, MINIBUS STOP sign R326, and TRAM STOP sign R341 permit wide flexibility regarding the information which may be displayed with these signs dealing with for example:

(a) routes;

(b) route zones;

(c) stages;

(d) destinations;

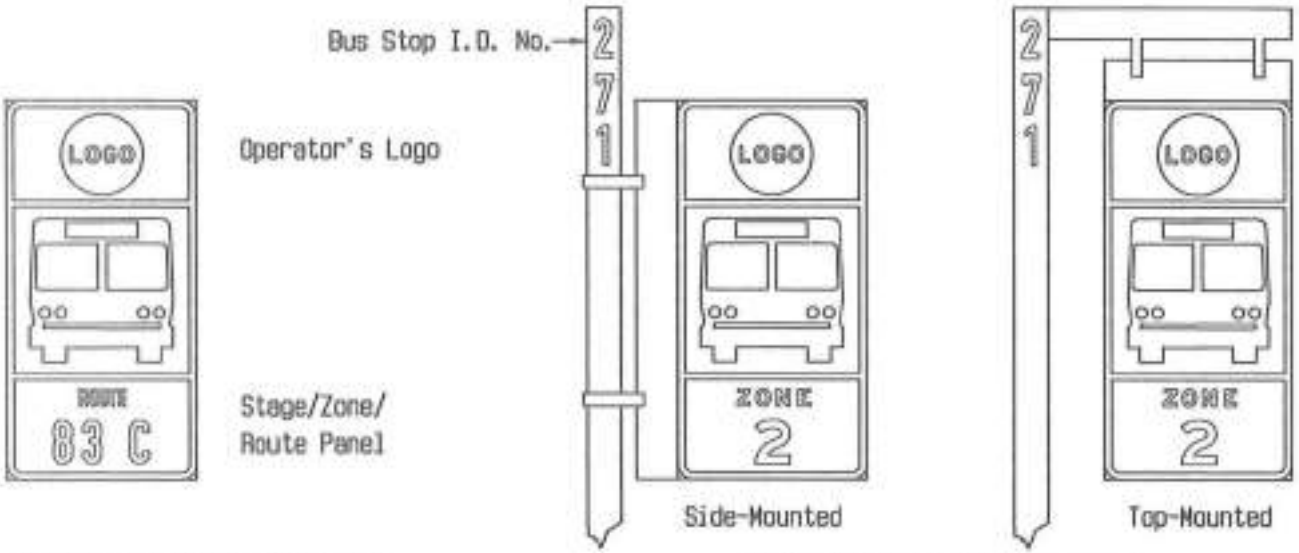
(e) operators.

Figures 8.7 and 8.8 illustrate a number of the principles involved in public transport signing and the possible sign combinations.

6 At the time of writing of this chapter, formal stopping places for minibus services are not common other than at terminal points. If the need should arise for a more formal approach appropriate signs are available. Examples in subsequent sections are included for illustration purposes.

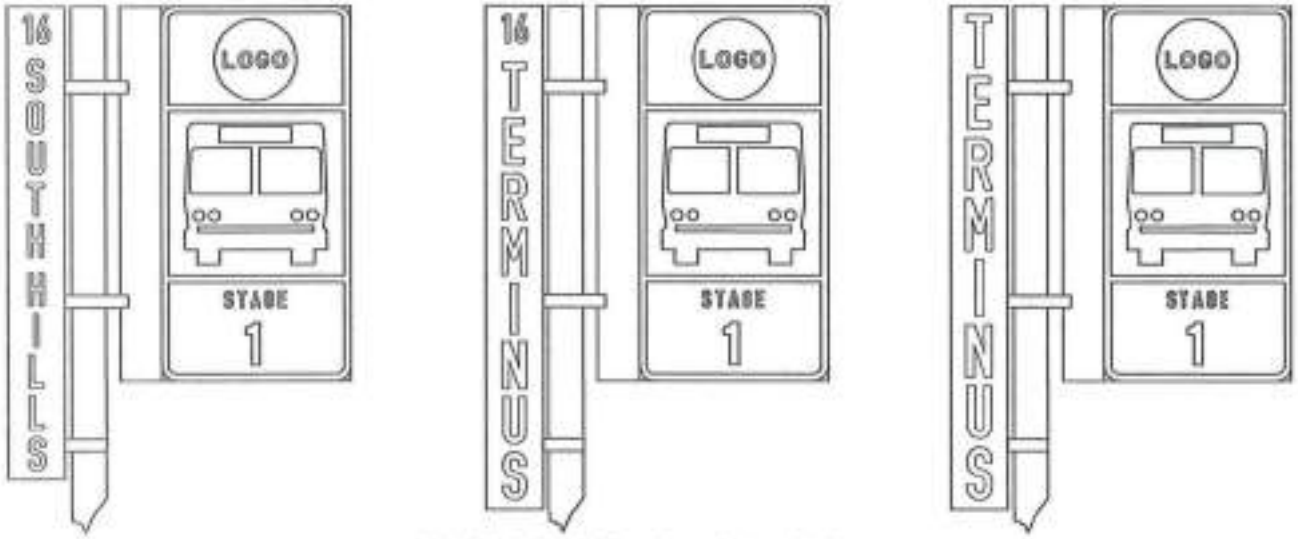
7 Figures 8.9 to 8.11 illustrate examples of typical bus stop and minor terminus locations, together with basic signing and road marking criteria.

8 If an EXCLUSIVE USE LANE facility is provided particular care should be taken in the siting of stops because it will rarely be possible for following vehicles to overtake a stopped vehicle. The use of laybys on such a facility is therefore recommended in order to maximise the lane capacity. If an exclusive lane is to be used by a range of "public transport" vehicles, as determined by the operating authority (see Subsection 8.5.3), it is recommended that when stops are required they be signed by means of BUS STOP sign R325 displaying the public transport logo, used elsewhere on the route in signs R324, R353 and/or R354 (see Figures 8.2. and 8.31).

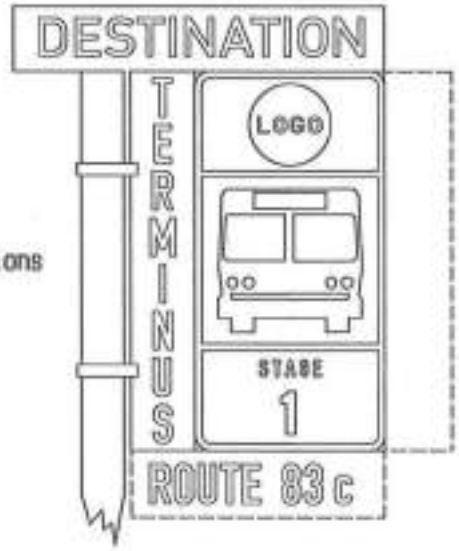



Detail 8.7.1 Basic R325 Sign

Detail 8.7.2 Mounting Options

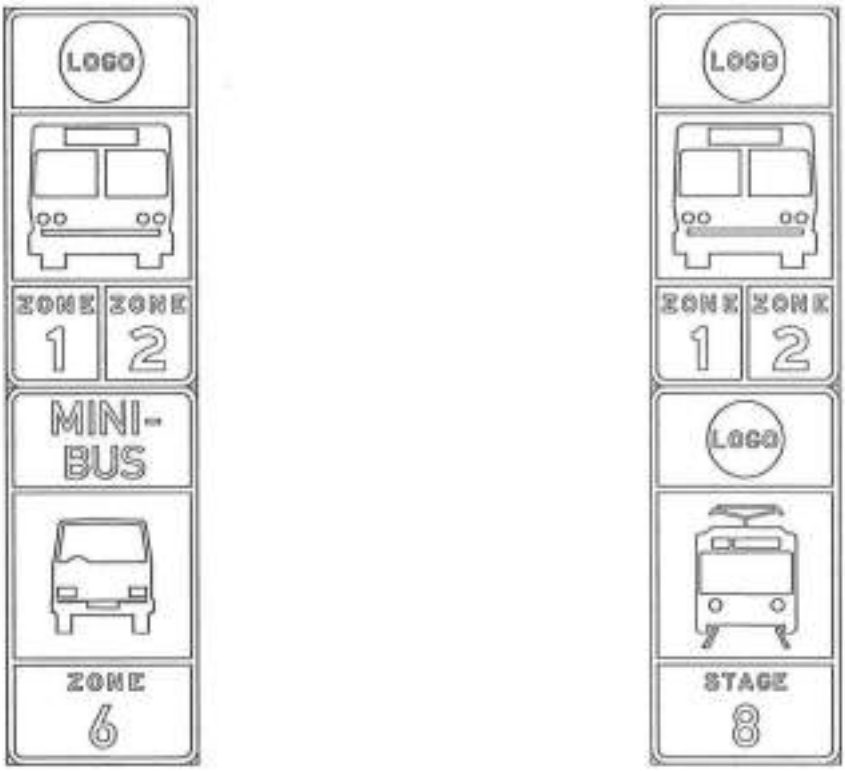



Detail 8.7.3 Terminus Stop Options
(Options : Route Number plus Name/Route Number plus "TERMINUS" / "TERMINUS" )



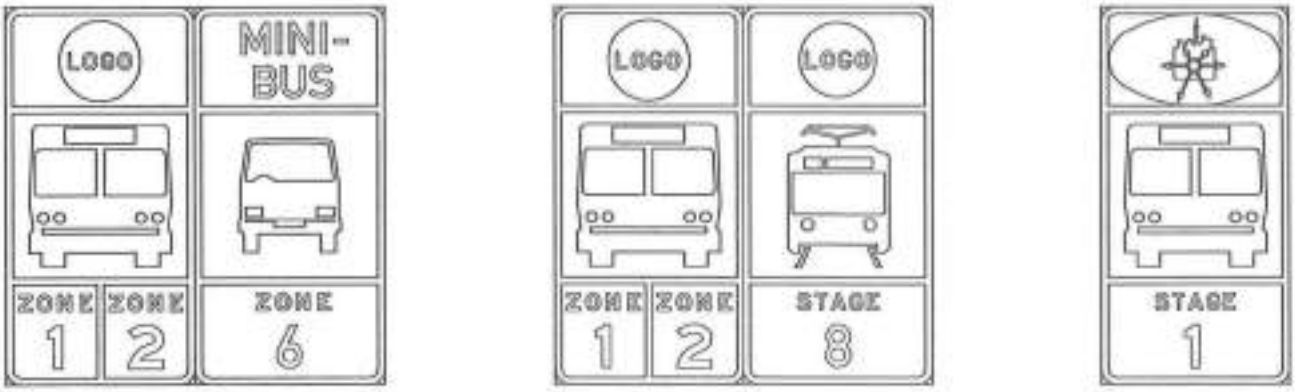

Detail 8.7.4 Information Plate Options

**Fig 8.6** **Bus Stop Signs – Permitted Variants - 1**




Bus/Minibus Bus/LRT

Detail 8.8.1 Shared Stop - Signs Mounted Vertically




Bus/Minibus Bus/LRT "Public Transport" in General - see paragraph 8.2.1.8

Sign Mounted Side-By-Side

Detail 8.8.2 Shared Stop

**Fig 8.8 Bus Stop Signs – Permitted Variants - 2**

## 8.2.2 Typical Bus/Minibus Layby Positioning and Basic Terminal Treatment

1 The details in Figure 8.9 are diagrammatic only. Whilst they imply good geometric design standards they are not drawn to specific spacing or design requirements.

2 For basic safety reasons rural bus laybys must provide for the bus or minibus to pull off the through portion of roadway. The main functions of any road traffic signing provided for the operational control of buses at laybys or minor terminals are:

(a) to control stopping places to safe locations;

(b) to identify the stopping place to bus or minibus drivers and to potential passengers.

3 Safety requirements may dictate that a stop be located in a position which is not the optimum choice of potential passengers, who, in a rural context, may have walked some distance to reach a particular junction on the route. Where necessary BUS STOP AHEAD information sign IN16 may be provided indicating an appropriate distance to the closest safe stopping place.

4 Rural bus or minibus laybys may commonly experience significant peaking of movements. Their capacity to handle the peak number of vehicles may require the use of more than one BUS STOP sign R325 (or sign R326) with an indication of the destination being served by each stop if necessary (see Figures 8.7 and 8.11).

5 Similarly a larger layby may require a greater set back from the edge of the travelled way due to the level of activity which occurs during the loading of passengers and goods (see Subsection 8.2.4).

6 In urban areas bus stops are commonly located in such a way that stopping buses obstruct traffic. When such a mode of operation becomes no longer acceptable urban authorities often provide laybys in a manner very similar to rural practices, namely away from junctions. This may be a disadvantage, however, when the street in question has trees or parking, and laybys may be difficult to provide.

7 It is therefore fairly common for bus stops to be located immediately before or immediately after a junction. Such positioning also commonly avoids the need for a layby to be provided, particularly if the rest of the street is marked with parking bays.

8 On lesser rural or urban bus routes, where bus numbers are not high, terminal facilities at the outer end of the route will commonly be provided at a bus stop. In both rural and urban situations this terminal stop must be located so that:

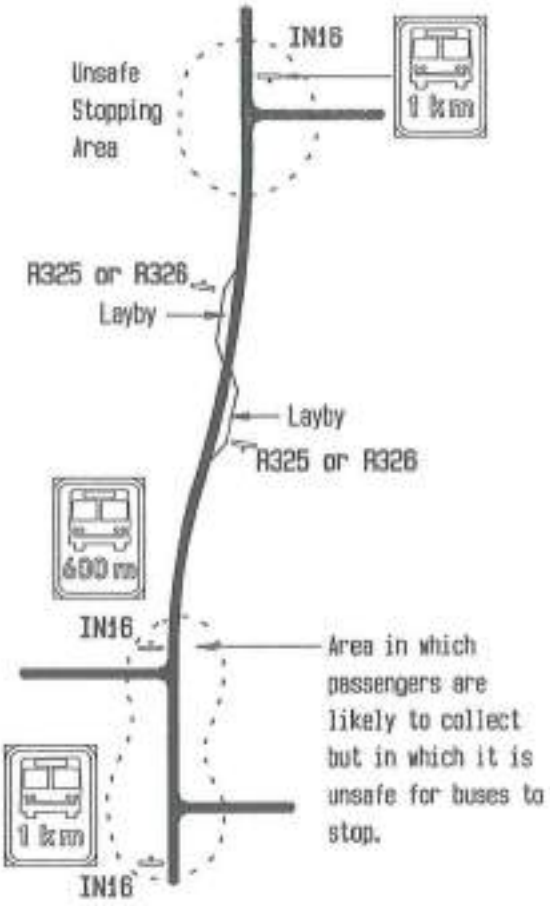
(a) buses can turn around safely without obstructing general traffic; and

(b) buses can be stopped for some time to allow drivers to rest or to wait for the scheduled time of departure on the return trip.

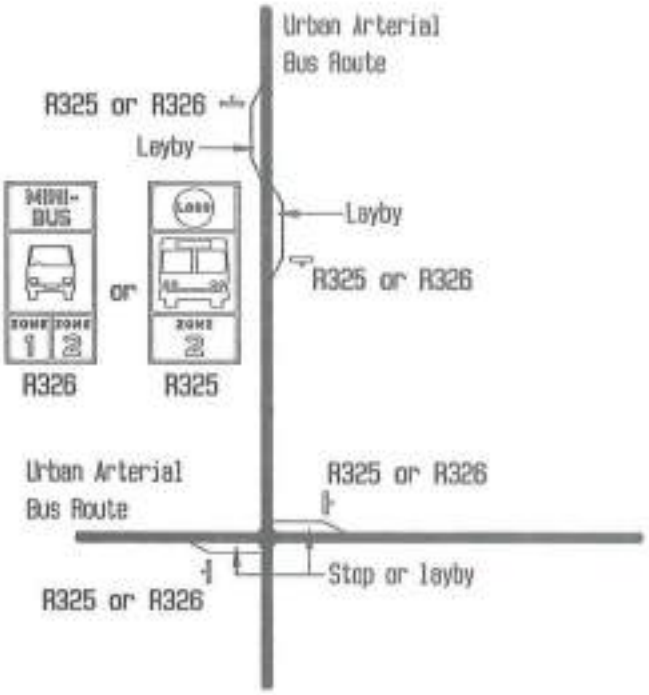
Details 8.9.3 and 8.9.4 illustrate typical examples of such terminals. Terminals are covered in more detail in Sections 8.3.

**Checklist**

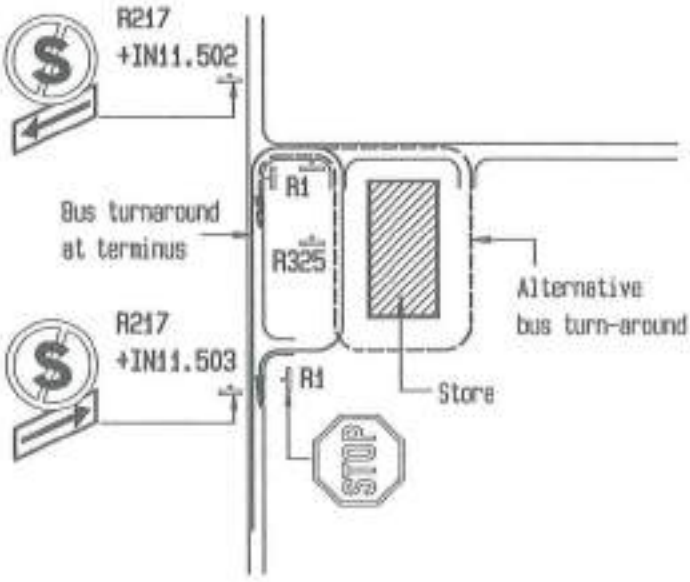
- ❑ can the stop be safely located closer to where passengers come from?
- ❑ can passengers safely cross the road in the immediate vicinity of the layby?
- ❑ are advance signs necessary?
- ❑ can buses and minibuses share a facility or not?
- ❑ do the stops need to be shared by different operators?
- ❑ are any stops shared by different routes?
- ❑ are multiple stops required?
- ❑ is the provision of a bus shelter appropriate?



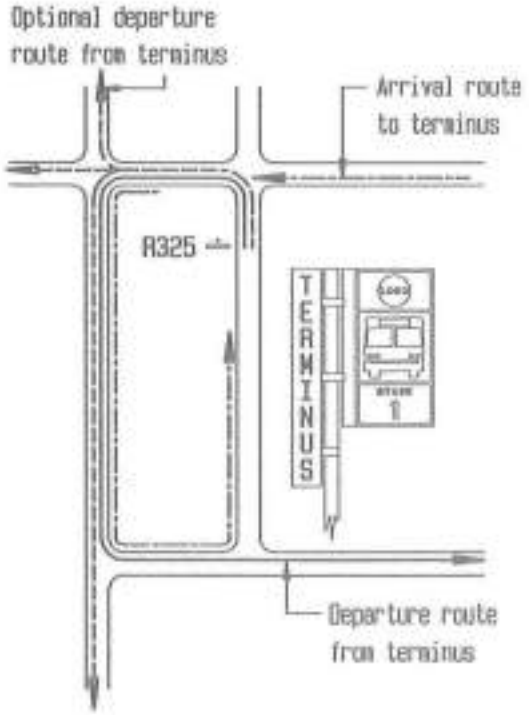

Detail 8.9.1 Rural Bus Route - Laybys and Advance Signing




Detail 8.9.2 Urban Bus Route - Layby/ Stop positions - Arterial




Detail 8.9.3 Rural Route Terminal Stop with Turn - Around




Detail 8.9.4 Urban Route Terminus/ Stop

**Fig 8.9** **Typical Bus/Minibus Layby Positioning**

## 8.2.3 Typical Bus/Minibus Laybys and Stops

1 The details in Fig. 8.10 are diagrammatic only. Whilst they imply good geometric design standards they are not necessarily drawn to a scale and should not be used as design drawings for actual laybys.

2 The basic reason for providing bus laybys is to allow for the bus or minibus to pull off the through portion of roadway to permit safe stopping and loading/unloading of passengers. In urban areas these benefits to bus operations and passenger safety may be negated by the inability of buses to re-enter the traffic stream from the layby under congested conditions.

3 It is strongly recommended that when a bus stop is provided on a rural road, even on a gravel road, sufficient space must be available for the bus to move sufficiently to the left to allow safe, free flow of through traffic. If this is not possible then the stop must be sited where visibility is such that a driver approaching the rear of a stopped bus has a clear view of any on-coming traffic.

4 Figure 8.10 illustrates a range of options for signing and marking of bus stops. Details 8.10.1, 8.10.2 and 8.10.3 are relevant in rural and urban areas although Detail 8.10.3 is only appropriate on a minor rural road if the lane is sufficiently wide that traffic will not be obstructed by a stopped bus or minibus. Details 8.10.1 and 8.10.2 show single bus stops at laybys on roads with a surfaced shoulder. Detail 8.10.1 shows a layby which is set back completely behind the outer edge of the surfaced shoulder whereas Detail 8.10.2 shows a layby which will require a stopping vehicle to occupy the shoulder or part of the shoulder. In the latter case a stopped bus represents an obstruction on the shoulder. **Since it is now permissible for drivers of vehicles to drive on the surfaced shoulder under certain circumstances when being overtaken, this type of layby must be made adequately visible to such a driver. It is recommended that the section of shoulder preceding the layby be marked with PAINTED ISLAND marking RM5 as illustrated.**

5 Bus or minibus laybys may commonly experience significant peaking of movements. Their capacity to handle the peak number of vehicles may require sufficient length to permit occupation by more than one vehicle and the use of more than one BUS STOP sign R325 (or sign R326), with an indication of the destination being served by each stop, if necessary.

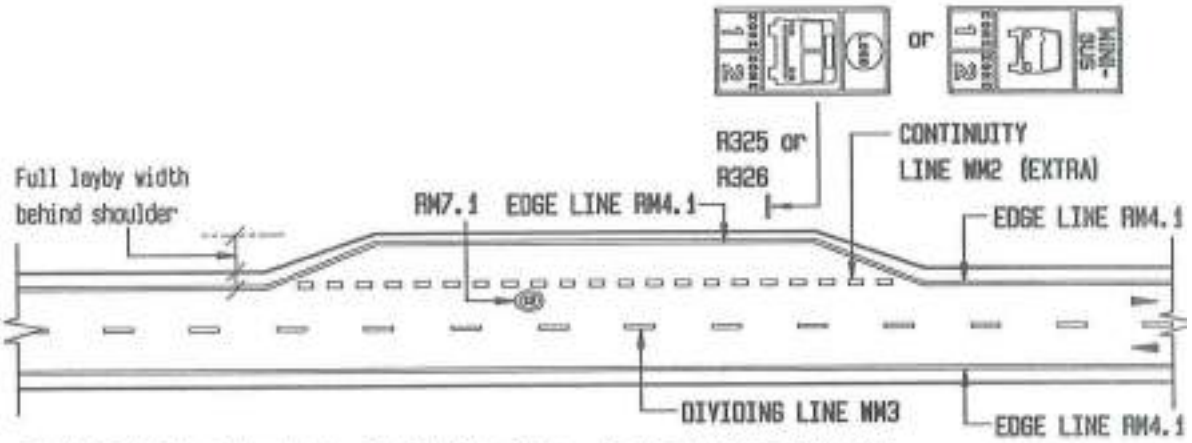
6 If an extended layby is provided so that buses, or minibuses, can arrive and depart independently of each other ie. not queue one behind the other, it is recommended that their correct stopping positions be individually identified by signs R325 or R326 (see Figure 8.11).

7 In urban areas bus stops are commonly located on- street and are demarcated by an EXCLUSIVE PARKING BAY marking RM7. The length of marking RM7 is not fixed but it shall be greater than 6m. Appropriate supplementary oval road markings RM7.1 are optional and may be marked approximately half way along the length of the bay within the adjacent lane. When the bay is more than 30m in length two or more appropriate RM7.1 markings shall be displayed (see Detail 8.10.3).

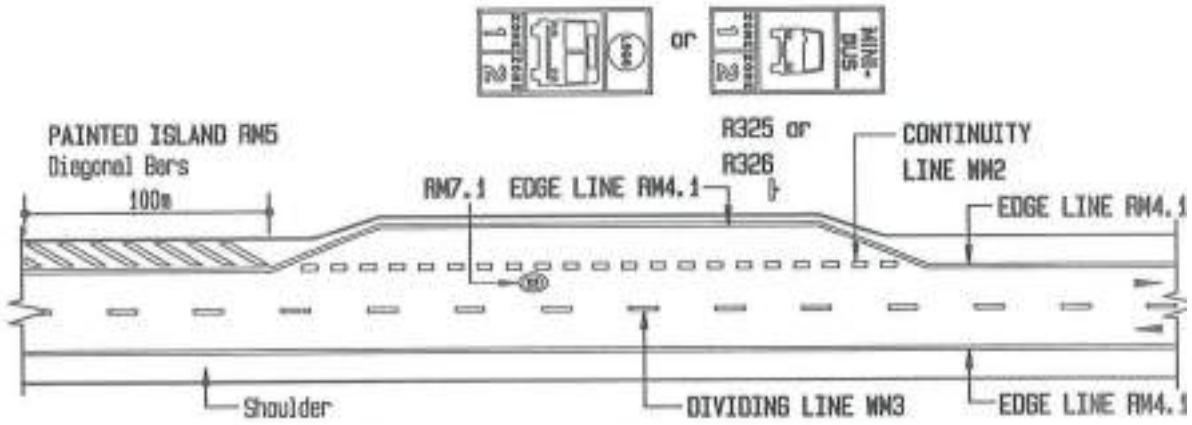
8 Detail 8.10.3 also illustrates a minimum bus stop installation commonly used in urban areas comprising sign R325 (or R326 or R341) only. The detail shows that such a sign may be located on a street in which an optional NO STOPPING LINE RM12 or NO PARKING LINE RM13 has been marked.

**Checklist**

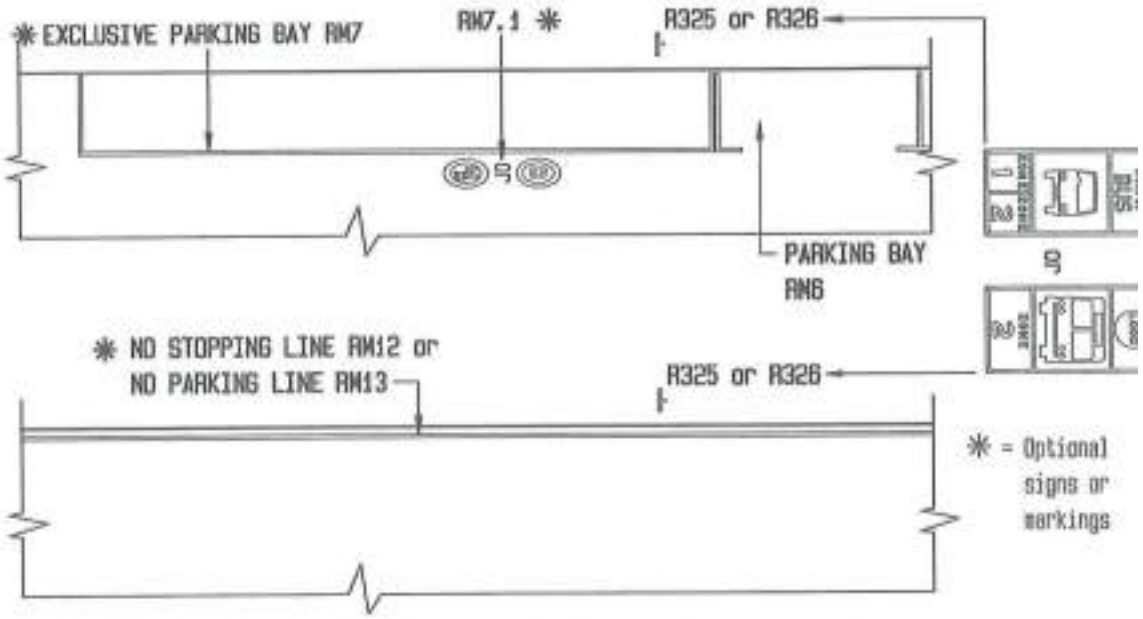
- ❑ can a bus be stopped at the stop without causing obstruction to other traffic?
- ❑ if obstruction is caused will it be safe and acceptable?
- ❑ can passengers safely cross the road in the immediate vicinity of the layby?
- ❑ can buses and minibuses share a facility or not?
- ❑ are multiple stops required?




Detail 8.10.1 Layby Fully Behind Shoulder - Rural or Urban Arterial




Detail 8.10.2 Layby Over Shoulder - Rural or Urban Arterial




Detail 8.10.3 Typical Urban Bus/Minibus Stops

**Fig 8.10 Typical Bus/Minibus Laybys and Stops**

## 8.2.4 Multiple Bus / Minibus Laybys

1 The details in Figure 8.11 are diagrammatic only. Whilst they imply good geometric design standards they are not drawn to a scale and should not be used as design drawings for actual laybys.

2 Detail 8.11.1 shows a wide long multiple bus layby which is designed to permit individual and independent bus arrivals and departures. To achieve this high operational level the individual bus stops must be sufficiently far apart to permit the entry and exit movements based on the least manoeuvrable class or type of vehicle which is likely to use the layby. This separation should be achieved by careful positioning of the bus stop signs. A multiple layby of this type must also be sufficiently wide to permit passing movements within the layby with a minimum risk of encroachment into the adjacent travelled way. A separating PAINTED ISLAND RM5 or a kerbed island is highly recommended. Detail 8.11.1 shows examples of a multiple layby on a 4-lane 2-way road and a 4-lane dual carriageway road. This type of layby can also be used on a 2-lane 2-way road when bus traffic warrants such treatment. On high-speed roads the entry and exit tapers must be correctly designed geometrically to permit safe slowing down on exit from the road and acceleration on re-entry to the road. If the layby is created over, or beyond, a surfaced shoulder the LEFT EDGE LINE marking RM4.1, which defines the edge of roadway, should be continued through the back of the layby as an edge line.

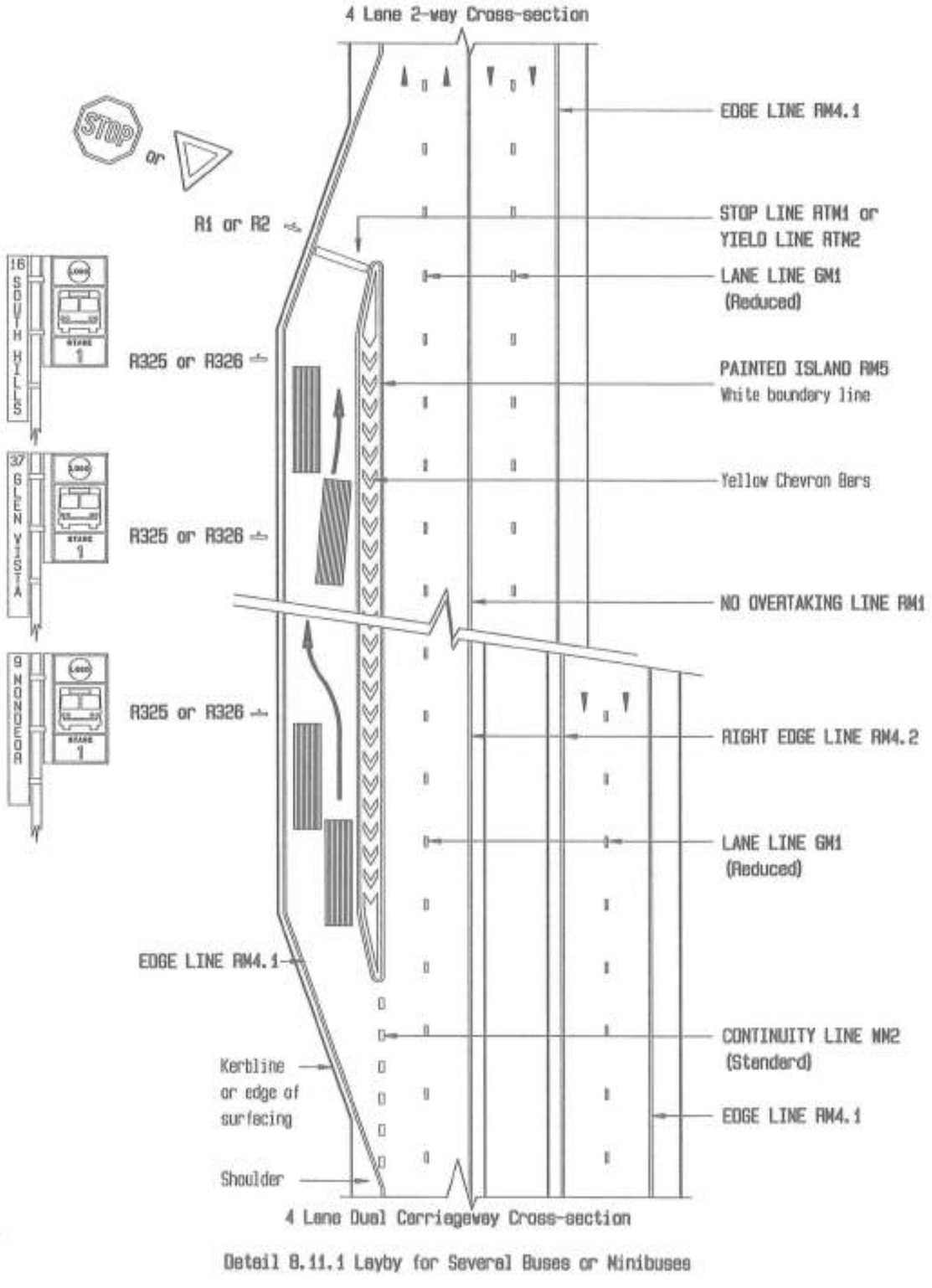
3 A multiple bus/minibus layby may therefore use more than one BUS STOP sign R325 (or sign R326) with an indication of the destination being served by each stop being available as an option.

4 Detail 8.11.2 gives detail of road signs and markings which may commonly be used in association with bus stops and laybys. It is a common feature of bus stop siting that "inbound" and outbound" stops or laybys are provided in close proximity to each other. It is recommended in such situations that the stops or laybys be staggered in a "tail-to-tail" manner as shown. This arrangement is particularly relevant on 2-lane 2-way roads to eliminate the risk of collisions between buses exiting simultaneously from both laybys. The separation can be increased further if volumes of pedestrians should warrant crossing facilities.

5 Detail 8.11.2 also illustrates the recommended separation of laybys provided for different classes of public transport vehicle. In this detail the DIVIDING LINE marking WM2 could commonly be replaced by a NO OVERTAKING LINE marking RM1 or a NO CROSSING LINE marking RM2. The indicated NO STOPPING LINE marking RM12 is recommended to continue through laybys for buses and/or other public transport classes of vehicle, and may be extended further to suit specific site requirements.

**Checklist**

- ❑ are opposite flow laybys correctly staggered?
- ❑ do different classes of public transport vehicle need to be catered for?
- ❑ how many destinations are to be served?
- ❑ are buses or minibuses required to pass each other within the layby?
- ❑ is a LEFT EDGE LINE marking RM4.1 provided on the existing road?
- ❑ is NO STOPPING LINE marking RM12 required in the vicinity of the layby(s)?

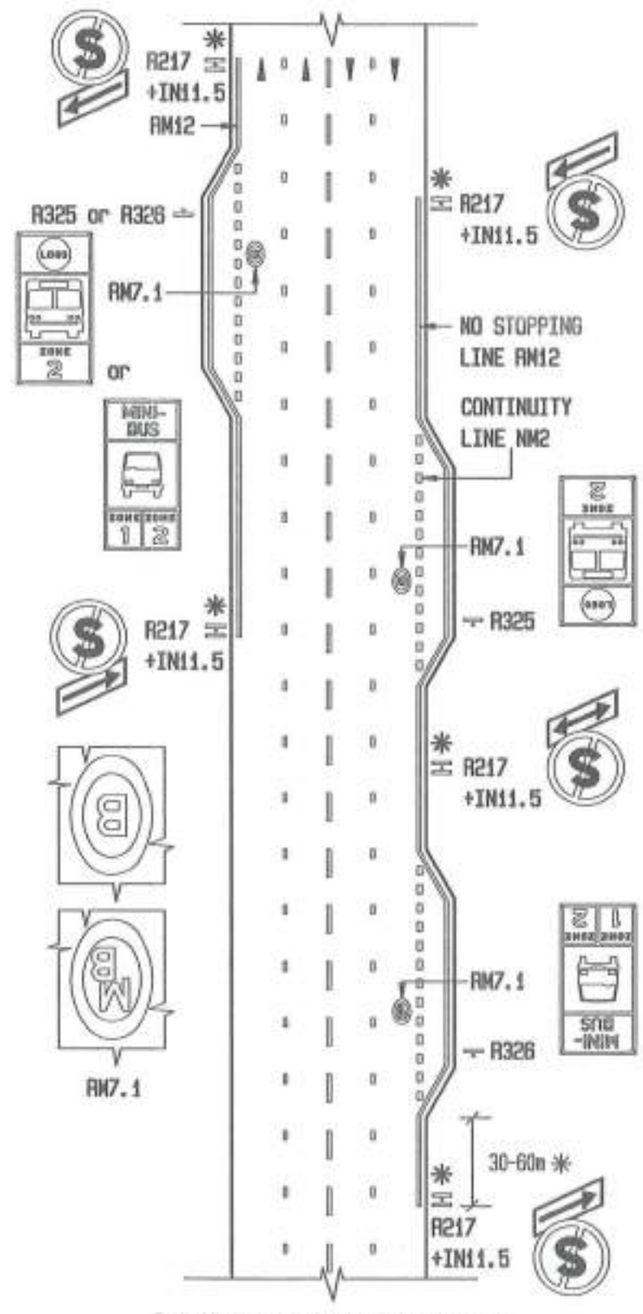



Detail 8.11.1 Layby for Several Buses or Minibuses

NOTES:

1. It is recommended that NO STOPPING LINE marking RM12 be continued through layby's when these markings are otherwise used on the section of road.
2. If a layby is placed over a shoulder or beyond a shoulder, LEFT EDGE LINE marking RM4.1 should be continued round the outer edge of the layby.
3. In Detail 8.11.2 single R217+IN11.5 signs may be placed parallel to the lateral edge of the roadway instead of the back-to-back signs placed at 90° to the road, as illustrated.

✳ = Optional signs or markings




Detail 8.11.2 Typical Layby on a Narrow Urban Arterial

**Fig 8.11**
**Enlarged Laybys and Laybys in Combination**

# 8.3 SIGNING APPLICATIONS FOR TERMINALS AND RANKS

## 8.3.1 General

1 The distinction between terminals and ranks can be considered difficult to define. Both terms are used, however, and to clarify signing and operational characteristics it can be beneficial to consider the differences. In general, in this chapter a "terminal" refers to a bus terminal and a "rank" refers to a minibus rank or taxi rank. A minibus rank may **function** as a terminal when it is located at the end of a minibus route. A modal transfer transport terminal may cater for several forms of public transport and its operation should be designed around the efficient movement of passengers between the different modes of transport. Such a terminal can provide an interface between buses and minibuses or even between heavy or light rail and road based public transport (see Figures 8.18, 8.20 and 8.22). It is the primary function of terminals and ranks to provide for large volume picking-up and setting-down of passengers. To achieve this buses and minibuses need to be segregated from normal traffic and commonly from each other. Road traffic signs, and their effective enforcement if necessary, play an important role in providing for the operational efficiency of terminals and ranks.

2 A terminal will commonly be located at the end of a route or at a point where several routes meet, cross or connect with each other. A rank may be similarly located although ranks, because they can occur on-street or off-street, may be located anywhere on a route where passenger numbers require.

3 A bus terminus handling any significant volume of buses will almost certainly be located off-street, either in a large layby (see Figure 8.16), or completely off-street with clearly defined points of entry and exit. Minor terminals on low volume routes may be located on-street provided a waiting bus will not obstruct the reasonable flow of traffic. A common design feature of a bus terminus is that buses can arrive and depart from individual stops without waiting for other buses at other stops within the terminal.

4 Minibus ranks may commonly be located on-street. Such ranks will generally be limited in size. It is becoming more common to provide off-street minibus terminals capable of handling large numbers of passengers and vehicles. An operational feature of minibus terminals and ranks, whether on-street or off-street is that they operate on a queuing principle. In such an operation several minibuses will form a queue behind each other so that only the front minibus can actually leave the queue, at which time the others may move forward and allow a new vehicle to join the end of the queue. At peak times, at the very busy terminals, it is not uncommon for platoons of minibuses to arrive, load and depart virtually simultaneously.

5 Conventional metered taxis normally operate from ranks. These are commonly located on-street within or adjacent to normal parking bays. Taxi ranks can also be located within car parks as an adjunct to "Park and Ride" operations or within the environment of a modal transfer transport terminal.

6 The operational characteristics of terminals and ranks, and their signing requirements, tend to centre around two basic locational or design features:

(a) blocking operation (queuing) or non-blocking operation; and

(b) on-street location or off-street location.

7 Public transport vehicles using urban ranks and terminals and operating commuter services should be discouraged from parking or holding at such ranks and terminals. If a need exists for parking this can be provided separately within the terminus or externally where high parking densities can be achieved (see Section 8.4). This requirement may be relaxed at terminals catering for long distance rural buses for which boarding times tend to stretch over several hours and schedules may not be adhered to very strictly.

8 For purposes of this chapter a rank for taxis or minibuses should have one or more of the following characteristics:

(a) it will be on-street;

(b) it will permit more than one vehicle to take on passengers at a time;

(c) it will permit vehicles to arrive and depart independently of each other;

(d) vehicles will not be permitted to park or hold at the rank (in this context "parking" means that the driver leaves the vehicle unattended).

9 The geometric design and size of ranks and terminals will vary significantly according to where they are located in the road network and on the size and shape of the land available to accommodate them. Terminals located close to residential areas will tend to be smaller than those located in city centres. The entry and exit signing for all should, however, conform to a common practice. **The past practice of signing the access to a bus terminus with a NO ENTRY sign R3 and an "Except Buses" information plate should be discontinued.**

## 8.3.2 Bus/Minibus Terminals

1 For the purposes of this section a bus, minibus or indeed a "transport" terminal is normally considered to be a public transport facility which requires the public transport vehicles to leave the roadway completely to drop-off or pick-up passengers. The vehicles then return to the road network to continue their service. The points of entry and exit are therefore specific and need to be clearly identifiable both in terms of the general street scene, and one from the other. The terminus for a very lightly used and/or infrequent service may, however, simply be a roadside BUS STOP sign R325 or MINIBUS STOP sign R326, suitably identified as a terminus (see Figures 8.7, 8.8 and 8.12). It is also possible that the operational and geometric design of a bus terminal may incorporate a layby stop for a specific service, or a minibus or taxi rank, on its outside perimeter.

2 The geometric and operational characteristics of bus and/or minibus terminals have a significant influence on their road traffic signing requirements. Whilst it may be argued that the drivers of public transport vehicles are essentially a "captive audience", who know their routes and terminals in detail, there is sufficient turn-over amongst drivers that clarity and safety need to be satisfied. There are also limits to what can be achieved by road traffic signs and poor geometry and/or operational characteristics cannot be cured simply by signing.

3 The functions of road traffic signs in relation to public transport terminals are therefore primarily as follows:

(a) to permit effective enforcement of regulations when necessary;

(b) to ensure the correct management of the use and operation of the terminus;

(c) to identify specific operational aspects of the terminus such as entry and exit points;

(d) to promote the efficient movement of vehicles and passengers within the terminus.

These functions are illustrated by the examples given in this section.

4 Figure 8.12 shows a medium sized bus terminus which could be expected in a residential environment at the outer end of a busy route. Such a terminal illustrates the following features:

(a) separate entry and exit points;

(b) the ability for buses to return in the direction from which they approached the terminal (in particular, but in other directions as well);

(c) the ability to handle three buses simultaneously with independence of arrival and departure - these buses can service one busy route with small headways or up to three different routes without sharing stops;

(d) a small holding area allows buses to be parked overnight for commencement of service early in the morning (subject to security this arrangement can save a length of "dead' return trip to depot).

5 Figure 8.13 illustrates three options for minibus terminal facilities in a residential environment with increasing handling capabilities shown from Detail 8.13.1 to Detail 8.13.3. Details 8.13.2 and 8.13.3 offer the ability to allow minibuses to return along the route they have used on the outward trip whereas a rank like that in Detail 8.13.1 requires that minibuses reverse their direction by a different route or by going round the adjacent street block.

6 Figure 8.14 shows one way in which bus and minibus terminals can be provided in close proximity to each other for passenger convenience and efficient provision of support services, such as toilets, and yet still achieve the desired segregation of the two classes of vehicle from a traffic management perspective.

**Checklist**

- ❑ are entry and exit points clearly identifiable?
- ❑ are control measures necessary to keep other vehicles clear of the site?
- ❑ are pedestrians adequately catered for when leaving and entering the site to or from the adjacent street network, and within the site?
- ❑ do stops or groups of stops within the terminus need to be specifically identified from each other to apply to specific services?
- ❑ can buses/minibuses exit the site freely (are traffic signals necessary to achieve this)?

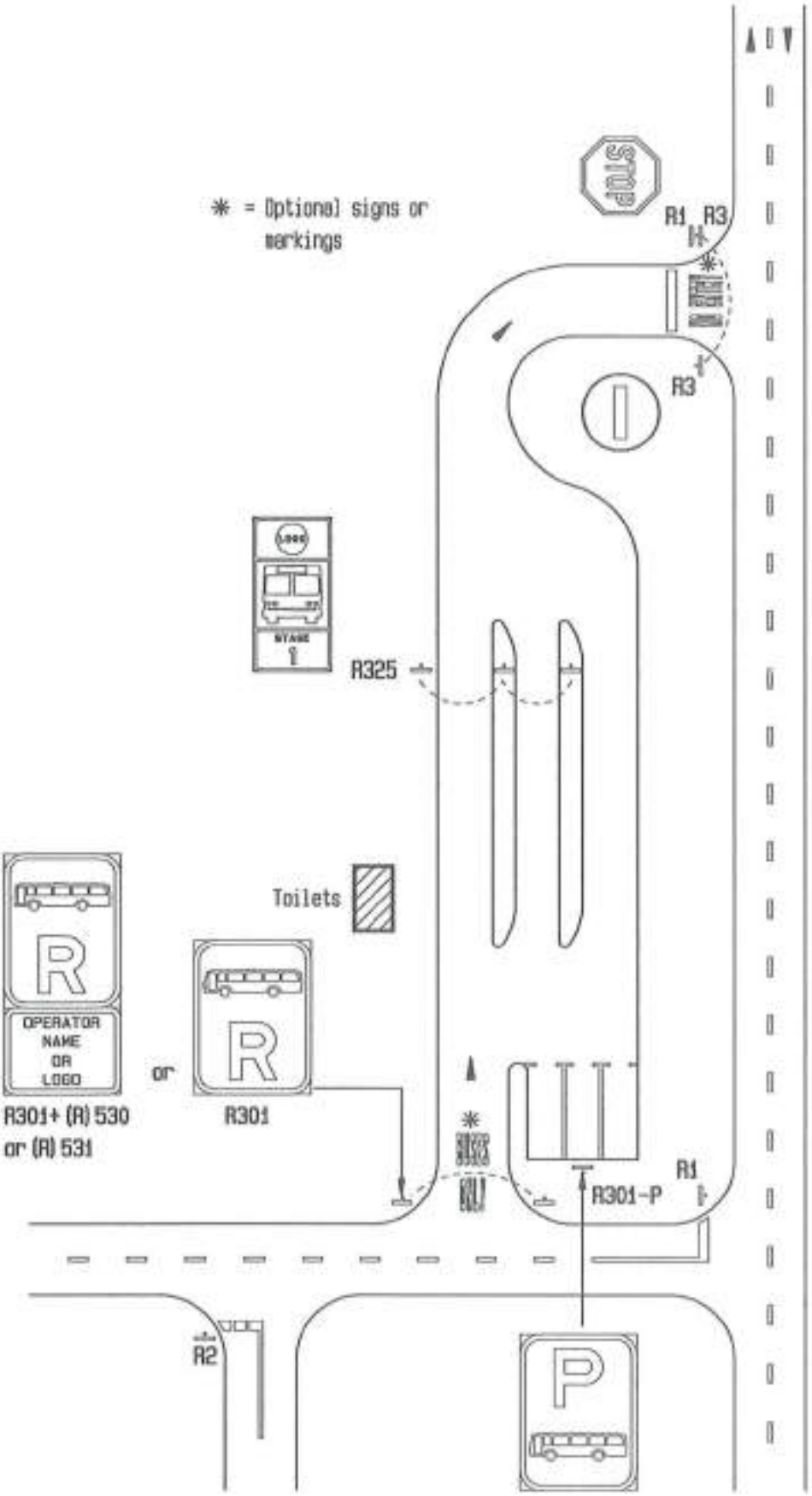
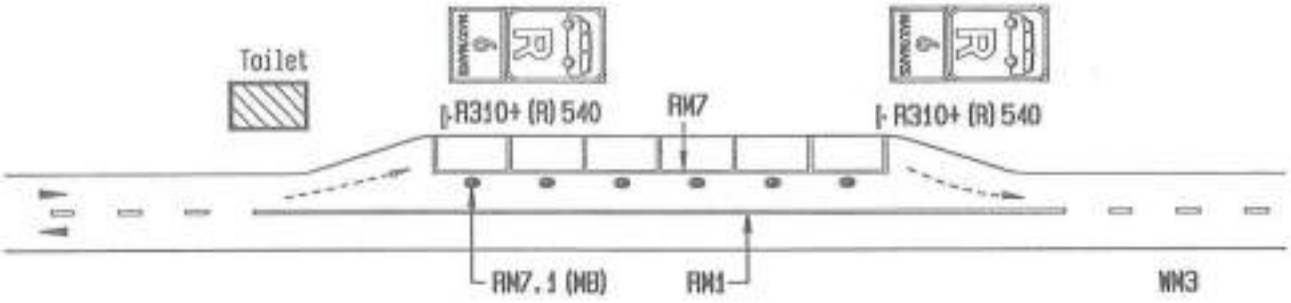
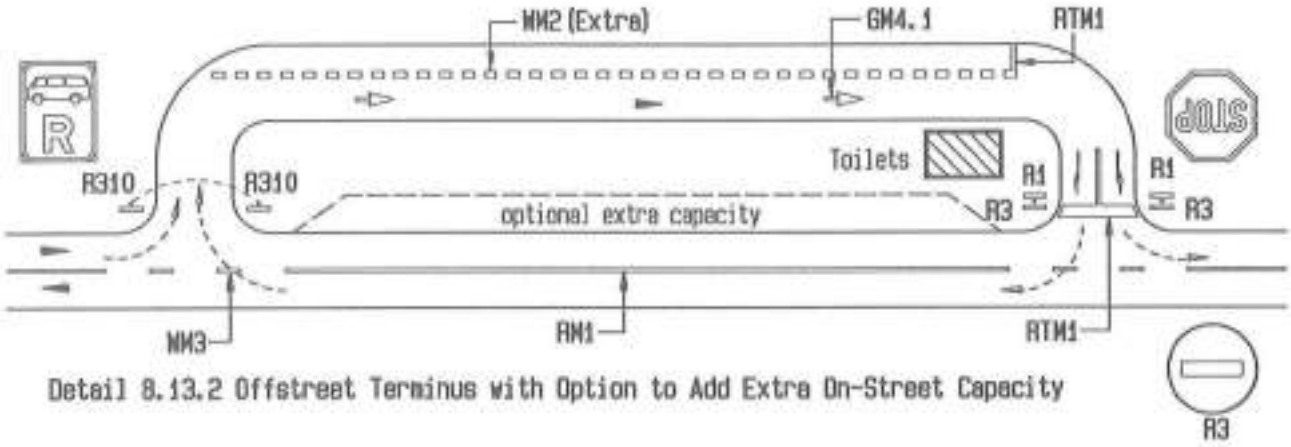


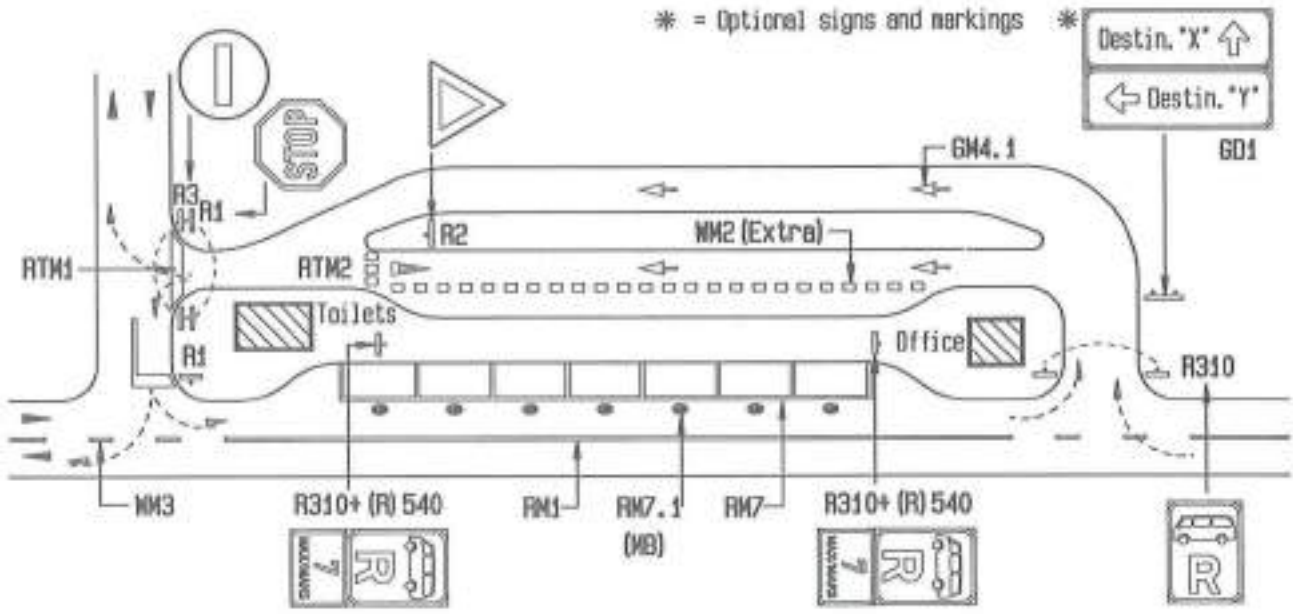

**Fig 8.12** **Typical Bus Terminal Signing – Residential Area**




Detail 8.13.1 Roadside Terminus - Maximum 6 Minibuses




Detail 8.13.2 Offstreet Terminus with Option to Add Extra On-Street Capacity




Detail 8.13.3 Larger Terminus with Option to Allocate Aisles to Destinations

**Fig 8.13 Typical Minibus Terminal Signing – Residential Area**

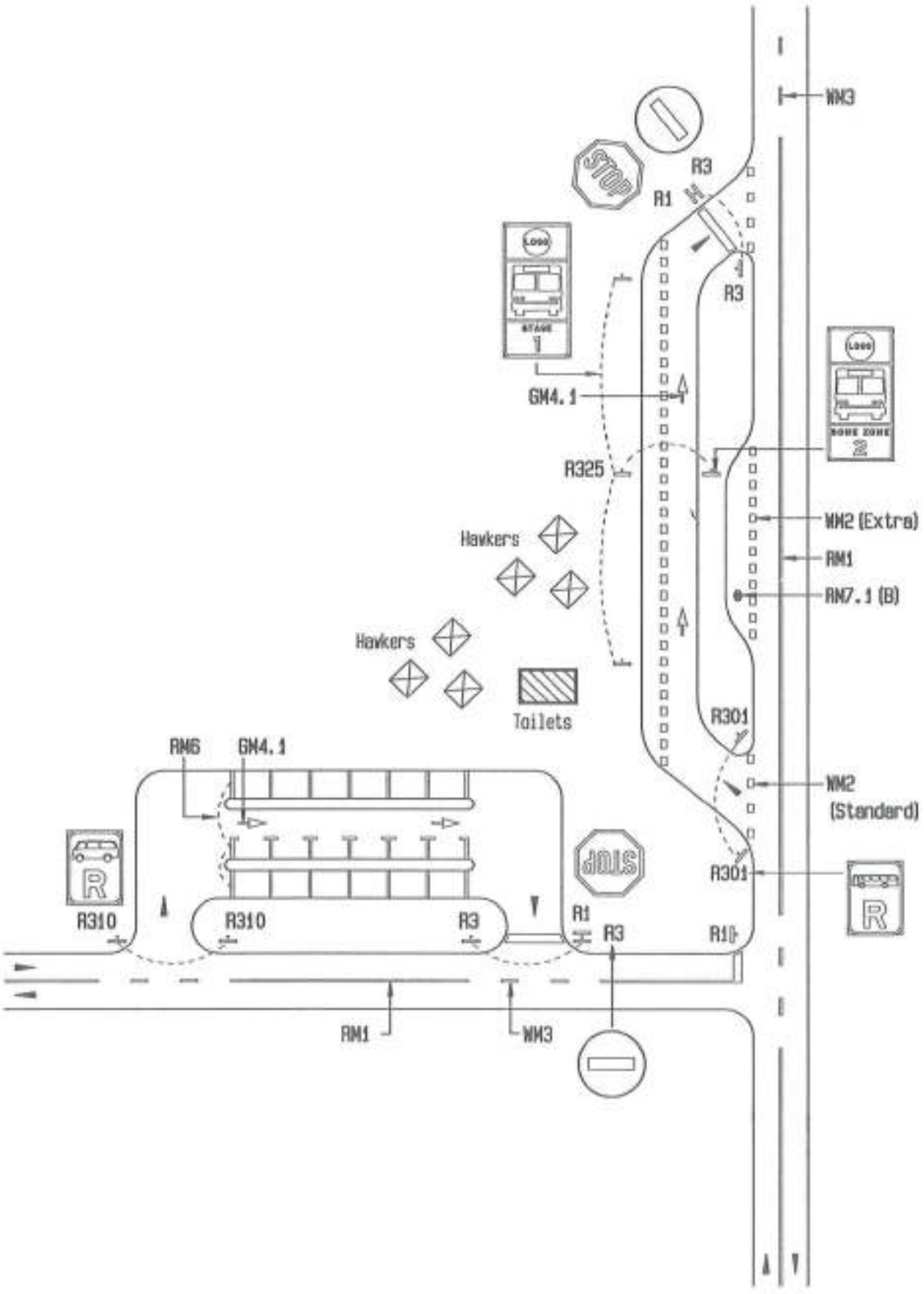



**Fig 8.14** **Combined Bus/Minibus Terminals – Residential Area**

## 8.3.3 Park and Ride Facilities

1 A "Park and Ride" terminal is a point of transfer whereby commuters park their private vehicles and transfer to a mode of public transport in order to reach their final destinations.

2 "Park and Ride" facilities are commonly associated with bus or rail operations because of the high passenger densities these modes of transport offer. If there is a requirement to cater for minibuses or taxis at a "Park and Ride" facility signs are available to cater for this. A "Park and Ride" parking area could in fact be the starting point for an HOV (high occupancy vehicle) operation.

3 "Park and Ride" facilities are normally located as close as possible to a commuter public transport route e.g. a bus route or a railway line (at a station). In order to keep walking distances to a minimum it may be desirable to divert a selected number of buses off their main route to service the "Park and Ride" area. If it is not possible to locate a parking area at a railway station it may be effective to provide a short shuttle "Park and Ride" service from a more remote car park to the station (and in the reverse direction) using minibuses or midi-buses.

4 Figure 8.15 shows the typical signing required for a Park and Ride Terminal. The ADVANCE TRANSPORT TRAILBLAZER signs are versions of signs GE9 utilizing the symbols from information PARK AND RIDE signs IN9 and IN10. The type of signing shown is equally appropriate to a rail related "Park and Ride" operation.

**Checklist**

- ❑ does the parking area have sufficient spare capacity to satisfy a "Park and Ride" operation?
- ❑ is the parking area clearly visible without direction signs?
- ❑ is the parking area within walking distance of a bus route?
- ❑ do buses need to be diverted to service the area?

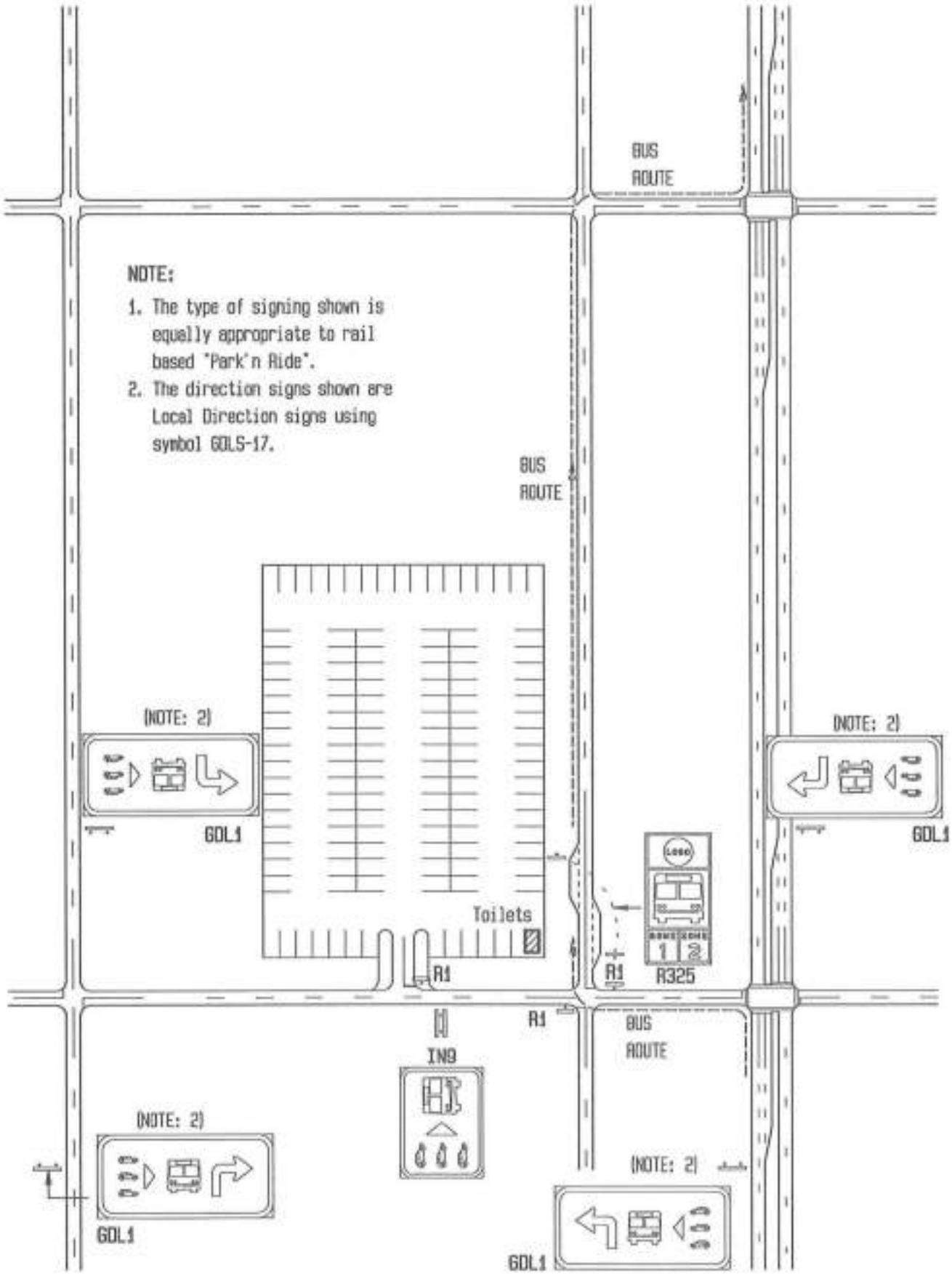



**Fig 8.15** **Park and Ride Terminal Signing**

## 8.3.4 CBD Terminal Facilities

1 Figure 8.16 shows a representative CBD bus terminal facility with the capability to provide segregated loading and drop-off areas for different bus operators internally and at bus laybys located on the adjacent street network. A number of holding bays are also provided in the terminal facility which can be clearly identified as such by PARKING RESERVATION sign R301-P. These holding or parking bays allow for buses to be held during off-peak periods or to be available in case of breakdowns. Such a terminus could ideally be located on the outer fringe of the CBD.

2 A terminus as large as that indicated in Figure 8.16 could be used in a number of ways. The larger area to the north of the site is designed to handle bus services operating to and from the north and east whereas the smaller southern area handles buses from the south. This arrangement allows interaction between the various routes. To achieve this, some sort of internal signing may be necessary for passengers. Typical examples of such signing are shown in Figure 8.21. This type of terminal could also operate very effectively as an interface between long-distance rural services and local urban commuter services. The southern part of the site is designed to cater for very large volumes of passengers on an west-to-east routing. The layby on the north side of the one way street can cater for moderate passenger volumes off peak without buses needing to enter the terminal, thus saving time.

3 All bus stopping points should be provided with BUS STOP sign R325. These may be modified to indicate various routes, regions or areas as shown in Figures 8.7 and 8.8.

4 Figure 8.17 shows a typical CBD minibus terminal facility with separate drop off and loading areas. This figure also shows a typical set of large on-street minibus ranks. MINIBUS STOP signs R326 are provided to indicate the pick-up and drop-off areas clearly.

5 Where roadside minibus ranks are provided consideration should be given to the location of pedestrian facilities in the vicinity of the ranks.

6 Figure 8.18 shows an example of a combined Bus/Minibus terminal located close to an exclusive public transport roadway and a railway station. Special attention must be paid to the signing of roads in the vicinity of such a facility, several of which may be dedicated to road based public transport use.

7 Access to segregated or shared bus and minibus terminals should be controlled by means of reservation signs such as R301, R310 or R327. Where required these signs can be combined into **Selective Restriction** signs by using **Exclusive Secondary Message** signs such as (R)522, (R)530 or (R)531.

8 This use of selective restriction signs may be extended to various prohibition signs such as R209 or R210 or even NO PARKING and NO STOPPING signs R216 and R217 by the use of vehicle class specific secondary messages.

**Checklist**

- ❑ do stops or groups of stops within the terminus need to be specifically identified from each other?
- ❑ are pedestrians adequately catered for leaving and entering the site to and from the adjacent street network, and within the site?
- ❑ are adjacent roads dedicated for road based public transport use?
- ❑ are there facilities shared by different classes of public transport vehicles?

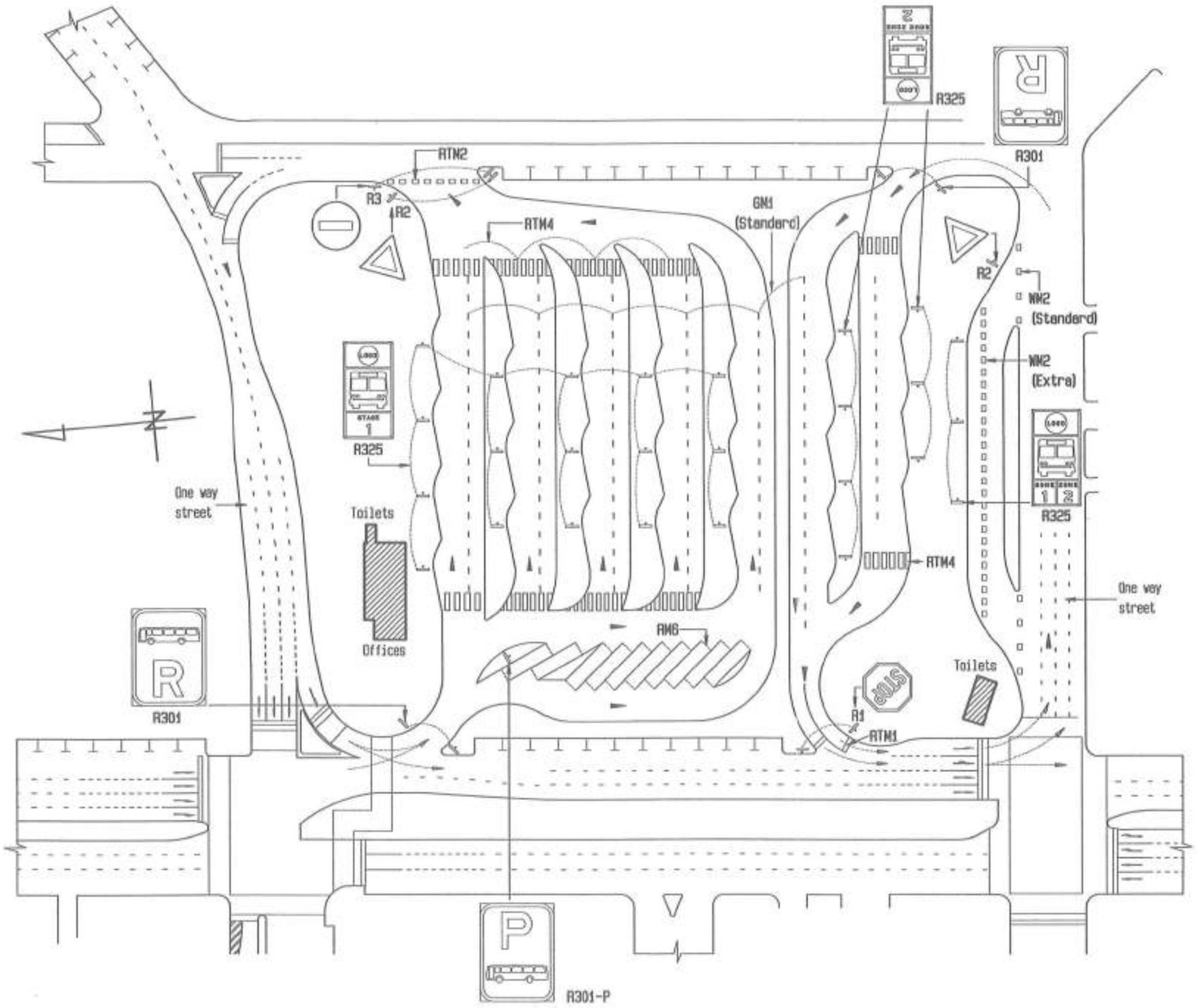
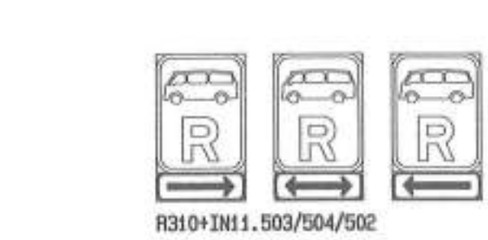



**Fig 8.16**
**Typical CBD Bus Terminal Signing**




R310+IN11.503/504/502

NOTE:

1. Roadside terminals or ranks require a pair of R310 signs up to 150m apart. For greater lengths additional R310 signs plus IN11.5 supplementary plate signs are required so that signs are not more than 75m apart.




**Fig 8.17 Typical CBD Minibus Terminal Signing**

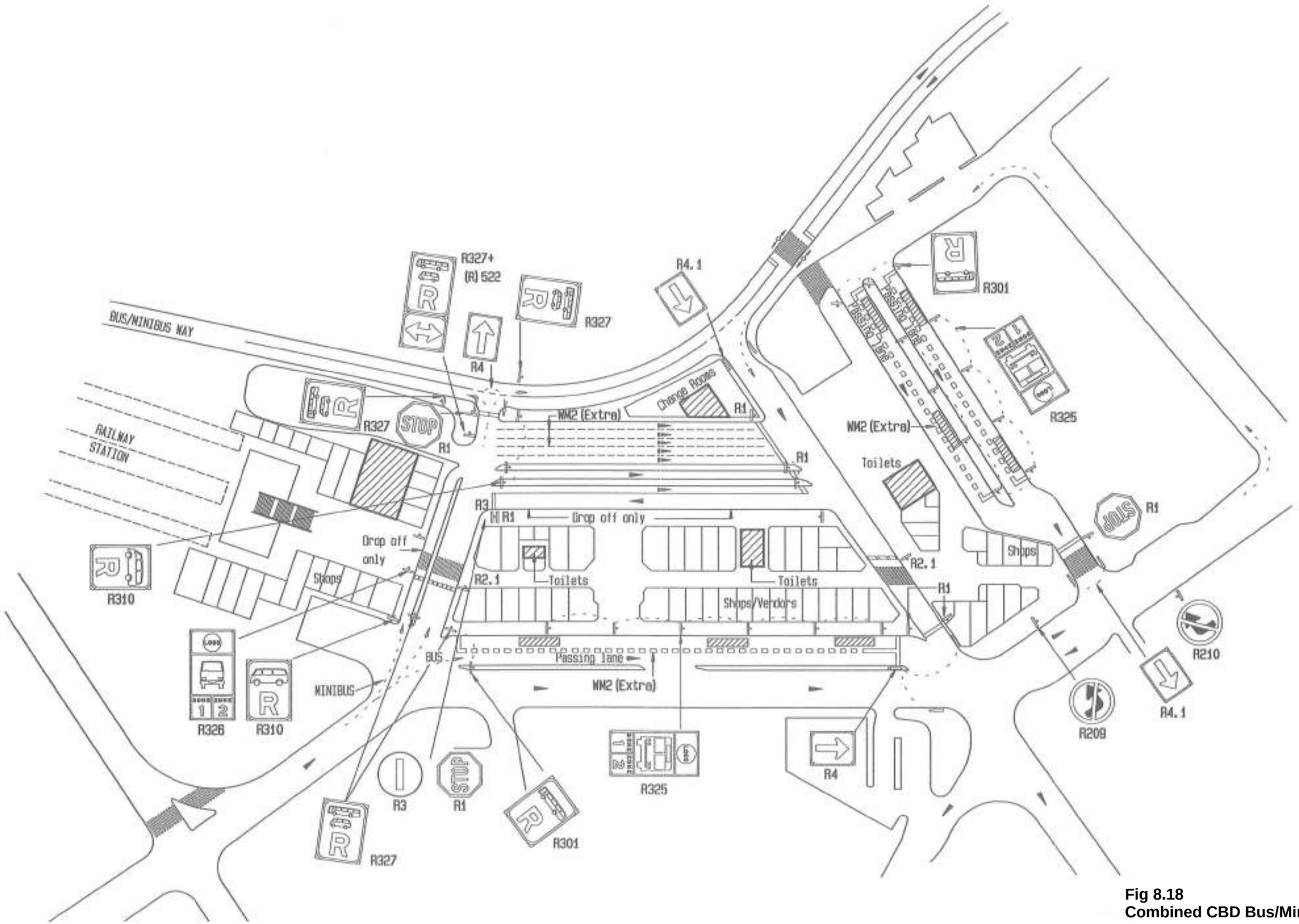



**Fig 8.18**
**Combined CBD Bus/Minibus Terminals**

### 8.3.5 Taxi Ranks

1 Taxi rank facilities can be located both on-and off-street. Access to a taxi rank should be controlled using reservation sign R309. It is recommended that a sign be placed at each end of the rank, whether on-street or off-street.

2 Sign R309 may commonly be used as a selective restriction sign in combination with Exclusive Secondary Message sign (R)540. It may also be advantageous to indicate the extent of the rank by combining these signs with IN11.502, 503 or 504 arrow signs.

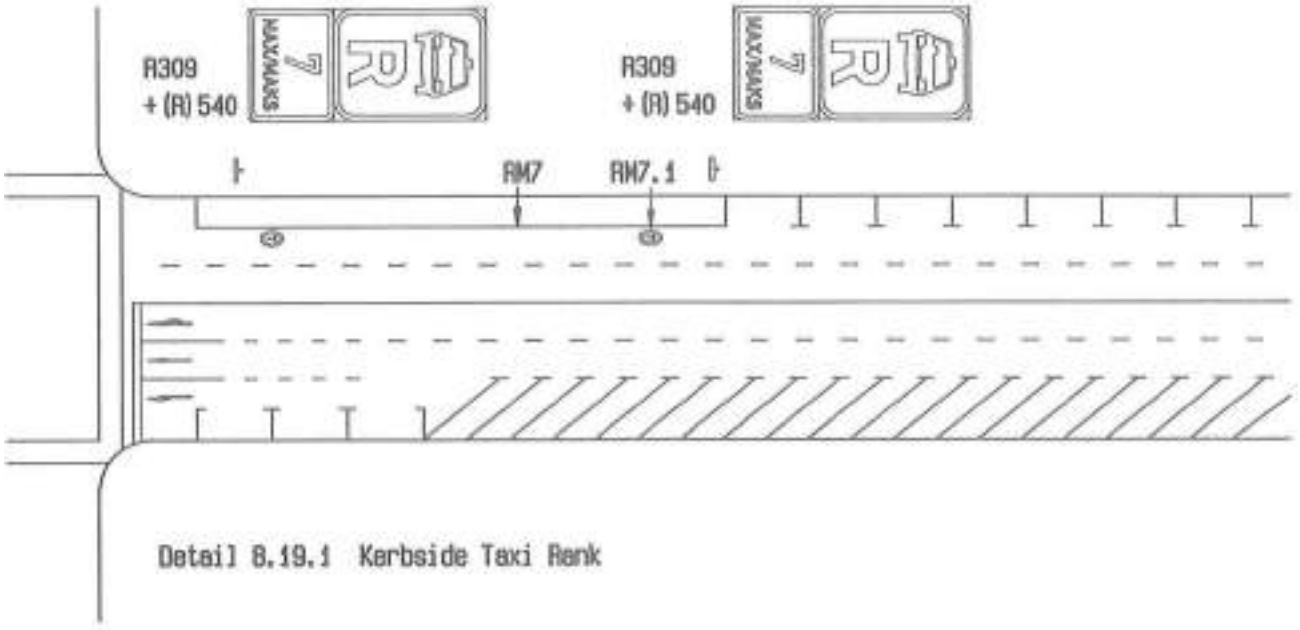
3 Taxi ranks located on-street shall be demarcated by an EXCLUSIVE PARKING BAY marking RM7. The length of the parallel Exclusive Parking Bay marking is not fixed but shall be greater than 6m. Supplementary oval marking RM7.1 may be marked approximately in the centre of the bay. When the bay is more than 30m in length two or more RM7.1 markings may be displayed.

4 The word marking "TAXIS" is optional for taxi rank facilities.

5 A taxi rank may be combined with other public transport facilities, when sufficient passengers may need the flexibility offered by taxis, which are not limited to specific routes. This may be particularly appropriate at a modal transfer terminal.

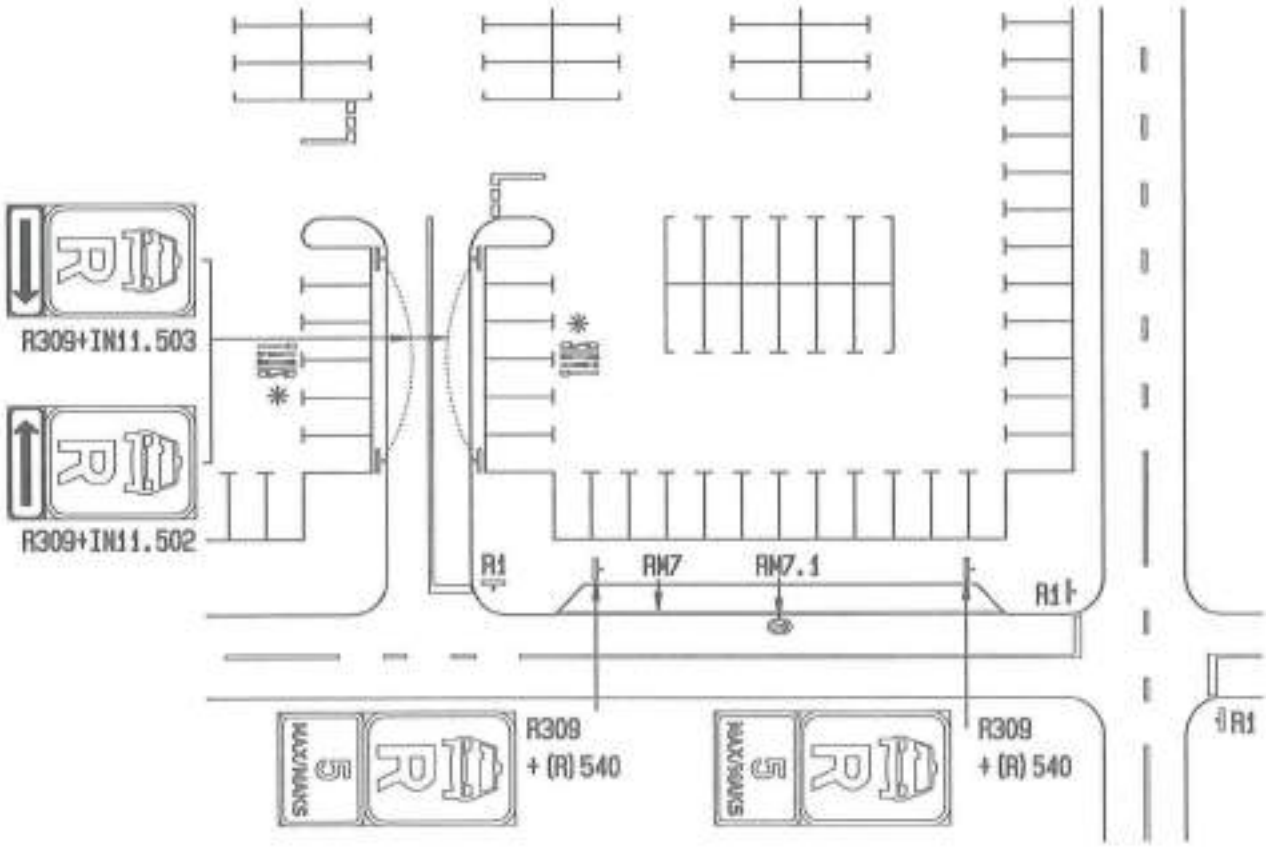
**Checklist**

- ❑ how many taxis are expected to use the facility at any one time?
- ❑ does a limit need to be placed on the number of taxis in a specific rank at a time?




Detail 8.19.1 Kerbside Taxi Rank

* = Optional markings




Detail 8.19.2 Taxi Rank within Car Park

**Fig 8.19 Typical Taxi Rank Signing**

## 8.3.6 Public Transport Terminals/Modal Transfer Stations

1 Public transport terminals/modal transfer stations can comprise any combination of rail, bus, minibus and taxi facilities as shown in Figures 8.20 and 8.22. Because of the volumes of people handled at a major terminal or modal transfer station there is almost invariably some form of associated commercial development. Figure 8.20 shows a large shopping centre which was developed in conjunction with the adjacent bus terminus and minibus ranks. Figure 8.18 illustrates a similar situation where there is scope for the development of small shops in support of the passengers using the public transport facilities. Figure 8.22 shows a spread of public transport facilities serving the interface between road and rail transport. In this example only informal commercial support exists in the form of hawkers.

2 The road traffic signs required for large facilities of this nature can be grouped into the following functions and/or areas of activity:

(a) signs to control access to the relevant areas to specific classes of public transport vehicle - this is normally achieved using reservation signs such as R301, R310 or R309 - these signs may, if necessary, be qualified by the use of secondary message signs making them selective restriction signs;

(b) signs such as R325 or R326 to indicate bus and minibus stopping places, both on-street and within the larger components of the terminals;

(c) various prohibition signs to control public transport vehicles so that they operate within acceptable parameters for good traffic management of the terminal and its surrounding area;

(d) guidance signs generally to assist pedestrian passengers to find the transport mode of their choice or the specific route stop which they wish to use.

3 In a similar way to Figure 8.16 the details of Figure 8.20 refer to a bus terminus which is designed to handle slow turnaround rural buses in the main area and high turnover commuter buses in the central loop in front of the offices. Many of the passengers using a terminus of this sort may do so infrequently and they may need some assistance to find the required platform. Detail 8.21.1 in Figure 8.21 gives examples of typical passenger direction signs and platform identification signs.

4 Figure 8.21 also gives examples, in Detail 8.21.2, of modular pictorial signs for passengers, to assist them find their way around a major terminus or modal transfer station. These modular signs form part of the GUIDANCE sign class of road traffic signs and are described in Volume 1, Chapter 4 and in Chapter 14 of this Volume. The signs may be used to give direction, and to actually identify specific facilities such as telephones or toilets.

5 In Figure 8.22 the public transport interface with heavy rail is largely provided by minibuses with ranks on both sides of the line of rail. In order to optimise space both sides of the station are provided with drop-off areas in which minibuses are not permitted to wait. Once passengers have been dropped off the minibus must proceed to the off-street rank or onto its normal route directly. The drop-off areas are identified by MINIBUS STOP signs R326. A small conventional parking area exists on the north east side of the station. In order to control such an area and prevent its use by public transport vehicles the use of sign R308-P is recommended at the entrance to the parking area.

**Checklist**

- ❑ are all entry and exit point clearly identified by the appropriate signs?
- ❑ are there areas from which public transport vehicles should be prohibited?
- ❑ do bus stops and minibus stops need to be designated for specific destinations (see Figures 8.7 and 8.8)?
- ❑ are pedestrian routes clearly marked and signed?
- ❑ do any minibus ranks or taxi ranks need to be limited to a specific maximum number of vehicles?

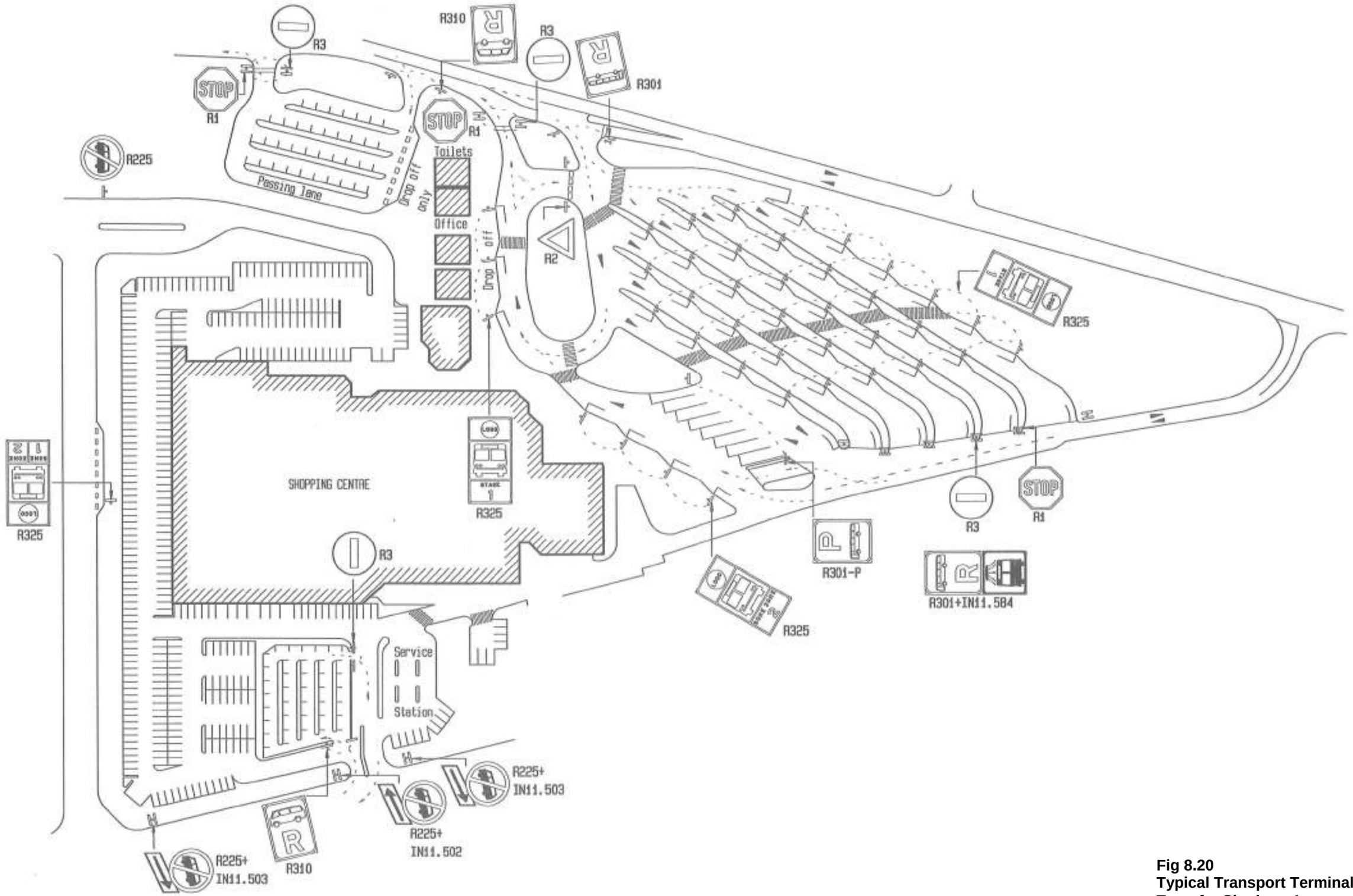
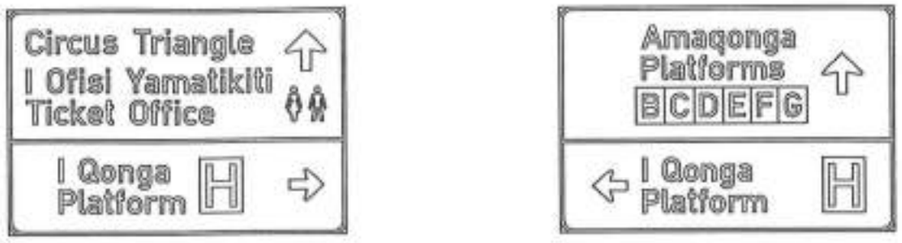
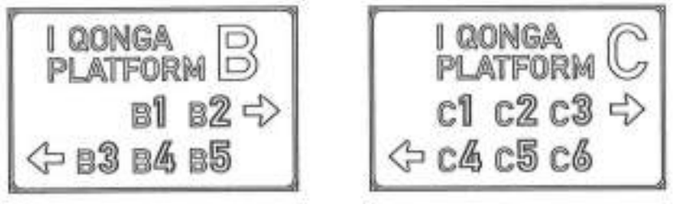



**Fig 8.20**
**Typical Transport Terminal/Modal Transfer Signing - 1**

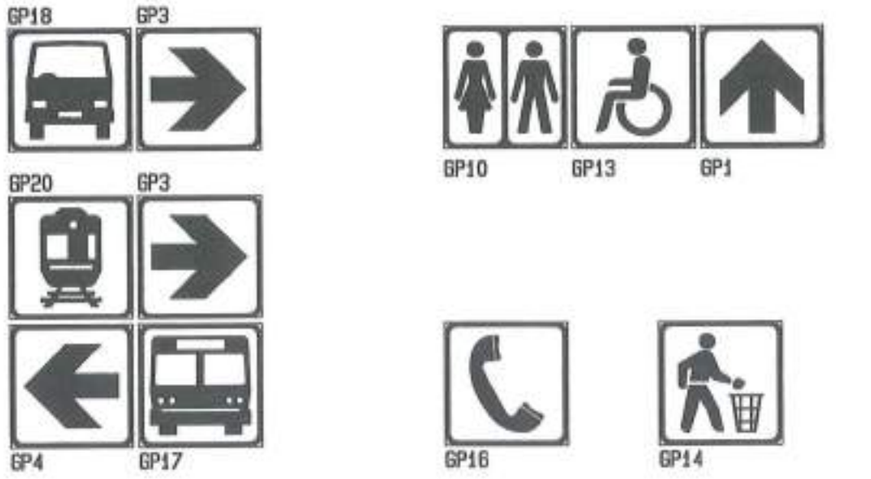



Direction Signs to Platforms Utilizing Platform Colour Coding
Each letter/block is a different colour combination




Colour Coded Signs on Platforms Indicating Shelter Numbers
In this case the signs and their letters take on the
colours from letter/block examples above

Detail 8.21.1 Typical Internal Direction Signs at a Large Bus Terminus




Detail 8.21.1 Examples of Modular Guidance Signing for Pedestrians

**Fig 8.21 Typical Internal Signing at Transport Terminals**

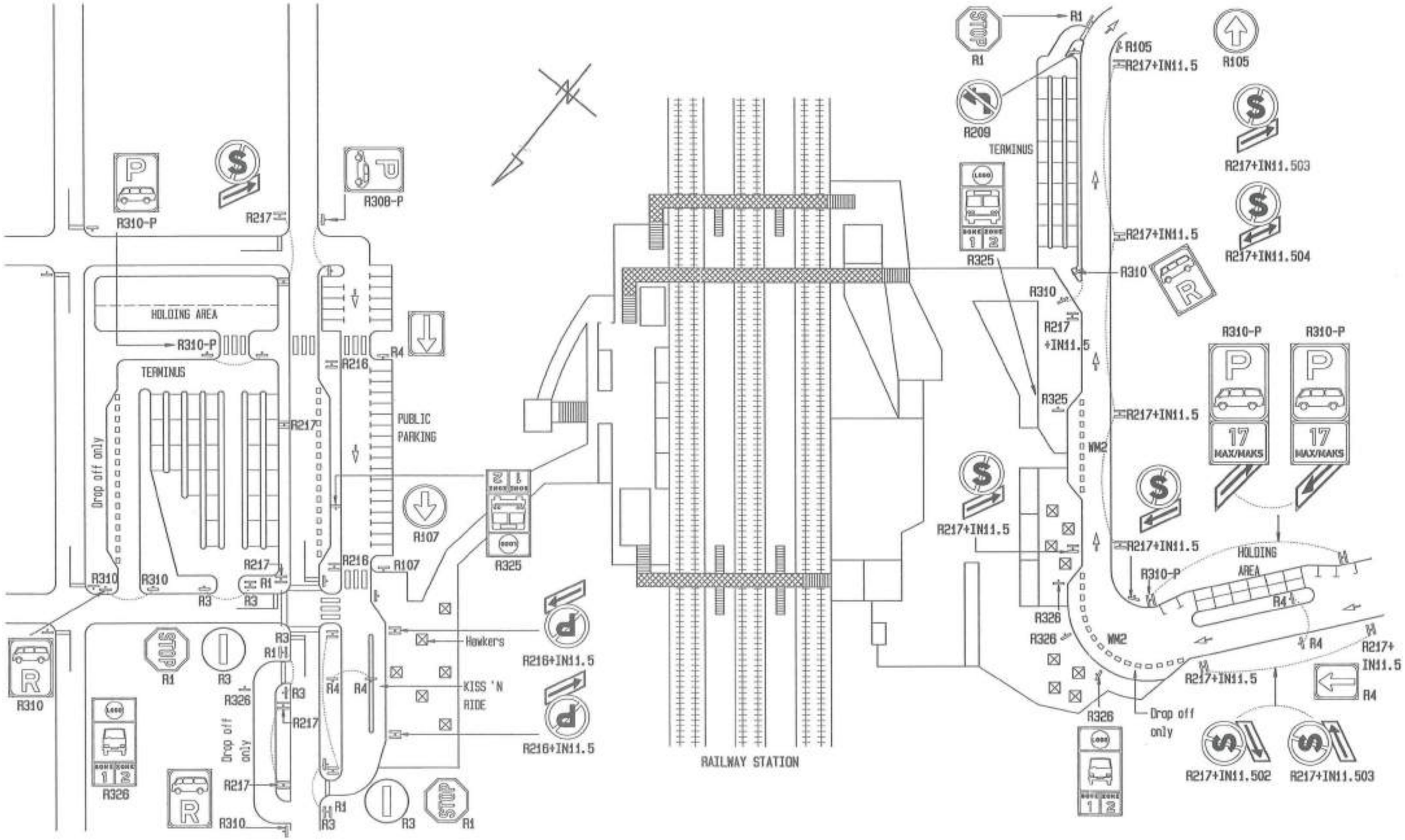



**Fig 8.22**
**Typical Transport Terminal/Modal Transfer Signing - 2**

## 8.3.7 Public Transport at Shopping Centres/Malls

1 The options for the provision of public transport are at shopping centres or malls as varied as the designs and concepts of the shopping centres themselves. This subsection simply identifies the more relevant factors and cannot provide solutions to all possible combinations of circumstances. The details covered deal with situations in which it is desired to cater for accessibility by patrons of the shopping centre to public transport routed past the centre, and to show public transport authorities a number of ways in which such a service may be provided, even to an existing shopping centre. The details given in Figure 8.20 also illustrate a shopping centre situation but are somewhat different in that the shopping centre and bus terminus have been developed as a co-ordinated exercise.

2 Figure 8.23 shows two basic ways in which public transport can be catered for at a large shopping centre. For convenience examples of both types of system are shown in the one figure. It is most unlikely that a specific site would use both although an intermediate compromise is always possible. The two principles involved are:

(a) that all interface with modes of public transport occurs on the external roads forming the perimeter of the site; and

(b) that the public transport vehicles enter the shopping centre internal road network.

3 The external or perimeter treatment is simple and comprises the provision of laybys for buses and minibuses controlled by BUS STOP signs R325 or MINIBUS STOP signs R326. If necessary one or more limited minibus ranks may be provided at laybys. In such an instance control should be provided by reservation signs R310. These may be provided as selective restriction signs R310 + (R)540, if the rank can only accommodate a limited number of minibuses. When bus and minibus laybys are provided on one section of road they should be adequately separated from each other (see Figure 8.11).

4 Given the size of modern shopping centres it is not unreasonable that patrons could expect to have access to public transport within the centre site. Figure 8.23 shows two examples of minibus ranks provided in close proximity to access points to the building itself. The signing indicated is intended to control minibus movement to the shortest possible access route from the external road network to these ranks. Figure 8.23 also shows how a bus, or midi-bus, route could be provided within a shopping centre. This type of public transport provision would have to be designed at the initial development stage because the roadway geometric standards required for buses would exceed those traditionally provided at shopping centres.

5 Although not directly a public transport issue Figure 8.23 also illustrates ways in which signing for delivery vehicles could be applied in the sort of situation illustrated by the figure. This has been included because there is perhaps a potential for increased conflict or congestion when buses, minibus and delivery vehicles have to share common roadways or space.

6 The traditional layout of large shopping centres tends to result in very large space requirements. There may often be an effective synergy for developers if they combine the concepts of modal transfer station with the commercial enterprise of a major shopping complex. In such a situation the provision of a vertical design element can create a viable operation if the shopping areas are located between interfacing public transport modes. A development of this nature may well require a greater provision of guidance signs than is common at normal public transport terminals. The signs for pedestrians illustrated in Figure 8.21 could also be of value.

**Checklist**

- ❑ are walking distances to the perimeter of the site reasonable?
- ❑ can adequate space be provided at the perimeter for queuing passengers?
- ❑ can a roofed area be provided for queuing passengers to protect them from the weather?
- ❑ can internal roadways accommodate a bus?
- ❑ can a bus get close to pedestrian access points to the building?
- ❑ is there likely to be conflict between public transport vehicles and delivery vehicles?

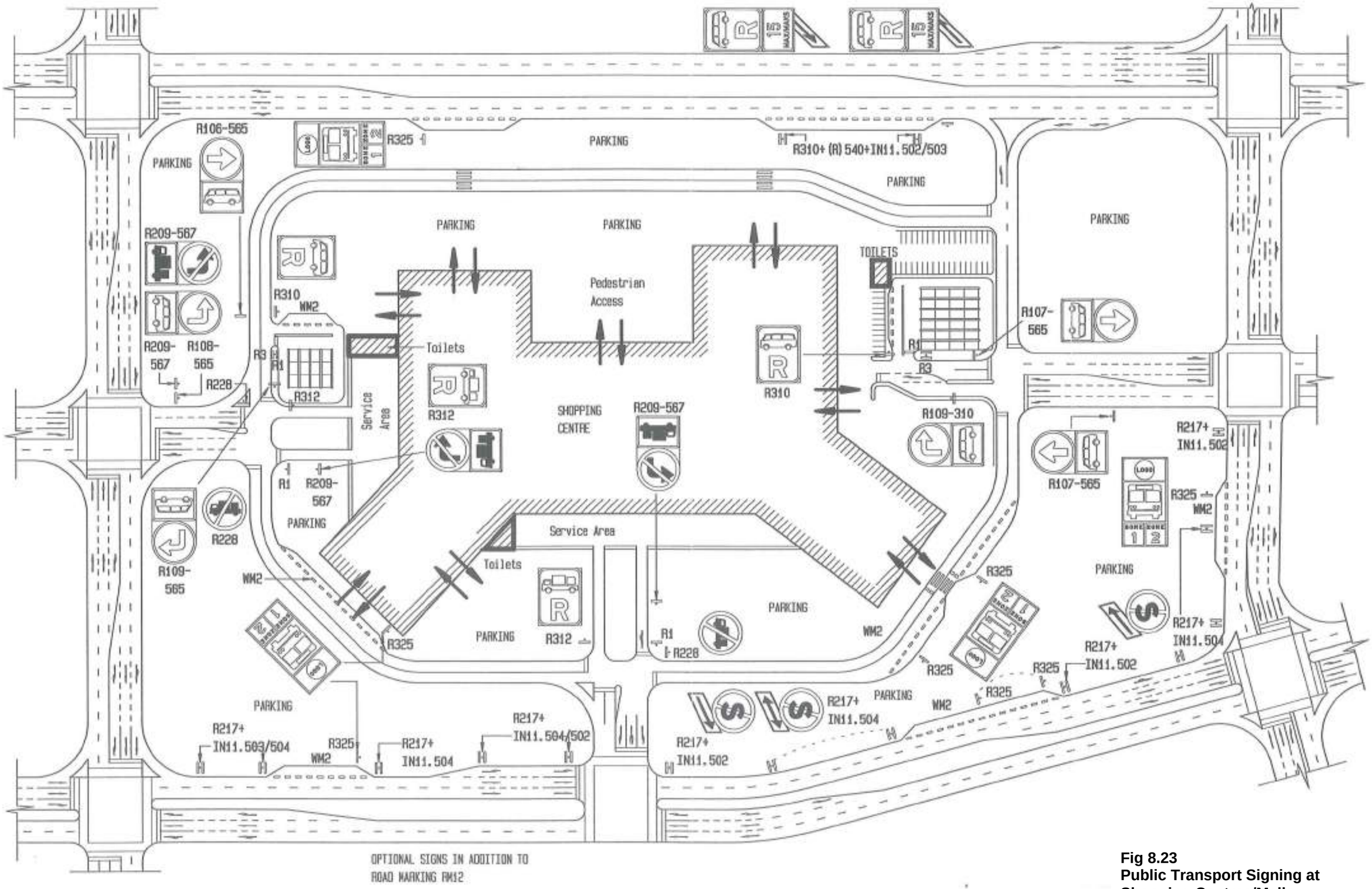



**Fig 8.23**
**Public Transport Signing at Shopping Centres/Malls**

# 8.4 SIGNING APPLICATIONS FOR PARKING AND HOLDING AREAS

## 8.4.1 General

1 Parking or holding areas are areas separate from stops, ranks or terminals where buses or minibuses may be held pending re-entry into scheduled service. The main function of such areas is to cater for the excess numbers of vehicles needed during peak operating periods which cannot, and need not, be accommodated at terminal facilities during off-peak periods.

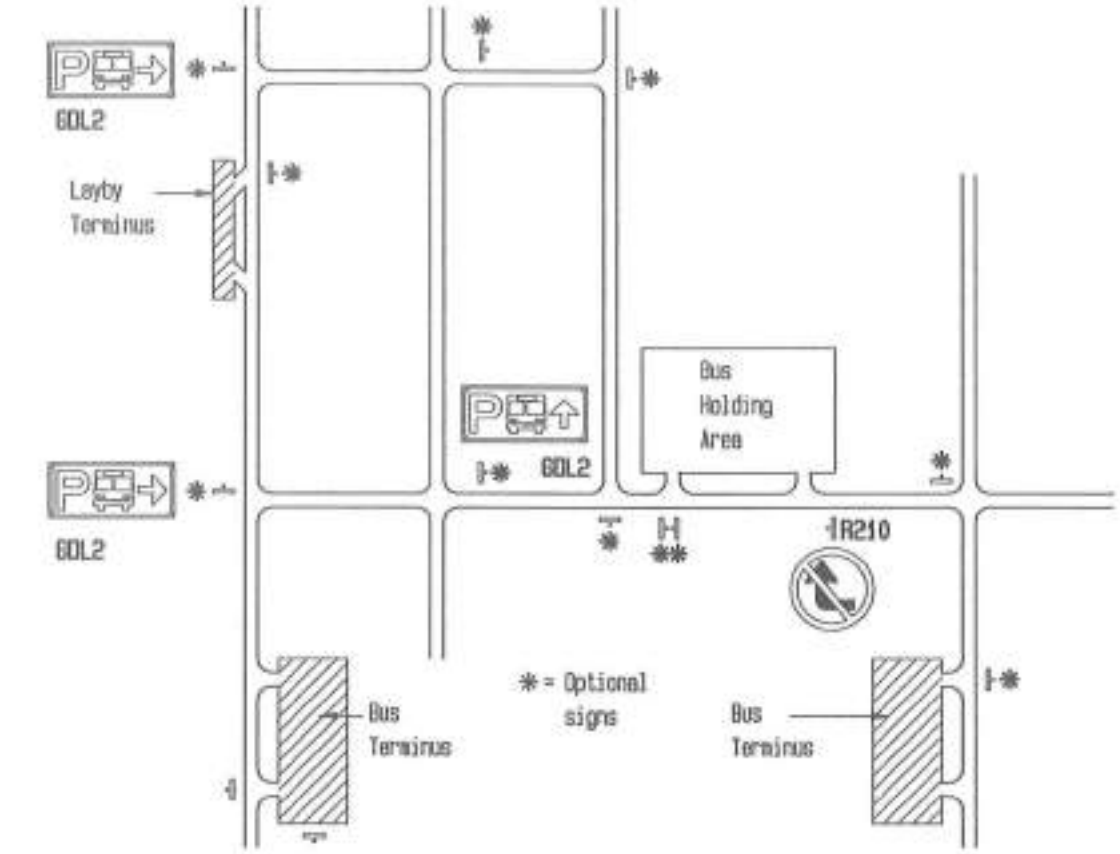
2 Passengers should be discouraged from boarding or alighting from buses in parking or holding areas. Since the vehicles are not required to take on or drop off passengers within the area no space is provided for the movement of pedestrians and the buses or minibuses can be parked to much higher densities than they can within a terminus.

3 Parking/holding areas may also be operationally effective when bus or minibus services comprise many individual driver-operators who do not have their own parking facilities.

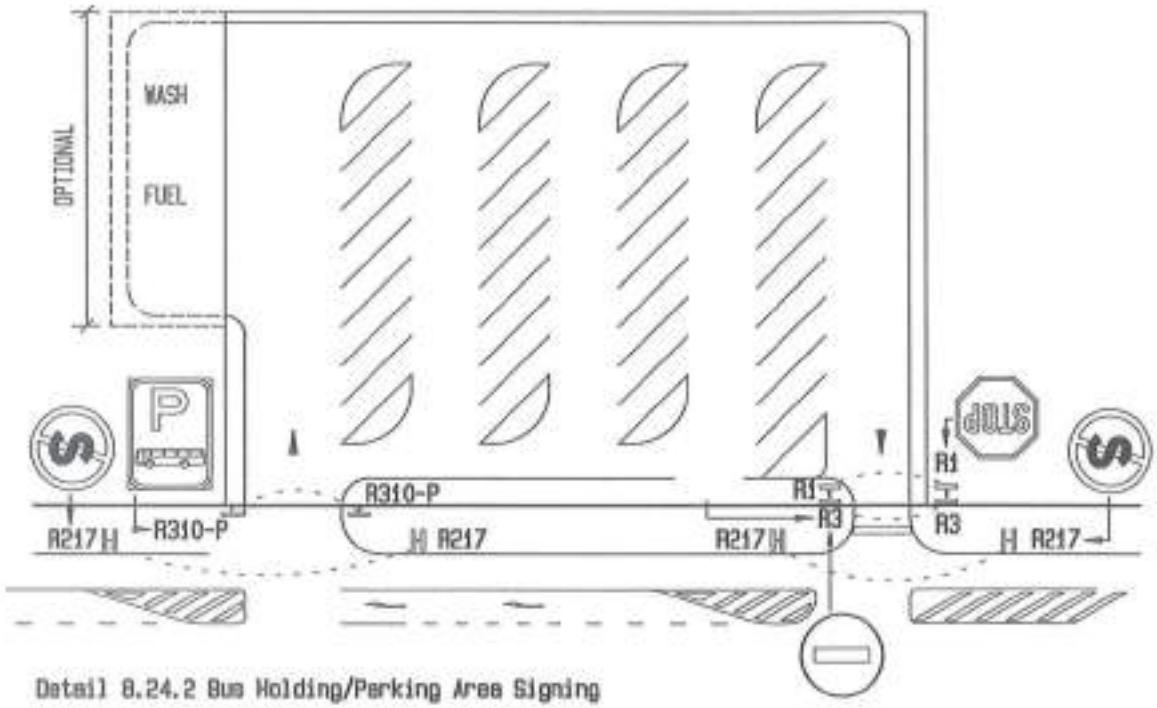
4 In order to encourage the use of parking and holding areas direction signs may be necessary to guide drivers towards their allocated parking area. The signs used for this purpose can be LOCAL DIRECTION signs GDL1 or GDL2, displaying symbols such as BUS (GDLS A1-8), or MINIBUS (GDLS A1-9) together with parking symbol "P" (GDLS A1-11). It is also desirable that there is a good system of communication between the relevant ranks and the holding areas so that additional vehicles can be called into service when required.

5 Figure 8.24 shows a possible arrangement for a bus parking/holding area. Detail 8.24.1 shows how GDL2 signs can be used to direct buses from terminal facilities to the holding area. Such an arrangement is most likely to be beneficial to a public transport operation in which unfamiliar or infrequent drivers use the terminal facilities. This may occur at a terminal within an urban area serving rural bus services. Detail 8.24.2 illustrates the typical signing treatment of the entry and exit points from the holding area. The bay arrangement shown is only representative of an area which permits individual bus entry and exit movements. Much higher parking densities can be achieved without this flexibility of movement.

6 Figure 8.25 shows a similar situation for a minibus parking or holding area.

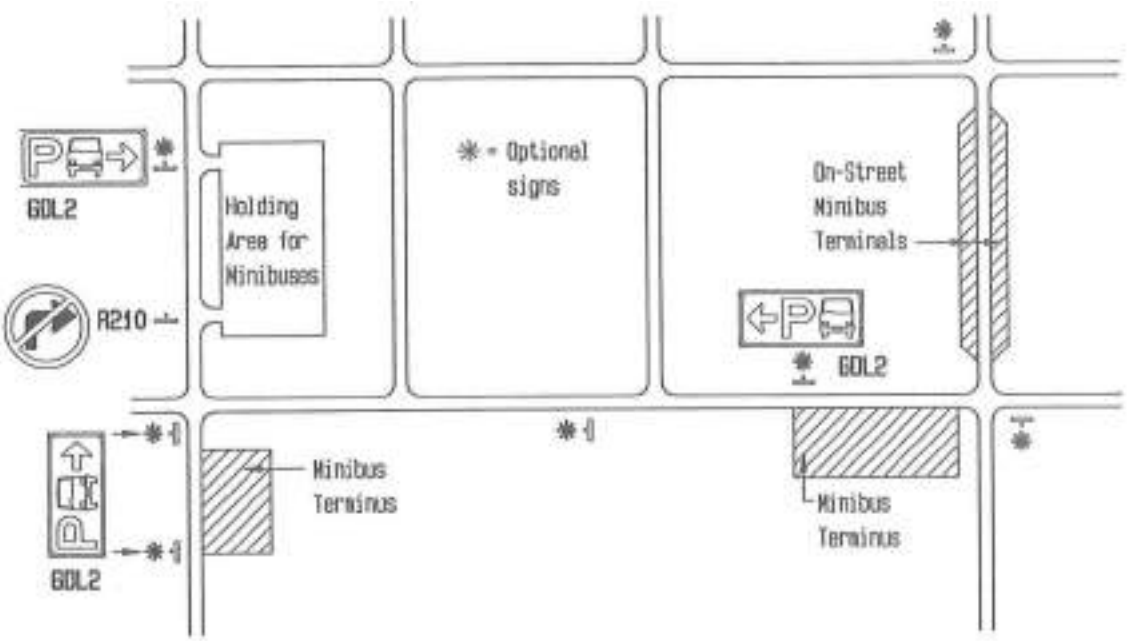



Detail 8.24.1 Direction Signing to Bus Parking Areas

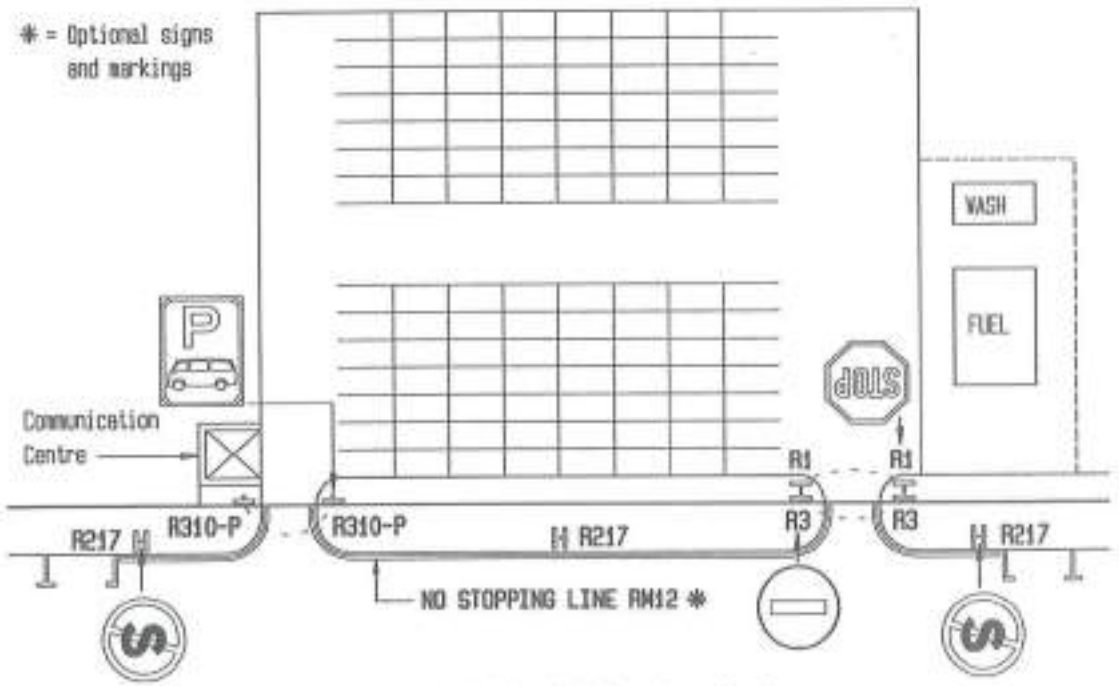



Detail 8.24.2 Bus Holding/Parking Area Signing

**Fig 8.25 Typical Bus Parking/Holding Area Signing**




Detail 8.25.1 Direction Signing to Minibus Parking Areas




Detail 8.25.2 Minibus Holding Area Signing

**Fig 8.26 Typical Minibus Parking/Holding Area Signing**

# 8.5 SIGNING APPLICATIONS FOR RESERVED LANE/ROAD USE

## 8.5.1 General

1 When it is considered necessary to significantly increase the priority or road space allocation for public transport this may be achieved in a number of ways including:

(a) by reserving one or more lanes of an existing roadway;

(b) by reserving the whole of the existing roadway;

(c) by building a new and dedicated public transport roadway.

Each of these methods of providing increased levels of priority to public transport vehicles may in turn use techniques such as traffic signal priorities to further enhance the operation of the facility.

2 Public transport lanes may operate in conjunction with general traffic, or they may be physically separated into an exclusive roadway occupying only part of the original road. Public transport lanes may also operate with the flow of general traffic or in the opposite direction to the other traffic lanes of a roadway. This latter manner of operation is commonly referred to as "contra-flow" operation. In addition these operating characteristics may apply to two-way roads or one-way roads. The resultant traffic configurations are therefore many and varied. This factor in itself creates difficult road safety and traffic management conditions, particularly for pedestrians.

3 The so-called "contra-flow" operating condition has specifically proven difficult to implement and operate safely. Particular care must be taken over the signing and marking for this type of operation (see Subsection 8.5.2 and Figure 8.29).

4 Reservation of lanes or roadways may be organised operationally in one of the following ways:

(a) exclusively to one class of vehicle i.e. buses - see paragraph 8.1.1.3;

(b) shared between two or even three classes listed in paragraph 8.1.1.3;

(c) shared by all vehicles classified by a public transport authority as public transport vehicles;

(d) as a high occupancy vehicle (HOV) lane;

(e) shared between public transport vehicles and vehicles requiring local access to property otherwise cut off from access by the lane or roadway reservation.

5 The option listed in paragraph 8.5.1.4(e) presents a difficult combination of circumstances to sign and, if necessary, enforce. The requirement for local access may vary from the need to service a single busy access approached by "identifiable" traffic, to the need to provide for many frontage accesses approached by essentially unidentifiable traffic. In the first instance access may be controlled by the display of two R300 series signs such as R301 permitting access to buses, plus a version of sign R324 permitting access to vehicles displaying a specific symbol, crest or logo appropriate to the identifiable organisation requiring access. The second, more general, example is most likely to be satisfied by the use of a SELECTIVE RESTRICTION sign comprising a primary message element R301 type sign and an EXCLUSIVE SECONDARY MESSAGE element in the (R)500 series involving a text message such as "and Local Access Only" (see Figures 8.28, 8.30 and 8.32).

6 Reserved public transport lanes and roadways are likely to experience pedestrian conflict problems as indicated in paragraph 8.1.3.8.

## 8.5.2 Signing for Bus Priority Systems

1 Bus priority systems involve the allocation of priority to buses in one or several forms. The priority may require exclusive phasing at one traffic signal, or a totally dedicated purpose built roadway, or one of many possible intermediate levels of prioritisation. Priority is invariably achieved by the use of road traffic signs. An exclusive traffic signal phase needs to be identified and dedicated roadway needs to be identified at its point of commencement.

2 The concept of bus priority can be described as Bus Rapid Transit, or BRT, and involves both bus priority and high frequency operation. A bus lane may be used for BRT or for less frequent services which are still accorded the priority use of the lane. A bus lane may even only apply for a specific part of the day (see Figures 8.4 and 8.31). The signing of bus lanes involves the use of BUS LANE RESERVATION signs R302 and R303 and BUS LANE road marking RM9. This combination of road traffic signs permits buses to use other parts of the roadway as well as the bus lane should this be necessary (in order to make a turn for example). If it is required that all buses be forced to use the lane, signs R302 and/or R303 should be replaced by BUSES ONLY sign R121. In order to fulfill the legal significance of the road traffic signs used, and allow other road users to cross a bus lane in order to leave the road in which it is located, the bus lane must be interrupted. Signs R302 or R121 must be repeated after any such discontinuity. Although road marking RM9 is essentially continuous (except for the breaks mentioned above) it is necessary to repeat the sign message at regular intervals. Signs R302 (R303 when appropriate), or R121, shall be placed so that no two signs are more than 250 m apart.

3 If a bus lane is interrupted to permit, for example, left turning traffic to enter the lane, and shortly thereafter make a left turn, warning END OF EXCLUSIVE LANE arrow marking WM11.1 may be specified. When an exclusive lane continues beyond such an interruption, marking WM11.1 may be followed by a WHITE warning arrow marking WM7, indicating a turn to the left so as to improve driver's understanding that they must not proceed straight-on from the left lane. If such a lane is terminated in mid-block or just prior to an intersection, warning marking WM11.2 is appropriate.

4 Techniques used to create bus priority can be applied to lanes or roads for other classes of public transport vehicle or in fact to priority situations shared by more than one vehicle class. Signs R302 and R303 or sign R121 may therefore be replaced by any appropriate sign from the range given in Figure 8.3 when the exclusive lane is provided for, or shared with, other classes of public transport vehicle. Concepts used for bus lane treatments can be considered equally appropriate to other forms of public transport, subject to an engineering assessment.

5 Figure 8.26 shows the basic bus lane treatment which is the simplest form of public transport prioritisation. Details worth noting include:

(a) termination of the bus lane a minimum of 20 metres from an intersecting side street or cross street - this requirement only applies if general traffic is permitted to turn across the bus lane - such turns will not occur if the side or cross street is an entering one-way street;

(b) the lane which is allocated to the bus lane must be indicated as a "lane drop" situation - if an advance sign R303 + IN11.3 is used, this, plus the LANE REDUCTION ARROW markings WM6 should be adequate - additional "lane drop" signs such as W214 (or W215) or GS103 (or any of GS101 to GS106) may also be specified;

(c) if it is required to make the bus lane operate for only a part (or parts) of the day SELECTIVE RESTRICTION sign R302-501, or similar, should replace sign R302 - no alteration is made to EXCLUSIVE USE LANE LINE marking RM9.

6 Figure 8.27 illustrates a major bus priority provision where a whole street has been allocated to bus use. In addition the cross street has a bus lane. Particular features of this example are:

(a) the busway is marked to operate always in a two-way mode with the direction of the central lane being reversible at various times of the day - the signing for such operation is not indicated since it is likely to require either overhead or variable message customised signing, or both;

(b) the bus lane in the crossing street is frequently considered as a "contra-flow" lane because all other lanes flow in the opposite direction - it is recommended, however, that to enhance pedestrian safety, the street be treated as a two-way street ie. **the use of ONE WAY signs R4.1 etc is not recommended** - this recommendation is based on the fact that operationally, and certainly from a pedestrian point of view, **the road is running as a two-way road with the difference that traffic in one direction is comprised exclusively of buses** (see also Figure 8.29);

(c) since the movements of buses have a measure of priority (and this might extend to exclusive traffic signal phases) it is recommended that bold diagrammatic signs (GS701 to GS703) be provided for pedestrian guidance;

(d) it should be noted that general traffic on the cross street can only proceed straight through the junction shown.

7 The need to share bus lanes or roadways may extend to local residents or businesses whose means of access to the property they occupy is via the bus lane. The signing of such situations is best achieved by means of SELECTIVE RESTRICTION signs based on signs R302 and R303 (or R121), or by the use of an appropriate version of AUTHORISED VEHICLE RESERVATION sign R324, or AUTHORISED PASSENGER TRANSPORT VEHICLE SIGN R353. Figure 8.28 illustrates such a situation where one half of the roadway is reserved by sign R301 - 531 for buses and local access traffic only. This figure also illustrates the use of dedicated bus priority traffic signal faces S1B and diagrammatic signs for pedestrians. **In this example the use of ONE WAY signs R4.1 is relevant.** Signs R324 or R353 are particularly relevant when the vehicles sharing the bus lane are destined for one location within the bus lane environs (see Figure 8.32). A similar situation in relation to Light Rail Transit is illustrated in Figure 8.33.

(continued on page 8.5.7)

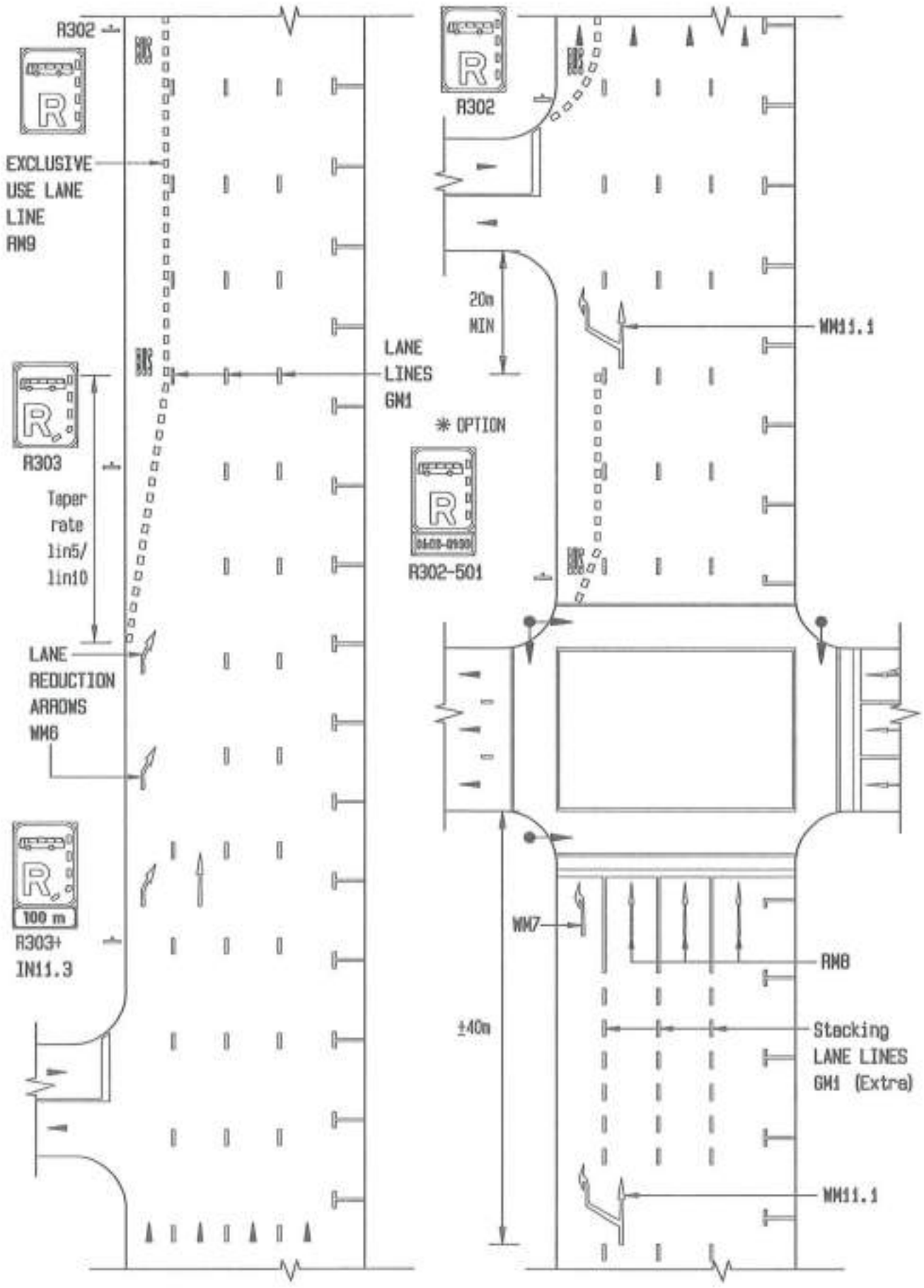



**Fig 8.26** **Typical Bus Priority Signing - 1**

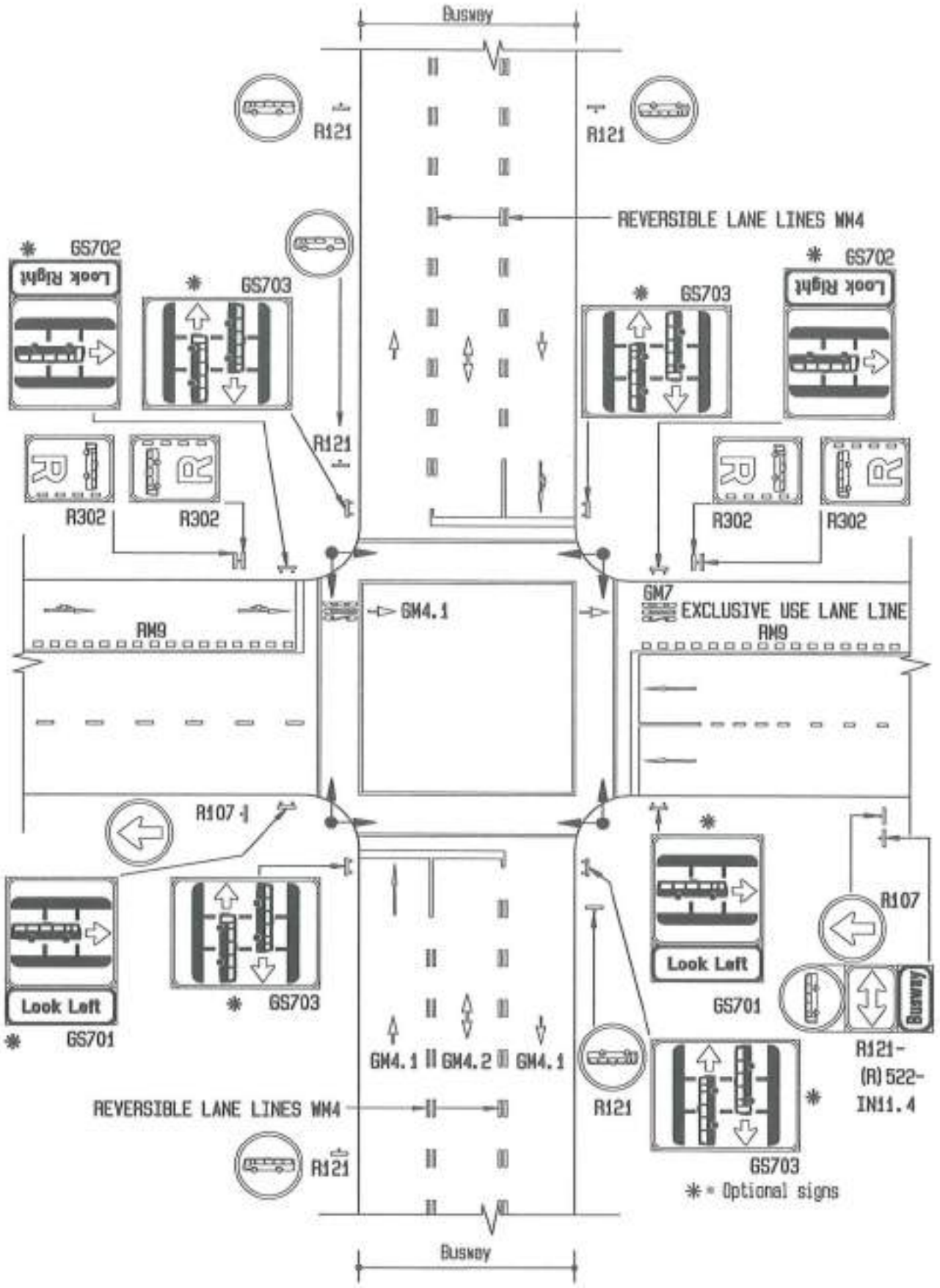



**Fig 8.27** **Typical Bus Priority Signing - 2**

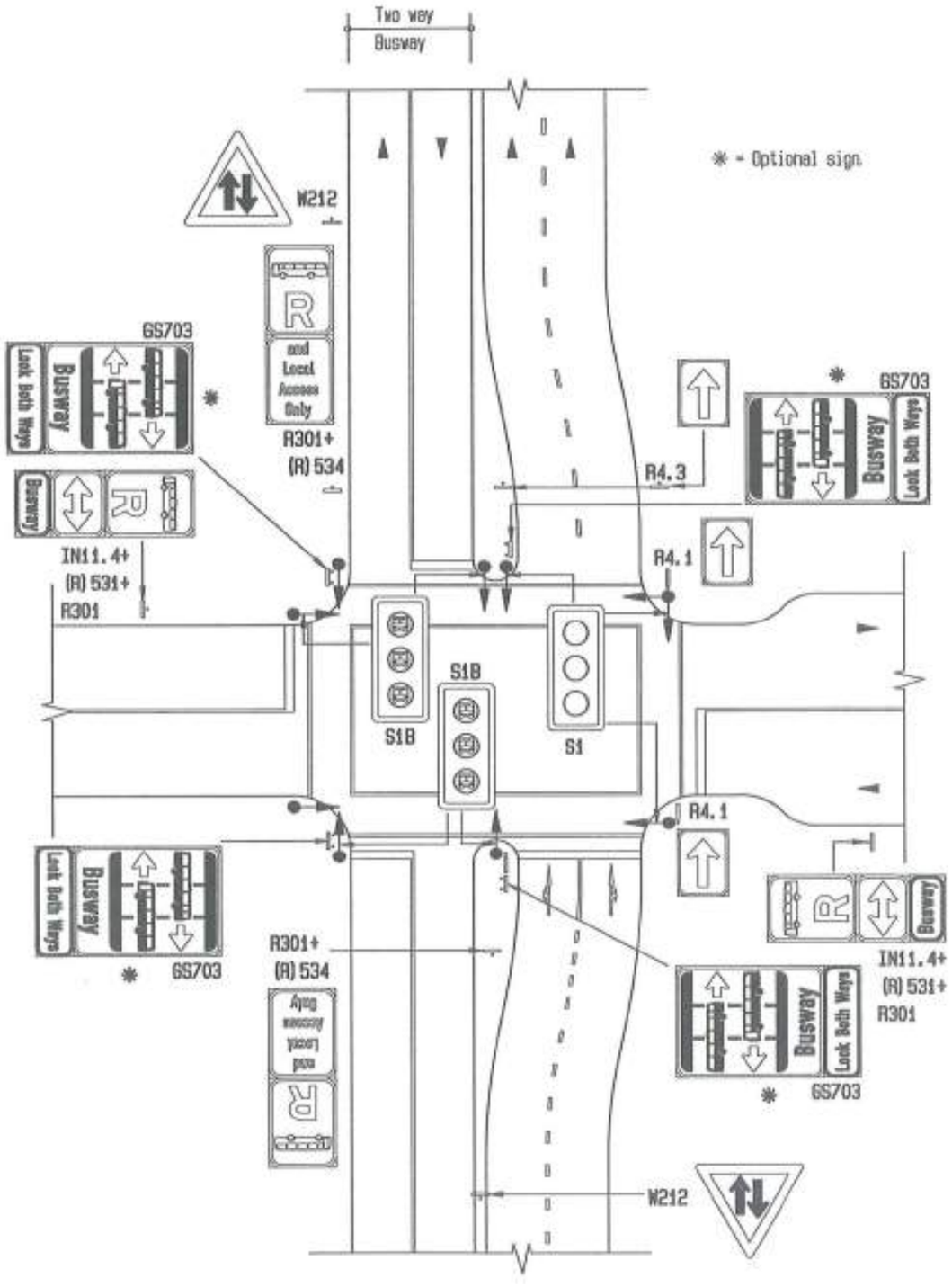
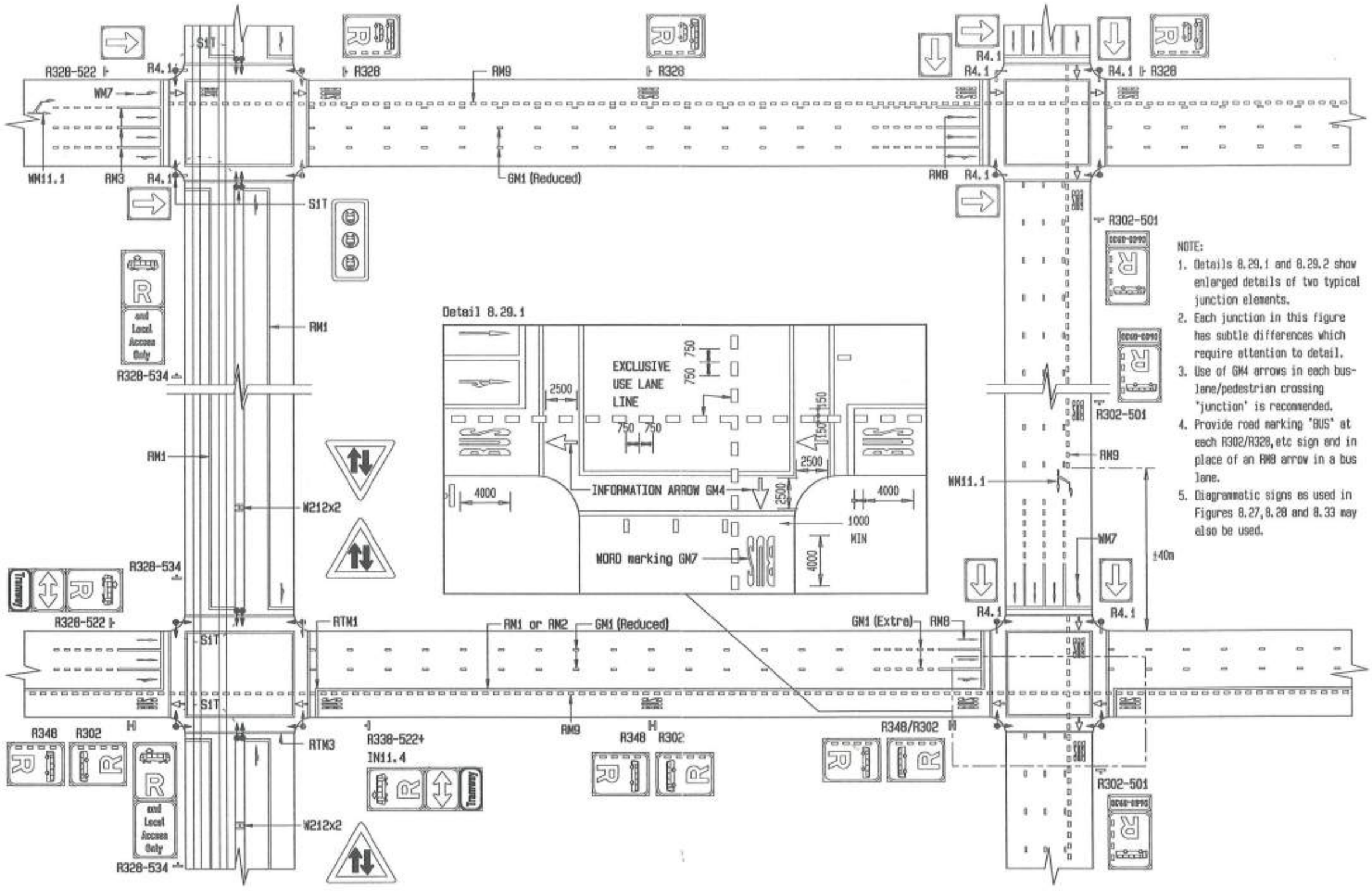
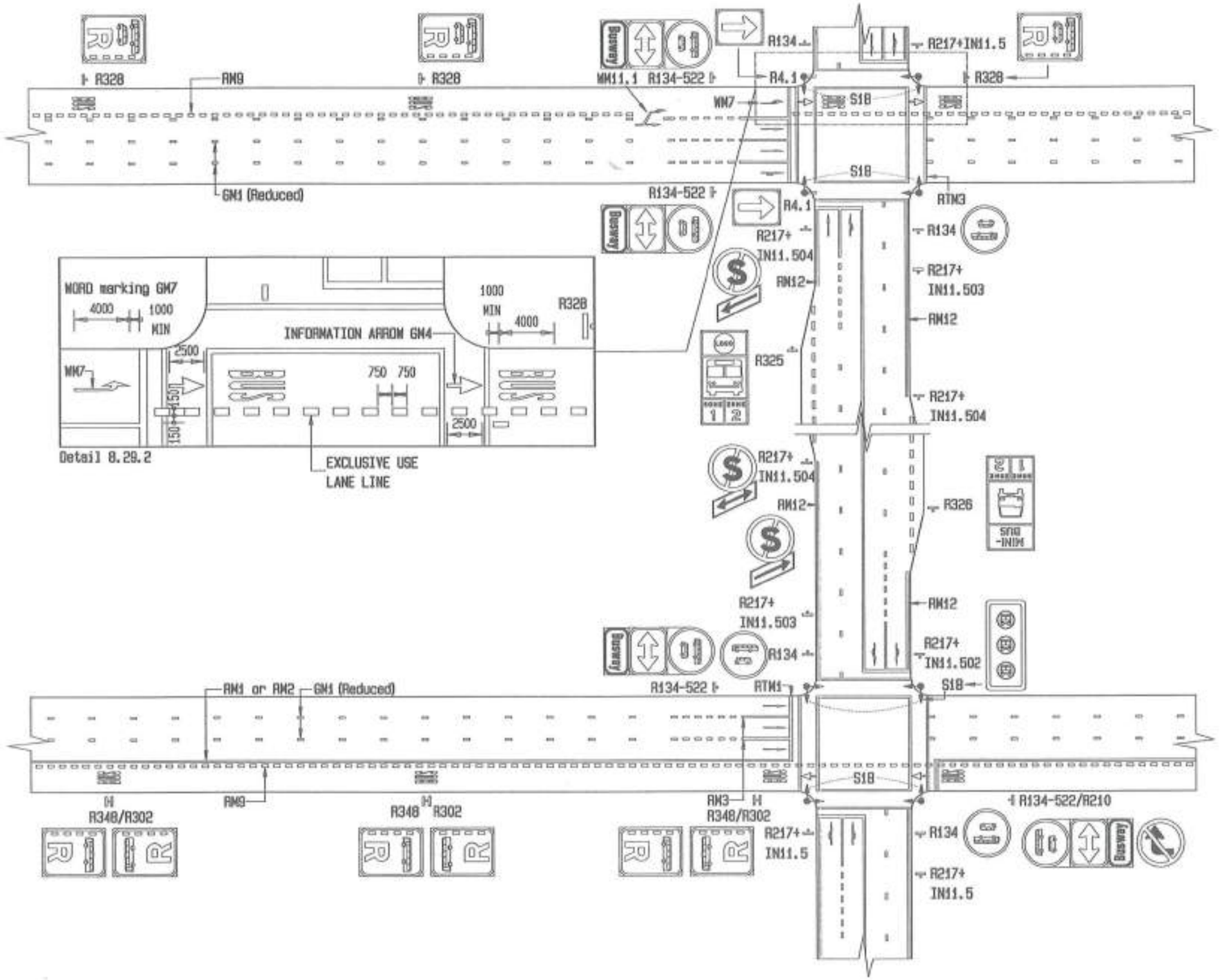



Fig 8.28 Typical Bus Priority Signing - 3




NOTE:

1. Details 8.29.1 and 8.29.2 show enlarged details of two typical junction elements.
2. Each junction in this figure has subtle differences which require attention to detail.
3. Use of GM4 arrows in each bus-lane/pedestrian crossing 'junction' is recommended.
4. Provide road marking 'BUS' at each R302/R328, etc sign and in place of an RM8 arrow in a bus lane.
5. Diagrammatic signs as used in Figures 8.27, 8.28 and 8.33 may also be used.




(continued from page 8.5.2)

8 Figure 8.29 shows a portion of a high order metropolitan public transport system in which a high degree of priority has been allocated to maximising the mobility and efficiency of public transport vehicles. The figure shows a public transport roadway dedicated to buses and minibuses, a shared bus and minibus lane, an exclusive bus only lane in a so-called "contra-flow" mode of operation, and a tramway.

9 The road traffic signing of the individual elements of Figure 8.29 is covered in principle in Figures 8.26 to 8.28 and Figures 8.30 to 8.33. These principles are applied to the broader example offered by Figure 8.29 and amplified where necessary. Road markings in particular are covered in more detail. Public transport systems of the type illustrated tend to require a significant number of signs and markings in addition to what might be required for normal traffic. There is therefore a risk of confusion for drivers, and particularly pedestrians. Special attention must be given to the co-ordinated and orderly provision of all signs and markings to limit this risk.

10 **The need to provide a safe environment for pedestrians cannot be stressed enough**. Figure 8.29 shows a number of conceptual ideas to improve pedestrian awareness, and thereby, safety. **It is recommended that a "contra-flow" operation be signed as a two-way street and not, as a one-way street with "contra-flow" buses. It is considered potentially hazardous for pedestrians to see ONE WAY signs R4.1 and yet for two-way traffic to be operating.** Bus lane related markings are also shown through junctions and pedestrian crossings to further enhance the awareness of both drivers and pedestrians regarding bus operations.

**Checklist**

- ❑ is signing of the bus priority lane to be developed around sign R121 or the R300 series?
- ❑ is the lane subject to shared use by more than one class of public transport vehicle?
- ❑ is shared use by local residents required?
- ❑ is shared use required by a single traffic generator?
- ❑ is the lane a "contra-flow" lane?
- ❑ is pedestrian safety adequately provided for?
- ❑ is the provision of pedestrian railings adjacent to a bus lane warranted?
- ❑ are traffic signal phases required exclusively for the public transport vehicles?
- ❑ if the bus priority scheme is a new one, do existing route marker signs need to be relocated?

**Fig 8.29**
**Typical Bus Priority Signing - 4**

## 8.5.3 Public Transport Lanes/Roads -Use by Different Vehicle Groups

1 In other subsections reference has been made to shared public transport facilities and to facilities for use by high occupancy vehicles (HOV) which may include public transport vehicles, but which need not be exclusively public transport vehicles. Shared facilities may be controlled by road traffic signs in essentially the same way as for facilities exclusive to a single class of public transport vehicle. Examples of shared facilities are illustrated in Figures 8.30 to 8.32.

2 It is recommended that if a lane or road is to be shared the RESERVATION class of regulatory signs be used rather than the COMMAND mandatory class of regulatory signs. The latter should only be used if use is mandatory to one or more class of vehicle. These classes of sign may be used on a lane only basis, as follows (see also Figures 8.30 to 8.32):

(a) on overhead diagrammatic signs such as GS603;

(b) on ground-mounted diagrammatic signs such as LANE USE CONTROL BY REGULATION signs in the GS300 series.

3 Figure 8.30 shows three similar signing examples, using sign R302 (Detail 8.3.1), R329 (Detail 8.30.2) and sign R337 (Detail 8.30.3). All examples utilise the EXCLUSIVE USE LANE LINE marking RM9.

4 Figure 8.30 also illustrates a point often missed by road, traffic or public transport authorities. The reservation class signs may be any one of six standard sizes, as shown in Detail 8.30.4 (see Volume 4, Chapter 2). There is a tendency to specify signs of the same size as similar parking reservation signs. Parking signs are, however, read at low speeds, or by pedestrians, and are closely spaced. For the higher speeds associated with reserved public transport lanes, and the likely sign spacing of 250 m, a larger size is recommended.

5 Figure 8.31 takes the principles given in Figure 8.30 one step further up the road hierarchy. Exclusive use lanes are shown on a dual carriageway road which could, in fact, be a freeway. In this case the "fast" lane has been allocated to public transport vehicles. This would be most appropriate for a rapid transit operation where the public transport vehicles stay in the median side lane for some kilometres, and would normally only exit the lane when it is discontinued.

6 The signing for the arrangement in Figure 8.31 requires large ground mounted signs of the GS300 series type, or overhead signs in the GS600 series, mounted on cantilever or gantry supports (see Detail 8.31.2). In each case these DIAGRAMMATIC signs incorporate an appropriate RESERVATION class regulatory sign.

7 A variety of sign types may be used to cater for single or multiple classes of vehicle. Detail 8.31.4 shows the variations which may be made to achieve the desired level of control. RESERVATION class regulatory signs can thus be displayed to cover use by:

(a) buses (sign R302);

(b) buses and minibuses (sign R327);

(c) buses and midi-buses (sign R330);

(d) buses, midi-buses and minibuses (sign R334);

(e) HOV with 2 or more passengers **on board** (sign R352);

(f) any vehicle classified by the authority as a public transport vehicle no matter what number of passengers it is carrying (sign R324).

8 If a lane or a roadway is to be reserved for the use of more than one class of vehicle, one of five methods of signing may be considered. The choice should be made according to the mix of vehicle classes permitted to use the facility. The signing principles of the five methods are as follows:

(a) for a lane or roadway used by more than one class of vehicle (up to three classes) the sign used includes the two or three appropriate vehicle class symbols (see examples in Figures 8.3, 8.30 and 8.31); or

(b) for a lane or roadway used by all classes of vehicle which are operating in terms of an authorities' regulations as "public transport", whether full, partly occupied or empty, the sign used should be R324 with a logo or device representing the public transport authority (this logo should appear as a "permit" on all vehicles authorised to use the lane in order for effective enforcement to be exercised); or

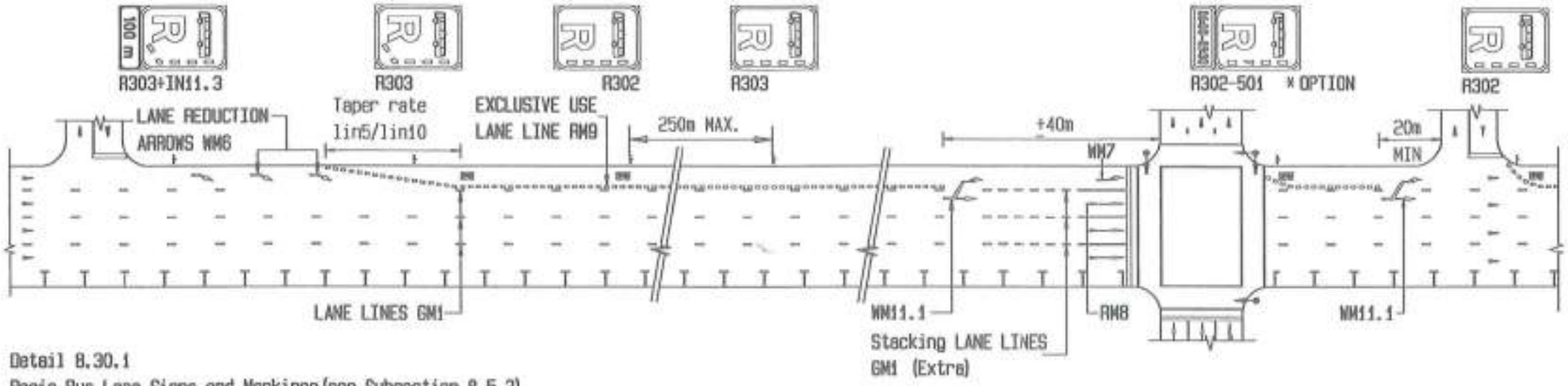
(c) for a lane or roadway used by any vehicle, public transport or private, carrying the number of passengers displayed in the symbol on sign R352; or

(d) for limited shared situations there may be a need to permit local access by private vehicle along the reserved public transport lane or roadway - in this case a SELECTIVE RESTRICTION reservation sign such as R301 - 534 is most appropriate (see Figures 8.4, 8.28 and 8.33 for examples); or

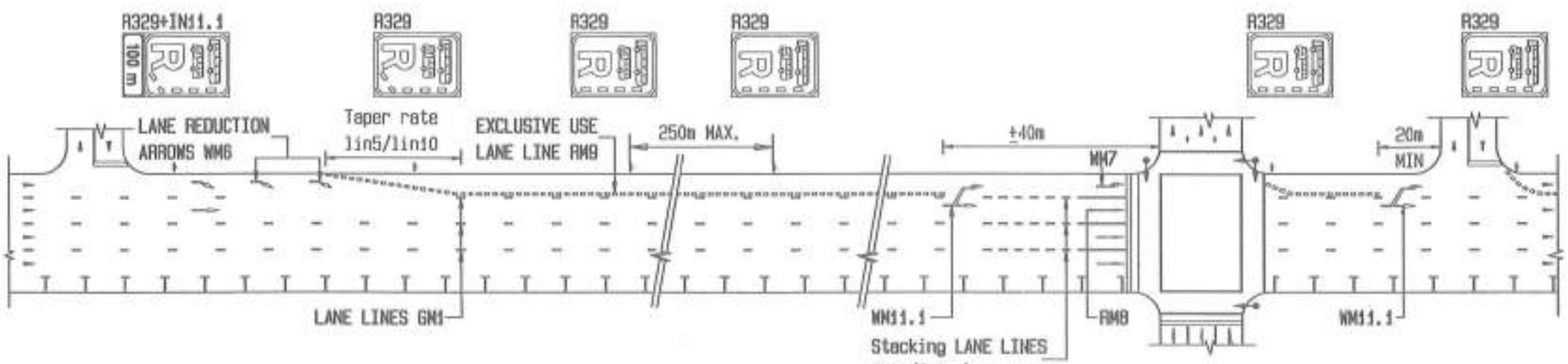
(e) for a lane or roadway used by more than one class of vehicle, one of which is **not** a public transport vehicle, two signs should be provided - one should relate to the public transport vehicle(s) and the other to the non-public transport class - the public transport sign may be a shared facility sign- (see the example in Figure 8.32).

As can be seen from Detail 8.31.4 all of the facilities described can be made applicable to a selected time or times of the day by means of appropriate SELECTIVE RESTRICTION signs.

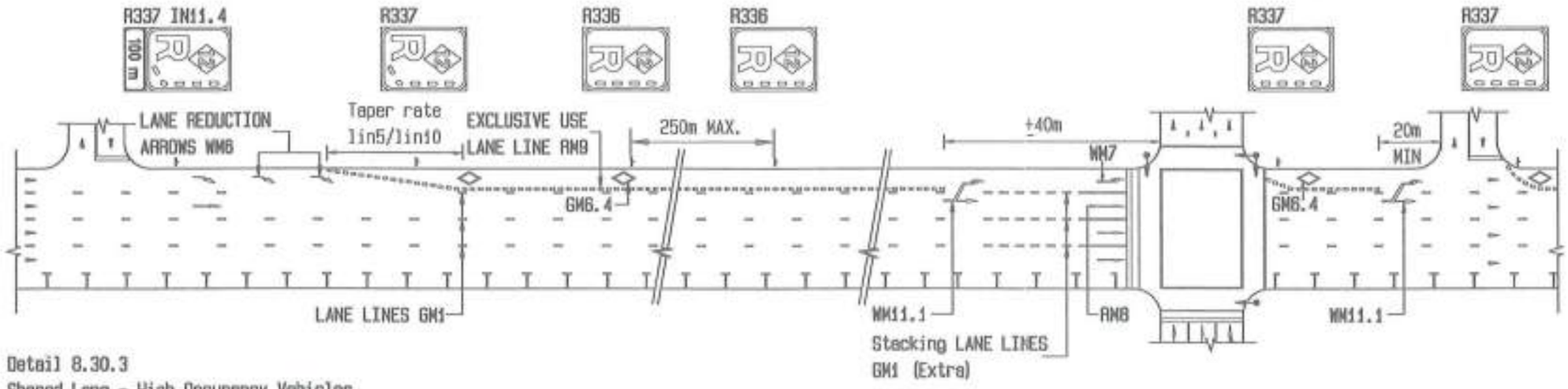
9 Figure 8.32 shows a number of details relating to the sharing of a busway. The example shows a CBD type of environment and the section of busway has only one side access to it, all other property accesses being from other street frontages. Traffic using this access must be identified by a suitable logo. The use of sign R324 and, in this case, sign R108 - 579 is appropriate. Only one lane is available to the private access traffic. Ground-mounted or overhead diagrammatic signs should also be used. The private organisation should be approached to co-operate by ensuring that all vehicles using the lane display the same logo or device on their windscreens as is shown on the signs. Known visitors to the site can be supplied with such a piece of information by FAX if necessary.



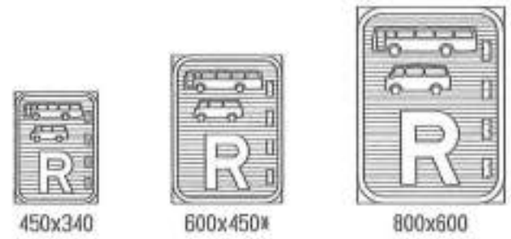

Detail 8.30.1
Basic Bus Lane Signs and Markings (see Subsection 8.5.2)



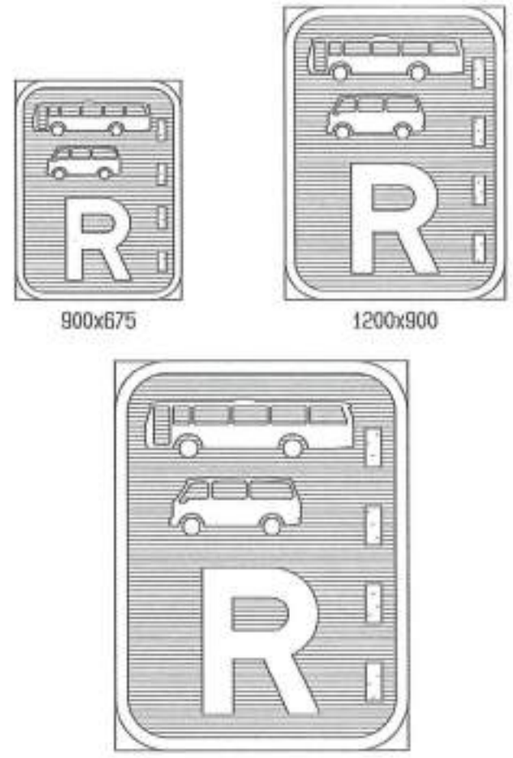

Detail 8.30.2
Shared Lane - Buses and Midi-Buses




Detail 8.30.3
Shared Lane - High Occupancy Vehicles



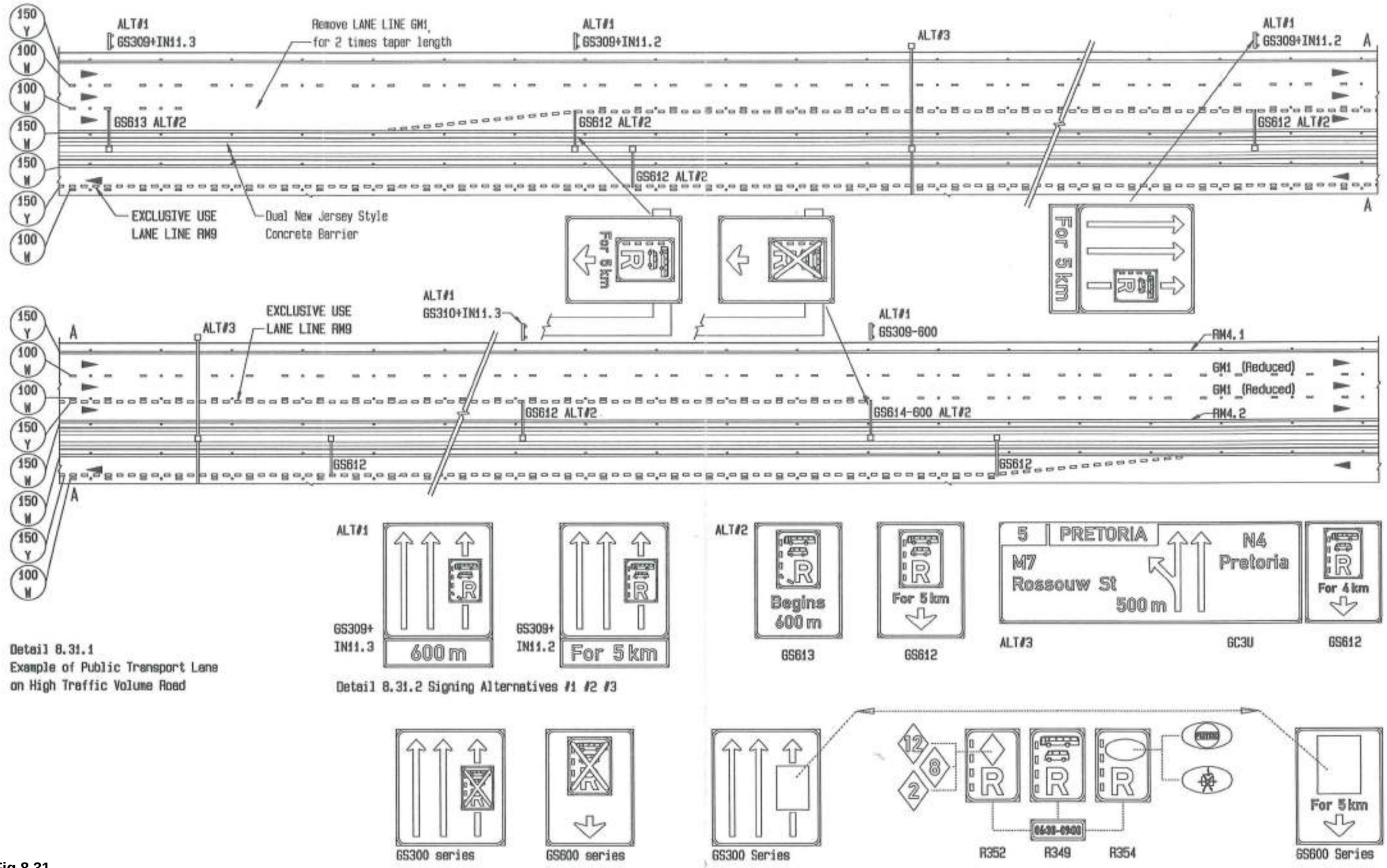

* This is the size most commonly used at 75m spacings for parking control




NOTE:
Ensure that a sign size adequate for the specific enviroment and 250m spacings is chosen (see also Fig.8.31)

Detail 8.30.4
Relative Sizes of Lane Reservation Signs - Standard Sizes for Sign R328

**Fig 8.30**
**Signing for Shared**
**Public Transport Facilities - 1**




Detail 8.31.1
Example of Public Transport Lane
on High Traffic Volume Road

Detail 8.31.2 Signing Alternatives #1 #2 #3

Detail 8.31.3 End of Restriction

Detail 8.31.4 Restriction Signing Alternatives

**Fig 8.31**
**Signing for Shared**
**Public Transport Facilities - 2**

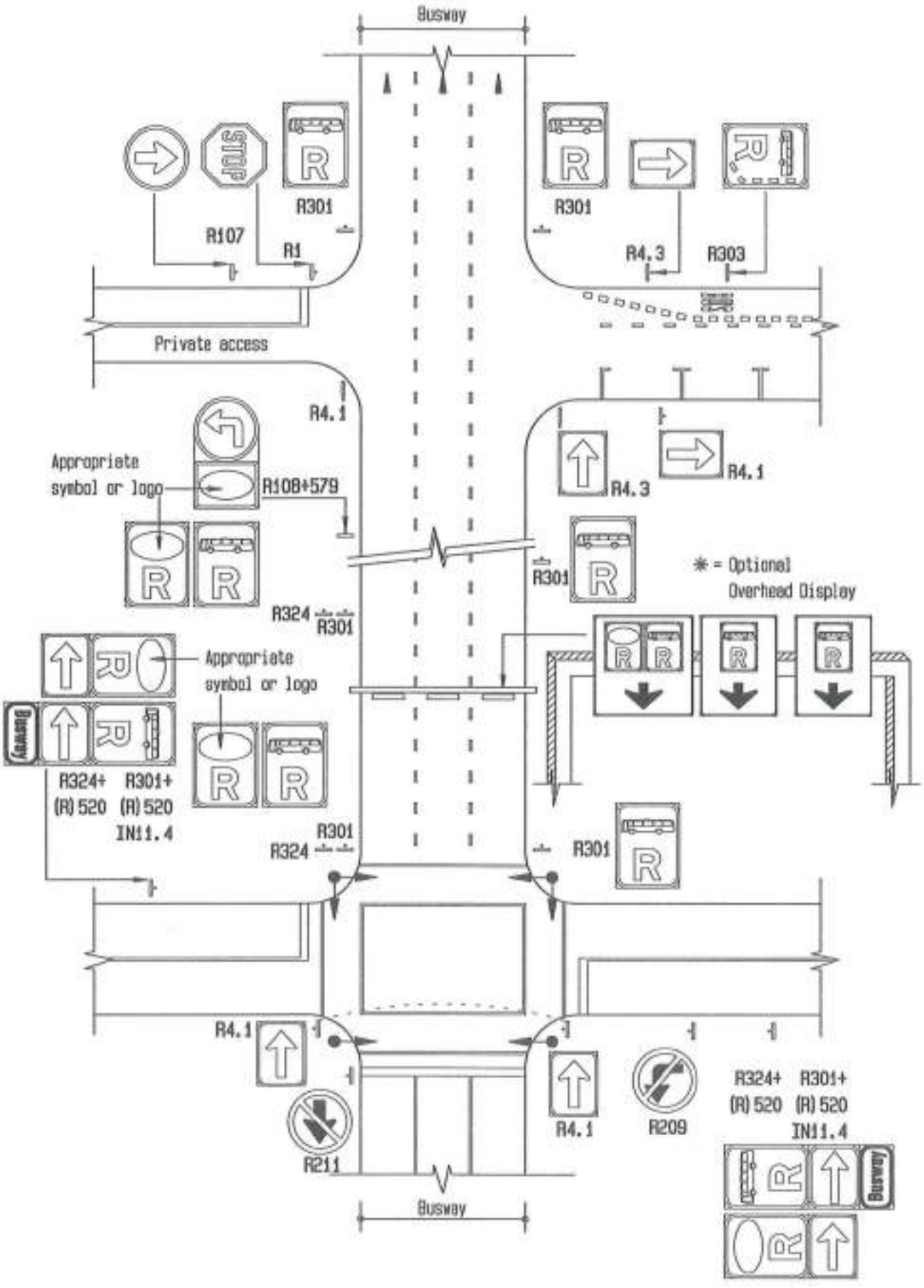



**Fig 8.32 Signing for Shared Public Transport Facilities - 3**

## 8.5.4 Light Rapid Transit LRT Signing

1 This chapter of Volume 2 would be incomplete without some guidelines regarding the possible future developments of public transport infrastructure. Cities in other parts of the world, the size of our major South African cities, often have a light rail based public transport system to compliment heavy rail and bus/minibus based systems. Each mode of transport has its place in the overall transport system of a large city. Light rail transit or LRT involves the use of rail-based trams. In order to provide some basis for future planners to work on, appropriate symbols have been adopted to create the basic signs required to set up an LRT public transport system. The relevant signs are shown in Figures 8.1 (R138), 8.2 (R338, R339 and R340) and 8.4 (W362 and GS704 to GS706). Figures 8.3 and 8.5 illustrate other applications of the two tram symbols.

2 Figure 8.33 shows a typical junction on a tramway. This junction represents a conversion of a busway shown in Figure 8.28 to a tramway. The similarity in the two signing plans can be clearly seen. Basically the signing for Figure 8.33 involves the replacement of the bus symbol by the tram symbol.

3 The information given in this subsection is not intended to be conclusive. **It is very likely that if an LRT system is developed in the future there will be a need to adopt or adapt additional specialised signs and/or signals which have been used elsewhere in LRT systems, for the specific direction and guidance of tram drivers.**

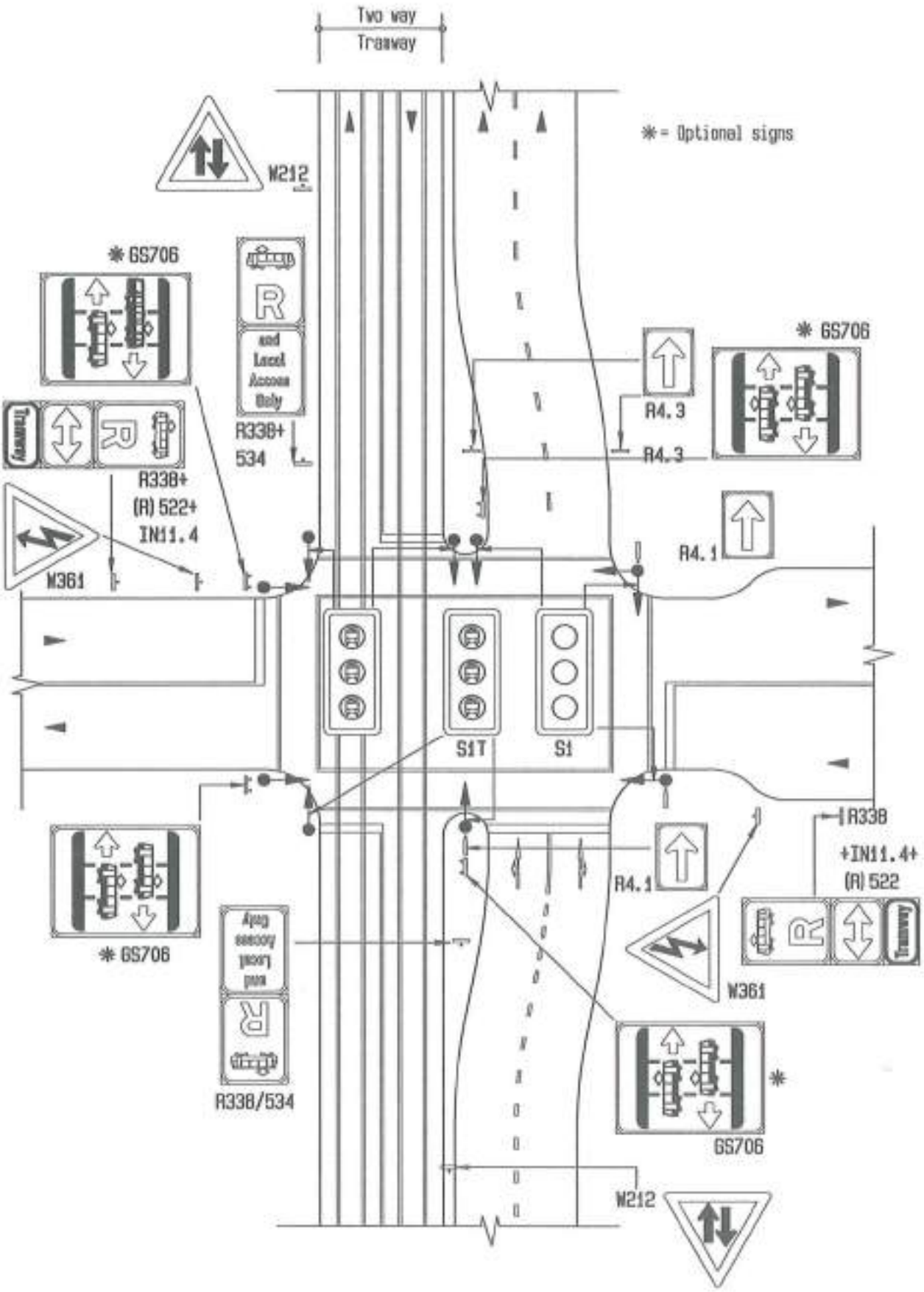



**Fig 8.33** **Light Rapid Transit (LRT) Signing**