



Hampshire
County Council

Universal Services Directorate

Technical Guidance Note TG2 - Alignment Design

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1. Policy / approach

1.1. The overall approach to the design of new highways and the improvements of existing ones needs to reflect a number of current and emerging policy developments including:

- Hampshire County Council's declared climate emergency and net zero target by 2050
- Hampshire County Council's [Local Transport Plan 4 \(LTP4\)](#)
- Movement and Place philosophy
- Healthy Streets approach
- Manual for Streets (MfS)

Refer to Technical Guidance Note TG1 – Highway Cross-sections for further information.

1.2. Within the local Highway network, it is appropriate to use the principles detailed in MfS for all local highways - for example, considering the place function and features of each route, local context, stakeholder engagement in the development of the design and providing high quality facilities for walking and cycling (including segregated facilities where there are higher carriageway design speeds). However, the geometric requirements will vary depending on the functions of the route, expected usage (by people and different vehicles) and the design speed.

1.3. This Technical Guidance Note details Hampshire County Council's requirements for the local Highway network (both existing and proposed), in relation to alignment design, geometry and layout of different types of junction. The requirements and guidance contained within this TG need to be coordinated together with the following [Technical Guidance Notes](#) so the three-dimensional layout as a whole is appropriate in terms of Road User Utility Hierarchy, safety, protection and comfort (both actual and perceived), place/movement functions, drainage, environmental impacts and maintenance.

- TG1 - Highway Cross-Sections
- TG3 - Stopping Sight Distances and Visibility Splays
- TG4-1 - Traffic Signal Junctions
- TG4-2 - Signal Controlled Crossings
- TG8-1 - Drainage – General
- TG8-2 - Drainage – Infiltration
- TG10 - Pedestrian and Cycle Facilities
- TG11 - Traffic Calming
- TG14 - Collision Risk Assessment, VRS and Passive Street Furniture
- TG15 - Trees, Landscape and Ecology
- TG20 - Utilities

- TG25 - Fencing, Noise Barriers and Demarcation of the Highway Boundary

1.4. Throughout this TG, where a requirement is limited to streets only, it has been stated as such.

2. Definitions and abbreviations

Class B planning uses	B2 General Industrial and B8 Storage or Distribution classes as defined in the Town and Country Planning (Use Classes) Order 1987 and amended by the Town and Country Planning (Use Classes)(Amendment)(England) Regulations 2020
Classified route	A highway which has been classified as either an A, B or C route (for example A339)
Design speed	Traffic speed used for establishing suitable geometric and visibility requirements. Design speed shall be determined in accordance with Technical Guidance Note TG3.
DMRB	Design Manual for Roads and Bridges
DfT	Department for Transport
Departure from standard (Departure or DfS)	A non-compliance with a mandatory requirement of a standard, as set out in Hampshire County Council's Technical Guidance Notes or other policy/standard document cross-referred to from the Technical Guidance Notes.
Dwell area	The area on a minor street/road on the immediate approach/connection to a junction where a vehicle would be required to give-way or stop, measured from the give-way/stop line.
ICD	Inscribed circle diameter
Immediate approaches to junctions	The carriageway within 1.5 x SSD of a junction on both major and minor arms (refer also to CD 109 DMRB for the full definition). This applies only where the design speed is greater than 37.5mph (60kph).
LCWIP	Local Cycling and Walking Infrastructure Plan
Legal requirement	A statement in a standard that is associated with the words "must" or "must not". Legal requirements cannot be departed from or relaxed.
Links	A length of carriageway between junctions

LPA	Local Planning Authority
LTN	Local Transport Note published by the DfT
LTP4	Hampshire County Council's Local Transport Plan 4
Mandatory requirement	A statement in a standard that is associated with the words "shall" or "shall not" and in which non-compliance would require a departure from standard.
MfS	The combination of Manual for Streets (2007) and Manual for Streets 2 – Wider Application of the Principles (2010)
MfS1	Manual for Streets – published 2007 by Thomas Telford Publishing
MfS2	Manual for Streets 2 – Wider Application of the Principles Published September 2010 by CIHT
Road	A highway that almost exclusively provides for the movement of motorised traffic. Access for people walking and cycling along or across the highway at grade is either restricted or has very low demand. There is very limited direct access to any buildings and spaces adjacent to the highway. A road will generally have a speed limit of 40mph or more.
RSA	Road Safety Audit
SSD	Stopping sight distance
SPD	Supplementary Planning Document – A document which adds further detail to policies in the LPA's Local Plan
Street	A highway that has or will have public realm functions beyond the movement of traffic. Streets should have a sense of place, which is mainly realised through distinctiveness and sensitivity in design. They also provide or will provide direct access to the buildings and spaces that line them. Most highways in built up areas will be streets, but the definition can also be applied to other locations, such as low traffic rural lanes. 'Street' is a collective term covering primary, secondary and tertiary streets together

	with private mews courts and edge lanes. A street will generally have a speed limit of 30mph or less.
Primary street	Main transport routes through a development, generally including bus routes with cycle routes protected from cars. May have either a 20mph or 30mph design speed. Smaller developments may not have a primary street within the development. Refer to TG1 – Highway Cross-sections and Streets for a Healthy Life - principal street / main street
Secondary street	Quieter residential streets with low traffic volumes and speeds. Not usually bus routes and generally have a self-enforcing design speed of 20mph. Refer to TG1 – Highway Cross-sections and Streets for a Healthy Life
Tertiary street	Residential streets which are generally only used to access properties in that street or private mews courts/edge lanes/private drives. Tertiary streets will have highway features that bring the self-enforcing design speed down to 20mph or less. Refer to TG1 – Highway Cross-sections and Streets for a Healthy Life
TSRGD	Traffic Signs Regulations and General Directions
Typical vehicles	The range of vehicles that will use the street/road on a regular basis. Refer to 3.2.7.
VPD	Vehicles per day
WCHAR	Walking, Cycling and Horse-riding Assessment and Review

3. Link design

3.1. General requirements

- 3.1.1. The design speed shall be established in accordance with Technical Guidance Note [TG3 – Stopping Sight Distances and Visibility Splays](#). When designing new streets/roads, the design speed shall be for the whole length of the street/road or sections associated with changes in proposed speed limit or clear changes in route character. Refer also to Policy TM2 – Speed Limits within the County Council's [Traffic Management Policy & Guidance](#).

3.2. Horizontal alignment

- 3.2.1. For all routes, the designer should consider the requirements of expected traffic movements including abnormal loads and large agricultural vehicles such as combine harvesters. Refer to Technical Guidance Note [TG11 – Traffic Calming](#) for more information regarding such routes and implications regarding the use of horizontal narrowings and refuges.
- 3.2.2. The alignment/width of routes with speed limits of 30mph or less should be variable using features such as planting, sustainable drainage, parking bays and facilities for people walking/cycling. Providing a varied street scene and minimising engineered features such as signs/lining/guardrailing will improve the sense of place. This will create a more attractive route for active travel and help to ensure traffic speeds are kept within the design speed without the need for vertical traffic calming features. Refer to Technical Guidance Notes [TG1 – Highway Cross Sections](#) and [TG11 – Traffic Calming](#).
- 3.2.3. The table below details the acceptable combinations of horizontal curve radii and forward visibility for different design speeds for streets within developments. Tracking is still required to demonstrate that the required vehicles can negotiate the corner – refer to 3.2.6 to 3.2.14.

Design speed (mph)	Typical street type	Min forward visibility* (m) (in accordance with TG3)	Minimum horizontal curve radii (m)	Typical carriageway width (m) (refer to TG1)
10**	-	11	6	- (will require curve widening)
15	Tertiary	18	10	5 (will require curve widening)
20	Secondary	25	19	5.5
20	Primary	25	42	6 (6.4m if bus route with no margin separation from footway/cycleway)
30	Primary	43	42	6 (6.4m if bus route with no margin separation from footway/cycleway)

* The minimum SDD may vary from this depending on the site-specific factors such as gradients and type of traffic. Refer to Technical Guidance Note TG3 -Stopping Sight Distances and Visibility Splays

** These values show the step below a 15mph design speed when considering horizontal curves on tertiary streets only.

Designs may step down the horizontal curve radii **one** step from that required for the design speed of the street **for secondary and tertiary streets only** provided that:

- typical vehicles can pass each other without having to reverse or overrun the kerb (refer to 3.2.4), AND
- the environment of the street, including the alignment/junction spacing/features, ensure that vehicles are likely to travel below the design speed for that street (refer to 3.2.5).

3.2.4. For secondary and tertiary streets with tight horizontal curves, if typical vehicles cannot track on their own side of a tight curve, then it will be necessary to widen the carriageway on the curve to enable typical regular vehicles to track past each other with a clearance of 0.3m between the vehicles. The exception to this will only be refuse vehicles where the risk of conflict between vehicles is low due to the low frequency of refuse vehicles.

3.2.5. For streets with a 20mph design speed, it is important to include features to maintain a self-enforcing speed of 20mph or less. Features to keep speeds low should be no more than 70m apart (50m for a 15mph design speed). Where low speed maintaining curves are proposed, the distance between the curve tangent and the adjacent speed reducing features shall

not be greater than 70m (50m for a 15mph design speed). The design speed should be reflective of the environment created locally.

Vehicle tracking

- 3.2.6. Vehicle tracking shall be used to establish geometry requirements for the design of junctions, tight horizontal curves and at other restrictions in the alignment (for example build-outs/traffic islands in close proximity to vehicle crossovers). The following design vehicles should be reviewed subject to the type(s) of vehicle(s) likely to use the junction/restriction:

Ref.	Vehicle	Length (m)	Width (m)	Kerb-to-kerb turning circle (m)	Lock-to-Lock time (s)	Autotrack Library
A	Articulated lorry	16.48	2.55	6.60	3	British design vehicles (autodesk) FTA 2016 Design Articulated Vehicle Ref 100045
B	Pantehnicon	9.57	2.52	10.45	6	British design vehicles (autodesk) DB32 Pantehnicon
C	Large family car	4.80	2.00	6.00	4	British design vehicles (autodesk) Standard Design Vehicle
D	Single decker bus	12.00	2.55	10.77	4	British design vehicles (autodesk) TfL standard rigid bus
E	Super large refuse vehicle	11.20	2.53	9.50	4	European vehicles (autodesk) – Dennis-Eagle Euro 3 Phoenix 2 Duo (P2-15W with Elite 6x4 chassis) Tractor
F	7.5T panel van	7.21	2.19	7.40	4	European library of vehicles (autodesk)
G	4.6T light van	5.89	2.00	6.00	4	European library of vehicles (autodesk)
H	Hampshire fire appliance	8.10	2.55	15.50	6	Custom
I	Hampshire fire aerial ladder platform	9.00	2.55	15.20	6	Custom

Tracking by specific vehicles may also be required where a known specialist vehicle needs to be accommodated at a specific site (for example - near docks, military bases, abnormal load routes, farming vehicles or lorry recovery depots).

- 3.2.7. Where the existing highway geometry prevents a super large refuse vehicle (E) from accessing a proposed development, the District Council should detail the refuse vehicle size requirements (including lock-to-lock time) to be used for tracking.
- 3.2.8. The typical vehicles to be tracked based on route types are as follows:

Location	Route type	Typical vehicles to be tracked
At simple priority junctions (the widths of the carriageways local to the junction may need to be increased to accommodate the vehicles)	Primary street	<ul style="list-style-type: none"> • Buses (D) in opposing directions if likely to be a bus route • Articulated lorry (A) in opposing directions
	Secondary street	<ul style="list-style-type: none"> • Buses (D) in opposing directions only if route is a bus route • Car (C) and 4.6T light van (G) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Tertiary street	<ul style="list-style-type: none"> • Cars (C) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Primary to Primary street	<ul style="list-style-type: none"> • Car (C) and 4.6T light van (G) in opposing directions • Bus (D) separately if likely to be a bus route • Refuse vehicle (E) separately • Fire appliance (H) separately
	Secondary to Primary street	<ul style="list-style-type: none"> • Car (C) and 4.6T light van (G) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Tertiary to Primary street	<ul style="list-style-type: none"> • Car (C) and 4.6T light van (G) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Secondary to Secondary street	<ul style="list-style-type: none"> • Car (C) and 4.6T light van (G) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Tertiary to Secondary street	<ul style="list-style-type: none"> • Car (C) and 4.6T light van (G) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately
	Tertiary to Tertiary street	<ul style="list-style-type: none"> • Cars (C) in opposing directions • Refuse vehicle (E) separately • Fire appliance (H) separately

However, depending on site specific local network requirements, other combinations of tracking may be required by the Highway Authority.

- 3.2.9. For residential developments, larger vehicles that may infrequently use a street, such as pantechincons, need not be fully accommodated (excluding routes to retail units in community or village centres). The requirements for safe access and manoeuvrability (such as by multi point turns) should be discussed with the design audit engineer and demonstrated by tracking. However, access for emergency vehicles, including appropriate fire appliances do need to be accommodated (Access Ladder Platform appliances where there are taller buildings/flats). Refer to section 5.19 of [TG1 – Highway Cross-Sections](#) and MfS section 6.7.
- 3.2.10. Vehicles shall be tracked at a minimum of 10mph at junctions. Depending on the junction type and expected vehicle speeds through the junction for particular turning movements, additional tracking at the likely speeds vehicles negotiate the junction will be required – for example, on high movement function routes.
- 3.2.11. All tracking plans should state the vehicle used and the tracking speed at which it was undertaken. The plans should show all of the following:
- the tracking of both the chassis and wheels
 - detail the dimensions of the vehicle tracked
 - the lock-to-lock time and kerb-to-kerb turning circle of the vehicle tracked.
- 3.2.12. For routes with speed limits of 30mph or less, it is acceptable for the design vehicle to encroach into adjacent lanes at junctions, provided this does not occur on curves with insufficient forward visibility. Refer to 4.3.9.
- 3.2.13. Vehicle overhang of the verge (including refuse vehicles) is only acceptable where there is not a footway or cycle track/lane immediately adjacent to the carriageway. Also, where vehicle overhang of verge is expected for large vehicles, street furniture/signs/lighting/bridge parapets & railings shall be at least 1.0m clear of the swept path.
- 3.2.14. For routes with speed limits of 30mph or less, the need for curve widening shall be informed by the swept paths of suitable design vehicles. For routes with speed limits greater than 30mph, curve widening shall be in accordance with CD 109.
- 3.2.15. For routes with speed limits greater than 30mph, the visual impact of compound curves of inconsistent radius should be considered to avoid creating unusual driving conditions that might confuse or otherwise distract highway users.

3.3. Vertical alignment

Longitudinal gradients

- 3.3.1. Where a footway and/or cycle track is adjacent to the carriageway, the footway/cycle track gradient requirements will limit the maximum carriageway gradient unless the two elements are segregated vertically. However, segregating the two elements vertically should be avoided as it creates severance problems for people trying to cross the carriageway. Designers need to ensure that roads/streets are suitable for all users as opposed to being designed purely for motor vehicles. Level sections and/or alternative routes may be provided to ensure the maximum gradients for footways and/or cycle tracks stated in Technical Guidance Note [TG10 – Pedestrian and Cycle Facilities](#) are not exceeded, but any alternative routes still need to be direct, following desire lines.
- 3.3.2. If considering steep gradients on roads, the designer should consider whether there is a need for climbing lanes for heavy vehicles.
- 3.3.3. Bus stops should not be located on steep gradients where it can be avoided as it is difficult for buses to pull away from the stop where it is a steep incline.
- 3.3.4. Maximum longitudinal gradients shall be:
- 1:12.5 (8%) for all routes with a speed limit of 40mph or more
 - 1:10 (10%) for all routes with a speed limit of 30mph or less (except for permeable paving)
 - 1:20 (5%) for permeable paving
 - See also 3.3.16. regarding dwell areas
- 3.3.5. With the exception of permeable pavements (which can be laid with minimal falls), all routes should have suitable longitudinal and transverse falls to ensure surface water drains effectively from the carriageway surface. When designing the vertical alignment, the designer should ensure they consider the drainage strategy fully, avoiding shallow gradients which are then problematic to drain effectively.



Designing for drainage should not be left to the detailed design stage as it will require careful design of the vertical alignment. Kerb drain shall not be used – Refer to Section 6.2 in TG8-1 – Drainage - General

In some locations the changing crossfalls can lead to drainage problems. Options for mitigating against potential drainage problems can include:

- 1) modifying the horizontal alignment to move a superelevation/change in crossfall
- 2) varying the longitudinal fall
- 3) applying a rolling crown

3.3.6. Minimum longitudinal gradients shall be:

- 1:100 (1%) for flexible surfacing*
- 1:80 (1.25%) for block surfacing
- Flat for permeable paving or where there is an over-the-edge drainage system

* Under exceptional circumstances gradients as slack as 1:200 may be permitted over very short lengths (namely, vertical curves using the minimum k-values) at crests or sags in the vertical alignment.

3.3.7. Gradients of private drives/ramps shall not exceed 1:10 (10%), or where there is joint pedestrian and vehicle use 1:20 (5%) should be the maximum. Also, the maximum change in gradient between the highway and the drive shall be 10% to ensure drives/ramps do not cause grounding of vehicles as they traverse from the drive/ramp onto adopted Highway. Refer to the County Council's [Standard Details HCC11/C/130 and HCC11/M/040](#) regarding vehicle crossovers. See also section 4.2.

Vertical curves

3.3.8. The following shall be used to determine the parabolic vertical curve requirement:

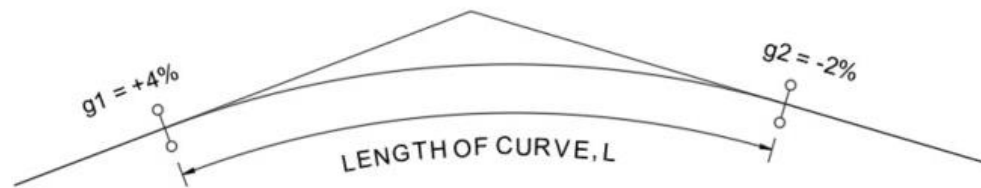
Using $L = K \times A$ where,

L = length of the vertical curve, along the curve (m)

K = vertical curve k-value

A = algebraic difference of the two gradients expressed as a percentage

So, $L = K \times (g_1 - g_2)$



For example:

For a route with a 20mph speed limit, $K = 1$

If $g_1 = +4\%$ and $g_2 = -2\%$, $L = 1 \times (+4 - -2) = 6$

However, from the table the minimum curve length shall be 10m

Route speed/type	Minimum length of vertical curve (m)	Minimum K-value
20mph speed limit	10	1
30mph speed limit	20	4
Class B planning uses with a speed limit of 30mph or less	30	6
40mph speed limit or greater	See CD 109	See CD 109

Crossfall and superelevation

- 3.3.9. The crossfall may either be balanced towards each channel or as a single crossfall depending on the alignment of the carriageway. Crossfalls shall be constant/straight for new roads/streets. Cambered crossfall may be used for maintenance purposes or to tie-in to existing cambered surfacing.
- 3.3.10. Crossfalls shall be a maximum of 1:20 (5%) and should be a minimum of 1:40 (2.5%).
- 3.3.11. The algebraic differences in crossfalls across crown lines, junction entrances/exits and across roundabout circulatory crown lines shall not exceed 5%. Any changes in crossfalls along a link shall be implemented gradually to ensure a smooth transition.
- 3.3.12. Coincident shallow longfalls and crossfalls should be avoided. The vertical alignment should be adjusted to steepen at least one of them to ensure that reasonable drainage of surface water run-off can be achieved.
- 3.3.13. By avoiding superelevation at the crest, as recommended in CD109, and keeping crests and sags to an absolute minimum (as comfort is less critical than adequate drainage), long flat spots, which are inherently difficult to drain, should be minimised. [Technical Guidance Note TG8-1 –](#)

[Drainage – General](#) and TRL LR602 should be consulted if a long flat area cannot be avoided.

- 3.3.14. Where superelevation is added/removed, consider the lengths of the resulting flow paths and ensure slack longitudinal falls are avoided. Good vertical alignment design will eliminate the need to utilise combined kerb drainage. Refer to Technical Guidance Note [TG8-1 – Drainage - General](#).
- 3.3.15. Superelevation should not be used where the speed limit is 30mph or less.

Dwell areas

- 3.3.16. Dwell areas shall be provided on each arm of a junction as follows:

Street/Road type for the arm being considered	Maximum gradient of dwell area (%)	Minimum length of dwell area (m)
Secondary / tertiary streets	2.5	5
All other routes	2.5	15

However, the algebraic difference between the gradient of the minor carriageway to the crossfall of the major carriageway shall be no more than 5%.




4. Junction design

4.1. Choice of junction type

- 4.1.1. Junctions onto major routes are subject to the type of carriageway, recorded speeds and the type & size of development being served. The movement function of the route will influence the number/frequency of any potential junctions - routes (which have a high movement function as their primary objective and limited place function) are to have limited side junctions in order to preserve their primary function.
- 4.1.2. Junction choice shall be driven by the requirements of the scheme/development considering the road user hierarchy and movement and place functions. Traffic modelling is still integral to junction design however providing traffic capacity is not necessarily the primary objective.
- 4.1.3. Movement of pedestrians and cyclists and place setting may be prioritised over vehicular movement/capacity, particularly where the location has a higher place function or is a key route for people walking and/or cycling.
- 4.1.4. Early engagement with the County Council should be sought to agree the function/objectives of the route and hence the suitability of different types of junction given the site specific context. Refer to the County Council's [Pre-Application Advice service](#).
- 4.1.5. Reference should be made to the following documents when determining the most suitable junction type:
- Healthy Streets
 - Manual for Streets (1 & 2)
 - Local Transport Note 1/20:
 - Section 3 Planning for cycling
 - Section 10 Junctions and crossings
 - Section 14 Integrating cycling with highway improvements and new developments
 - Appendix B Junction Assessment Tool
 - Traffic Signs Manual Chapter 6 – Traffic Control
 - CD 123 - Geometric design of at-grade priority and signal-controlled junctions – Section 2 Junction Selection
 - CD 116 – Geometric design of roundabouts
 - CD 143 Designing for Walking, Cycling and Horse-riding
 - CD 195 Designing for Cycle Traffic
- 4.1.6. In streets, junctions will tend to be one of the following:
- simple priority junctions (including staggered, crossroads, squares, crescents, informal)
 - roundabouts (mini or compact)
 - signal controlled

For high movement priority routes, Figure 2.3.1 in CD 123 illustrates when more complex junctions may be required as vehicle flows increase where capacity (movement function) is a key priority. However, this should always be considered in relation to the needs of those users walking and cycling to ensure suitable safe, comfortable, coherent, direct and attractive routes, with appropriate junction form and crossing provision are provided. Designs should provide crossings that are suitable for most people (green options to Table 10.2 of LTN1/20. Refer to Technical Guidance Note [TG10 – Pedestrian and Cycle Facilities](#) and Table 10.2 in [LTN1/20 – Cycle Infrastructure Design](#).

Speed Limit	Total traffic flow to be crossed (pcu)	Maximum number of lanes to be crossed in one movement	Uncontrolled	Cycle Priority	Parallel	Signal	Grade separated
≥ 60mph	Any	Any					
40 mph and 50 mph	> 10000	Any					
	6000 to 10000	2 or more					
	0-6000	2					
	0-10000	1					
≤ 30mph	>8000	>2					
	>8000	2					
	4000-8000	2					
	0-4000	2					
	0-4000	1					

	Provision suitable for most people
	Provision not suitable for all people and will exclude some potential users and/or have safety concerns
	Provision suitable for few people and will exclude most potential users and/or have safety concerns

Notes:

1. If the actual 85th percentile speed is more than 10% above the speed limit the next highest speed limited should be applied
2. The recommended provision assumes that the peak hour motor traffic flow is no more than 10% of the 24 hour flow

4.1.7. Modelling shall be provided demonstrating the vehicle capacity achieved (noting that catering for vehicle flows will not be the primary objective in locations with higher place function). Typically, modelling will utilise the following software:

- priority junctions – PICADY
- signalised junctions – Linsig (Refer to Technical Guidance Note [TG4-1 – Traffic Signal Junctions](#))
- roundabouts – ARCADY
- additionally, microsimulation modelling may be required for particularly complex and/or congested networks in support of the proposals (the microsimulation model shall use Paramics or Vissim software)

4.2. Direct accesses (vehicle crossovers)

4.2.1. A direct access (vehicle crossover) should be used for the following unless directed otherwise by the Highway Authority (**Note – these are different to continuous footways/cycleways which are covered in 4.3.4**):

- a single field
- a single-use public utilities site (such as an electric substation) where access is needed for maintenance of that specific site only
- a single-use highway maintenance site (such as an attenuation pond) where access is needed for maintenance of that specific site only
- access to up to a maximum of 9 dwellings
- a small commercial unit with limited vehicle movements:
 - less than 100sqm of office, retail or light industrial use (E)
 - less than 250sqm of warehousing or distribution (B8)
- a temporary construction access (only where approved **in advance** by the Highway Authority)

4.2.2. A direct access may be appropriate in site specific circumstances to accommodate a greater quantum of development. However this would need to be with site specific agreement of the Highway Authority through the Planning Process.

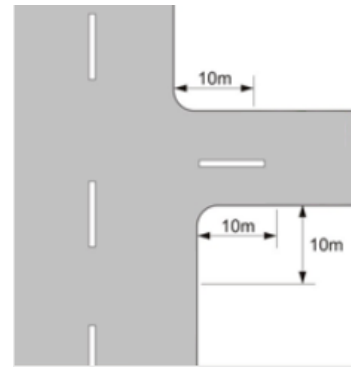
4.2.3. To request approval for constructing a vehicle crossover to an existing Highway, refer to the County Council's [Information for Developers](#) web page. Vehicle crossovers on classified routes require planning permission.

4.2.4. Refer to the County Council's [Highway Construction Standard Details](#) as follows:

Detail drawing number	Title	Use
HCC11/C/130	Kerb, footway & vehicular verge crossing details for commercial & industrial areas	Details the increased pavement construction depth for use in high stress locations, where regular trafficking by heavy vehicles is anticipated
HCC11/M/040	Typical vehicle crossing in existing footway	Typical construction for an access to a single property.

4.2.5. Where the access is across a footway, there should be at least 900mm wide strip at the back of the crossover that is at the same crossfall as the adjacent footway, to enable users of the footway to traverse the crossover with ease. Refer to [DfT's Inclusive Mobility](#) document. **Note: Use of Dutch style kerbs is currently being trialled within Hampshire. They should not be used within the adopted highway until the outcome of the trials are established.**

- 4.2.6. Vehicle crossings shall not be located within 10m of a junction on the same side of the carriageway, traffic signals or roundabout for safety reasons.
- 4.2.7. Visibility requirements for vehicle crossovers are detailed in Technical Guidance Note [TG3 – Stopping Sight Distances and Visibility Splays](#).
- 4.2.8. The maximum change in gradient between the access and the carriageway crossfall shall be 10% to avoid grounding of vehicles when using the access. Refer also to 3.3.7.
- 4.2.9. A minimum area of 5.2m deep x 2.7m wide within the property boundary shall be allowed to enable a vehicle to park at right angles to the pavement. (Note: This is the minimum size required for private light goods (PLG) vehicles irrespective of applicants actual vehicle size). There shall be sufficient room on the property so that the vehicle does not protrude over the footway/verge when parked.
- 4.2.10. The standard requirement for any access onto a classified route or an access serving more than one dwelling is that the turning provision for a car shall be provided within the private property to enable vehicles to leave the property in a forward gear. To check if a route is classified, see the [maintained roads database](#).
- 4.2.11. Where entrance gates are provided across a direct access they shall be set back to accommodate one vehicle in the access, clear of the main running lane and footway/cycleway if one is present (6m). Gates are to open inwards and where there is parking in front of a garage with outward opening doors, the design needs to allow 6m depth on the private property to enable a vehicle to park without overhanging the Highway. Where it is not possible to accommodate gates opening away from the highway, the setback should be increased to accommodate them being fully open without encroaching into the carriageway (by the gates or waiting vehicle).



4.3. Priority junctions (including staggered, crossroads, squares, crescents and informal)

- 4.3.1. Junctions with routes which have speed limits of 40mph or higher shall be in accordance with the requirements of CD 123 and the following:
- crossroads shall not be used
 - staggered junctions should be right-left staggers
 - approach angles should be no less than 80 degrees (the more off-perpendicular a minor arm is to the major arm, the harder it is for drivers with restricted movement to be able to check visibility in both directions)
 - use of diverge/merge tapers and auxiliary lanes should be avoided - they shall not be used:




































- where the junction is a simple junction
- where the design speed is less than 85kph
- at non-simple priority junctions on the inside of curves

However, for junctions within urban 40mph speed limits, designers should still bear in mind the key principles of MfS and apply DMRB in a way that respects local context. Refer also to 3.3.16.

- 4.3.2. Junctions within streets can help to reduce vehicle speeds by diverting the major flow and can be of a wider range of layouts/form as described below.
- 4.3.3. Junction layouts within streets should consider the road user hierarchy first, ensuring directness of route for those walking and cycling.
- 4.3.4. Continuous footways/cycle tracks shall not be used at side street junctions with streets without seeking prior approval from Asset Management. The County Council is currently developing guidance on where such crossing may be safely used based on experience of their use across the country so far. Early consultation with the County Council’s Asset Management team is therefore required to agree the proposals coming forward; for developer-led schemes this will be considered by the Highway Authority at the development of the Design Code or planning application stage but pre-application advice should be sought – refer to the County Council’s [Pre-Application Advice service](#) and to Section 5.5 in Technical Guidance Note [TG10 – Pedestrian and Cycle Facilities](#).

Priority junction form for streets

- 4.3.5. The junction form used within streets should primarily be designed around the needs of people walking and cycling (as detailed in 4.1.5), ensuring equality for users with mobility/visual impairments.
- 4.3.6. As detailed in MfS, junction layout may take various forms.

Nodal form	T	Y	Cross / staggered	Multi armed	Square	Circus	Crescent
Regular ↑ ↓ Irregular							
							
							
							
							

- 4.3.7. Junctions with primary streets should include road markings, although these should be kept to a minimum. Unless there is a safety issue/concern, road markings at junctions with secondary and tertiary streets should be avoided to help keep speeds low. The exception to this is where priority is being provided for people walking/cycling at continuous footways/cycle tracks; where give-way road markings for carriageway traffic will help highlight the requirement to give way to those walking/cycling.
- 4.3.8. Raised/tailed junctions with a bituminous surface (refer to [Standard Detail HCC11-C-100](#)) may be considered within secondary/tertiary streets. Blockwork should only be used as detailed in Technical Guidance Note [TG6-3 – Modular Pavement Design](#). Vertical traffic calming features shall not be used on Priority One or Priority Two salt routes – Refer to Technical Guidance Note [TG11 – Traffic Calming](#). Where considering raised features on primary streets or town/retail centres, approval from the County Council’s Asset Management team shall be sought in advance of fixing the design concept; for developer-led schemes this will be considered by the Highway Authority at the development of the Design Code or planning application stage but preapplication advice should be sought – refer to the County Council’s [Pre-Application Advice service](#).

Junction Corner Radii

- 4.3.9. Minimum corner radii at junctions depend on traffic speed on the major arm and traffic flow on the minor arm – see table below. However, tracking will be required to prove the accessibility of any junction using the vehicle types likely to use the junction on a regular basis. For streets, swept paths for larger vehicles may use both sides of the street to enable tighter junction radii to be provided and more direct and convenient walking and cycling desire lines to be achieved. However, where the carriageway width of either arm is narrow, this will limit the tightness of the radii that can be used due to tracking limitations. In many cases it will be better to widen the carriageway width in the vicinity of the junction to accommodate the tracking whilst enabling tight junction corner radii to be used.
- 4.3.10. The radius of the back of footway edging should be at least equal to the kerb radii at the junction to enable people walking and wheeling to easily negotiate the corner.

Major arm speed limit	Minimum* corner radius
20mph	2m
30mph	3m
40mph or more	6m in urban areas 10m in rural areas

* Note: These are the minimum values that should be used. Depending on the site specific circumstances, it may be desirable to use larger radii – such as at a junction expected to be utilised regularly by commercial vehicles without an adjacent footway. Refer to CD 123 for further information.

Junction spacing

- 4.3.11. Crossroads are permitted within speed limits of 30mph or less provided that the minor road design speeds do not exceed 20mph. Otherwise, junctions should be staggered to avoid direct visibility through the junction which increases the risk of traffic on the minor arms not giving way to the major arm traffic. Right/Left staggers are preferred to left/right staggers, particularly as the speed of the major arm increases (due to the increased risk and likely severity of rear end shunts).
- 4.3.12. For all road/street types, junctions on the same side of that street/road shall be spaced so that the visibility requirements of each junction do not interfere with each other. Refer to 3.3.5 in [TG3 – Stopping Sight Distances and Visibility Splays](#).
- 4.3.13. Spacing of junctions (centreline to centreline) shall be in accordance with the following table:

Speed limit on main street/road	Spacing same side	Spacing opposite sides		Notes
		Right-left stagger	Left-right stagger	
20mph	Defined by TG3 visibility requirements	Defined by tracking of likely vehicles. Traversing of centrelines by large vehicles permitted.	Defined by tracking of likely vehicles. Traversing of centrelines by large vehicles permitted.	Crossroads permitted but staggered junctions are more effective at helping to keep speeds low.
30mph	Defined by TG3 visibility requirements	Defined by tracking of likely vehicles. Traversing of centrelines by large vehicles permitted. If there is likely to be a need for the vehicle to have to wait to enter the side street/road (for example, due to need to track over minor arm centreline and high probability of there being another vehicle exiting) then a stagger of 45m should be provided.	45m* Where the crossing movement is likely to be only undertaken by cars/delivery vehicles, this may be relaxed to 30m (without need for a DfS).	Crossroads not permitted where the minor arm design speed is greater than 20mph
40mph or greater	Defined by TG3 visibility requirements	As DMRB CD 123	As DMRB CD 123	Crossroads not permitted

* This could potentially be departed from, using the DfS process, subject to the type of major street/road, type of minor street/road, existing accident history (if applicable), expected traffic flows and types of traffic – for example, very lightly trafficked minor arms may have a reduced stagger defined by tracking instead.

This is based on the major arm being at least 6m wide, minor arms being at least 5.5m wide, corner radii of 6m and the minor arms being perpendicular to the major arm. Where the site specific circumstances are less than this for any element, the proposed layout shall be checked by tracking as well.

4.4. Traffic signal junctions

4.4.1. Refer to Technical Guidance Note [TG4-1- Traffic Signal Junctions](#)

4.4.2. When considering the vertical alignment through a signalised crossroads, care should be taken to ensure that the alignment is smooth for the minor crossing arms as well as the major arms.

4.5. Roundabouts

- 4.5.1. The choice of roundabout should be based on several factors including speed limits, traffic flows and associated turning movements, land constraints and expected levels of pedestrians and cyclists.
- 4.5.2. Maximum changes in gradient should be 5%, including changes at crown lines on the circulatory. Careful consideration should be given to how the surfacing is likely to be laid at the roundabout, particularly in relation to where the surfacing joints will be as this will influence the vertical alignment design through the junction. Careful vertical alignment design through the junction should eliminate the need to use kerb drainage.
- 4.5.3. Tracking will be a key element of the design. Tracking speeds should be realistic in relation to the vehicle speeds likely to occur. If there are footways/cycleways immediately adjacent to the roundabout, tracking of design vehicles shall not overhang the footway/cycleway. For new designs, the appropriate safety margins are to be provided in accordance with Technical Guidance Note [TG 10 – Pedestrian and Cycle Facilities](#). The position of the central island should also be informed by tracking assessment, minimising the requirement for any overrun areas.

Normal roundabouts

- 4.5.4. Normal roundabouts (unless fully signalised) should not be used in urban areas due to the difficulties they present for people walking and cycling. Refer to CD 116 for design requirements.
- 4.5.5. The number of lanes on the exit should match the number of lanes on entry (following the lane markings). This primarily relates to the straight-ahead flow of traffic where there may be two lanes on the entry approach to the roundabout where vehicles could use either lane to continue “straight ahead”. However, all exits should be reviewed relative to the lane markings approaching and around the roundabout circulatory.
- 4.5.6. On new normal roundabouts, overrun areas shall not be used. Instead, the junction shall be sized to ensure that overrun is not required.
- 4.5.7. CD 116 3.6.9 bullet-point 4 states that the circulatory carriageway lane markings should be designed to allow sufficient swept path of the largest vehicle anticipated to use each individual lane (for non signal-controlled roundabouts). Within the County Council’s local highway network, this may be relaxed where the speed limit is 40mph or less; designers should use their engineering judgement for the site-specific circumstances being considered including vehicle usage / flows / speed / number of entry/exit/circulatory lanes.

Compact roundabouts

- 4.5.8. Compact roundabouts are roundabouts with single lane entries on all arms. This single lane geometry should be continued throughout the

junction to keep speeds low. From the outset, safe provision for walking and cycling should be incorporated into the design.

- 4.5.9. With good geometric design and appropriate sizing of the central island, overrun areas can be avoided on compact roundabouts. The inscribed circle diameter (ICD) should be designed by tracking (refer to section 3.2). Using the minimum ICD in CD 116 is likely to result in the need for overrun areas to accommodate HGVs. As described in Traffic Advisory Leaflet 9/97, continental roundabouts have a minimum central island diameter of 16m which then avoids the need for overrun areas around the central island. Therefore, for compact roundabouts, small central island diameters (with correspondingly small ICDs) should be avoided in order to avoid the need for overrun areas.
- 4.5.10. The use of over-runnable areas **shall be restricted to a maximum width of 1.5m** and **shall only be permitted** with site specific approval from the Asset Management team (for developer-led schemes this will be considered by the Highway Authority at the planning application stage but pre-application advice should be sought – refer to the County Council’s [Pre-Application Advice service](#)). They shall only be permitted where it can be proven that a compliant junction, or deflection, cannot be produced without an over-runnable area, irrespective of whether the junction needs to be positioned further into the development site to achieve a compliant design. However, over-runnable areas shall not be used in un-lit areas and lighting must be provided to illuminate any over-runnable area installed.
- 4.5.11. All overrun areas will incur [Commuted Sums](#).
- 4.5.12. Refer to Technical Guidance Note [TG11 – Traffic Calming](#) for more detailed requirements for over-run areas.
- 4.5.13. To minimise the area of overrun where it cannot be avoided, the width of the circulatory carriageway for a compact roundabout (excluding the overrun width) may be relaxed above 1.2 times the minimum entry width subject to:
- sufficient deflection being achieved
 - two vehicles not being able to circulate side by side
 - the road safety audit not identifying any concerns with such relaxation given the site-specific circumstances.

Mini-roundabouts

- 4.5.14. Mini-roundabouts are the implementation of the road marking TSRGD Diagram 1003.4. If this marking is not used (as prescribed by the TSRGD), the junction will be classed as an informal junction as described in MfS but should only be used on streets that are low flow and low speed (namely, secondary or tertiary streets).
- 4.5.15. Mini-roundabouts shall only be used on routes with a **speed limit** of 30mph or less and where the 85th percentile speed of traffic is less than

35mph within a distance of 70 metres from the proposed give way line **on all approaches** (see 2.8 CD 116).

- 4.5.16. Mini-roundabouts shall be designed in accordance with Technical Guidance Note [TG3 – Stopping Sight Distances and Visibility Splays](#) section 3.5 and CD 116. Another useful reference is the [Mini-Roundabouts Good Practice Guidance](#).
- 4.5.17. Mini-roundabouts shall have 3 or 4 arms only and may be used at new junctions. Where used in combination to create a double mini-roundabout, each individual mini-roundabout shall only have 3 arms.

5. Further support

- 5.1. Should you have a specific query or feedback about any of the content of this Technical Guidance Note 2, please send an email to technical.guidance@hants.gov.uk.
- 5.2. Should you have a query about applying this to your particular project, please contact:
- the design audit engineer dealing with your S278 or S38 application (if you are a developer or developer's consultant)
 - the Technical Guidance Note Specialist(s) (if you are a working within Hampshire County Council)
- 5.3. Associated Technical Guidance Notes:
- TG1 – Highway Cross Sections
 - TG3 – Stopping Sight Distances and Visibility Splays
 - TG4.1 – Traffic Signal Junctions
 - TG4.2 – Signal Controlled Crossings
 - TG8.1 – Drainage – General
 - TG8.2 – Drainage – Infiltration
 - TG10 – Pedestrian and Cycle Facilities
 - TG11 – Traffic Calming
 - TG14 – Collision Risk Assessment, VRS and Passive Street Furniture
 - TG15 – Trees, Landscape and Ecology
 - TG17 – Departures from Standard
 - TG18 – Road Safety Audit
 - TG20 – Utilities
 - TG21 – Traffic Regulation Orders
 - TG25 – Fencing, Noise Barriers and Demarcation of the Highway Boundary