Cardiff Council
Planning, Transport & Environment
Infrastructure & Operations

Cardiff Technical Standards

Version 2.0
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Cardiff Technical Standards

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Cardiff Technical Standards
INTRODUCTION

1. Applicable Legislation

   1.1. Creation of New Highways for Adoption. Under section 38 of the Highways Act 1980, the highway authority[1] can enter into a legal agreement with a developer to adopt a highway provided the highway has been constructed to a specified standard and to the satisfaction of the local highway authority.

   1.2. Alterations or Improvements to the Public Highway. Under section 278 of the Highways Act 1980, the highway authority can enter into a legal agreement with a developer (in order to facilitate development) for the developer to either pay for, or make alterations or improvements to, the public highway.

2. Section 38 and Section 278 Approval Process

   2.1. The approval process will vary as appropriate to the nature and scale of the development and a separate process will normally undertaken for both the Section 38 and Section 278 elements of the development. For guidance these processes but will be generally in line with the information in Section A – Typical Design Approval Process

3. Design of Residential Roads.

   3.1. The general principals of the development should be in accordance with the Cardiff Liveable Design Guide[2].

   3.2. Where designs are influenced by schemes such as the design at Poundbury it is important that the whole philosophy of those designs are understood and applied rather than elements of them in a cosmetic manner.

   3.3. The detailed design will require the application of the standards and guidance as set out in Section B – Residential Development Roads.

4. Design of Industrial and Commercial Roads.

   4.1. These should be designed in accordance with guidance in Section C – Industrial and Commercial Estate Roads.

   4.2. This guidance only covers the issues particular to these types of road and so further reference should be made to Section B – Residential Development Roads, which provides guidance on design philosophy.

[1] Normally Cardiff Council except on Trunk Roads where this will be with the Welsh Government
[2] https://www.cardiff.gov.uk/ENG/Your-Council/Strategies-plans-and-policies/liveable-design-guide/Pages/default.aspx

4.3. Reference will also be required to Section D – Advice on Design Elements, which provides advice on implementing common highway features.

5. Construction Standards

5.1. The Council has developed a set of standard details for construction of roads to an adoptable standard. These are set out in Section E – Highway Construction Details. However these are being revised and currently reference may need to be made to other standard details. Section E will therefore change from time to time and the designer will need to check they have the latest information to avoid reworking their designs.

5.2. The designer must seek guidance where it appears that there is a difference in the guidance between these standards and the principals set out in the Sections A to D or the requirements in documents referred to in those sections.

5.3. Where necessary designers may need refer to the standard details in the Manual for Construction of Highway Works – Volume 3: Highway Construction Details[3], but any use of these details should be agreed with Officers.

[3] http://www.standardsforhighways.co.uk/mchw/vol3/index.htm

A1. Section 278 and or Section 38 Approval Process

A2. The applicant will be provided with specific instructions for each scheme for which the following are a typical example.

A3. Main Legal Process

Legal Instruction Requirements (assuming a valid planning consent):-

3.1. Developer's 'Letter of Intent' to enter into S278/38 Agreement under Highways Act 1980 with Cardiff Council. To include:

a) Developer's Details: -Name and address.
b) Planning Consent Reference Number
c) Legal Representatives Details
d) Bondsman Details (if available)
e) Engineering Consultants (if known)
f) Main Contractor (if known)
g) N.B. The text of a pro-forma 'Letter of Intent' is given in the appendix to this section.

3.2. Drawing List. To be agreed between Civil Consultants and Cardiff Council (CC) Engineer (Lead officer for the process).

3.3. Six colour copies of the Land Dedication / Appropriation Plan. (if applicable)

3.4. Principal Financial Obligations:-

a) Commuted Maintenance Sum (CMS). Applicable to additional maintenance obligations.
b) Engineering & Inspection (E/I) Fee.
c) Legal Fee.
d) Temporary Traffic Regulation Order (TTRO) Fee. (if applicable).
e) Traffic Regulation Order (TRO) Fee. (if applicable).
f) Traffic Calming Consultation (1999 Act.) Fee. (if applicable).
g) Bond.
h) Developer's maintenance and defect liability period of 12 months unless otherwise specified by the planning process and legislation etc.

3.5. Projected completion duration - Approximately 3 to 6 months from CC-Development Team's instruction date to CC-Legal Team. **Assuming NO land ownership issues/delays.**

A4. (Only when applicable) Special Legal Process Stopping up of Highway Application (S247 Town and Country Planning Act)

4.1. Developer or his agent to prepare and make a formal application to the Welsh Government in consultation with CC. i.e. Stopping-up of existing public highway land.

4.2. This application will be subject to the original planning consent since the specific purpose of the S247 is extinguishment of highway in order to enable an approved development to be implemented.

A5. (Only when applicable) Special Legal Process (Transfer of Land Agreement)

5.1. Developer's lawyers to contact the Council's Legal Services (Contact as below) to discuss and agree terms of a draft land transfer agreement.

5.2. Legal completion of such agreement shall be conditional on satisfactory completion of the General Legal Process and any S247 Legal Process as well as the satisfactory completion of the highway works covered by the General Legal Process.

5.3. Supporting contact points for this process are Mark Coleman and Sue Colston on tel. no. 2078 8559.

A6. **Technical Approval / Conditional Acceptance Process:-** (Assuming Letter of Intent is issued to CC):

6.1. Ongoing discussion between appointed Civil Consultant / Technical Agent (appointed by the Developer or his agent) and CC to achieve a full detailed design package in compliance with CC adoption requirements and the planning objectives and conditions.

6.2. Interim Fee Payment by the Developer-CC to advise but usually a minimum of £2,000.00 to £10,000.00. In this case likely to be £(value subject to assessment of scale and complexity).

6.3. Satisfactory completion of any outstanding Traffic Modelling or any outstanding transport assessments. (If applicable)

6.4. CC acceptance of the GA Plans supported by Swept Paths plus Road Safety Audit (RSA)[4] Stage 1 (possibly a combined Stage 1 and 2 for minor schemes) and Equalities Impact Assessment (Pending scope of Works – TBC by CC). The same plan to be utilised to discharge relevant planning conditions.

6.5. Commencement and completion of detailed design approval process in full compliance with CC adoption requirements, planning objectives, specifications and standards based on a pre-agreed drawing list and (for large schemes) a Focus Group Approval Strategy as per 8.2.

6.6. Where appropriate a Combined Audit[5] (including Equality Impact Assessment in 6.4)

[4] All Road Safety Audits to be undertaken in accordance with the CC Road Safety Audit Manual or HD19 of the Design Manual for Roads and Bridges

[5] Combined Audits to be undertaken in accordance with the CC Combined Audit Manual

6.7. At the appropriate project stages: RSA Stage 2, RSA Stage 3 & RSA Stage 4 of the Works.

6.8. Street lighting assessment and design[6]. This can be delegated to the CC Street Lighting Section, based on which the detail design will be made available to the principal civil consultant for the S278/S38 Works for inclusion in the overall package. Alternatively, other approved designers listed below can be considered for its procurement:-

a) Capita

b) WSP

- Consultation with WPD and any other existing power supply owners for procurement of disconnections and new power supplies / cabling remains with the Developer and his delivery agents (Consultants / Contractors etc.)
- The street lighting shall include and support the Phillips Central Management System currently operated by the Council's Street Lighting Section.

6.9. Traffic Signal, communications and CCTV via an approved designer:-

a) Siemens - Traffic Signals

b) Dinniq – Traffic Signals

c) CK Com. – Communication Equipment

6.10. Traffic Regulation Order (TRO) Application – Completion duration 6 to 12 months depending on complexity and objections. Note, as stated below, no road signs or markings related to TROs are permitted until the TRO is sealed and so an early application is recommended.

6.11. Projected completion of the technical approval – 4 to 6 months for small schemes and 6 to 18 months for medium to large scheme depending on phasing, scope and complexity of the Works. This can only be accelerated in additional funding is secured by the Developer to support the procurement of additional resources.

6.12. Typical Conditional Acceptance Conditions are given in A12 below.

A7. Contact Points:

7.1. Letter of Intent: -Paul Carter
Copy to: Saeid Valivand 029 2087 3350
To be addressed to:-

[6] This is normally delegated to CC - Street Lighting Section, but will be subject to their approval

Mr Paul Carter,
Head of Transport,
Strategic Planning, Highways, Traffic and Transportation,
. Room 301,
Cardiff Council,
County Hall,
Cardiff.
CF10 4UW

7.2. Legal Agreement: - Kerry Pain 029 2087 3641**
(** There must be no contact with Kerry Pain prior to the issue of the 'Legal Instruction Confirmation Letter' to you (The Developer / Consultants / Agents)

A8. Technical Issues:

8.1. Preliminary General Arrangement (GA) Approval – Martin Smith (029 2087 3795) / Chris Hanson (029 2087 3793) / Saeid Valivand (029 2087 3350) / Mark Foweraker (029 2078 8522) / Greg Loughlin (029 2233 0111)

8.2. Larger schemes will be managed using a Focus Group Approval Strategy. The Developer's consultants will be responsible to co-ordinating and managing the flow of information and approval process with the Focus Groups and keeping the Highway Design and Road Safety Group up to date with progress. Typical Focus Groups for a large scheme are taken from the following but always include Group f)

a) Telematics (Traffic Signals, CCTV and Communications)
b) Road Markings and Road Signage
c) Street Lighting
d) Highway Drainage
e) Soft Landscaping
f) Highway Design and Road Safety

8.3. Detailed Design GA Approval – Greg Loughlin (029 2233 0111) G.Loughlin@cardiff.gov.uk or Mark Foweraker (029 2078 8522) m.foweraker@cardiff.gov.uk

8.4. RSAs – Mark Foweraker

A9. Pre-commencement Compliance/Requirements:

9.1. Completion of the Legal Agreement.

9.2. Completion of technical approval process.

9.3. Traffic Management (TM) approval in full compliance with CC Network Management Working Restrictions for Primary Traffic Routes and the City Centre.

9.4. The main highway contractor for the Works and associated specialist sub-contractors shall be on appropriate Council's List

of Approved Contractors or South East Wales Framework. Other multi-disciplinary highway contractors can only be appointed if they satisfy the following approval requirements in advance:

a) Liability-Public liability insurance etc. Min. £10M per claim.
b) Quality-Minimum of 2 written references from other highway authorities confirming competence & ability to manage & deliver high quality works within primary public highway routes.
c) H&S Registration and Accreditations including Supervisors' Roads & Street Works Certification.

9.5. Street lighting specialist contractors shall be on CC's approved List.
9.6. Telematics specialist contractors shall be on CC's approved List.
9.7. Soft Landscaping specialist contractors shall be on CC's approved List.

A10. Typical / Generic Drawing List:

10.1. Existing Survey & Location Plans-A1
10.2. Existing Photographic Survey Plan-A1 (if required)
10.3. Hoarding Layout, X-Section & Fixing Arrangement-A1 (if applicable)
10.4. General Arrangement Plans-A1s
10.5. Street Lighting, Road Marking and Signs Plans-A1s
10.6. Drainage Layout & Details-A1s.
10.7. Pavement & Finishes Plans-A1s.
10.8. Construction Details-A1s.
10.9. Setting-out & Levels-A1s
10.10. Contour Map. A1s.
10.11. Cross Sections.A1s.
10.12. Kerbing & Channelling Layout-A1
10.13. Soft Landscaping & Details.-A1 (if applicable)
10.14. Existing Services.-A1
10.15. Services-Diversion, Protection & New.-A1
10.16. Swept Paths.-A1
10.17. Site Clearance Plans. A1s.
10.18. Specification Booklet. (Street Lighting)-A4
10.19. Land Dedication / Appropriation Plan. (if applicable)-A1
10.20. Section 142 Licence Plan. A1 (if applicable)-A1
10.21. TRO Plan. (if applicable)-A3 to A1

A11. Other Development Related Advance CC Contact points:

11.1. Tower Crane Licence – Asset Management email AssetManagement@cardiff.gov.uk

11.2. Hoarding Licence – Asset Management email AssetManagement@cardiff.gov.uk / Ryan Williams (029 2233 0215 ryanwilliams@cardiff.gov.uk)

11.3. Road Opening Notice & S50 Licence – Kadie Irish (029 2233 0213 KIrish@cardiff.gov.uk) / Samantha Dacey (029 2233 0125 Samantha.Dacey@cardiff.gov.uk)

11.4. Traffic Management – Kadie Irish Kadie Irish (029 2233 0213 KIrish@cardiff.gov.uk) & Samantha Dacey (029 2233 0125 Samantha.Dacey@cardiff.gov.uk)

11.5. Permanent Traffic Regulation Orders (TROs) – Helen Grainge (029 2087 3250 Helen.Grainge@cardiff.gov.uk) / Carwyn Harvard (029 2087 3353 CHarvard@cardiff.gov.uk)

11.6. Bus Lane Enforcement Matt Harries – (Matthew.Harrison@cardiff.gov.uk)

11.7. Traffic Signals – Dave Kinnaird (D.Kinnaird@cardiff.gov.uk)

11.8. Street lighting – Matt Davies (MatDavies@cardiff.gov.uk)

11.9. Bus Stops – Joe Stitfall –(JStitfall@cardiff.gov.uk) / Gareth Stevens (gstevens@cardiffbus.com)

A12. Issue of Technical Approval / Conditional Acceptance

12.1. Once the design package, as referenced above, has been prepared to an acceptable standard, including both the drawings and the specification booklet, a conditional acceptance will be issued. The terms of this acceptance will generally follow the format below.

a) We are able to confirm that the detailed design package represented by the attached drawing list is conditionally accepted in principle, without prejudice to any outstanding planning conditions as detailed below.

b) This does not prejudice your liability as Designer for the works.

c) This acceptance is subject to the following conditions:-

- This acceptance is without prejudice to the design being fully in compliant with the details submitted as part of the planning consent and subsequent discharge of the reserved matters in the detailed planning submissions. In particular this includes approved access parameters and the overall public transport objectives linked to the development consent.
- *EITHER The Developer shall at its own expense carry out a detailed consultation in full compliance with the applicable sections of the New Roads and Street Works Act 1991 and the supplementary Codes of Practice dated June 1992 and January 2008 issued by the Welsh Government in conjunction with all existing Statutory

Undertakers and public utility companies who are likely to or will be affected in relation to or in consequence of the construction of the Works. For the avoidance of doubt such consultation is to be carried out and completed prior to the commencement of the Works.

- *OR You and your client(s) have undertaken all necessary consultation and have issued formal notifications to all statutory undertakers for all services that may be affected by the works and that this package is inclusive of their requirements as approved by them.
- *An application for the necessary Traffic Regulation Order(s) (TROs) has been made and you have been issued with a C reference number. The implementation of the works associated with the TRO are subject to the conditions below.
- *No traffic signs and road markings related to Traffic Regulation Order (TRO) Ref C** will be erected or laid until you have formal confirmation that the TRO has been sealed. Any such works can considered to be “pre-determination” of the TRO process which may result in the failure of the TRO process. Such a failure would require the developer or their agents to pay for the removal of all such signs and markings and additional costs for a subsequent TRO process, including all advertising, legal and works costs.
- The Developer and Designer will be responsible to check for, and avoid, any physical conflict between new service chamber locations and the other detail design objectives (such as, but not exclusively, telematics infrastructure, pedestrian crossing locations (tactile paving and route across the carriageway), traffic signs and street lighting).
- The installation of the modified street lighting and illuminated road signs shall be Installed, Tested & Commissioned in accordance with BS7671 “Requirements for Electrical Installations – IET Wiring Regulations Seventeenth Edition with appropriate test certificates issued to CC on completion of the works.
- Your design proposal will not result in any surface water ponding within scope of the works.
- You have obtained formal permission and connection consent for any new highway drainage connection to Welsh Water-Dwr Cymru owned drainage infrastructure or any other amendments to the same assets owned and maintained by Welsh Water.

- You and your clients will notify owners of any existing damaged / unsafe service covers and frames within the boundary of the works, in advance, that would require replacement works by the owners.
- You would adjust (raise and lower) existing service covers and frames that may be necessary to achieve safe and acceptable road and footway profiles and levels.
- The execution of the Works and their associated traffic management scheme will be carried out by approved and qualified main contractors, specialist sub-contractors and installers and in full compliance with the working restrictions applicable to the local highway network.
- All modifications or amendments to the design, whether due to unforeseen site conditions or any other reason will be discussed and agreed with the Council in advance prior to implementation.
- The same as any other comparable highway scheme, the works will be subjected to Stage 3 and Stage 4 Road Safety Audits at the relevant post completion stages.
- *Due to the scale and duration of the temporary works they will need to be subject to a Stage 3 RSA as soon as practicable once the diversion is open to traffic.
- Your design is compliant with: a) Equalities Act 2010 (DDA considerations), b) Section 1.13 of Building Regulations 2010 ADM Part M1. c) Guidance in Inclusive Mobility 3.11 and Guidance on the Use of Tactile Paving Surfaces 1.5.1.2.
- This package and its highway design model is a continuation of the adjacent existing and / or new highway as part of an overall continuous and compliant model for both horizontal and vertical tie in details. In addition it must tie in in the same way with all private and public access points as well as any private boundary fence and wall affected by the Works.
- * You must provide a copy of the full set of the drawings (printed at full size and folded to A4) and documents (staple bound where appropriate) on CD for our archive records.

*delete as appropriate

**this number to be supplied once the application has been received.

A13. Approved Contractors:-

13.1. Approved Contractors

a) General Contractors on South East Wales Framework:-

- Alun Griffiths
- Calibre
- Dyre & Butler
- ERH
- Horan
- North Midland
- Tarmac

b) However this does not exclude us to appraise contractor consideration from outside of the framework arrangements, and the following contractors have been successfully utilised for development projects. Again this give us more confidence in the terms of contractor competency:-

- Walters
- Randalls
- Rapid Grid
- WDL

13.2. Approved Soft Landscaping Contractors

- Landcraft
- Afan
- Gerald Davies
- Inscapes
- Approved Telematic Contractors / Designers
- Siemens
- Dynniq
- CK Com. (communications only)

13.3. Approved Street Lighting Designers:-

- Capita
- WSP
- Joint CC / WSP (In-house Design Team)

13.4. Approved Street Lighting Contractors:-

- Centregreat Ltd., 16 Village Farm Road, Village Farm Ind. Est., Bridgend, CF33 6BL: Contact Julian O'Brien 01656 746 444 (FAX 01656 749 838)
- Southern Electric Contracting. Ty Golau, Tyn Y Bonau Ind. Est., Pontardulais, Swansea, SA4 8SG: Contact Adrian Percival 01792 882 227 (FAX 01792 885 556)
- Exterior Lighting, Unit 5A&B George Thomas Ave, Brynmeyn/Ind. Est., Brynmeyn, Bridgend, CF32 9SQ:

Contact Leighton Coates 01656 720 211 (FAX 01656 729 611)

- P.S. Lighting Solutions Ltd., Units 10 – 11, Fraldau Ind. Est., Blaengarw, Nr Bridgend, CF32 8NQ: Contact Paul Samuel 01656 871 366 (FAX 01656 871 466)

Our Reference:

[Company Address]
[or Headed Paper]

[Date]

Mr Paul Carter
Head of Transport
Planning, Transport and Environment
Room 301
Cardiff Council
County Hall
CF10 4UW

Note [Type] could be: S278; Mini S278; combined S278/38; S38 or other as agreed Where details of Bondsman, Consultants, or Contactor are not yet appointed this should be stated rather than deleting the paragraphs.
Remove this note before sending this letter

Dear Mr Carter

Re: [Scheme Name]

Letter of Intent to Enter into a [Type] Agreement under the Highways Act 1980 with the Cardiff Council

We hereby notify you of our intention to enter into a [Type] Agreement for works to [nature of works] associated with the [re]development of [description of site or address], Cardiff. We therefore provide you with the following details;

a) Developer's Details – [Name of Contact and Address to which correspondence will be sent]
b) Planning Consent Reference – [Reference or description of relevant enabling legislation giving consent for the works]
c) Legal Representative – [Name of Contact and Address to which legal correspondence will be sent]
d) Bondsman Details – [Name of Contact and Address to which legal correspondence will be sent]
e) Engineering Consultants – [Name of Contact and Address to which correspondence will be sent]
f) Main Contractor Details – [Name of Main Contractor if appointed and Registered Company Address to which legal correspondence can be sent]

If you require any further information please let me know.

Yours faithfully

[Contact Name]
[Contact Role]

B1. Design Philosophy

1.1. Notwithstanding any gradients given in these or other referenced standards, account must be taken of the requirements of the Design Guidance for the Active Travel (Wales) Act and the DfT's publication, Inclusive Mobility. In particular, if the gradients of the carriageway are greater than that given in those documents, then alternative, convenient and safe alternative routes must be provided that provide the same overall level of access as the carriageway network.

1.2. The appropriate application of the principals given in the Home Zone Design Guidelines (HZ),[7] Manual for Streets (MfS),[8] Manual for Streets 2 (MfS2),[9] or the Design Manual for Roads and Bridges (DMRB)[10] will depend upon several aspects and the application of the Cardiff Liveable Design Guide[11]. Also differing documents may be appropriate for different elements of a development, particularly if it is large. Therefore is will be beneficial to the successful development of the scheme if these matters are discussed with the officers dealing with Section 278 and Section 38 agreements as soon as possible.

1.3. Designs must also take account of the Active Travel (Wales) Act 2013 and the statutory guidance published under that Act[12] (ATWA). The design of schemes must also take account the requirements and guidance in the Cardiff Cycle Design Guide (CCDG) where the ATWA does not apply.

1.4. Designs for developments accessed from distributor roads should limit the walking distance between a property and the closest possible approach of a potential through bus service to about 300 metres and must consider potential later expansion of the site. Such routes should be lit and meet the requirements of Secured by Design for the use of these routes by people of all ages. This may be increased on sites with low gradients as agreed with officers.

1.5. The layout of street furniture and the choice of materials must take into account the requirements of the Cardiff Public Realm Manual (CPRM). This must take into account which of the four Public Realm Character Areas the scheme is within.

1.6. As various standards could be cited in a design all layout drawings and design descriptions must clearly indicate which standards have been used in each area.

1.7. All changes to the highway, including new roads, must be subject to a Road Safety Audit (RSA) process either in accordance with the standard in the Design Manual or Roads and Bridges, or the Cardiff Council Road Safety Audit Manual.

1.8. All schemes must be subject to an Equalities Impact Analysis (EqIA) as required by the Equalities Act 2010, and these should be discussed with the appropriate Council officers.

[7] Institute of Highway Incorporated Engineers 2002
[8] Department for Transport 2007
[9] The Chartered Institution of Highways & Transportation 2010
[10] Department for Transport various dates
[11] Cardiff Council, May 2015
[12] Design Guidance: Active Travel (Wales) Act 2013

1.9. Developers may also find that the completion of a Combined Audit (CA) will assist in ensuring that there is a record that the requirements of the Equality Act 2010 and other legislation and guidance has been considered.

1.10. Advice on the detailed implementation of design elements is given in Section D – Advice on Design Elements.

B2. Road Hierarchy and Standards

Type 1: Providing access into and through residential areas and including public transport

(a) This road allows for public transport.
(b) This is the part of the network in the development that connects with the existing Principal Road network, or improves that network, whether Numbered –Classified or not.
(c) The design speed is expected to be 30 mph with possibly some areas of 20 mph. However 20 mph may be considered to be appropriate if there are numerous junctions, regular parking, residential frontage, or a limited length. It should not have a higher limit at its ends than the road it connects to.
(d) The carriageway width is 6.3 metres with parking prohibited except in bays.
    i. These parking bays can be provided on one or both sides of the road.
    ii. Where loading bays are required they must be protected by traffic Orders and of increased width.

Type 2: Providing access into and through residential areas for larger developments

(a) This connects directly Type 1 other classes of Road, including links between different Type 1 Roads or different points on the same Type 1 road.
(b) There is no restriction on the length, but layouts with excessive distances between junctions with Type 1 are unlikely to allow adequate public Transport provision.
(c) Direct vehicle access is permissible but needs careful design, especially on the side with cycle provision.
(d) The speed limit is expected to be 20 mph or possibly 30 mph depending upon the same factors as Type 1(c).

Type 3: A residential street with a significant access function

(a) This normally only connects directly to Type 2 to provide access for Types 4 and 5.
(b) These roads either are non-through roads, or loop back to the originating road.
(c) The maximum distance from any point on this road is 200 m to or from Types 1 and 2.
(d) The design speed and speed limit is expected to be 20 mph.
(e) The highway is likely to have direct residential access via driveways with limited on street parking in bays

Type 4 : A residential street with scope to share the highway with traffic, but also a clear, dedicated area of safe access for vulnerable street users.

(a) These connect to Type 3 or possibly 1 and 2.
(b) It is expected that shared space signs will be used.
(c) These are expected to be connected to Types 2 or 3, though connection off Type 1 may be possible.
(d) The total number of parking spaces served from this road, including streets off it would not be expected to exceed 200 without prior discussion.
(e) The layout could be either a no through road or it could loop back to the same road, but must not provide a through route to a different Type 4 or above road.

Type 5: Forming a shared space street or courtyard

(a) The maximum length of this type of highway is 80 metres and would not serve more than 30 spaces, including both on and off street provision. The right is retained to include clear parking opportunities, whether designated or not, in this figure.
(b) The speed limit is expected to be 20 mph with possibly a 10 mph design speed.
(c) Shared spaces will have a design speed of 10 mph. Note Home Zones cannot be provided in Wales as the Welsh Government have decided not to publish the required Regulations or to authorise the required signs.

Type 6:Shared Driveways

(a) These are not adoptable but the following design parameters are expected to apply.
(b) Length of road not more than 25 metres
(c) Number of parking spaces served 10
(d) Turning space suitable for a 3.5 T “Home Delivery” van should be provided for safety of residents.

Type	Function of adoptable highway, speed limit and design speed	Length or Parking Limits	Basic All User Space[1] m	Kerb Height mm	Segregated Cycle Space[2]	Shared Footway / Cycle Track[2]	Pedestrian[3] Space[4]	On Highway Parking[6]
1	Public Transport Route 30 or 20 mph	None	6.3	125	3 m one side	n/a	2 m both sides	In parallel bays
2	Access Into and Through Residential Area 20 (30) mph	None but see 2(c)	5.5	125	3 m one side	n/a	2 m both sides	In parallel bays
					n/a	3 m one side	2 m other side	
3	Residential Streets with Local Access Function 20 (30) mph	Maximum 300 m to Types 1 or 2	5.5	125	n/a	3 m one side	2 m other side	Limited on street 1 side only
4	Purely Residential Street 10 mph design and 20 mph limit	Serving total 200 spaces	4.8	50 to 0[5]	n/a	n/a	2 m continuous safety zone for vulnerable users down one side and 1.2 m car free safe access into and across the street from every home	On street in bays
5	Street for Shared Use 10 mph design and 20 limit	80 metres or 30 spaces	5.6 (including service strip)[7]	n/a	n/a	n/a	Provided by the Service Strip	On street in bays

[1] This is without Bus Lane, Turning Lanes, Parking or other additional road space. Where the radius is 300 m or less on Public Transport Routes the layout will need checking using Track Runs for all combinations of opposing 12 metre buses and / or

Maximum Articulated Vehicles. The required clearances are 200 mm tyre to verge or body to footway (or similar) and 650 mm bus to opposing vehicle or 450 mm goods to opposing goods.

[2] This is the core width, additional width requirements from the Active Travel Guidance must be provided. Side must only change at crossing facilities or features.

[3] The term pedestrian covers all users permitted on a Footway (including, but not limited to, pushchairs, wheelchairs and mobility scooters)

[4] This is the clear width. Where two widths are provided, they must not change sides except at points with good crossing opportunities. The narrower width need not be continuous.

[5] 50 mm or less kerb heights are only permissible if other features prevent driving and parking on the footway (planters, walls or bollards) but allowing pedestrian movement by providing adequate guidance through materials for visually impaired users. Note, the use of height 50 mm kerbs will need frequent crossing places for mobility impaired users unless full batter kerbs are used.

[6] Parking in bays will require additional space for all users. Type 4 and 5 highways can have chevron or parallel parking bays and should change sides to limit forward visibility for drivers.

[7] This width of the service strip is 1.1 m. This strip must be visually identifiable in the area of the highway and the surfacing material should take into account the risk of excavation and reinstatement. Parking should be prevented or deterred on the service strip.

B3. Application of Design Standards

3.1. Gradients. Notwithstanding any gradients given in these or other referenced standards, account must be taken of the requirements of the Design Guidance for the Active Travel (Wales) Act 2013 and the DfT's publication, Inclusive Mobility. In particular, if the gradients of the carriageway are greater than that given in those documents, then alternative, convenient and safe alternative routes must be provided that provide the same overall level of access as the carriageway network.

3.2. Home Zone Design Guidelines. The principals in these guidelines are of use when considering some smaller developments or areas of a scheme that are intended to be largely traffic free. However it is important to note that the Welsh Government have not issued the necessary regulations under the Transport Act 2000 to enable Home Zones to be created in Wales and so no approved signs designs exist and the English only sign face must not be used. Accordingly, no design based exclusively on these guidelines will be acceptable.

3.3. Manual for Streets. This is the primary document to be used for the design of new residential areas and supersedes DB32 and Places, Street and Movement and complements Planning Policy Statement 3: Housing and Planning Polity Wales. Designs that comply with these guidelines will generally be acceptable for all roads with a residential development. The exception is for roads that have low levels of frontage and access and are therefore primarily for vehicle movement, where other standards should be applied.

3.4. Manual for Streets 2. This document extends the principals of MfS and should be used in larger developments where the expected traffic volumes and the context of the road are outside those assumed in the preparation of the MfS. Where the development joins the existing highway the designer must agree whether the standards in MfS2 or the DMRB should be used to design the access point and any features associated with it. When Section 278 drawings are submitted for RSA and approval the use of MfS2 standards must be clearly stated in accordance with paragraph 1.4.

3.5. Design Manual for Roads and Bridges. This is the Department for Transport[13] standard for Trunk Roads and gives the requirements for these roads. They are not generally applicable to Cardiff's County Road network but works on several of the A class roads, particularly the Principal road network, should be designed to these

[13] Also Welsh Government and other national Trunk Road bodies.

standards. Also the apparent standards of the existing road in the vicinity of the works, as well as the speed limit will need to be considered. Consequently the decision to require DMRB standards will be made by the Council's officers in discussion with the developer. Notwithstanding this decision the developer can make use of the DMRB standard where it provides guidance on elements of design not specifically provided in the MfS or MfS2.

3.6. Active Travel (Wales) Act 2013. The Active Travel Act allows the Welsh Government to publish statutory guidance and this is currently the Design Guidance (December 2014). This guidance must be used when designing active travel routes in Wales. Accordingly the developer must ascertain from the Council if any of the new or existing roads or paths associated with a development are, or are likely to be, designated as Active Travel routes. If this is the case then this guidance must be used. The guidance is also commended to developers for use throughout the scheme, but particularly on any roads that have a significant movement status rather than a place status.

3.7. Cardiff Cycle Design Guide. This states that "Needs of cyclists must be considered in the designing of ANY scheme on the highway, not just cycling schemes." This design guide must be considered when undertaking alterations to the existing highway under Section 278 agreements, including ensuring that the scheme does not preclude later introduction of planned cycle improvements. It should also be considered on all roads with a significant movement function.

3.8. Cardiff Public Realm Manual. This manual sets out the best practice for the layout and the use of materials within of the Public Realm with particular reference to four Pubic Realm Character Areas. It provides summary guidance to the application of the principals and requirements provided by the other design manuals referenced above. It also gives specific advice regarding the acceptable choice of materials and their application throughout the Public Realm.

3.9. Road Safety Audit. All roads constructed or modified under Section 38 or Section 278 agreements must be subject to a Road Safety Audit process. The developer can either elect to use the standard for RSAs set out in the DMRB or to use the Cardiff RSA manual. The Cardiff RSA follows the principals of the DMRB standard but adapts it to the particular situations and extents relevant to works on County Roads. Generally these result in relaxations of the audit requirements, but it also introduces the

concept of an Essential Audit at the feasibility design stage to identify significant issues before the concept design is undertaken.

3.10. Equalities Impact Assessment. The Council has developed a process for undertaking these assessments that are required to fulfil the obligations of the Equalities Act 2010, and these should be discussed with the appropriate Council officers.

3.11. Combined Audit. There are numerous audits and consultations that should be carried out during the preparation, implementation and monitoring of a scheme on the adopted highway. Cardiff Council has developed the CA as a way of ensuring that these are both considered and documented and so it brings all these processes together in a single formalised document. It is recommended that the developer considers undertaking this process as it provides a clear record that these issues have been considered.

3.12. Swept Path Analysis. Track runs must be undertaken at junctions, turning heads, turning space and other locations as required. The type of vehicles will be determined by the nature of the road and typical usage as requested. In addition, where the radius is 300 m or less on Public Transport Routes, track runs are required. These will be for all combinations of opposing 12 metre buses and / or Maximum Articulated Vehicles. The required clearances are 200 mm tyre to verge or body to footway (or similar) and 650 bus to opposing vehicle or 450 goods to opposing goods.

C1. Design Philosophy

1.1. Notwithstanding any gradients given in these or other referenced standards, account must be taken of the requirements of the Design Guidance for the Active Travel (Wales) Act and the DfT's publication, Inclusive Mobility. In particular, if the gradients of the carriageway are greater than that given in those documents, then alternative, convenient and safe alternative routes must be provided that provide the same overall level of access as the carriageway network.

1.2. Industrial and commercial estate roads must be designed specifically to cater for use by large commercial vehicles. In this respect the Freight Transport Association Guide will be heavily relied upon for information regarding vehicle length, width, height, fully laden weight, turning circles and manoeuvring capabilities.

1.3. Industrial and commercial estate roads must also be designed with peak hour vehicle flows and with pedestrians in mind. The vehicle speeds must also be minimised wherever possible to produce safe roads. In order to reduce reversing movements for heavy goods vehicles, turning circles are preferred to reverse turns.

1.4. In small developments which are not expected to have regular deliveries by vehicles over 7.5 tonnes some relaxation in the design standards may be acceptable. However, the design must still allow for maximum size rigid and articulated vehicles to access and egress the site without having to reverse onto the main highway.

1.5. Industrial and commercial estate roadsmust also include provision for pedestrians and cyclists in accordance with Council and Welsh Government requirements for Active Travel.

1.6. Industrial and Commercial developments must provide the required level of parking and if necessary restrictions should be provided where overspill parking could impact on access and safety.

1.7. Designs must also be subject to Road Safety Audits and an Equalities Impact Analysis as set out in Sections A and B.

C2. Road Hierarchy and Standards

2.1. The road hierarchy falls into two categories which are Approach Roads and Access Roads and the layout should be designed to the standards in Table 1.

	Approach Road	Access Road
Design Speed (mph)	30	25
Minimum Carriageway Width (m) (see 2.3)	7.3	6.5
Minimum Centre Line Radius (m)	70	50
Maximum Gradient (%)	8	8
Maximum Adjacent Junction Spacing (m)	60	30

Minimum Opposite Junction Spacing (m)	30	25
Minimum Kerb Radius at Junction (m)	15	15
Minimum 'X' Distance at Junction (m)	2.4	2.4
Minimum Forward Stopping Sight Distance (m)	40	40

Table 1 – Layout Standards

2.2. Carriage Widths on Bends - Allowance must be made on tight bends for increase in the width of the paths described by vehicles when turning. The width of the road will therefore depend on the radius of the bend and the length of the vehicle.

a) Throughout commercial and industrial developments, swept paths will be required to ensure that road widths and widening on bends is sufficient to allow for the passing of heavy goods vehicles. The safety margin shall be;

b) 7.3m wide carriageway, 1.1m between opposing directions and 0.5m from the kerb

c) 6.5m wide carriageway, 0.7m between opposing directions and 0.3m from the kerb

d) The safety margins shall be maintained at all times

2.3. Turning Areas. A turning area must be provided at the end of every cul-du-sac and at other locations where large vehicles might otherwise be expected to reverse more than a short distance.

a) Turning areas must be able to accommodate the turning manoeuvers of large vehicles.

b) They shall be laid out in accordance with the standard details. Turning circles are preferred.

C3. <u>Gate Accesses</u>

3.1. All gates leading into adjoining industrial units shall only open away from the back of the adjoining highway and where possible should be set back 12 metres.

3.2. Security gates of barriers that are predominantly closed and need to be opened for every vehicle shall, where possible, be set back 20 meters from the edge of the adjoining highway. Where the size of vehicles entering the site are normally less than 10 metres long then the set back can be reduced to 12 metres with the agreement of the appropriate Officers.

C4. <u>Access Junctions</u>

4.1. Junctions with the existing road network shall be designed in accordance with the standards applicable for the existing road. The design must be based on actual survey data, making allowance for traffic growth as necessary. Developers should contact the Council for advice on this.

4.2. As a minimum an Essential Road Safety Audit[14] will be required as part of the planning submission for the access junctions. It is recommended that the whole layout is similarly audited to reduce the risk of having a planning consent for a layout with safety issues that cannot be easily resolved without a revised consent.

C5. Further Guidance

5.1. The Council's guidance in Section B – Residential Development Roads, should be consulted for further information and advice on the requirements for developments and approval of design elements.

[14] In accordance with Cardiff Council's Road Safety Audit Manual

D1. Pedestrian and Cycle Facilities.

1.1. Please refer to Section E Appendices B to E for details regarding the positioning of uncontrolled pedestrian facilities, cycle facilities and tactile paving use.

D2. Layout

2.1. Gradients. Notwithstanding any gradients given in these or other referenced standards, account must be taken of the requirements of the Design Guidance for the Active Travel (Wales) Act and the DfT's publication, Inclusive Mobility. In particular, if the gradients of the carriageway are greater than that given in those documents, then alternative, convenient and safe alternative routes must be provided that provide the same overall level of access as the carriageway network.

2.2. Minor Access Points. It should not be presumed that a junction layout is always needed when an access point from a road serves multiple properties. In many cases in urban areas where the footfall across the access is many times the vehicle flow using the access then a cross-over arrangement is preferable as is does not disrupt the pedestrian flow and reinforces the road user hierarchy. In central areas it also reduces the risk of the access being mistaken for public highway and being used for general parking to the detriment of residents. However this principal is not suitable for roads with a speed limit above 30 mph.

2.3. Staggered Pedestrian Islands. The design of these facilities should use the raised 'barrier' kerb layout, known as the Kensington High Street design, unless there is a identified safety reason or to maintain design continuity with adjacent existing facilities. These islands should be in the 'left / right' layout so that pedestrians crossing the barrier kerbs are beyond the vehicle stop line. Deterrent paving must not be used in the barrier kerb design. See Section E para 8.

2.4. Tactile Paving. Attention is drawn to the advice in the Guidance on the use of Tactile Paving Surfaces[15] and Inclusive Mobility[16] regarding location, colour and dimensions. Dropped kerb crossings do not need to be on the desire line, but must be kept close to it. Accordingly designs should strike a balance between: pedestrians using it having visibility to and from turning traffic; minimising the crossing distance and reducing the possibility that

[15] DETR Department of Environment Transport and Regions (now DfT) 1988
[16] Department for Transport 2005

visually impaired users could be uncertain about the direction of the crossing. The last issue can occur when tactile paving is placed on the bell mouth radius such that the layout is ambiguous and potentially misleading or even dangerous. See Appendix C.

2.5. Footways and Paths. New footways must be designed to have a clear width of 2.0 metres unless otherwise agreed by the Council. This clear width must take into account all expected obstructions such as street lighting, pedestrian guardrail and equipment cabinets such as feeder pillars and traffic signal controllers. All other paths must meet the requirements of the design guidance issued under the Active Travel (Wales) Act 2013 or the Cardiff Cycle Design Guide as appropriate. This must include any additional width associated with a path being adjacent to a road or fence that would limit the effective width available.

2.6. Junctions Between Paths or Tracks. Where a path joins another path, i.e a footpath entering a footway and they are bounded by landscaped areas, then there must be a fillet of at least 1 m by 1 m to prevent the area becoming worn by footfall crossing the corner. If a Cycle Track is involved then consideration must be given to increasing the dimensions to 2 m by 2 m.

2.7. Junctions of Paths with Carriageways. The design of the points where footpaths or shared footpath / cycle-paths / shared paths meet carriageways need to be carefully considered. The design should avoid the risk of pedestrians or cyclists not perceiving that they are reaching a junction with a carriageway and as a result inadvertently entering the carriageway. This can be achieved by suitable horizontal deflection on the approach and should not normally be achieved by the use of barriers. However, where this is not possible due to land constraints or similar issues the guidance on the use of Pedestrian Guardrails must be followed.

2.8. Dropped Kerbs at Pedestrian Crossings. The dropped kerbs should be flush with the carriageway or channel block but in no case should it be more than 6 mm. All such dropped kerbs must have tactile paving in the appropriate layout for the location of the dropped kerbs. This guidance also needs to be followed for the pedestrian crossing points within a tabled crossing or junction table.

2.9. Dropped Kerbs at Vehicle Crossovers. The dropped kerbs should be an absolute minimum of 25 mm above the carriageway or channel level and ideally 35 mm above it. Blister tactile paving

should not be placed either side of the crossover as if it was a junction.

2.10. Dropped Kerbs at Entry to Shared Footway / Cycle Tracks. Where cyclists cross dropped kerbs at a shallow angle to enter a shared footway / cycle track the use of dropped kerbs higher than 6 mm can risk cyclists losing control, however this means that visually impaired users will be at risk. In these cases the use of corduroy hazard warning paving along the kerb line may be appropriate and should be discussed with the Council's officers. Where there is a segregated cycle track adjacent to the carriageway this issue should not occur if the specified tactile paving has been used correctly.

2.11. Kerb Height at Speed and Junction Tables. An absolute minimum kerb height of 25 mm and preferably 35 mm should be provided. 200 mm long transition kerbs must be provided each side of the pedestrian crossing points. Where necessary corduroy hazard warning paving, may be provided in lieu of the pedestrian guardrail shown on Figure 17 in the "Guidance on the use of Tactile Paving Surfaces". In these cases the alignment should be as straight as practicable between crossing points.

2.12. Pedestrian Guardrails. Pedestrian guardrail should not be used unless there are specific safety issues that need to be addressed. Their over use can result in pedestrians being trapped in the carriageway and increase the danger to cyclists as they can become crushed between it and an errant motor vehicle. Where there are concerns, such as when a path meets a highway, then the design should be altered where possible to eliminate or minimise its use. Guardrails need to be set back a minimum of 450 mm from the kerb face and the width of the footway or other path will need to be increased by at least[17] 500 mm to make allowance for the loss of width due to the barrier. Where it is placed to deter users of the path from inadvertently entering the carriageway it should be placed on the front edge of the footway and not as a staggered arrangement within the path. Accordingly any dropped kerb crossing associated with the path will need to be offset from the line of the path. Where they are used the requirements in the section on Street Furniture must be followed.

[17] For paths with cycle usage the requirements for extra width that are given in the guidance published under the Active Travel (Wales) Act 2013

2.13. Pedestrian Deterrent Paving. Experience has shown that this is rarely effective and therefore becomes an additional hazard to pedestrians, rather than addressing the perceived issue of the use of the feature where it is placed. Consequently it should not be used except in the limited cases as stated below. Where it is considered to act as an alternative to guardrail, such as in a central reserve to deter crossing movements, then guardrail should not be used either as this also generates hazards. The more appropriate solution would be to make suitable, albeit minimum standard, crossing facilities at the necessary sites. Pedestrian deterrent paving is only likely to be effective if pedestrians have to walk a significant distance on it, such as 10 metres or more, and where the reason is that the footway, or marginal strip, is discontinuous or too narrow for it to be safely used. In these cases there must be an alternative route via appropriate crossing facilities. Alternatively it could be used to pave an area where there is a desire to reduce pedestrians or cyclists from gathering, but this is unlikely to be a feature of the adopted highway.

2.14. Traffic Regulation Orders (TROs). Schemes should be designed to minimise the need for TROs and any requirement should be discussed as early as possible with our TRO team. Where a scheme includes a TRO the designer should note the time required to process the necessary Order can be up nine months. Consequently where there is a risk that the scheme could be open to the public before the TRO is sealed the design must allow for both the intermediate situation and the completed scheme.

2.15. Traffic Signals. Schemes involving traffic signals whether as junction control or crossing facilities need to be discussed with the Council's Electrical Team at the earliest opportunity. All signal control designs have to be approved by the Electrical Team and design guidance and services can be provided by them.

2.16. Cycle Advance Stop Lines. These must be provided at all signal controlled layouts, even if there are adjacent off carriageway cycle provision. Lead in lanes should be provided unless there are constraints that can be demonstrated make this impracticable. Where there is an adjacent off carriageway cycle provision a Cycle Pick-up point must be provided just before the further stop line so that cyclists can transfer between the two locations. This can assist cyclists leave the main road to use a toucan crossing without having to use the toucan dropped kerbs or cross the stop line whilst the signals are on red to traffic.

2.17. Traffic Calming. Schemes involving the implementation of alteration of any road humps, or other vertical deflections, will need to be subject to statutory consultation. Generally any new vertical defections will only be acceptable in the form of speed tables, rather than road humps or speed cushions. The plateau height and length of any speed table and the gradients will need to meet the relevant requirements in Section E – Construction Standards paragraphs 1.7 and 18.

D3. Street Furniture

3.1. Pedestrian Guardrails. Where pedestrian guardrails are required then the style used must be agreed with the Council and the style should reflect the other elements of street furniture specified in the CPRM. All guardrail must be standard "ex-stock" units installed with socketed bases to enable their easy removal or replacement.

3.2. Bollards. The type of bollard will have to take account of the requirements of the CPRM. In addition, unless it is agreed that the bollards are in a position that makes the risk of vehicle collision very low, they must either be socketed or self righting, or preferably both. The exact specification must be agreed to reduce the required street works inventory.

3.3. Anti-Motorcycle Barriers. These barriers can prevent legitimate access for disabled people, as well as users with push chairs and prams, their use can be in violation of the Equality Act. Their use should only be considered where it can be shown that there is a problem with the antisocial use of motorcycles or bicycles that cannot be addressed by better design.

3.4. Street Lighting. Street lighting designs need to be approved by the Council's Electrical Team and design guidance and services can be provided by them. Where it is on a footway it should always be aligned with the back edge of the footway unless there are special circumstances that require a different location.

3.5. Highway Drainage. Highway drainage designs need to be approved by the Council's highway drainage team and design guidance can be provided by them.

3.6. Road Signs. Road signage designs need to be approved by the Council's Road Signage officers and design guidance and services can be provided by them. However any design should aim to minimise the number of signs and must be included in the RSA for the scheme.

3.7. Utility covers. All manhole and other similar covers in the highway.

a) Covers that are near breaking or turning areas[18] must have a high skidding resistance surface. Preferably these covers should be in a composite material to reduce the risk of metal theft.

b) Covers must be located in the centre of lanes and clear of wheel tracks for the turning movements of buses, HGVs and motorcycles.

c) Covers must be located at least 5 metres from the top and bottom of ramps of Speed Tables and Road Humps.

d) The frame must be at least 150 deep so that surfacing can be laid right up to it without any infill, or in landscaped areas so it can have a 100 mm minimum wide concrete boarder. See Section E – Construction Standards: Appendix F : Miscellaneous Construction Details: Item 2

e) Any new cover will need to be approved by the Council's Highway Team and where appropriate the Utility company.

D4. Landscaping

4.1. All landscaping must be in accordance with the planning conditions and must be finalised before the Street Lighting design is completed.

4.2. Root-cells associated with a highway tree can be positioned partially below an adoptable shared space or road/footway as long as:-

a) Correct traffic load bearing cell-type is specified.

b) Min. 650mm clearance from the finished road level to the top-level of the cells is maintained.

c) Root-cells associated with adoptable public highway trees should not protrude outside the limits of the public highway (i.e. not into private front gardens and lands etc.)

D5. Construction Standards

5.1. The Cardiff Council Standards have been withdrawn and are replaced with the South East Wales Highways Framework Standards. https://sewh.co.uk/.

[18] The minimum breaking and turning areas will coincide with the definition of a Critical Area in Cardiff Council's Road Safety Audit Manual

5.2. Scheme specific details may be issued in addition to the above.

5.3. Where necessary designers may need refer to the standard details in the Manual for Construction of Highway Works Volume 3: Highway Construction Details[19], but any use of these details should be agreed with Officers.

[19] http://www.standardsforhighways.co.uk/mchw/vol3/index.htm

Introduction

E1. Cardiff Highway Standards

1.1. These standards have been superseded by those in the SEWF.

E2. Manual for Construction of Highway Works

2.1. Where necessary designers may need refer to the standard details in the Manual for Construction of Highway Works Volume 3: Highway Construction Details.

2.2. Any use of these details should be agreed with Officers, particularly with respect to any options on construction width, depth or material specification.

E3. Manufacturer's Specifications and Standards

3.1. Where the manufacture has provided specifications or guidance for the installation of a product which varies from the Cardiff Highway Standards, then the greater requirements will apply.

3.2. Any uncertainty regarding the standards that should be applied will need to referred to the Council's Officers for their decision.

1. Principal Dimensions: To be read in conjunction with sections B2 and C2:-

1.1 Minimum clear footway and footpath width : 2.0 m with a cross-fall of 1 in 40 or 1 in 50.

a Examples of additional width requirements (unless otherwise stated the additional width is to have minimum tapers of 1 in 2 or 1 in 4 when on a cycle track or a footway / cycle track)

b Controlled crossing waiting areas: -

i footways an additional 0.4 m (0.5 m if adjacent to a cycle track to the rear of the crossing)

ii shared footway / cycle track an additional 1.0 m at parallel and toucan crossings, 0.6 m at other crossings.

c Bus Stops with bus boarder:-

i The bus boarder must be constructed with 180 mm high Kassel Kerbs.

ii The preferred length of the bus boarder is 10 metres including 1 metre long transitions at each end.

iii Where there is a cantilever shelter at the front of the footway, open at the back, the absolute minimum length is 9 metres including 1 metre long transitions at each end.

iv Where there is an enclosed shelter at the front of the footway the absolute minimum length is 7 metres including 1 metre long transitions at each end.

v Where there is either no shelter, or it is at the back of the footway, then if there is restricted space and subject to agreement, a reduced length of 5 metres including transitions may be permitted.

d Enclosed Bus shelter provision at the back of the footway:-

i The preferred minimum width of the footway is 3.3 metres, which allows for a 1.5 m shelter and 1.8 m footway. However if there is a wall, fence or hedge, and additional 0.5 metre clearance is needed to the rear of the shelter, giving a total of 3.8 metres.

ii Normally the footway width is to be maintained but for footways in low footfall areas an absolute minimum of 1.2 metres can be considered, subject to approval.

iii The widening must extend for the length of the full length of the Kassel Kerbs, but not less than 7 metres.

iv The tapers of the footways at each end should be a minimum of 1 in 5 and any reduction will be subject to agreement.

e An Enclosed Bus shelter provision at the back of a shared footway and cycle track (FW/CT) is not recommended and it should be located at the front, with the FW/CT to the rear.

f Enclosed Bus shelter provision at the front of the footway:-

i The required width for the shelter is 0.75 m clearance from the carriageway and 1.5 metres for the shelter giving a widened width of 4.25 m.
ii In low footfall areas, subject to approval, an absolute minimum footway width of 1.2 metres can be considered, reducing the overall width to 3.5 metres. However, an additional width of 0.25 m must be allowed if there is a wall or hedge at the back of the footway.
iii The widening must extend for the length of the full height bus boarder.
iv The tapers at each end should be a minimum of 1 in 5 for a footway Any reduction will be subject to agreement but a step change in width is not permissible.

g Enclosed Bus shelter provision at the front of a shared footway / cycle track (FW/CT):-
i The required width for the shelter is 0.75 m clearance from the carriageway and 1.5 metres for the shelter. Based on a 3.5 m FW/CT the widened width would be 5.75 m.
ii The width of the FW/CT either side of the shelter must be maintained including any additional width that is required if there is a wall or hedge at the back of the footway.
iii The widening must extend for the length of the full height bus boarder.
iv The tapers at each end should be a minimum of 1 in 10. Any reduction will be subject to agreement but a step change in width is not permissible.

h Cantilever Bus shelter provision:-
i The required width for the shelter is 0.75 m clearance from the carriageway and 0.85 metres for the shelter (0.1 front panel + 0.75 for half end panel and seat) giving a minimum additional width for the footway or FW/CT of 1.6 metres. That is for a 2 m footway it would be 3.6 metres wide at the bus boarder.
ii Normally the footway width is to be maintained but for footways in low footfall areas an absolute minimum of 1.2 metres can be considered, subject to approval. Narrowing of a FW/CT is not permitted.
iii The widening must extend for the length of the full height bus boarder.
iv The tapers at each end should be a minimum of 1 in 5 (or 1 in 10 for a FW/CT) and any reduction will be subject to agreement, but a step change in width is not permissible.

i Grit Bin Area:- Additional area 2.0 m x 2.0 m. Tapers can be omitted if it is located at the back of the footway or footway / cycle track

j Lighting Column Area:- Where this is at the back of the footway an additional paved area of 1.0 m x 1.0 m is required with no tapers

1.2 Shared Footway/Cycle Track and Segregated Cycle Track:
The required width varies depending upon the use and status of the cycle

track and the adjacent carriageway. Allowance is also required for a verge and also additional space where the path is bounded by vertical features. Please refer to the Welsh Government's Active Travel Design Guide Dated 2013 and in particular DE021 to DE034. Guidance from CC staff should be sought on the standard that is applicable to any particular design.

1.3 Islands for traffic signals.

a As these details can affect the track runs, the required dimensions should be determined at an early stage in the design process.
   i Islands are to be a minimum width of 2.5 metres wide except where any relaxation is agreed by CC.
   ii Islands with pedestrian or cycle facilities will be considerably wider.
   iii The length will depend on the number and types of equipment and chambers that need to be provided.

b The kerbing is normally Trief or Trief Cadet as agreed based on the location and design speed of the road.

c The paving to be either square setts or rectangular block paving depending upon the location. Concrete or asphalt paving is not acceptable.

1.4 Type 1 Residential Road (Primary Access including. Public Transport): minimum 6.30 m
This presumes Parking Restrictions on Both sides or inset parking bays of at least 1.8 metres. Where the road is on a radius of 300 metres or less tracking checks will be needed for a 12 metre bus and each of the FTA design vehicles as well as a second bus. This must be in accordance with the table and note 1 in Section B.

1.5 Type 2 Residential Road width (non-primary/main) : minimum 5.50 m
Where the road is on a radius of 300 metres or less tracking checks will be needed for refuse vehicle and a large car, or on a public transport route a 12 metre bus and a large car. This must be in accordance with the table and note 1 in Section B.

1.6 Types 3 to 5 must be tracked where the road is on a radius of 300 metres or less for the Cardiff Refuse Vehicle and Fire Tender. Where necessary road widening or parking restrictions must be provided as part of the design.

1.7 Speed Tables and Road Humps

a <u>Length of Plateau</u>
   i Primary Routes, Main Access Roads and Public Transport Routes – 6.0 metres minimum
   ii Residential Access Roads and 20 mph limits not on Public Transport Routes – 4.0 metres minimum
   iii Shared Use Areas (requires a 20 mph limit and should assist pedestrians) – 2.5 metres minimum

b Height above pre-existing or projected surface
- i Installations on existing roads will need detailed pre-installation surveys to enable the differential height to be proved post installation.
- ii Installations on new carriageways will need projected surface and tabled surface levels to be provided to enable the effective height to be proved.

c Adjacent Kerb Height
- i At dropped crossings provided with tactile paving – 0 to 6 mm
- ii At all other locations – 25 mm to 50 mm

d Ramp Gradient
- i Special Cases Where Speed Reduction is NOT Required (Such as tabled crossings within 25 metres of a structure) –1 in 20 Maximum
- ii Primary Routes, Main Access Roads and Public Transport Routes
  30 mph limit – 1 in 16
  20 mph limit – 1 in 14
- iii Residential Access Roads
  30 mph limit – 1 in 14
  20 mph limit – 1 in 12 Maximum
- iv Shared Use Area
  1 in 8 Maximum
  However this is relative to the road surface and, unless there is an alternative route for non-motorised users, the maximum absolute gradient (compared to a level surface) should not exceed 1 in 10 and preferably 1 in 12. This limit would also apply to the design of any alternative route that bypasses the traffic calming feature.

e Foot of Ramp Detail
- i On existing roads the surface must be planed out for 4 metres beyond the limits of the table.
- ii The surface must either be planed out over the whole extent of the feature, or for a distance that will ensure that the full depth of surface course can be laid at all points.
- iii To ensure accurate formation of the ramp, the surface course at the table top and, if appropriate, approach must be laid and saw cut before the surface course for the ramp is laid.

f Location of Utility Covers
- i Covers must be located at least 5 metres from the top and bottom of ramps of Speed Tables and Road Humps. See Section D – Advice on Design Elements : D3 Street Furniture : 3.7 Utility covers. Item c)

1.8 Dropped Kerbs

a Width of crossings:

i The minimum width of uncontrolled crossings is 1.6 metres but the following should be noted:-
- Min. uncontrolled tactile crossing width (residential only)-1600mm
- Min. uncontrolled tactile crossing width (retail/business)-2400mm

ii Controlled crossing widths will depend on the type and expected use but the following should be noted:-
- Min. Zebra controlled tactile crossing width (excludes cyclists)-3000mm
- Min. Zebra controlled tactile shared crossing (includes cyclist)-3000mm + Parallel cycle lane.
- Min. signal controlled tactile crossing width (excludes cyclist)-3000mm
- Min. signal controlled tactile shared crossing width (includes cyclist)-4000mm
- Min. stagger in-between the 2 adjacent signal controlled crossing-3000mm

iii Vehicle crossovers will vary depending on whether they are single, dual, multi-user or multiple adjacent crossings and specific advice will be required.

iv The width of Cycle Pick-up / Drop-off areas is normally 0.9 metres. If they are significantly longer than this then a 400 mm line corduroy tactile paving slabs are required.

b Depth of Tactile Paving: The depth of the tactile paving will vary in accordance with the guidance and will vary from 1.2 metres for a direct approach to 0.4 metres for an inset crossing at a junction.

c Depth of Pedestrian Dropped Kerb Area and vehicle crossovers: The maximum gradient of the dropped kerb area (increase in cross-fall) is to be 1 in 12. Accordingly, except at raised areas:-

i If the footway, footway / cycle track, width is less than 2.9 metres then the dropped kerb area will extend to the back of the footway.

ii If the footway, footway / cycle track, width is 3 metres or more the dropped area will be 2 metres wide and the remaining width will be at the general footway cross-fall as in 1.1.

iii If there is a segregated footway and cycle track then the change in crossfall must fall on the boundary between the two.

d Depth of Cycle Pick-up Drop-off Dropped Kerb Area: These are to be 1 metre deep, measured from the kerb.

e Residual Kerb Height:

i Pedestrian crossings and Cycle Pick-up / Drop-off areas: 0 to 6 mm. Note the normal 6 mm tolerance does not apply.
ii Standard vehicle crossovers: Minimum of 25 mm, preferably 35 mm.
iii Multiple adjacent crossings: 50 mm.

2. Highway Drainage Guidelines and Standards:-

2.1 Site Specific guidance will need to be sought from the relevant officers, David Brian or Rhodri Powell.

3. Highways-Adoptable Construction Make-ups

3.1 Note:- The choice of surfacing materials should be made taking into account the requirements of the Cardiff Public Realm Manual.

3.2 Note:- Alternative construction make ups will be considered, or instructed, where technical considerations affect the laying of the materials in Sections 5 to 19.

4. Protection of the Binder Layer:-

4.1 External Primary Routes / Internal Primary Routes / Main Access Roads / Public Transport Routes. Should there be an expected delay longer than one month in laying the S/C course, installation of a temporary protective system/layer should be considered prior to use by vehicular traffic. Such proposed protective layer / system shall be agreed with CC in advance.

4.2 Residential Access Roads. Should there be an expected delay longer than three months in laying the S/C course, installation of a temporary protective system/layer should be considered prior to use by vehicular traffic.

4.3 Any proposed protective layer/system shall be agreed with CC in advance.

4.4 In cases where a protective layer/system has not been used and the above times have been exceeded, or when the binder course has been subject to exceptional wear or contamination, CC reserve the right to require core samples to be taken to check on integrity of the construction. Should this be lacking then remedial measures will have to be undertaken at the cost of the scheme promotor.

5. External Primary Route-**(Classified Roads)**

5.1 45mm-50mm Surface Course-HRA 30/14 F 40/60pen Des Cl.911 with 20mm PCC PSV 65 to BS EN 13108-4

5.2 60mm AC20 Dense Binder 100/150 to BS EN 13108-4.

5.3 200mm AC32 Base 40/60 to BS EN 13108-4.

5.4 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

6. Internal Primary Routes / Main Access Roads / Public Transport Routes **(Types 1 & 2)** The Surface Course will be one of two options as advised.

   6.1 EITHER: 45 mm High Stone Content, Hot Rolled Asphalt Surface Course 55/14 F, 68 PSV, 14mm stone size, 55% stone, Penetration grade binder 40/60 (50pen) BS EN 13108-4 (45mm HRA HAS 55/14 40/60 BS EN 13108-4)

   6.2 OR: SMA 14 surf PMB 75/150-75, 45-50mm thick, min PSV 65, PMB - Class 7 Penetration, Class 3 Softening Point (Table 1 BS EN 14023) & Class 2 Elastic recovery (Table 2 BS EN 14023)

   6.3 60mm AC20 Dense Binder 100/150 to BS EN 13108-4.

   6.4 200mm AC32 Base 40/60 to BS EN 13108-4.

   6.5 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

7. Residential Access Roads (Flexible):- **(Types 3 to 5)**

   7.1 40mm AC10 Dense surface Course 100/150.

   7.2 60mm AC20 Dense Binder 100/150 to BS EN 13108-4.

   7.3 100mm AC32 Base 40/60 to BS EN 13108-4.

   7.4 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

8. Residential Access Roads (Block Paving):- **(Types 3 to 5)**

   8.1 200x100x80mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1344.

   8.2 30mm compacted thickness-Sharp Sand bedding.

   8.3 150mm AC32 Base 40/60 to BS EN 13108-4.

   8.4 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

9. Footpath/Cycle Track (Flexible)

   9.1 25mm AC6 Dense Surface Course 100/150 BS EN 13108-4.

   9.2 50mm AC20 Dense Binder 100/150 to BS EN 13108-4.

   9.3 150mm Type 1 Sub-base.

10. Footpath/Cycle Track (Block Paving)

    10.1 200x100x65mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1344.

    10.2 30mm compacted thickness-Sharp Sand bedding.

    10.3 150mm Type 1 Granular Sub-base.

11. Footpath/Cycle Track (Granite Block Paving)

11.1 Granite Paving 70 mm Thick (Q25/310) Size and laying pattern to manufacture's recommendations.

11.2 5mm Mortar Joints (Q25/370)

11.3 30mm Mortar Bedding.

11.4 150mm Concrete Base.

11.5 150mm Type1 Granular Sub-base.

12. Tactile Paving Slabs

12.1 400 mm square slabs to BS EN1340

a Blister Paving 65 mm thick

b Footway / Cycle Track 50 mm thick

c Corduroy Paving 50 mm thick

12.2 30mm compacted thickness-Sharp Sand bedding.

12.3 150mm Type 1 Granular Sub-base.

12.4 All edges to be bounded by EF edging unless against kerbs or block paving of the same construction thicknesses.

12.5 Colours

a Blister Paving Red at controlled crossings, Buff at uncontrolled crossings

b Footway / Cycle Track Natural

c Corduroy Paving Buff

13. Single/Twin Residential Vehicular Crossover (Flexible)

13.1 25mm AC6 Dense Surface Course 100/150 BS EN 13108-4.

13.2 50mm AC20 Dense Binder 100/150 to BS EN 13108-4.

13.3 225mm Type 1 Sub-base.

14. Single/Twin Residential Vehicular Crossover (Block Paved)

14.1 200x100x80mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1344.

14.2 30mm compacted thickness-Sharp Sand bedding.

14.3 225mm Type 1 Sub-base.

15. Multi-user (more than 2) Residential Vehicular Crossover (Flexible)

15.1 40mm AC10 Dense Surface Course 100/150 BS EN 13108-4.

15.2 60mm AC20 Dense Binder 100/150 to BS EN 13108-4.

15.3 100mm AC32 Base 40/60 to BS EN 13108-4.

15.4 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

16. Multi-user (more than 2) Residential Vehicular Crossover (Block Paved)

16.1 200x100x80mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1344.

16.2 30mm compacted thickness-Sharp Sand bedding.

16.3 150mm AC32 Base 40/60 to BS EN 13108-4.

16.4 Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

17. High Friction Surface HFS

This treatment is only to be used where required by CC and to be applied to new surfaces or surfaces free from defects

17.1 Material Specification

HAPAS Certified High Friction Surfacing, grading to Clause 924 (2-5mm), Min PSV 65, Max AAV 12.

17.2 Colour

a	Breaking Area or Bends with deficient PSV	Natural Aggregate
b	Bus Lane	Bold Green
c	Cycle Lane	Bold Red
d	Hatching Infill	Bold Red
e	Obliteration of Road Markings	Black

18. Tabled Junctions, Speed Tables, Road Humps and Speed Cushions: This section presumes full depth construction. On existing carriageways testing will be required to establish that the construction is at least equivalent to that specified and if not, full depth re-construction will be required. If the feature is being construction on the existing surface then the design details will need to be agreed based on these requirements. The surface course for the ramp must extend for 4 metres beyond the bottom of the ramp to account for braking and impact loading.

18.1 Flexible Construction – Public Transport Route (HRA surface adjacent)

a 45 mm AC10 Dense Surface Course 100/150 PMB (Polymer Modified Binder).

b 75 mm (upper) AC20 Dense Binder 100/150 to BS EN 13108-4.

c 60 mm (lower) AC20 Dense Binder 100/150 to BS EN 13108-4.

d 200 mm AC32 Base 40/60 to BS EN 13108-4.

e Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

18.2 Block Paved - Public Transport Route (HRA surface adjacent) This only applies to the table top, the ramps must be the same as the equivalent flexible construction. The block paving on the plateau to be bounded by 125x225 channel kerbs laid on edge.

a 200x100x80 mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1334 (upper)

b 30 mm compacted thickness-Sharp Sand bedding

c 70 mm (lower) AC20 Dense Binder 100/150 to BS EN 13108-4

d 200 mm AC32 Base 40/60 to BS EN 13108-4.

e Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

18.3 Flexible Construction – Residential Access Roads (AC10 surface adjacent)

a 40mm AC10 Dense Surface Course 100/150 PMB (Polymer Modified Binder).

b 75 mm (upper) AC20 Dense Binder 100/150 to BS EN 13108-4.

c 60 mm (lower) AC20 Dense Binder 100/150 to BS EN 13108-4.

d 100 mm AC32 Base 40/60 to BS EN 13108-4.

e Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

18.4 Block Paved - Residential Access Roads (AC10 surface adjacent) This only applies to the table top, the ramps must be the same as the equivalent flexible construction.

a 200x100x80 mm Rectangular Concrete/Clay Block Paving to BS EN 1338/BS EN 1334 (upper)

b 30 mm compacted thickness-Sharp Sand bedding

c 70 mm (lower) AC20 Dense Binder 100/150 to BS EN 13108-4

d 150 mm AC32 Base 40/60 to BS EN 13108-4.

e Sub-base Type 1 (min. 150mm) and Capping Layer-Pending CBR.

19. Natural Stone based Surfacing:-

19.1 Surface material as per Cardiff Public Realm Manual.

19.2 Construction make-up to be agreed with CC in advance.

20. Block Paving Selection:-

20.1 As given in the Cardiff Public Realm Manual and following examples as approved.

20.2 300x300x65 mm Exposed Aggregate Concrete Paving Slabs in colour Silver Grey or to BS EN 1338/BS EN 1344

20.3 Or 400x400x65-70 mm Exposed Aggregate Concrete Paving Slabs in colour Silver Grey to BS EN 1338/BS EN 1344

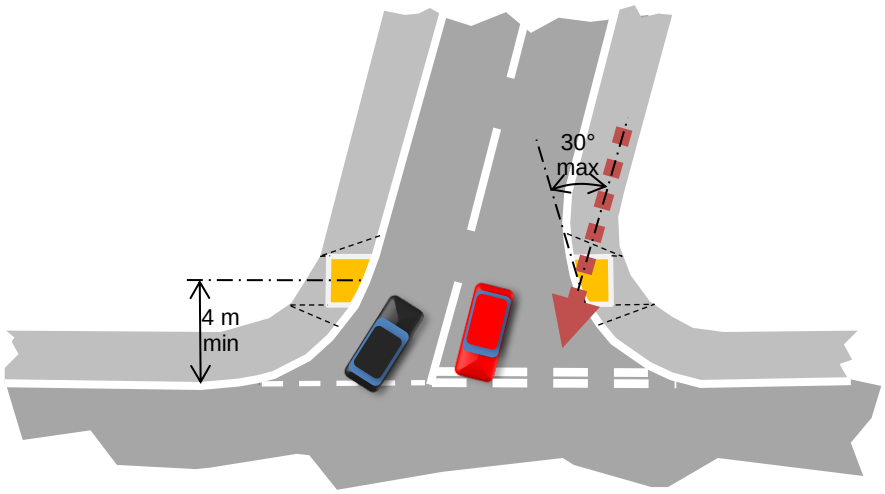
20.4 30 mm compacted thickness-Sharp Sand bedding.

20.5 150 mm Type 1 Granular Sub-base.

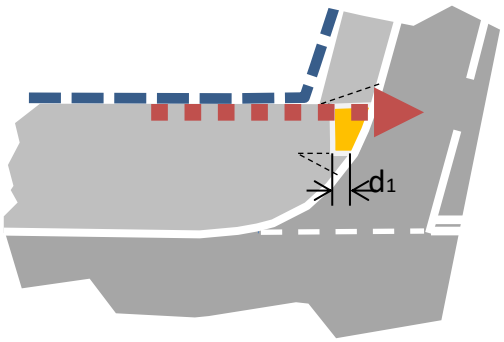
21. Sub-base Thickness and Capping Layer Pending CBR Table:-

CBR Value	Thickness of Type 1 Sub-Base in mm in accordance with Cl.803 (SHW 1986)	Thickness of Capping Layer in mm in accordance with Cl.613 (SHW 1986)
>5%	300	-
>2% to <5%	150	350
<2%	150	600

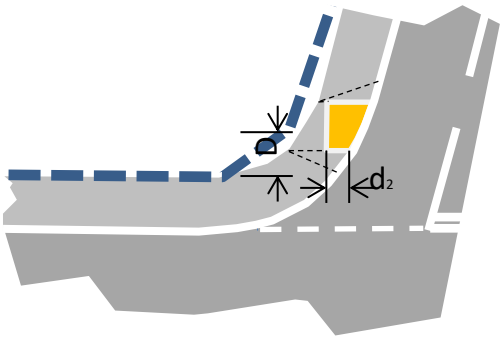
A Uncontrolled Crossings (Dropped Kerb Crossing Points or sometimes Courtesy Crossing)



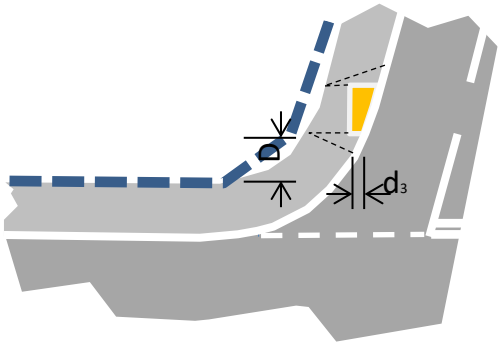
Key elements of dropped kerb locations



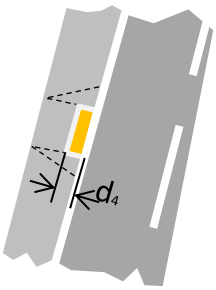
Direct approach d_1 = 1200 mm



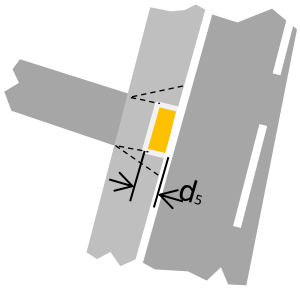
Inset D less than 4 m
d_2 = 800 mm



Inset D more than 4 m
d_3 = 400 mm



Remote from
a Junction
d_4 = 800 mm



Junction With
a Path
d_5 = 1200 mm

1. These must always be placed in pairs with the blisters accurately aligned to guide visually impaired users towards the matching crossing point.
2. At junctions these are often incorrectly placed too close to the Give Way line, causing problems, and this arises from an incorrect understanding of “desire line” and the users that dropped kerbs are provided for. This term is often misapplied in the design of dropped crossings as it applies to a corridor, not a precise location, even when based on observed behaviour.
3. Whilst there is a clear pedestrian desire line to follow a main road across a side road, and pedestrians who can step up and down kerbs may follow the Give Way line, this does not mean the correct place for a dropped kerb crossing is on that exact line.
4. The Figures in the Guidance all show the tactile paving starting clear of the bell mouth radii. This has three advantages and one disadvantage:-

    4.1 This would generally result in the dropped kerbs (the only way for a mobility impaired user to cross the road – and on shared use crossings most cyclists) being behind the position of a car waiting at the Give Way line.

        a) Having the dropped kerbs set back about 4 to 6 metres ensures that the dropped kerb crossing is available for use at all times except when a long vehicle is waiting at the Give Way line.

    4.2 When the dropped kerbs are on the radius of a junction there is a risk (that increases the closer it is to the main road) that the direction of the crossing indicated by the tactile paving will become ambiguous (that is it could easily be interpreted by a visually impaired pedestrian coming along the footway from the side road as being tactile paving for crossing the main road).

        a) Having the dropped kerbs and therefore the tactile paving clear of most the radius of the junction avoids this problem.

    4.3 If a pedestrian, whether mobility impaired or not, is crossing the side road at the dropped kerbs and a vehicle turns in (and gives way to the pedestrian as set out in the Highway Code), it will be generally clear of the main road

        a) Having the dropped kerb set back minimises the risk of a vehicle turning in being hit by a following vehicle travelling along the main road.

    4.4 The disadvantage is that where the visibility splay is limited in depth there will be limited visibility to and from users of the dropped crossing and vehicles turning in.

        a) The reduction in visibility resulting from the dropped kerbs being set back is offset by the fact that the speed of turning vehicles will be at their minimum as they turn.

B Controlled Crossings (Zebra, Parallel Cycle, Parallel Equestrian Puffin and Pedestrian Phase Crossings)

1. The requirements for controlled crossings regarding equipment and road markings generally ensure that these are prevented from being too close to the junction and so it is unusual for the issues that can affect uncontrolled crossings to occur.
2. However much of the guidance in section A is still applicable.

C Incidental Crossings

1. In some residential streets it may prove difficult to provide dropped kerbs set back from the junction as set out in section A due to the presence of vehicle crossovers for driveways.
2. As long as the crossover has an adequate kerb height no special facilities are required for visually impaired users.
3. If there are crossovers that are nearly opposite and the kerb heights are in the normal range then these may be adequate for mobility impaired users. However, this will only be true if the traffic flows are such that users have adequate time to negotiate the kerb to leave the carriageway in an unhurried manner. This will require a site specific assessment which should be recorded.
4. It would be inappropriate to change the kerb height at the crossover to that of a dropped kerb with tactile paving as:-
    a) Vulnerable users will be given the impression that this is a “safe” place to wait and cross when it is also on a direct vehicle path.
    b) Visually impaired users may find it difficult to determine when they have reached the back of the footway, with the risk that they could enter the driveway and become disorientated.
    c) The regular trafficking of the tactile paving is likely to result in them failing resulting in trip hazards and additional maintenance costs.
    d) The property owner may object to pedestrians “loitering” outside their property.

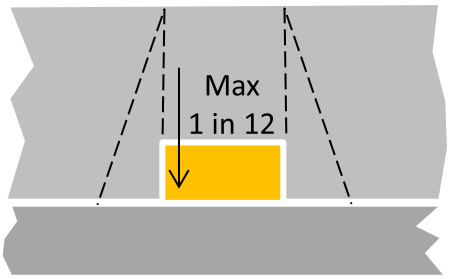
D Parallel (Pedestrian / Cycle) Crossings

1. These are a new type of crossing introduced in the Traffic Signs Regulations and General Direction dated 2016 (TSRGD 2016) and the use of tactile paving is discussed in that section.

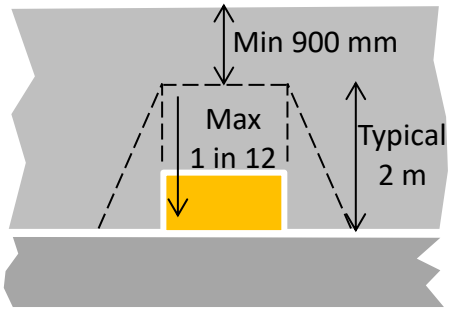
E Parallel Equestrian “Pegasus” Crossings

1. The layout of this type of crossing will depend on site conditions and must be discussed at an early stage in the scheme design.

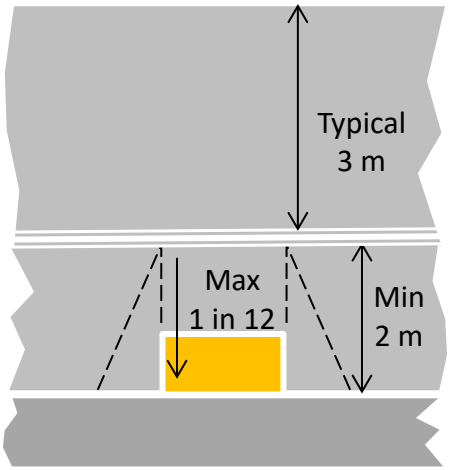
A Layout and Gradient of Dropped Kerbs



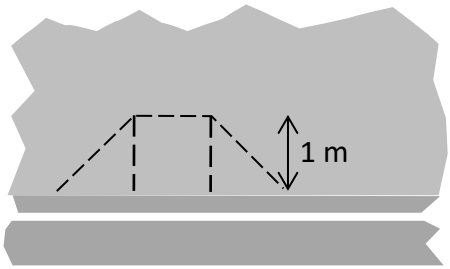
Footway / Cycle Track
< 3 m wide
Dropped Kerb 1.6 m minimum



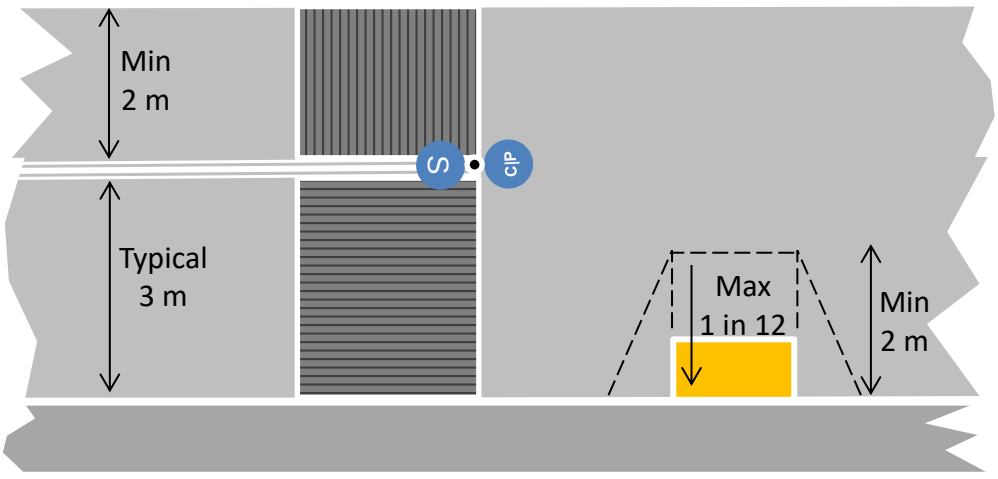
Footway / Cycle Track
> 2.9 m wide
Dropped Kerb 1.6 m minimum



Segregated Footway / Cycle Track
(Cycle Track to rear)
Dropped Kerb 1.6 m minimum

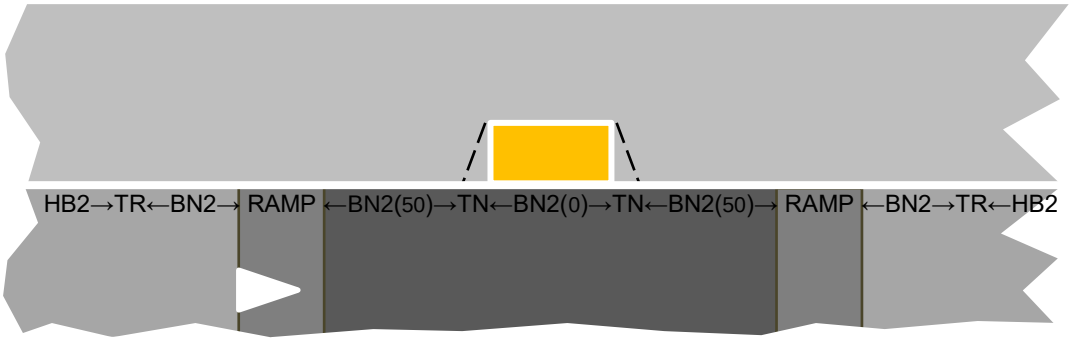


Except Cycle Pickup
Drop-off Point
Dropped Kerb 1.0 m nominal



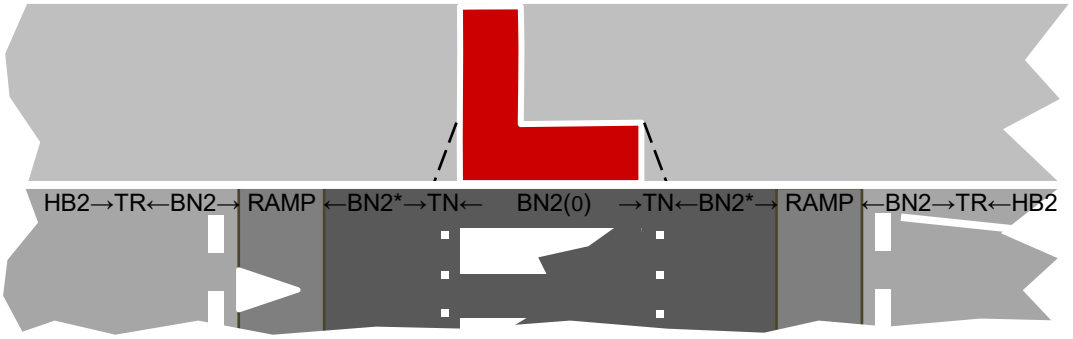
Segregated Cycle Track / Footway
(Footway to rear)
Dropped Kerb 1.6 m minimum

B Dropped Kerbs on Speed Tables



Dropped Kerb Crossing

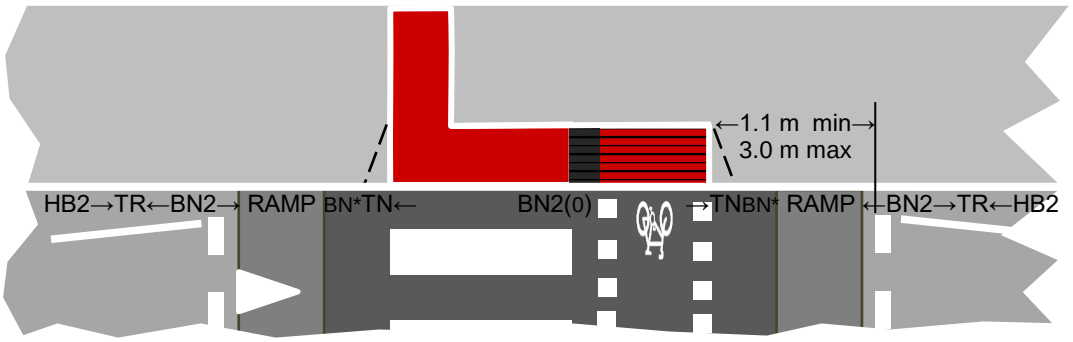
Dropped Kerb 1.6 m minimum



Zebra or Puffin Crossing

Dropped Kerb 2.4 m minimum

BN2* = BN2(50)

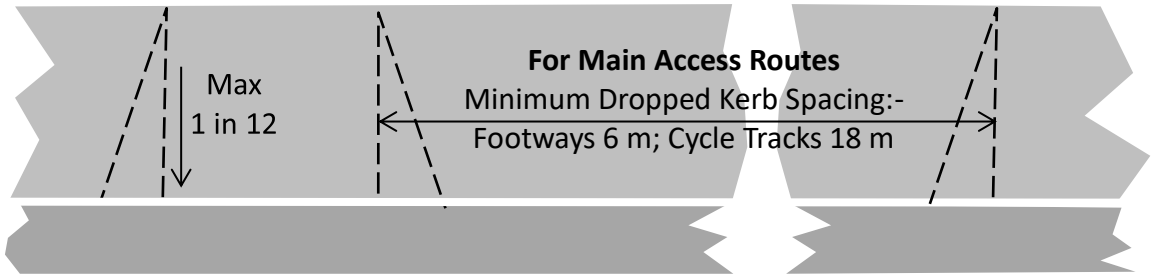


Parallel (Pedestrian and Cyclist) Crossing

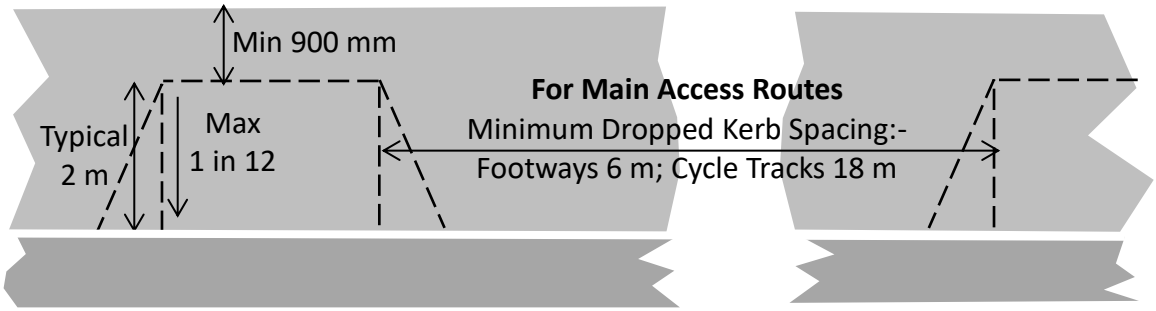
Dropped Kerbs 2.4 m and 1.5 minimum (0.4 gap also dropped)

BN* = BN2(50)

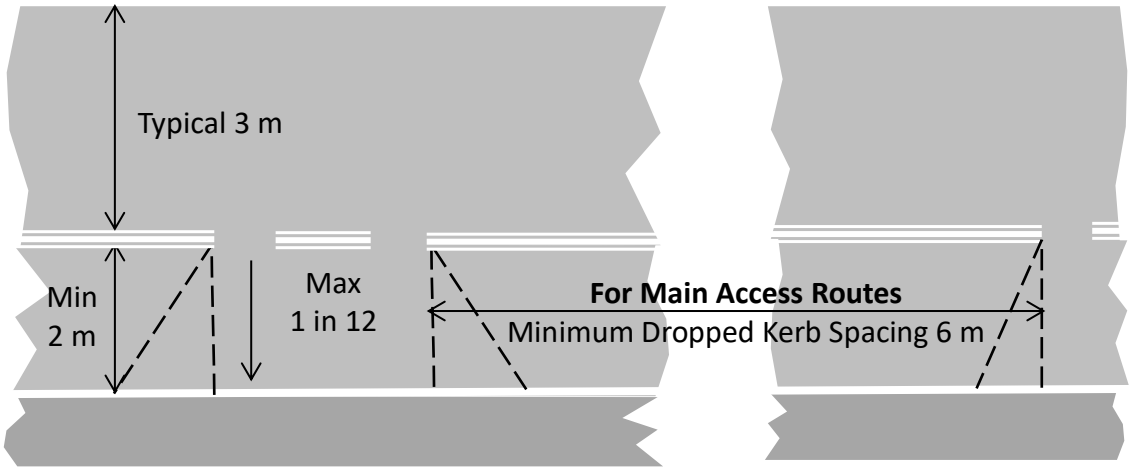
Vehicle Crossovers



Footway / Cycle Track
< 3 m wide



Footway / Cycle Track
> 2.9 m wide



Segregated Footway / Cycle Track
(Cycle Track to rear)
Dropped Kerb 1.6 m minimum

C Dropped Kerb Gradients

1. The guidance in Inclusive mobility is that the gradient should be no more than 1 in 12 and recommends that the back 900 mm of the footway should kept at the same crossfall as the rest of the footway.
2. However with a 125 mm kerb face and a 1 in 40 crossfall a 1 in 12 gradient the footway would have to be 2.150 m wide to meet the crossfall criteria and 3.050 m wide to have the 900 mm wide undisturbed strip.
3. With a standard 2 metre wide footway the gradient of a standard crossover will be between 1 in 11.4 for a 125 mm kerb and 0 mm upstand and 1 in 13.9 for a 100 mm kerb and a 6 mm upstand.
4. The ideal given would only be possible where the dropped kerb in being provided in a shared footway / cycle track of 3.1 metres.

D Vehicle Crossover Gradients

5. The upstand on these facilities are a minimum of 25 mm, with a preference for 35 mm and even in exceptional cases 50 mm (as discussed below).
6. Based on these criteria, where the crossover is on a 2 m footway the increase in crossfall would be from 1 in 40 (2.5%) to 1 in 13 (7.6%). However if a 900 mm strip of 1 in 40 was maintained then the crossover would be at a gradient of 1 in 8.6 (12%). This is considered to be too steep and would be difficult for any wheelchair user that encountered it and for vehicles entering and leaving the adjacent property in icy conditions. Consequently for 2 m footways the vehicle crossover should be developed over the whole width of the footway
7. Where a crossover is on a 3.1 metre shared footway / cycle track there would be an option to maintain a 900 mm strip at the back of the path with a 1 in 40 crossfall which would provide a better ride quality for wheelchair and other users as well as for cyclists in lightly trafficked conditions.
8. The situation for segregated Pedestrian path and Cycle track layouts is better again for pedestrians as it is clear that the dropped kerb element should be constrained to the Cycle track.

F Calculation of the Footway Width Needed for Dropped Kerbs

1. The two cases above are based on having a standard 125 mm kerb height, which is not always the case, especially where there is a raised table or similar feature, or where existing lower kerb heights are encountered.
2. The calculation does not directly involve the surrounding kerb face, but the amount by which the kerb face is dropped (d). d is the result of deducting the residual kerb height at the dropped kerb from the surrounding kerb height and could be 125 - 0 or 125 – 25 or 50 – 0 or any other values.
3. The calculated dropped footway width is given by the formula $w = d \times 120 \div 7$.
4. Where the calculated width is less than the width of the tactile paving, it should be equal to the tactile paving.

5. Where the width of the footway less the calculated, or tactile width, is less than 900 mm the dropped area shall be developed over the full footway width.
6. Where the width of the footway less the calculated, or tactile width, is more than 900 mm the dropped area shall be designed taking into account other features, such as the delineation between cycle track and footway, as long as a minimum of 900 mm width is retained at 1 in 40 crossfall and the maximum gradient on the dropped area is below 1 in 12.

G Multiple Vehicle Crossovers for New Developments

7. Where there is more than one vehicle crossover over a shared footway / cycle track or, and arguably more importantly, a Cycle track, the changes in level would be a significant reduction in ride quality which is unacceptable.
8. The first decision is how far apart two crossovers need to be to be considered to be individual crossovers. Based on a time frequency of two seconds and a cyclist speed of 20 mph this would require a separation of 18 metres. Thus if driveways are closer than this distance, not including the width of the dropped kerb section, then it is considered that it would adversely affect the ride quality. For a footway the spacing would be reduced to 6 metres.
9. In layouts where the crossovers are closer than this, the solution is to drop the kerb over the whole length, but to maintain a 50 mm kerb upstand.
10. The whole of the area would need to be constructed to vehicle crossover standards, but there will be an advantage in simplicity of construction and flexibility in the layout of the housing plots as the driveway locations will not be fixed.
11. To deter the cycle track from being treated as an extended layby the scheme would need to include double yellow lines for the length of housing frontage. This may need to be extended at each at each end to deter parking just outside of the crossover area.
12. Where crossovers serve multiple driveways or double driveways the width of the dropped kerb should be reduced to 4 metres for a multiple driveways and 2 metres for a double driveway.

Cycle Pick-up and Drop-off Points

(Where not at Pedestrian Dropped Kerbs)
The symbols are given in the key below.

Buff tactile paving (or red tactile paving as required)

Ladder tactile paving in Grey

Tramline tactile paving in Grey

Corduroy paving in buff

Shared use (Footway / cycle track sign) (Diag 956)

Optional Shared use (Footway / cycle track sign) (Diag 956)

Cyclists rejoin carriageway (Diag 966 variant)

End of cycle track (Diag 965)

Segregated use (pedestrian | cyclist sign) (Diag 957)

Cycle Track sign (Diag 955)

Optional cyclists dismount (Diag 966 variant)
(ONLY when cycling is not permitted beyond this point)


Bollard with Red / White reflectors


Edge marking of cycle track buffer strip (preferred)

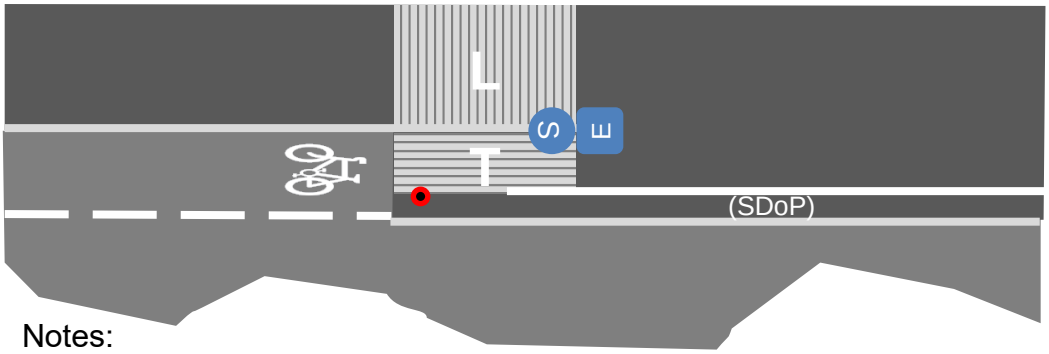

Delineator strip or 50 mm BN kerb


On road cycle track (advisory or mandatory)


Full height kerb (except at dropped kerb locations)


Cycle pick-up / drop-off dropped kerbs

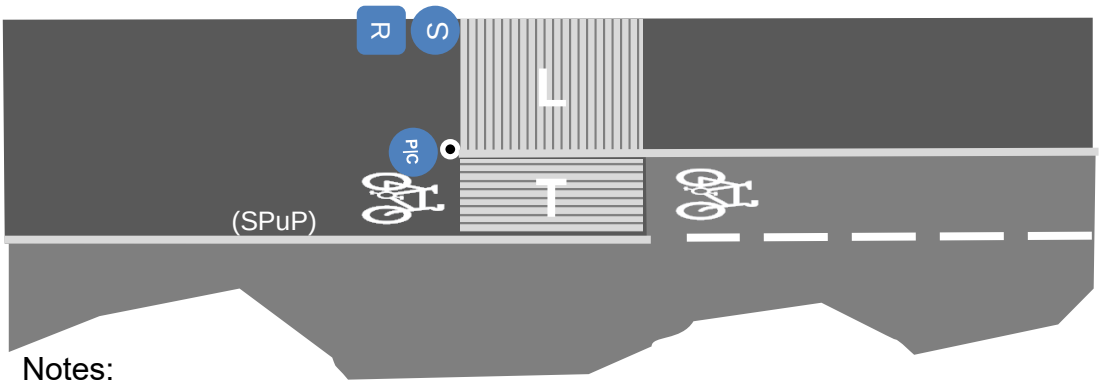
Type 1. Direct entry: – from on road cycle track (advisory of mandatory)
Exit against flow (End of route) Suitable for shared and segregated schemes



Notes:

- The depth of the ladder paving is 2.4 metres*
- The minimum width of the Tramline paving is 1.0 metre
- The on road cycle track could be a short, possibly tapered) section provided mostly to guide motor vehicles away from the entry point
- A Short Drop-off Point (SDoP) may be needed to allow cyclists to exit the shared footway / cycle track to cross the road

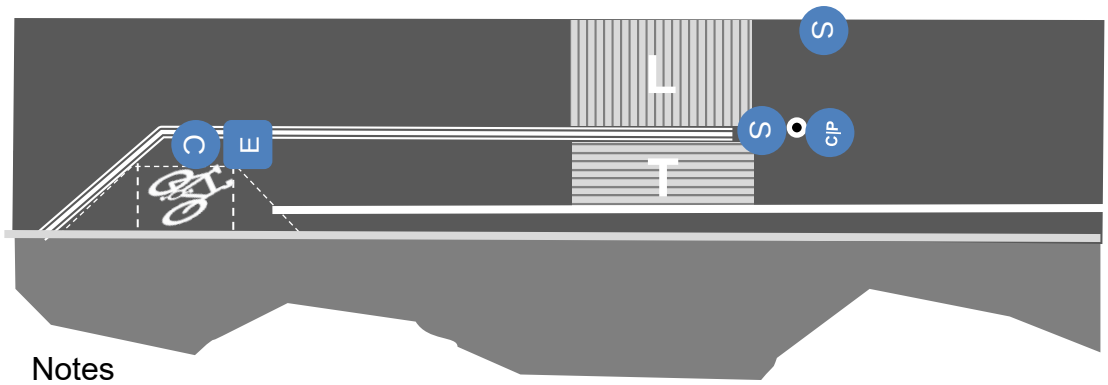
Type 2. Direct exit: – to on road cycle track (advisory of mandatory)
Entry against flow (start of route) Suitable for shared and segregated schemes



Notes:

- The depth of the ladder paving is 2.4 metres*
- The minimum width of the Tramline paving is 1.0 metres
- The on road cycle track could be a short, possibly tapered) section provided mostly to guide motor vehicles away from cyclists using the exit point
- A Short Pick-up Point (SPuP) may be needed to allow cyclists to cross the road and enter the shared footway / cycle track

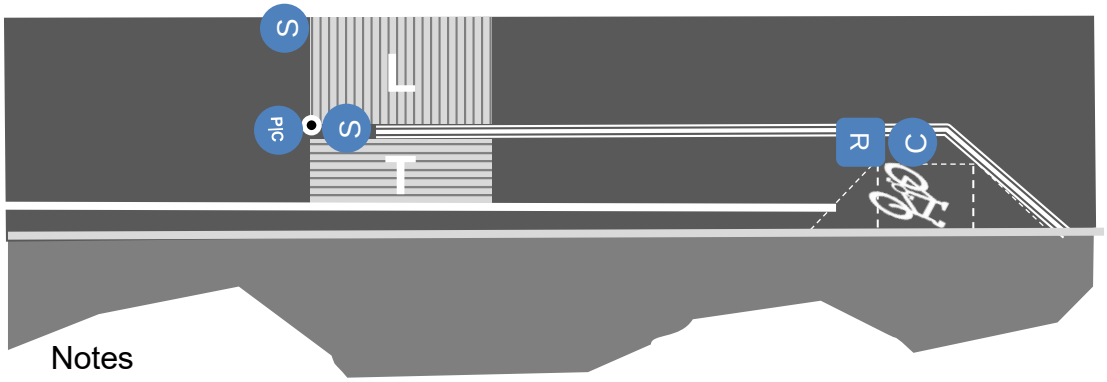
Type 3. Offset entry or exit: Two way segregated treatment
Suitable for shared and segregated schemes



Notes

- The depth of the ladder and tramline paving is 2.4 metres*
- The minimum width of the cycle track should be 1.5 m plus buffer strip
- The domed delineator strip should be 12 to 20 mm high with drainage gaps, or a 25 mm full batter kerb with the cycle track on the lower level. A painted line is not a permitted alternative
- The length of the dropped kerb can be varied to suit without concern about the need for tactile paving
- The dropped kerb can be located close to the Tramline paving but the transition kerb must not overlap it.

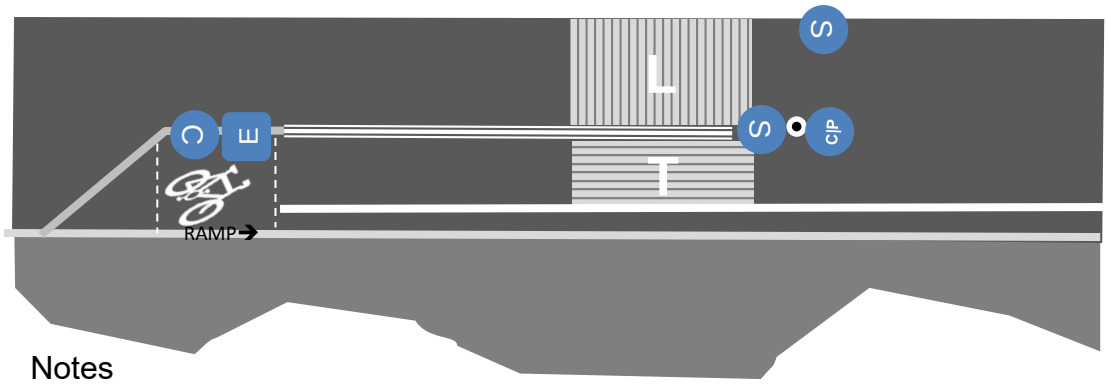
Type 4. Offset exit or entry: Two way segregated treatment
Suitable for shared and segregated schemes



Notes

- The depth of the ladder and tramline paving is 2.4 metres*
- The minimum width of the cycleway should be 1.5 m plus buffer strip
- The domed delineator strip should be 12 to 20 mm high with drainage gaps, or a 25 mm full batter kerb with the cycleway on the lower level. A painted line is not a permitted alternative
- The length of the dropped kerb can be varied to suit without concern about the need for tactile paving
- The dropped kerb can be located close to the Tramline paving but the transition kerb must not overlap it.

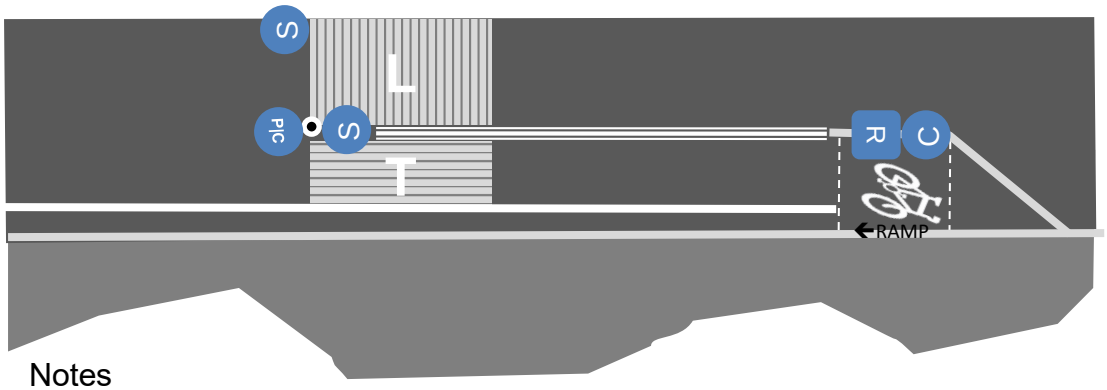
Type 5. Offset entry or exit: Two way segregated treatment
Suitable for shared and segregated schemes



Notes

- The depth of the ladder and tramline paving is 2.4 metres*
- The minimum width of the cycle track should be 1.5 m plus buffer strip
- The domed delineator strip should be 12 to 20 mm high with drainage gaps, or a 25 mm full batter kerb with the cycle track on the lower level. A painted line is not a permitted alternative
- The length of the dropped kerb can be varied to suit without concern about the need for tactile paving
- The Tramline Paving must be clear of the ramp.

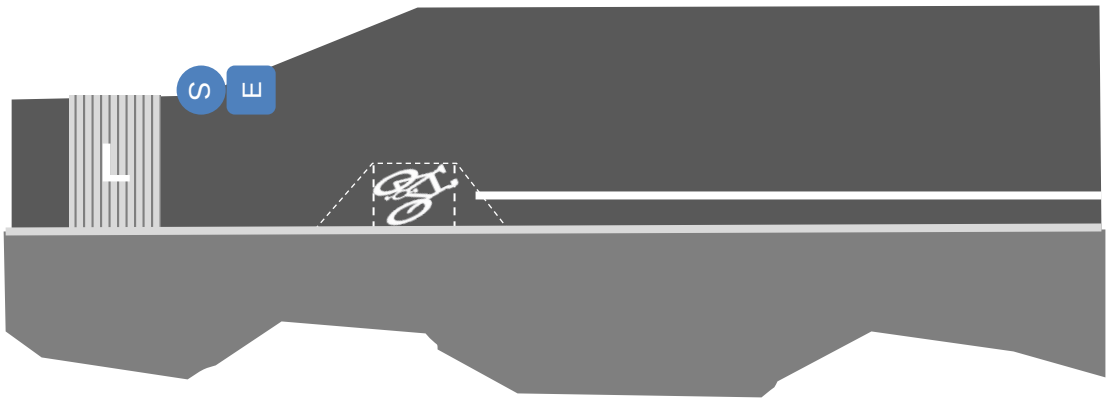
Type 6. Offset exit or entry: Two way segregated treatment
Suitable for shared and segregated schemes



Notes

- The depth of the ladder and tramline paving is 2.4 metres*
- The minimum width of the cycle track should be 1.5 m plus buffer strip
- The domed delineator strip should be 12 to 20 mm high with drainage gaps, or a 25 mm full batter kerb with the cycle track on the lower level. A painted line is not a permitted alternative
- The length of the dropped kerb can be varied to suit without concern about the need for tactile paving
- The Tramline Paving must be clear of the ramp.

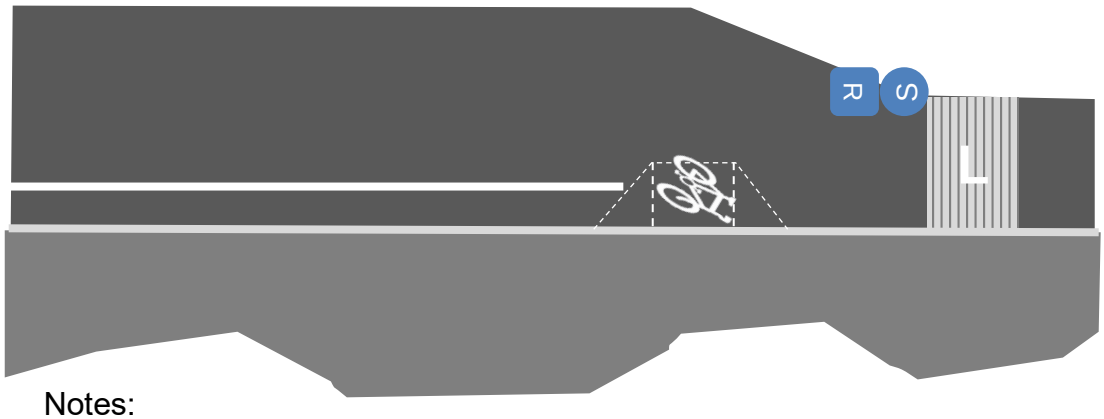
Type 7. Short Pick-up – Entry with flow: Exit against flow (End of route)
Only suitable for shared use footway / cycle track areas



Notes:

- The depth of the ladder paving is 1.2 metres
- If the length of the dropped kerb is 0.9 metres and the depth is 1 metre then no tactile paving is required

Type 8. Short Drop off – Exit with flow: Exit - Rejoin carriageway
Entry by crossing the road: Only suitable for shared use footway / cycle track areas

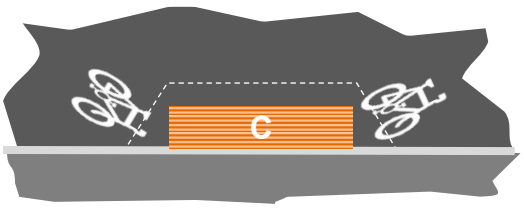


Notes:

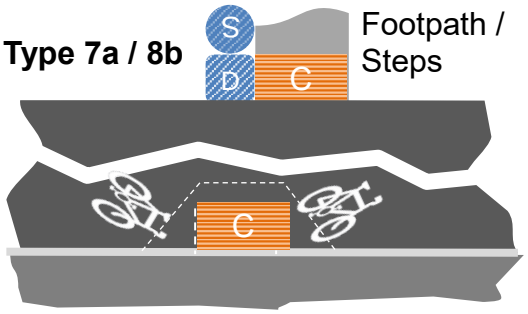
- The depth of the ladder paving is 1.2 metres
- If the length of the dropped kerb is 0.9 metres and the depth is 1 metre then no tactile paving is required

Type 7a / 8a. Long Pick-up or Drop-off
Type 7a / 8b. Pick-up or Drop-off near Footpath / Steps

Type 7a / 8a

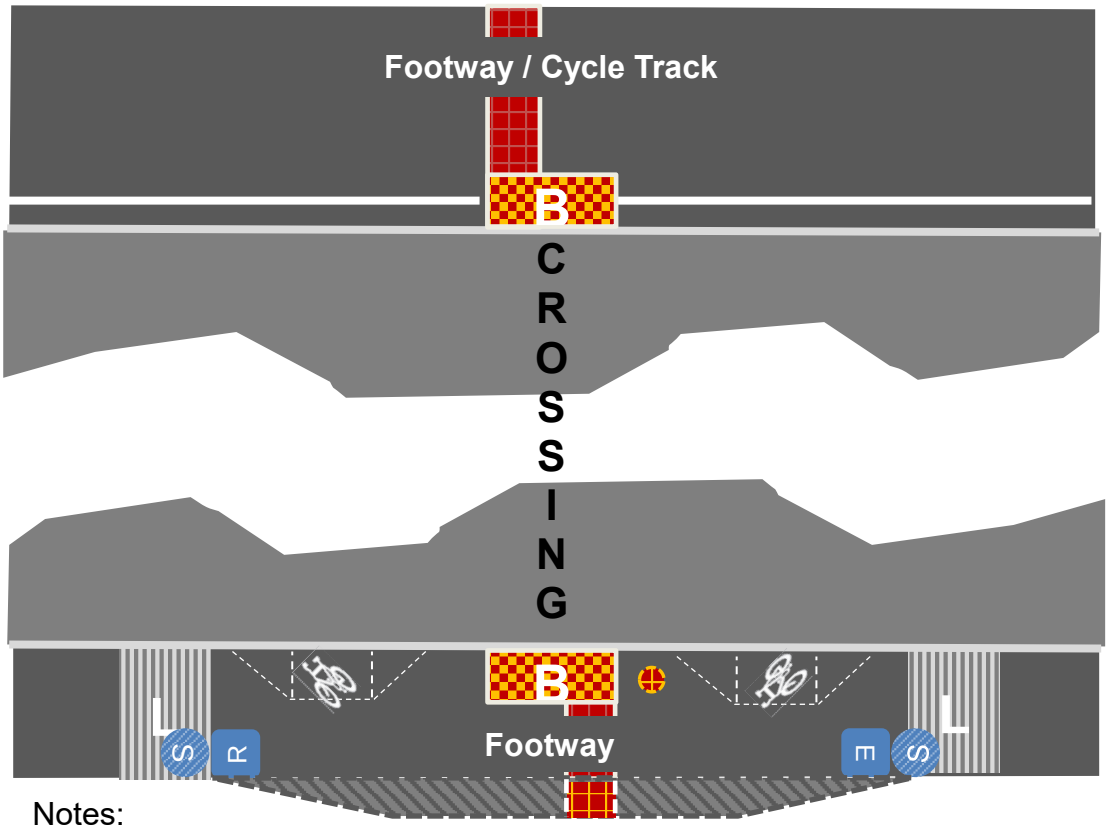


Type 7a / 8b



Note: These illustrate the use of Corduroy where the pick-up / drop-off point is over 2 m long or there is a risk to visually impaired users

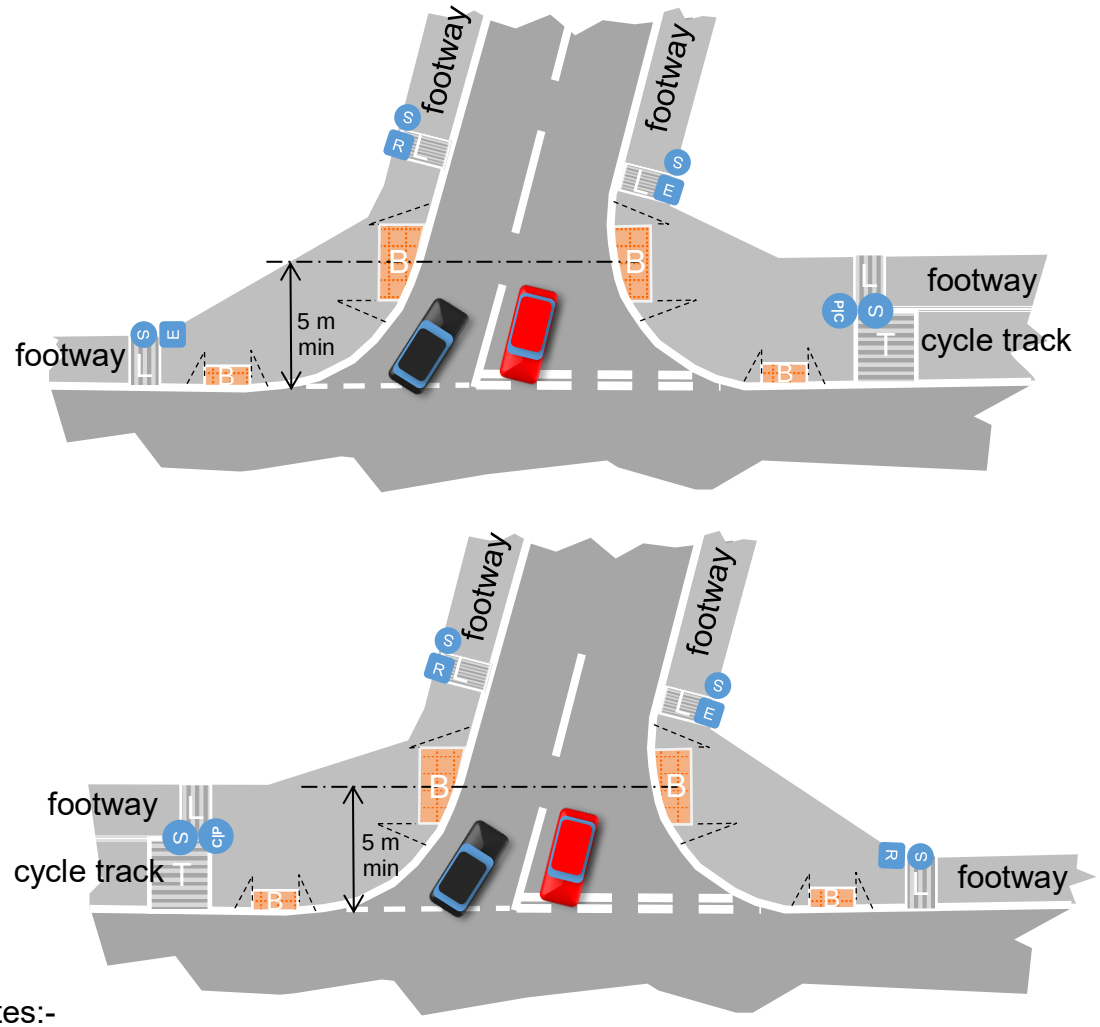
Type 9: Crossing between a footway / cycle track and footway: Footway treatment is irrespective to the type of crossing, but the footway needs widening if there is a beacon or signals
Only suitable for shared use footway / cycle track areas



Notes:

- This layout applies to any crossing layout (with the appropriate blister tactile paving) where cyclists are likely to cross
- Cycle pick-up / drop-off points may not be required where the crossing is on a speed table
- The footway must be widened to 2.6 m minimum when there is a controlled crossing with beacons or signals
- See other layouts for further details

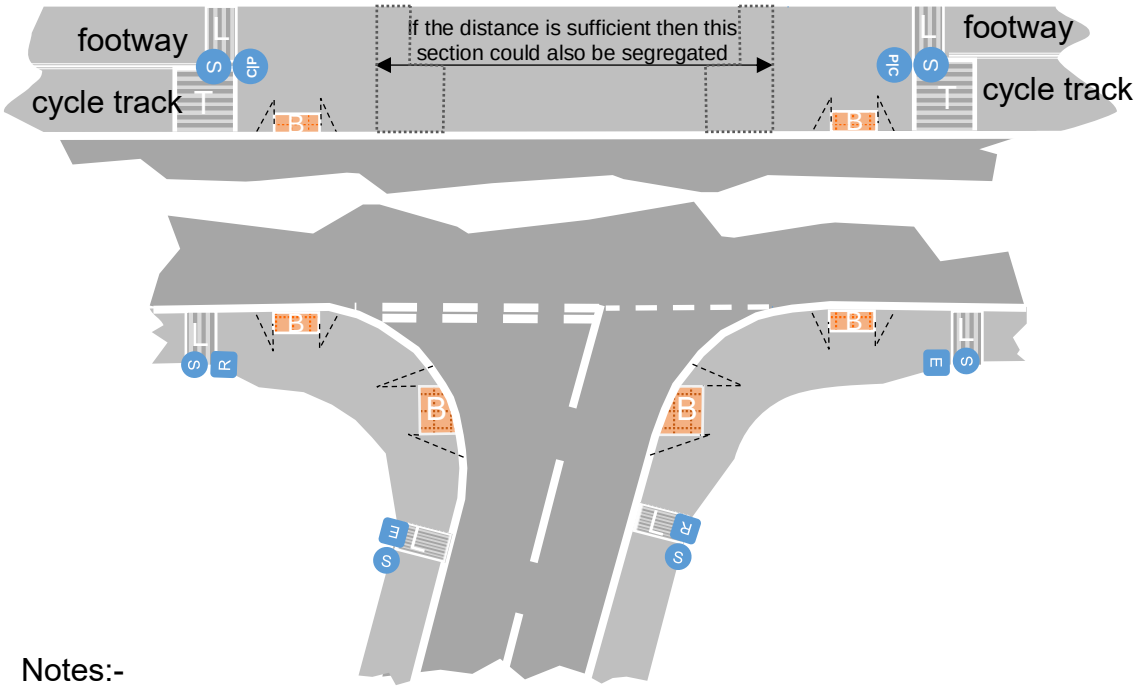
Type 10: Treatment options for segregated footway and cycle track at side road junctions:



Notes:-

- These sketches illustrate the various elements and are not intended be, nor to be used as, designs.
- It is normal for the cycle track to continue across the junction and changes of order or to shared footway / cycle track should be avoided.
- The width of the tactile crossing of the side road arm must be a minimum of 2.8 m, but preferably 3.2 m.
- Consideration should be given to tabling the side road arm.
- Tactile crossings of the side road are required if there is a footway on the other side of the main road. Note the need for Ladder Tactile paving on the far side of the main road.
- If the cycle track is ending and there are no dropped kerbs, then there needs to be a cycle pick-up / drop-off facility. Depending on assessment it may either not need tactile paving, or need Corduroy paving.
- If the cycle track is changing to shared footway / cycle track after it crosses the junction, then there must not be any signage or tactile paving.

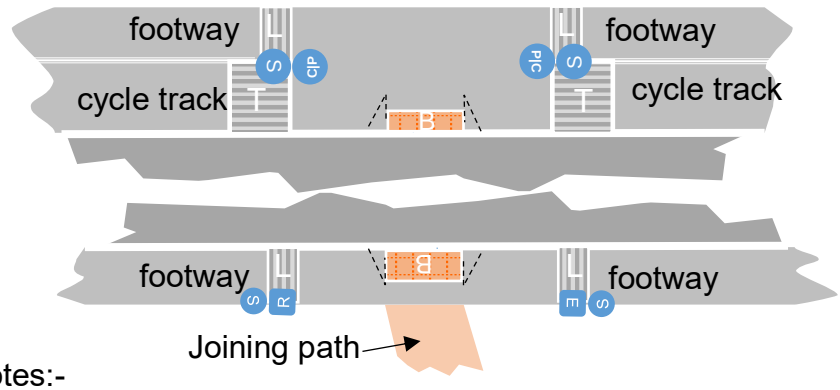
Type 10 (continued): Treatment options for segregated footway and cycle track at side road junctions:



Notes:-

- These sketches illustrate the various elements and are not intended be, nor to be used as, designs.
- The order of the footway and cycle track do not change the principles of this design.
- The width of the tactile crossing of the side road arm must be a minimum of 2.0 m.
- Tactile crossings of the side road are required if there is a footway on the other side of the main road. Note the need for Ladder Tactile paving on the far side of the main road.

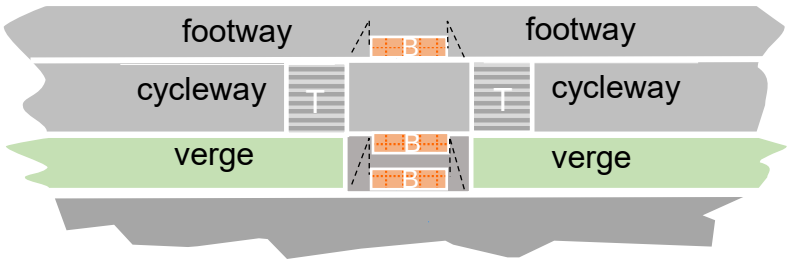
Type 11: Treatment options for segregated footway and cycle track at cycle tracks and footpaths



Notes:-

- These sketches illustrate the various elements and are not intended be, nor to be used as, designs.
- The order of the footway and cycle track do not change the principles of this design unless the path is for pedestrians only, in which case no gap is required if the footway is adjacent to the carriageway.
- Tactile requirements for the path will vary depending on the path type.

Type 12: Treatment option for segregated footway and cycle track with a verge



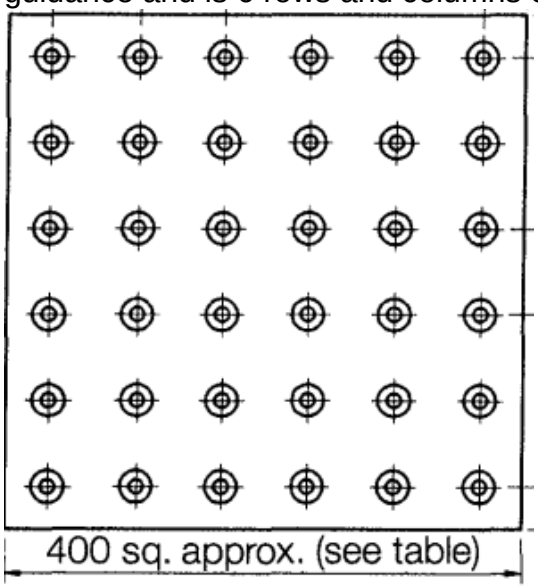
Cycle Pick-up and Drop-off Points

1. Any pick-up or drop-off point must be within the area bounded with Tramline tactile paving and are normally a short distance from these points.
2. The exact layout of the features will depend on the type of Pick-up and Drop-off point and other adjoining features as illustrated in the following sketches. The principles given will need to be interpreted to suit the actual conditions and not the idealised ones shown.
3. The sketches are based on designs using a shared footway / cycle track and will need to be varied if a segregated pedestrian and cycle track layout is being constructed. These are well illustrated in the Guidance of the Use of Tactile Paving, Designing for Mobility and other related documents.
4. *By agreement, on Types 3 to 6a, the Ladder, but not the tramline, tactile paving can be reduced to 1.2 m in length.

A Blister Paving[20]

1. This is the most common paving and is typically in red for controlled crossings and buff for uncontrolled crossings. However, the guidance is that for controlled crossings the colour can vary to another contrasting colour when necessary but there is a prohibition on the use of red except at controlled crossings. Use can be made of contrasting banding courses and localised changes in paving colour where the general paving colour lacks contrast with the slabs.

   1.1 The Layout of Blister Paving Slabs is given in Figure 2 of the guidance and is 6 rows and columns on a 400 mm square slab.



   1.2 The layout of the slabs is always an 'L' for controlled crossings.

   - The minimum depth of the "foot" of the L is 800 mm which although shown on Figure 4 is at the instep (where the front of the "leg" meets the foot) it would equally apply to the "toe" but not the "heel" as the "leg" provided the necessary depth.
   - Complex shapes can occur when crossings on two separate arms interact, see Figure 5 of the guidance.
   - The guidance shows the "leg" of the L extending back to the building line, (or its projection from the side road – Figure 3) but in 1.5.1.4 recommends that if the building line is on a publicly accessible forecourt that the land owner's agreement should be sought to extend the "leg" to the actual building line.

   1.3 The layout for uncontrolled crossings is more complex than many people think – i.e. it is not a minimum of 800 mm on the shortest dimension. The actual requirements are:-

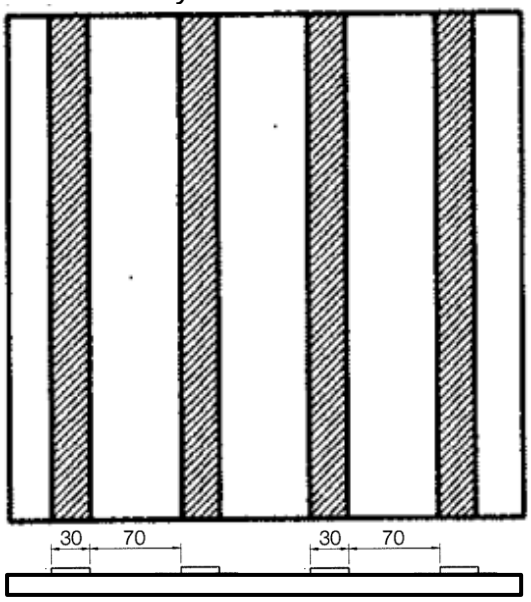
[20] In this document the following terms are used for tactile paving:
Blister Paving to Figure 2: Properly known as "Blister Surface for Pedestrian Crossing Points" This is a Warning Surface and is only to be used at dropped kerbs for Controlled and Uncontrolled crossings

- 400 mm deep where the crossing is inset by more than 2 metres from the building line. (Figure 6)
- 1200 mm deep where the crossing is in front of the building line. (Figure 7)
- 800 mm deep where the crossing is at some other point remote from a junction. (Figure 9)

B Ladder and Tramline Paving[21]

1. This is the second most used paving adjacent to the main carriageway. It is important to note that this paving is distinct in form from Corduroy paving which has twice as many narrow rounded ribs and consequently they are not interchangeable. For the avoidance of doubt in specifications the term “Corduroy” should never be applied to Ladder or Tramline Paving.

   1.1 The Layout of Ladder and Tramline Paving Slabs is given in Figure 19 of the guidance and consists of 4 flat, 30 mm wide, ribs on 400 mm square slab. These slabs are typically grey and this is partly because they are an information surface, rather than a warning one.



   1.2 Where pedestrians on a footway enter a shared area the slabs should be laid in a Ladder pattern, that is with the ribs being at a right-angle to the direction of travel. The length of the tactile paving, measured along the line of the footway is shown as 2.4 metres but see Section B1.3.

   1.3 It is noted that the layout in C Types 1 and 2 appears to be at variance with Inclusive Mobility 4.2 Application.

[21] **Ladder and Tramline Paving** to Figure 28: Properly known as “Segregated Shared Cycle Track/footway Surface” with the orientation determining the names used. These are used at the interface between Footways and either Shared Areas or Cycle Tracks.

i) However this is contradicted by the subsequent table that does not mention the entry from a footway to a shared area.

ii) In contrast the layouts in the Guidance on the Use of Tactile Paving Surfaces, can (only?) be interpreted (Figure 30 B, for Pedestrian Path as opposed to the Footpath – 31 B and 32 as showing the case where a Pedestrian path enters and leaves a shared area.

In all but the most basic layouts the use of Corduroy warnining paving as described in Inclusive Mobility has the following issues

iii) In the case of a visually impaired pedestrian encountering Corduroy warning tactile paving when entering a shared area, they would be unaware of the type and location of the "hazard". On leaving the area could not be sure if they were about to encounter another hazard or leave the area of hazard.

iv) If they entered a shared area via a Corduroy paved area and then left via a segregated pedestrian path over Tramline paving, they would be uncertain if they had entered or left a shared area.

v) Similarly, travelling in the other direction, their first encounter with the Corduroy paving would be on entering the footway.

None of these cases occur if Ladder paving is used except for the singular case where a pedestrian path enters a cycle track as Figure 30 B.

The issue of how cyclists enter and leave these areas is discussed in Section G Cycle Pick-up and Drop-off points.

1.4 The dimensions in the standard relate to cases where a shared route, as in separate parallel pedestrian path and cycle track end in an area that is either purely pedestrian or a shared footway / cycle track. This relatively large dimension, say compared to the 1.2 metres for a footway directly approaching a road (Section A1.2 second bullet).

- On this basis the 2.4 metres is relevant where the paths are segregated as it gives a visually impaired user who enters on the Tramline pattern the distance to transfer to the Ladder pattern without having to turn back to find if they have successfully changed to the correct side. Accordingly, if tramline tactile is needed, then the area of both tramline and ladder tactile paving should be 2.4 metres.
- In other cases where a footway is joining, or leaving, a shared area it is considered that an area of ladder tactile 1.2 metres long is sufficient

1.5 Where the footway is widened to create a shared footway-cycle track the Ladder paving should be laid before the start of the change to the wider width.

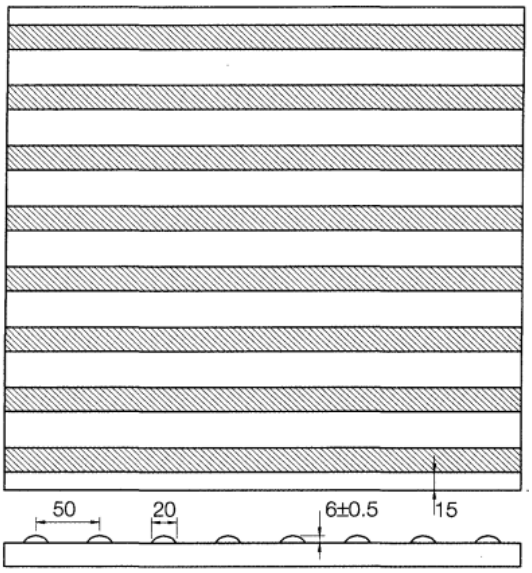
1.6 Where a cycle track joins a shared footway-cycle track area in a straight line the paving is laid in the Tramline pattern, that is in line with the direction of travel and again the specified length is 2.4 metres.

1.7 Where cyclists join or leave a shared footway-cycle track directly from or to the carriageway at a "pick-up drop-off" the layout should be as in Section G Cycle Pick-up and Drop-off Points.

C Corduroy Paving[22]

1. This paving is normally restricted to the top and bottom of flights of stairs and at the bottom of ramps up to On-Street platforms, but not bus boarders. A special use at Parallel (Zebra and cycle) crossings is set out as there is no national guidance. The conflicting advice in the guidance related to where footways join shared areas is discussed in Paragraph F below.

2. Corduroy paving as it has eight rounded ribs on a 400 mm slab . These slabs are typically buff or, as with blister paving, a contrasting colour from the paving. Generally red would be avoided but again special use at Parallel (Zebra and cycle) crossings is proposed.

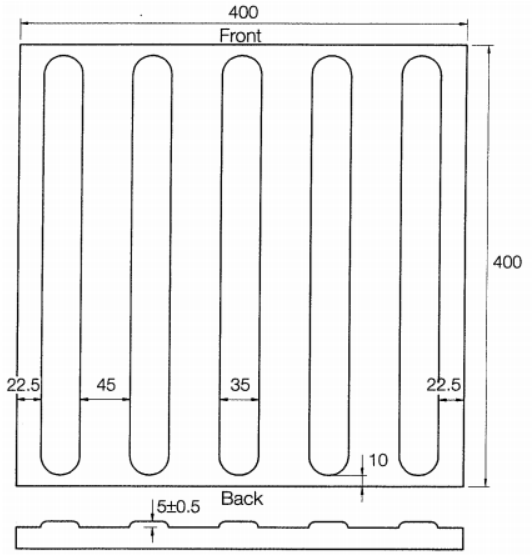


D Guidance Path Paving[23]

1. This is an Amenity Surface and is typically coloured to match the surrounding paving. Whilst its role in replacing the traditional guidance when there is not a kerb is noted, reading the full advice indicates that this should be to form a route, not to highlight a hazard.

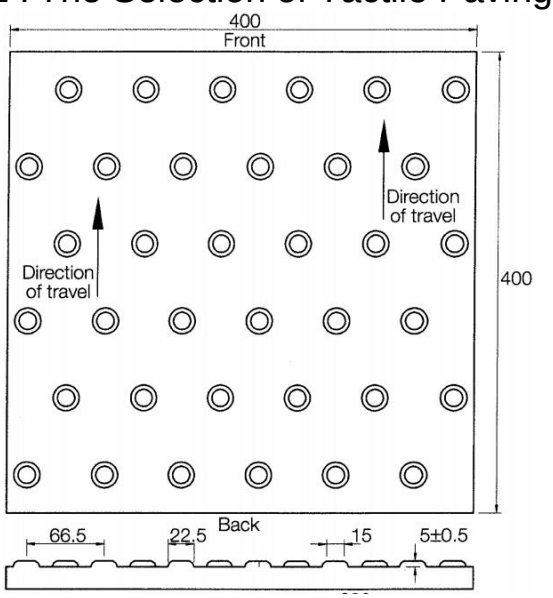
[22] **Corduroy Hazard Warning Surface** to Figure 19: Note this must only be used where there is an immediate hazard for visually impaired users if they proceed over it.
[23] **Guidance Path Amenity** Surface to Figure 36: Note this is not intended as a warning surface but to provide guidance.

2. It has a potential use to indicate the outer edges of a route between dropped kerbs across a large pedestrian island where kerb lines or guardrail are not present.
   2.1 When used in this manner it would be preferable for the paving to take the straightest line between the two sections of tactile paving.
   2.2 If it is placed at the outer edges, and allowing for a minimum 800 mm width, then a central gap of about one metre of smooth surface should be provided for easy movement of wheelchairs and similar mobility aids.
   2.3 If it is placed in the middle, then it would actually have to start from the edges furthest away from the destination to ensure that a visually impaired user is likely to encounter it.
3. The layout of the ribs, having five wide but rounded edge ribs makes it more similar to the Ladder / Tramline surface



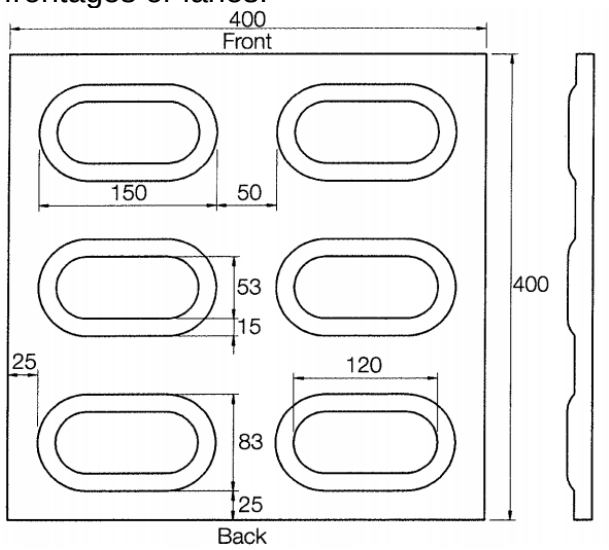
E Other Surfaces

1. There are a number of other surfaces but these are related to specific installations and need to be identified as required. These are:-
   1.1 Platform Edge (Off-Street) Warning Surface to Figure 24:
   - This is for railway stations and is a diamond blister surface with a passing resemblance to buff coloured Blister Paving.



1.2 Platform Edge (On-Street) Warning Surface to Figure 26

- This is intended for Tram (Light Rapid Transit) platforms which have a greater height difference from the carriageway (200 to 915 mm) than bus boarders, but this surface can be used particularly where there is a risk of approach from adjacent frontages or lanes.

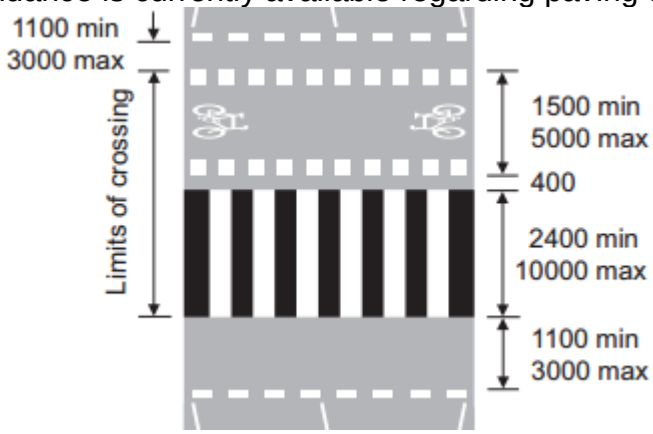


1.3 Information Surface (Amenity Surface)

- This is intended to act as guidance to the location of any amenity ranging from Cash Dispensers to Toilets. It is intended to draw attention to the amenity, not to warn of its presence.
- There is no specific pattern as this has to be determined by site specific requirements.

F Parallel Pedestrian / Cycle Crossings

1. These are a new type of crossing introduced in the Traffic Signs Regulations and General Direction dated 2016 (TSRGD 2016) and no guidance is currently available regarding paving on the footway.



Extract from Sign table – Schedule 14, Part 2 Item 53 – Page 476

2. It is considered that red Corduroy paving, laid with the ribs parallel to the kerb, is the appropriate choice and that a depth, measured back from the kerb, should be 800 mm. The gap between the two sets of tactile paving can be either left plain, or paved with Corduroy paving in another colour.

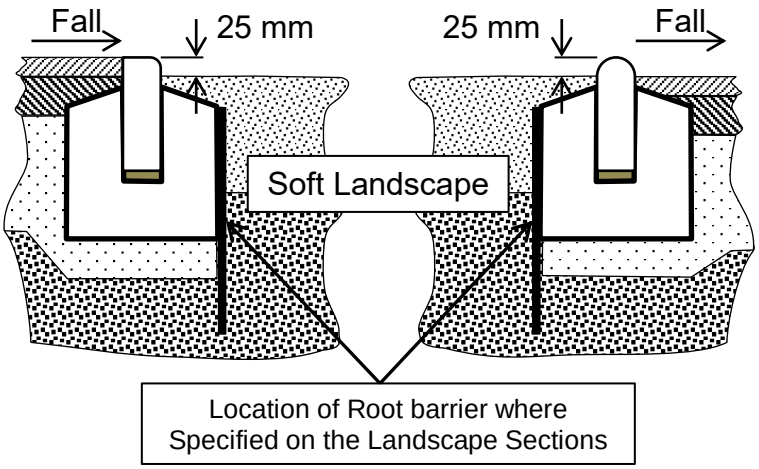
.

1. Standard Edging Kerb Details

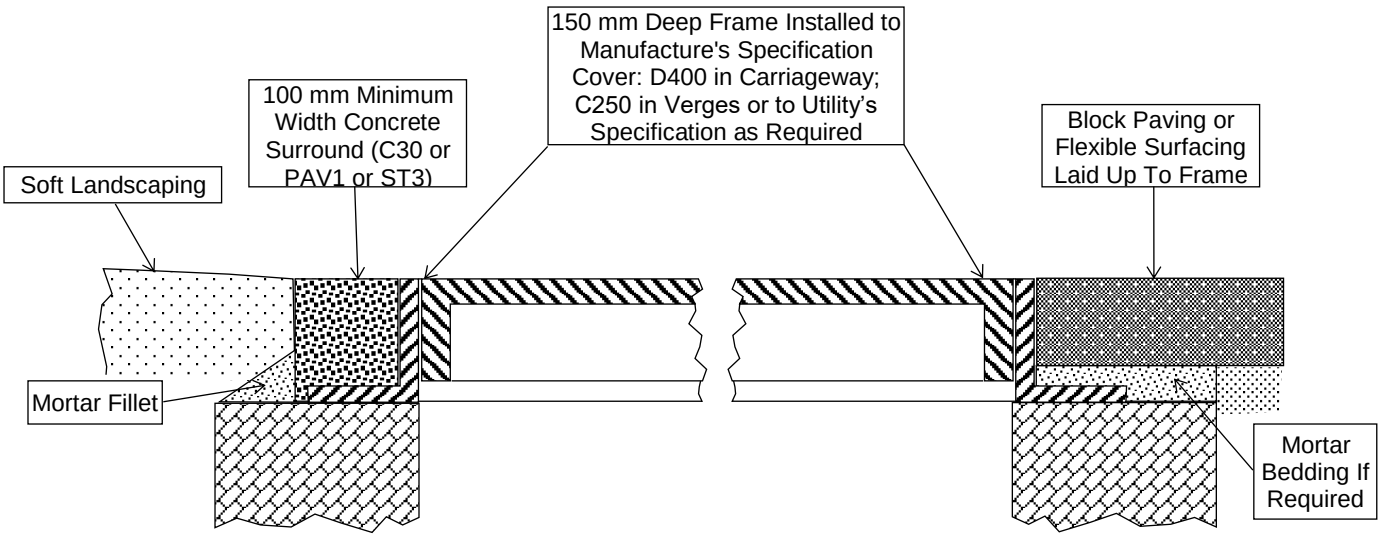
1.1 Private land must drain away from the Highway or have private boundary drainage.

1.2 Footways and cycle-ways adjacent to the carriageway must drain towards the carriageway.

- Where there is a verge on the high side there must be an ER edging kerb on the high side with a 25 mm upstand (on both sides).
- Where there is a verge on the low side there must be an EBN edging kerb on the low side with a 25 mm upstand above the finished verge level.
- Any verge must be level or dished to encourage rainfall infiltration.



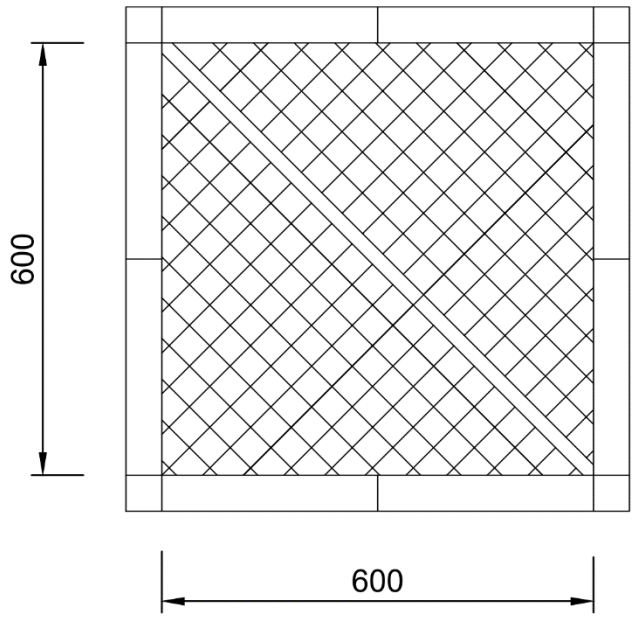
2. Standard Cover Detail



2.1 This detail covers all situations including in hard paved and landscaped areas.

2.2 In hard paved areas the 150 mm depth of the frame prevents the breakup of thin areas of paving.

2.3 When the cover is installed in the carriageway, it must have a highly durable skid resistance, such as a composite cover.



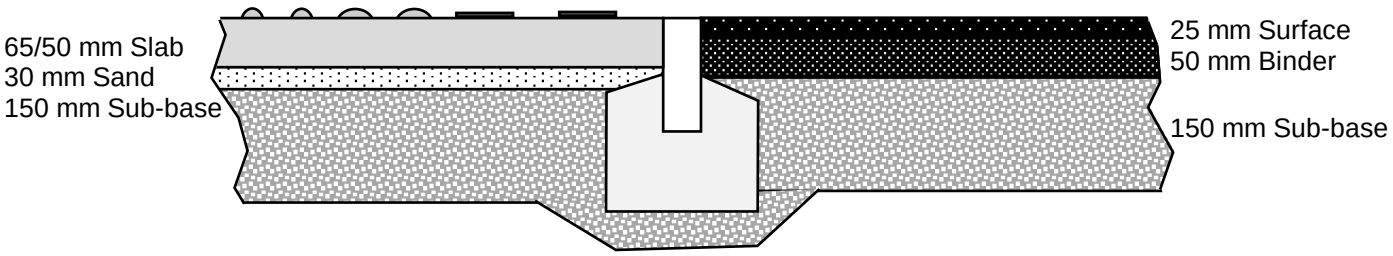
GRIP TO ANTI-SKID MANHOLE COVER			
SAP CODE	SPECIFICATION	CLEAR OPENING (mm)	DEPTH (mm)
212929	GRIPTOP OPT-EMAX (OSA)	600 x 600	150

2.4 When the cover is installed in soft landscaping the 100 mm minimum width concrete surround provides a safe working environment and reduces issues with grass experiencing drought.

3. Section for Tactile Paving Within Flexible Paved Footway

3.1 This shows the required detail for EF edging around tactile paving in areas of flexible paved footway.

3.2 EF edging is not required where the adjacent paving is block or paving slabs, but can be provided is desired.

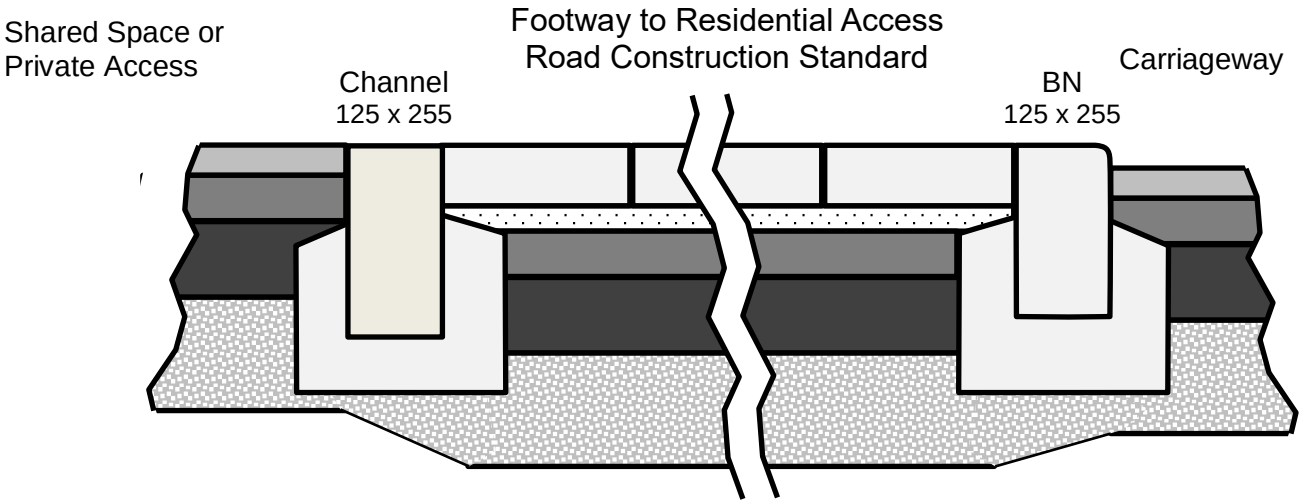


4. Section for Footways Across Vehicle Crossover

4.1 This is a typical detail where a footway is continued across a vehicle crossover that leads to a shared space or private access. Note the

footway can be either rigid paved (as shown) or flexible, but to the required standard.

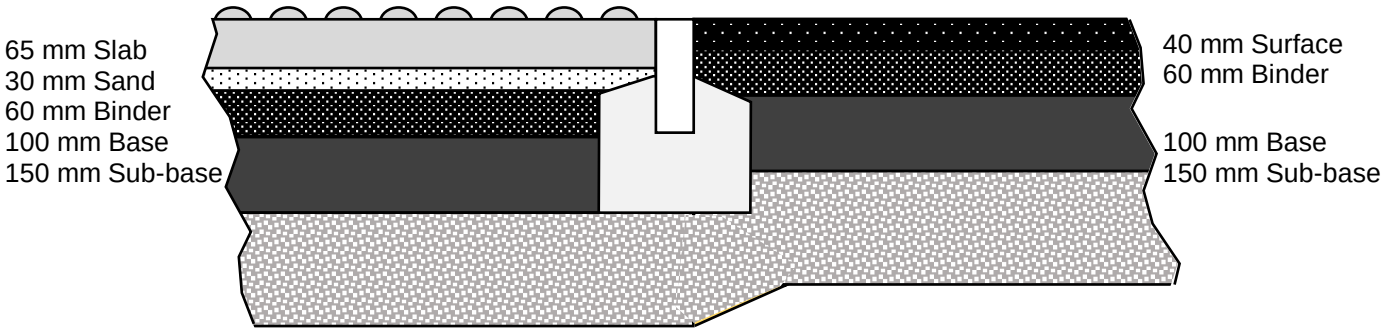
4.2 The kerb upstand adjacent to the carriageway must be between 25 and 35 mm.



5. Section for tactile paving within an Emergency Vehicle Crossover

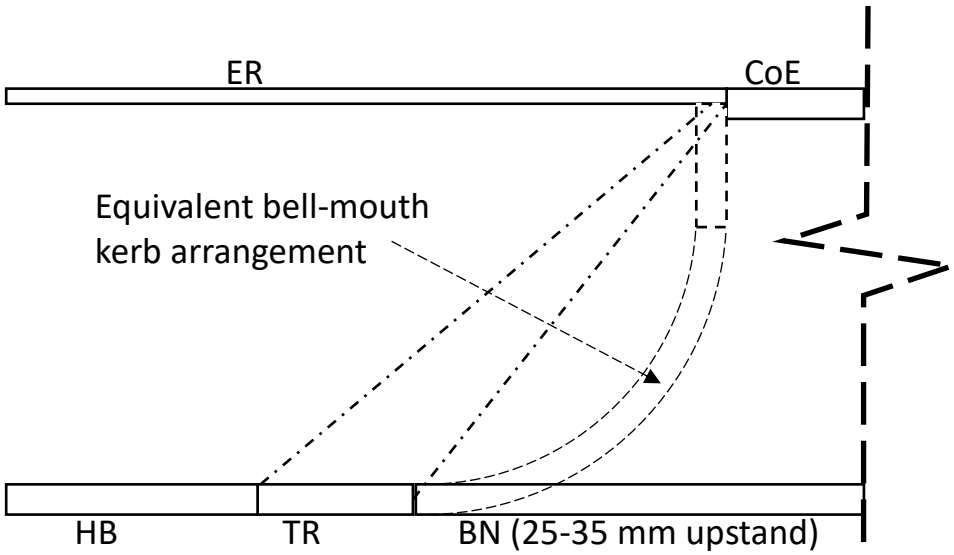
5.1 This detail should only be used were it is not possible to separate the two facilities.

5.2 The kerb must be dropped to 0 to 6 mm adjacent to the tactile paving, but rise to 50 mm for the rest of the vehicle crossover.



6. Layout of vehicle crossover

6.1 In the absence of tracking information, this determines the length of dropped kerb required for this access layout.



7. CC Refuse Vehicle Specification

7.1 This is the information to be used for AutoTrack assessment of highway layouts

Olympus 6x2RS Narrow, Smooth Body RCV (19N)

Drawing Reference	Vehicle Part	Dimensions in mm
V1	Overall wheelbase	5250
V2	Overall length	9190
V2	Overall length with tailgate raised	10270
V3	Front axle to front of compaction body	650
V4	Front overhang	1665
V4	Front overhang with cab tilted	3465
V5	Rear overhang	2285
V5	Rear overhang with tailgate raised	3145
V6	Overall height	3450
V6	Overall height with tailgate raised	5100
V7	Height at exhaust tip - nominal	3500
V8	Cab roof height	3130
V8	Cab roof height with cab tilted	3690
V9	Cab floor height	885
V10	First cab step height from ground	495
V11	Rave rail height	1050
V12	Ground clearance at lowest part of vehicle	250
V13	Ground clearance with tailgate	410

8. Barrier Kerb Design Considerations

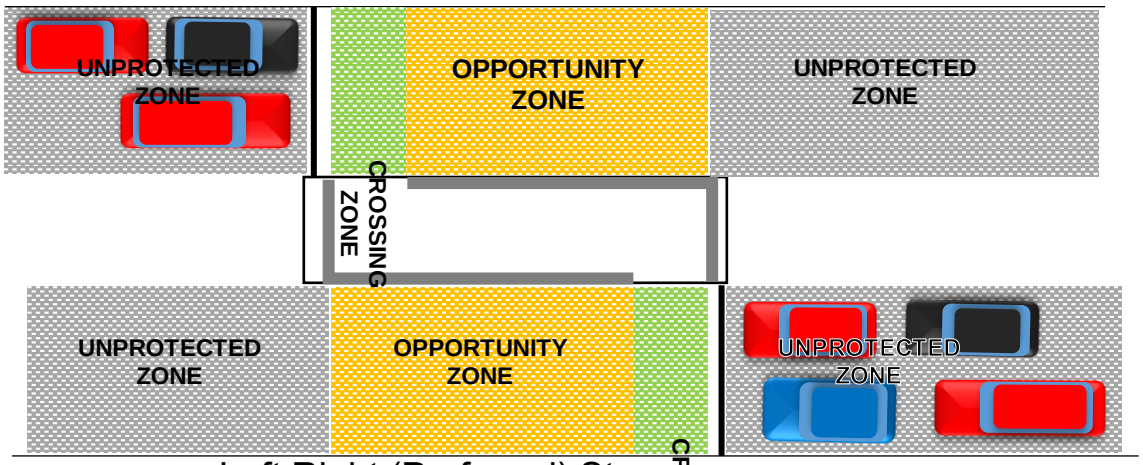
8.1 Whilst with guardrail pens pedestrians are constrained to the Crossing Zone, barrier kerbs introduce other areas. See Sketches.

- The Unprotected Zones are where there is no access to the island or expectation of protection from the operation of the pedestrian signals. These areas are either 'inaccessible' or general carriageway in designs using guardrail.
- The Opportunity Zone is where some pedestrians can enter or exit the island under the protection of the pedestrian signals without having (in normal circumstances) to encounter vehicles. If they mistakenly take their cue for crossing by the actions of those in the Crossing Zone, they will be further from any approaching traffic and have relative protection.
- The Ambiguous Zone appears to be similar to an Opportunity Zone, but any person crossing at this point is closer to an exposure to moving traffic than those using the Crossing Zone, whether crossing in a pedestrian phase or gapping. Thus any person using the Ambiguous Zone taking their cue from those on the Crossing Zone may be a higher risk than they anticipate.

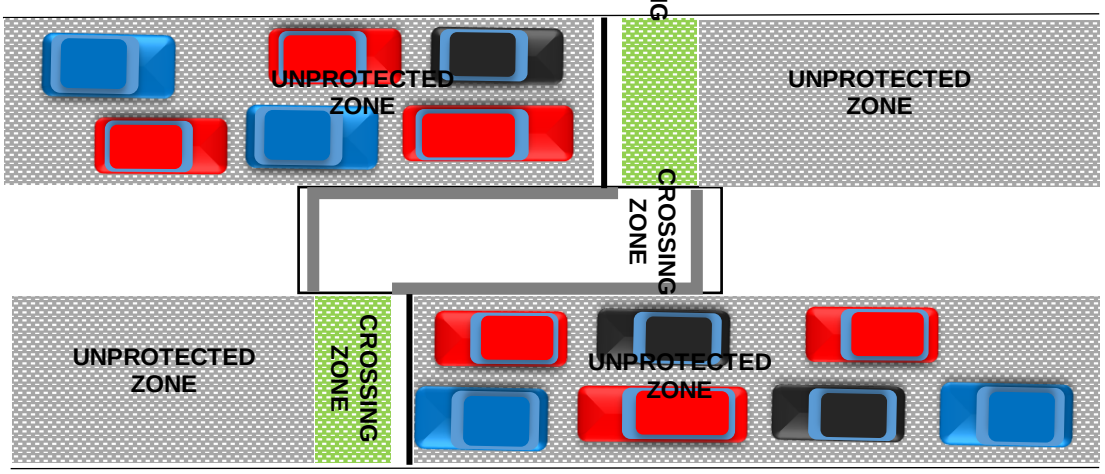
8.2 No design can prevent unsafe actions by users, but they should not increase risk by misguiding the unwary or distracted user. Based on the above there is little benefit and possible increased risk of using barrier kerbs with the Deprecated Stagger, though the issue of guardrail being a risk to cyclists and by trapping pedestrians in the carriageway also needs to be considered.

8.3 The Barrier should be constructed as shown depending upon whether HB or Conservation kerbs are used. The infill must be 200 x 100 x 80 mm paving blocks such as Charcon Andover Tegula.

Stand Alone Crossings

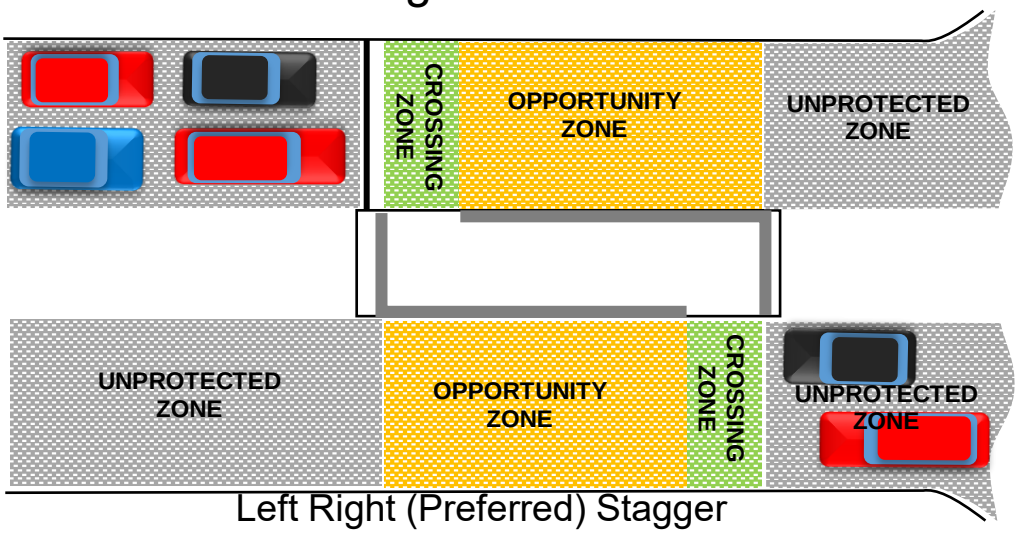


Left Right (Preferred) Stagger

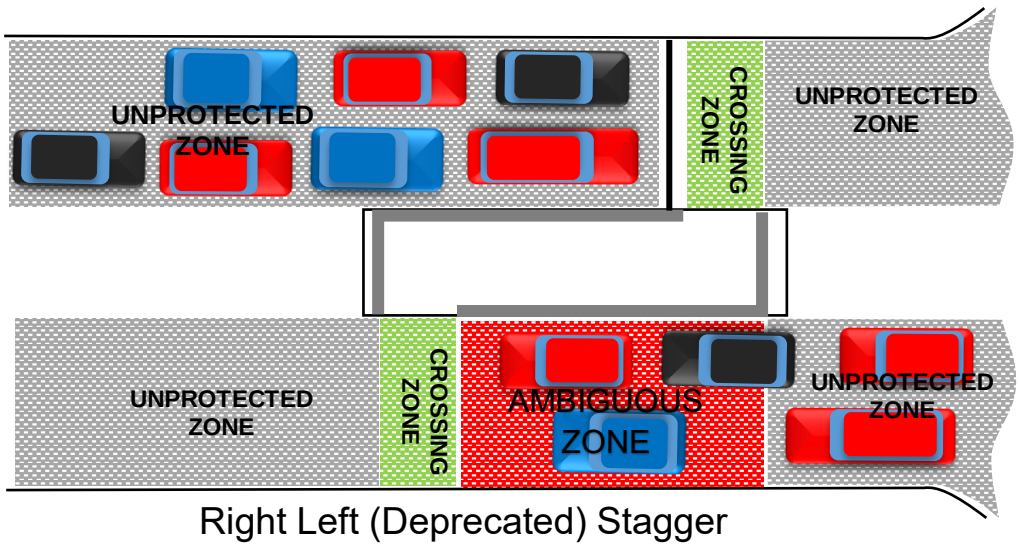


Right Left (Deprecated) Stagger

Crossings in Junctions

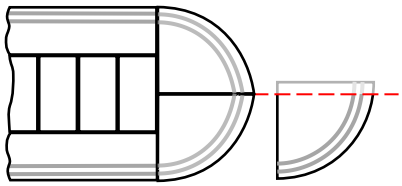


Left Right (Preferred) Stagger

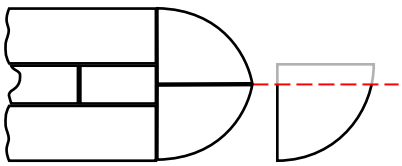


Right Left (Deprecated) Stagger

Barrier Kerb Construction Details



HB Barrier Kerb Detail



Conservation Kerb
Barrier Kerb Detail

The Cardiff Council Standards have been withdrawn and are replaced with the South East Wales Highways Framework Standards. https://sewh.co.uk/

Scheme specific details may be issued in addition to the above.

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