North Lincolnshire Council

Industrial Roads Design Guide

NORTH LINCOLNSHIRE COUNCIL

February 2001

INDUSTRIAL ROADS DESIGN GUIDE

CONTENTS

1. INTRODUCTION

1.1 Aims

1.1.1 The new Council of North Lincolnshire was formed in 1996 and it assumed responsibility for both the Planning and Highway functions within North Lincolnshire.

1.1.2 The Council is committed to encouraging, through partnership working, a vibrant, diverse, environmentally and economically sustainable local economy, capable of providing quality employment and an improved quality of life for the residents of North Lincolnshire.

1.1.3 The main aim of this document is to establish highway standards that enable designers to create safe, visually attractive and secure environments that are economic to construct and maintain.

1.1.4 This document provides guidance on the geometric layout and design of Access Roads serving Industrial and Commercial development. It also provides information about the procedures to follow to enable the street works to be adopted by the Highway Authority.

1.1.5 Guidance on constructional matters is set out in the Development Roads Construction Guide.

1.1.6 This document replaces the guidance and technical standards adopted by the former Highway Authority, Humberside County Council, set out in their Industrial Roads Design Guide.

1.2 Objectives

1.2.1 The style and quality of new industrial development is of importance to all whom live and work in North Lincolnshire. It is of prime concern to the Council that the working environment should be of high quality. Of equal importance is the effective utilisation of land.

1.2.2 In order to ensure that safe high quality working environments are achieved, it is essential that proper consideration is given to the development of industrial estates and the purpose of this guide is to give advice in respect of the site layout, servicing arrangements, parking requirements and landscaping.

1.2.3 It is the Highway Authority's intention to pursue this policy by ensuring that all Industrial Access Roads meet the needs of the associated industries and that the adjacent highways are adequate to support the development. This will be achieved by ensuring that: -

(a) Commercial transport can gain adequate access.
(b) Staff can reach their work place conveniently and safely, whether by public transport, cycle, on foot or by car.
(c) The geometric standards applied to the road layout meet the particular needs of the development.
(d) Proper provision is made for the emergency services.
(e) The needs of the utilities - Electricity, Gas, Water, Telephones, Drainage, Cable and special pipelines are met.
(f) The appearance of the environment is enhanced by quality landscaping and the retention of existing landscaping where appropriate to minimise the impact of the industrial development on its surroundings.
(g) The maintenance of the road infrastructure is vested in the Highway Authority, where appropriate.

There are other objectives, which should also be achieved: -

(h) Economic construction.
(i) Realistic maintenance liability for the Highway Authority after adoption.
(j) Comprehensive but precise negotiations between Developers and the Local Authority before site works commence.

1.3 Safety

1..3.1 Although accidents within industrial estates are relatively rare, the Highway Authority is conscious of the importance of road safety on Industrial Access Roads. With this in mind safety on Industrial Access Roads will be met by:-

(a) Imposing a road hierarchy.
(b) Limiting the amount of traffic on a particular Industrial Access Road by taking account of the number, size and nature of the industrial units to be served off that road.
(c) Establishing standards for layout, road widths, junction design, parking arrangements and footway provision.
(d) Prohibiting direct vehicular or pedestrian access from individual industrial units on to local distributor roads, where appropriate.
(e) Ensuring that the roads and footways are adequately lit.

2 THE ROAD HIERARCHY

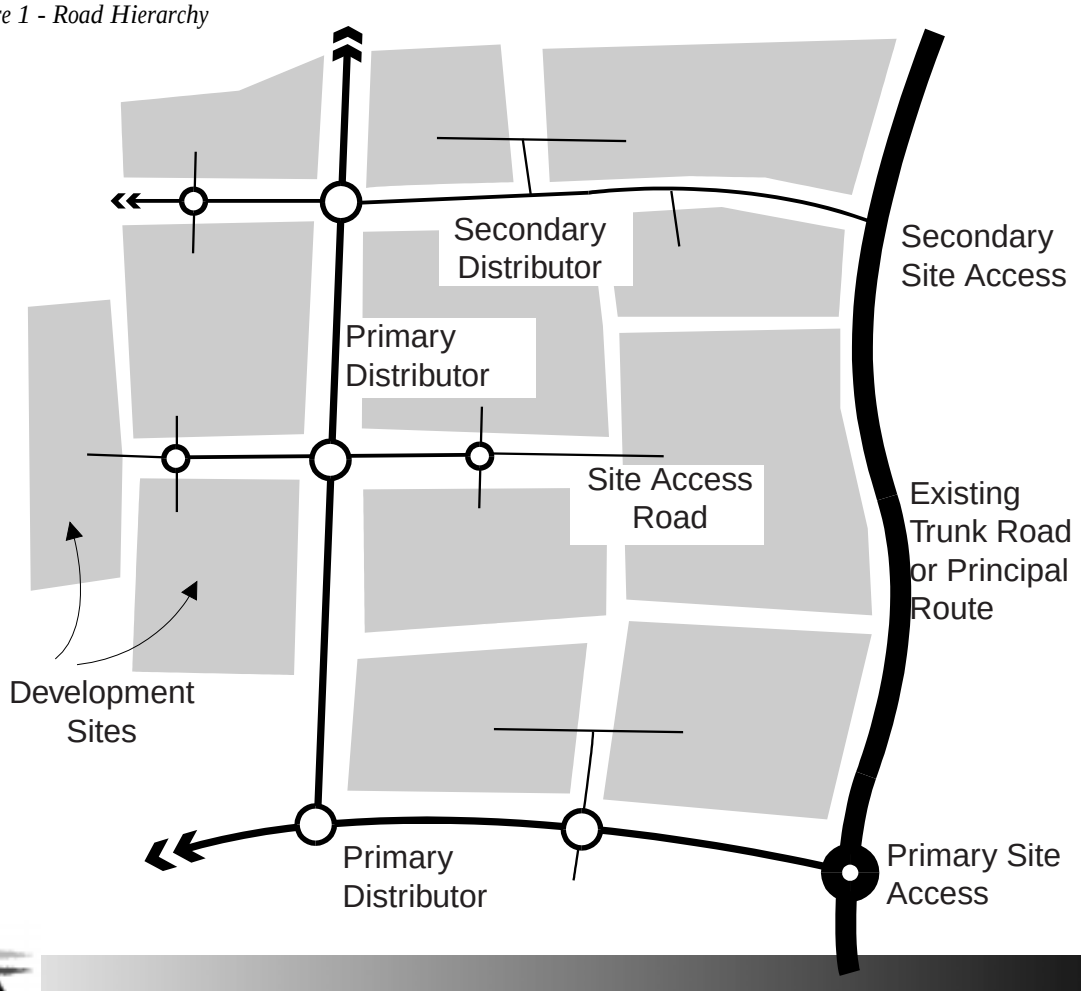
2.1 Road User Hierarchy

2.1.1 In all matters relating to transport and land use planning, consideration will be given to the needs of user groups in the following priority order : -

(a) Pedestrians, (including those with restricted mobility).
(b) Cyclists.
(c) Public transport / taxis.
(d) Motor cycles.
(e) Commercial / business users.
(f) Car and coach borne shoppers and visitors.
(g) Car borne commuters.

2.1.2 The Road User Hierarchy (RUH) informs all aspects of North Lincolnshire Council's role as Highway Authority. From the formulation of funding bids, through the design and implementation of improvements and maintenance, to the negotiation of off site highway works with developers, the RUH provides guidance that ensures the correct emphasis is given to various transport modes.

Figure 1 - Road Hierarchy



The purpose of the RUH is two-fold; firstly ensuring that the highway network develops in a way that complements the efforts of the local planning process in affecting the shift to sustainable modes. Secondly, from a safety viewpoint, adoption of the RUH ensures that the most vulnerable users of the highway are given due consideration, and aims to see the highway develop as a safer and more inviting environment for these groups.

2.2 Road Hierarchy

2.2.1 The Highway Authority recognises the importance of a designated hierarchy of roads as a means of accommodating the major movements of vehicles onto those roads best suited to accommodate them whilst restricting access to sites to the lesser roads in the hierarchy. The main distinction made in the hierarchy is between 'Distributor' Roads that should be primarily designed to meet the needs of the moving vehicle and 'Access' Roads where the aim should be to discourage non-access traffic. This is regarded as a key policy in meeting the objectives set in paragraphs 1.2.1 to 1.2.3

2.2.2 The Highway Authority has adopted the three-tier hierarchy for industrial development: -

- Primary Distributor Roads, onto which there should be no frontage or individual site access.
- Secondary Distributor Roads, onto which frontage access will be limited, though allowed in some circumstances.
- Industrial Access Roads, from which site access will be gained.

This is illustrated in Figure 1. However, this approach must be used with flexibility particularly in existing towns and villages where the connection of new Industrial Access Roads to Primary Distributor Roads (or even the main road network) may be difficult to avoid. (See section 11 on sight distances).

2.2.3 It is unlikely that Developers will be involved in Primary Distributor Road construction except in very large-scale developments. The technical content of this Guide has therefore been restricted to Secondary Distributor and Industrial Access Roads. If the scale of the development requires the provision of Primary Distributor Roads, the Highway Authority will provide specialist advice, but it should be noted that direct access from individual sites would not be permitted.

2.3 Secondary Distributor Roads

2.3.1 Generally, the route between industrial sites and the wider highway network will consist of Secondary Distributor Roads, (SDR's). Large sites may have direct access whilst smaller sites will be located on Access Roads (see following pages), which in turn will connect to Secondary Distributors.

2.3.2 The layout of SDR's does require careful design to achieve the objectives described in Chapter 1. Preferred layouts will have all SDR's as through roads, as this affords each site more than one means of access, and so increases operational flexibility. SDR's will generally have an operating speed of 50km/h and this should be acknowledged by designing for higher speeds than on Access Roads.

2.3.3 The primary purpose of an SDR is to provide means of access to multiple sites. Therefore, frontage access should be limited. Figure 1, The Road Hierarchy illustrates that junctions onto SDR's should be limited, with Access Roads providing access to individual sites. This restriction may be relaxed in cases of large or high traffic generating concerns, however in these circumstances a higher standard of junction access will be required than normally expected for an individual site.

2.3.4 Technical information on the layout standards to be used for the design of SDR's is shown in Table 1. This should be read in conjunction with Figures 2 and 3, which relate to junction design and location.

Carriageway Width	7.3 metres
Carriageway widening	Increased to 8 metres on bends of less than 75 m centre line radius
Junction radii	See Junction Layout A in Fig 4
Junction spacing	90 metres centre lines spacing adjacent 40 metres opposite
Forward Visibility	90 metres
Footway width	2 metres
Vertical alignment	Maximum gradient 5% (1 in 20)
Verges / planted areas	3m wide normally - see para 15.1
Horizontal alignment	Minimum centre line radius (60m metres)
Carriageway camber	2.8% (1 in 36)
Footway crossfall	2.5% (1 in 40)
Verge crossfall	5% (1 in 20)

Table 1 - Secondary Distributor Road (Operating Speed 50 Km/h)

2.4 Industrial Access Roads

2.4.1 In most cases sites will gain access to the road network via an Industrial Access Road. These roads, which will generally be constructed to a lower geometric standard than distributor roads, are intended to provide access to individual sites.

2.4.2 The layout of Industrial Access Roads requires careful design to achieve the objectives described in Chapter 1. In particular, the layout should be arranged so that the operating speeds of vehicles are never greater than 40 kph (25 mph). In addition, the network of Industrial Access Roads must be designed to discourage non-access traffic.

2.4.3 Limits on the numbers of units per access road have not been set, as traffic generation is dependent on the nature of each particular industrial unit. Accordingly greater numbers of units are permissible on developments where the units are expected to have a low traffic generation. The Highway Authority will, for each individual development, assess whether a proposal is acceptable in terms of the number and nature of units served off each access road and availability of emergency access.

2.4.4 Technical information on the layout standards to be used for the design of Industrial Access Roads is shown in Table 2. This should be read in conjunction with Figures 2 and 3, which relate to junction design and location.

Carriageway width	7.3 metres
Carriageway widening	Increased to 8 metres on bends less than 75 metres centre line radius
Junction radii	See Junction Layout B in Fig.4
Junction spacing	90 metres centre line spacing adjacent 40 metres opposite
Forward Visibility	45 metres
Footway width	2 metres
Vertical Alignment	Max Gradient 6% (1 in 17)
Turning facilities	Must be provided at the ends of all culs-de-sac in accordance with the details set out in section 9.
Verges/planted areas	2 metres wide normally - see Para. 15.1
Horizontal Alignment	Minimum centre line radius 60 metres
Carriageway camber	2.8 % (1 in 36)
Footway crossfall	2.5 % (1 in 40)
Verge crossfall	5% (1 in 20)

Table 2 - Industrial Access Road Operating Speed 40 Km/hr

3. ROAD JUNCTIONS

3.1 Design

3.1.1 One of the important objectives in any layout is to minimise road accidents. The need for good junction design is illustrated by the fact that a large proportion of injury accidents in urban areas occurs at junctions. The basic principles to be considered in junction design are, therefore: -

(a) The type of junction to be adequate for safety and vehicle manoeuvrability.
(b) Proper control over spacing of junctions and access restriction on Distributor Roads.
(c) Proper definition of right of way at priority junctions.
(d) Adequate provision for pedestrian and cycle movements - including pedestrian crossings and suitable signing.

3.1.2 Careful control of access is essential on Distributor Roads. Generally, individual accesses onto Primary Distributors will not be permitted. Access to sites shall be gained from Access Roads and in certain cases, Secondary Distributors. The design of the junctions between Primary and Secondary Distributors and the main highway network shall be undertaken to Department of Environment Transport and Regions standard, and is beyond the remit of this guide. Junction spacing along Distributor Roads shall accord with the recommendations set out in the publication entitled “Traffic in Urban Environments”. This is based on 85 percentile stopping sight distances of vehicles on the Priority Road and an indication of the requirements is given in Table 3.

Vehicle Speed (mph)	SSD* Desireable Minimum (m)	SSD* Absolute Minimum (m)
70	295	215
60	215	160
50	160	120
40	120	90
30	90	70

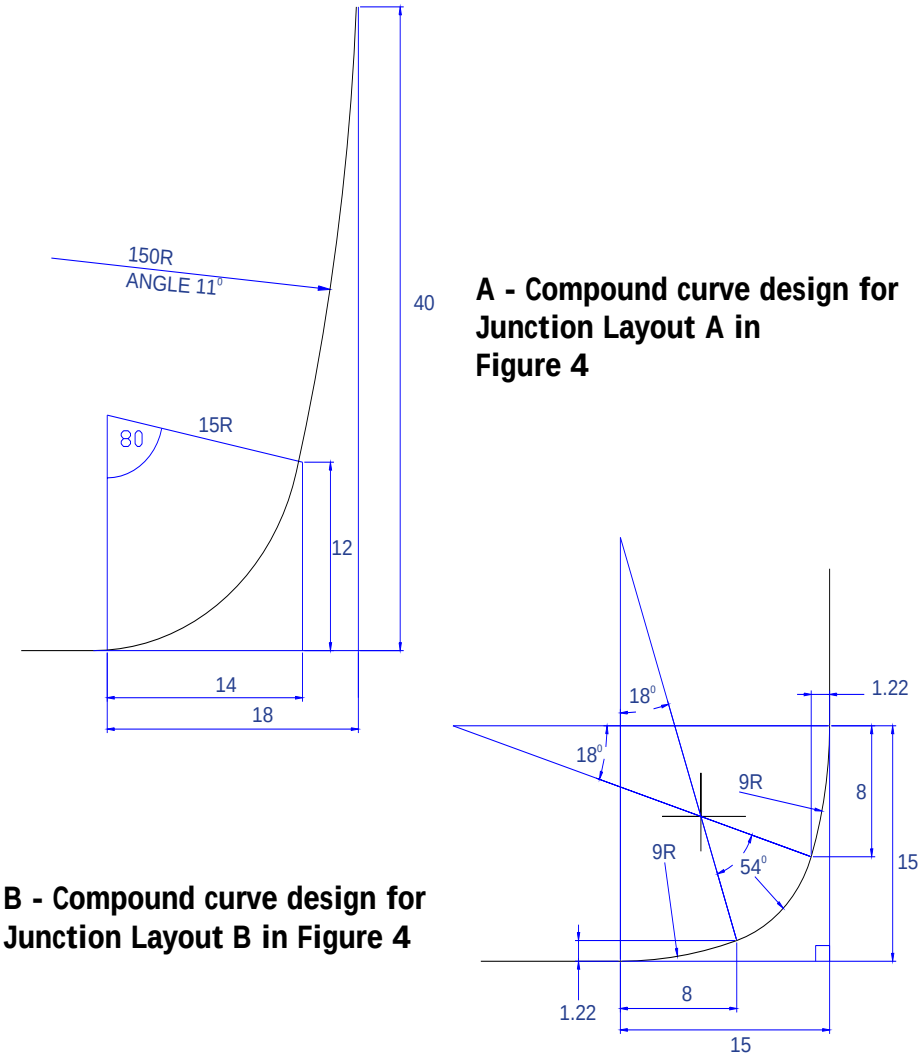
*SSD - Stopping Sight Distance

Table 3 - Stopping Sight Distances

3.1.3 Greater distances should be provided between junctions which are likely to generate large numbers of trips.

3.1.4 Away from the distributor road network rigorous control over the control of access is not appropriate and, indeed, can lead to inappropriate use of land resources. Junction spacing in such cases should normally be dictated by the need to achieve economical industrial layouts subject to a minimum spacing of 45 metres.

3.1.5 Within most industrial estates the problem of providing adequate traffic capacity is not critical and road safety requirements will normally dictate the type of junction. Simple 'T' junctions are usually appropriate. However, where a distributor road serving a large industrial development joins an existing primary district or local distributor road then more complex junction layouts should be considered.



A - Compound curve design for Junction Layout A in Figure 4

B - Compound curve design for Junction Layout B in Figure 4

Figure 2 - Compound Curve Design for Junction Radii

3.1.6 For safety reasons "square on" junctions are preferable to skewed ones. Therefore, throughout the design process consideration should be given to the layout of the road links to ensure that the approaches to junctions are, wherever possible, square.

3.1.7 The provision of direct crossroads should be avoided and deliberate stagger in the minor road introduced. The minimum amount of stagger is indicated in Figure 3 and the right/left stagger is preferable to eliminate the possibility of large commercial vehicles 'hooking' and impeding movements on the major road.

3.2 Priority Junctions and Individual Site Accesses.

3.2.1 Priority junctions should be set out as illustrated in Figure 3. Where the junction is between Distributor Roads, and or an access road, the design shall accord with the DoT's Technical Memoranda TD 42/95, (junction layouts 'A' and 'B' in Figure 4). Where the junction is between an Access Road and a site access, Junction Layout 'C' may be used. For all junction types simple curve radii may be used, unless high HGV turning volumes are predicted in which case the standard compound curve as illustrated in Figure 2 should be used.

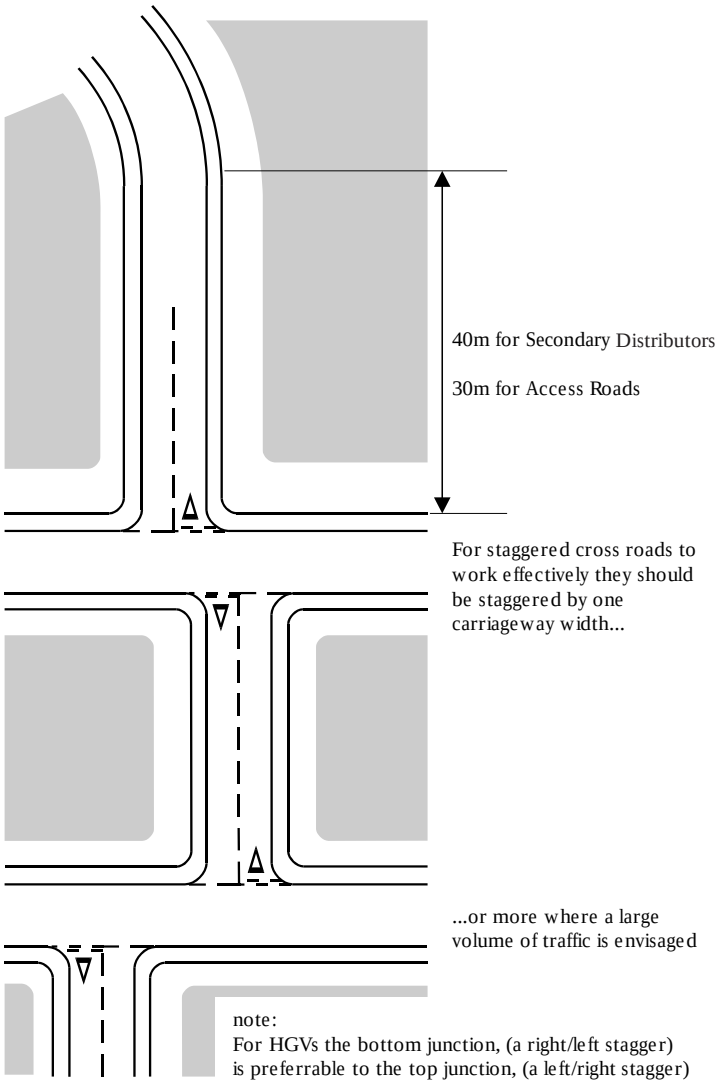


Figure 3 - Staggered Junction Layout

3.2.2 For the individual site access, (Junction Layout'C'), the values of the dimensions 'D' and 'W' should be as follows: -

W (m)	5.5	7.3	1.0
D (m)	15	10	5 or less

Table 4 - Individual Access Layout Dimensions

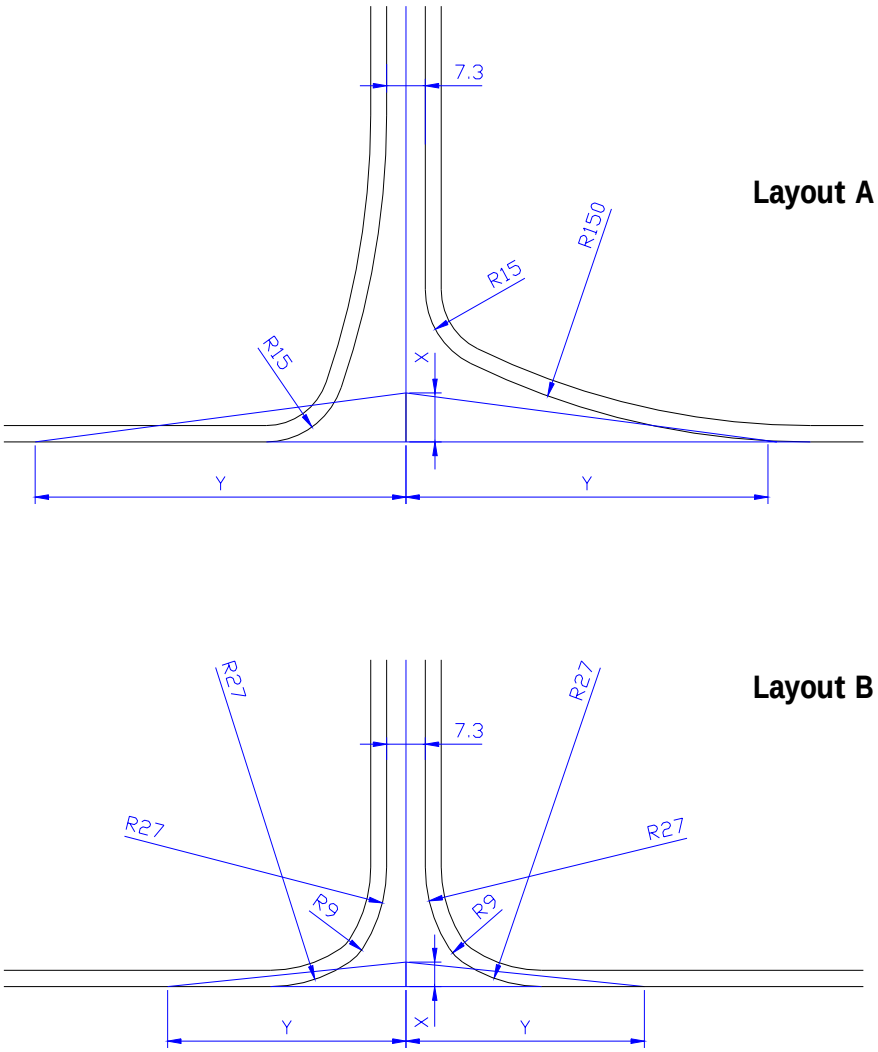


Figure 4 - Junction Layouts

3.3 Visibility

3.3.1 Visibility splays for all priority junctions should be provided as follows (refer to figure 5 for annotation).

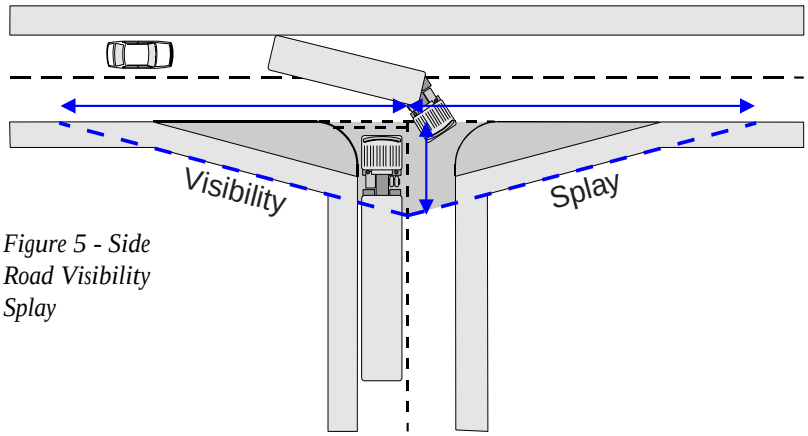


Figure 5 - Side Road Visibility Splay

(a) The X dimension shall be: -

Junctions between Distributor and Access Roads	4.5m, or 9.0m where high traffic volumes are predicted
Junctions Involving Site Access	2.4m, or 4.5m where high traffic volumes are predicted

(b) The Y dimension should be based on vehicle speed provided in accordance with the following table.

Vehicle Speed (mph)	70	60	50	40	30	30	25
Vehicle Speed (kph)	120	100	85	70	48	48	40
Distance (m)	295	215	160	120	90	70	45

3.3.2 Where the junction is located within a 30 mph speed limit but the actual speed of vehicles is not known then the higher Y distance for 48 kph (30 mph) should be used for the visibility splay.

3.4 Roundabouts

3.4.1 At junctions with Primary Distributors, or at locations where high traffic volumes or HGV percentages are expected, the provision of a roundabout in preference to a priority junction should be considered. Roundabouts are able to cope with higher traffic flows than priority junctions, and are better suited to safely accommodating turning movements by large articulated vehicles. Additionally their accident rate is lower than for other junction types, and they represent the most acceptable form of at-grade junction for pedestrians and cyclists.

3.4.2 For the benefits discussed above to be realised careful consideration needs to be given to the design aspects of a roundabout. These are covered in the DoT's Technical Memoranda TD 16/93, "Geometric Design of Roundabouts", which describes in detail all aspects of design, safety and capacity analysis. All roundabouts that will be adopted as public highway shall conform to the standards therein, and it is recommended that developers contemplating the inclusion of a roundabout in a scheme contact the Highway Authority at an early stage.

3.4.3 There are two types of roundabout commonly used on Industrial Access Roads: -

- Mini roundabouts - having an Inscribed Circle Diameter (ICD) of no greater than 28 Metres, and a centre island that although raised can be over ridden.
- Normal roundabouts - having an ICD of no less than 32 metres, (more commonly 40 metres), and having a raised kerbed centre island of no less than 4 metres.

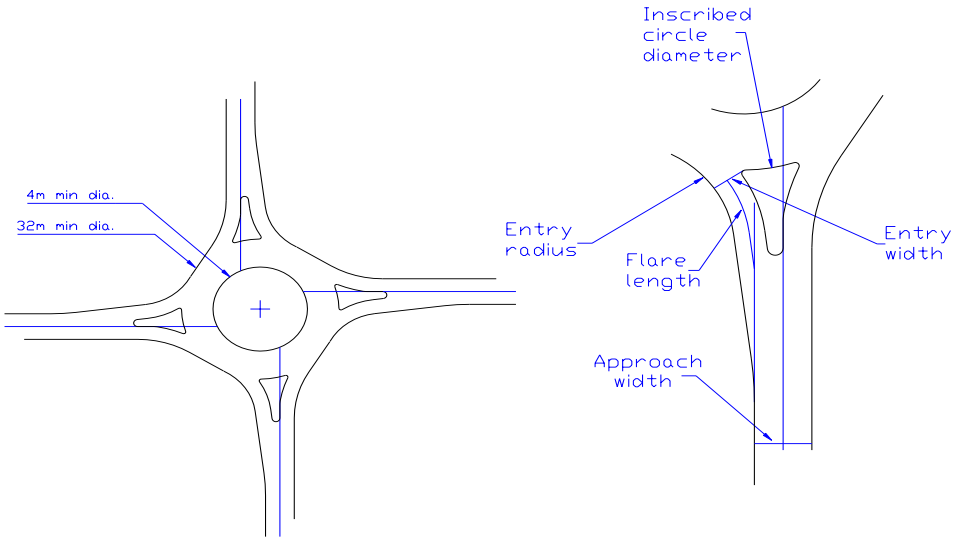


Figure 6 - Normal Roundabout Design Elements

3.4.4 Figure 6 shows the principal design elements of a normal (full size) roundabout, however it is recommended that the Highway Authority be consulted before any design work is commenced.

(left) - Junction between Primary and Secondary Distributor Roads (see Figure 4 layout B).

(right) - Junction serving a large industrial unit, design to accomodate HGV traffic (See Figure 4 layout C).

(left) - Junction serving a small industrial unit
(Dropped kerbs & tactile paving must be provided)

4 FOOTWAYS, PUBLIC RIGHTS OF WAY AND CYCLE ROUTES

4.1 Footways

4.1.1 Footways adjacent to carriageways will be required on all Industrial Access Roads. The minimum width is 2.0 metres. Pedestrian crossings will be required wherever footpaths intersect with roads and accesses.

4.1.2 Footways and verges on Industrial Estates are subject to widespread and frequent damage by lorry traffic, either as a result of the rear wheels of lorries mounting the kerb at bends, or the straightforward misuse of the footpath or verge for parking/loading. Suitable kerbing and avoidance wherever possible of tight kerb radii will assist in reducing damage caused by vehicle overrun at junctions and bends. Where there is an unavoidable risk of kerb mounting or a likelihood of abuse of the footways or verges by vehicles then specialised barrier kerbs should be used. Where this is not practical bollards should be installed located 0.5 metres behind the kerb at 4 metre centres.

4.2 Public Rights of Way

4.2.1 North Lincolnshire Council has published a separate Supplementary Planning Guidance document on developments affecting Public Rights of Way and developers should consult this directly.

4.2.2 Many development sites are affected by public rights-of-way in the form of highways, public footpaths and bridleways, and the developer will normally be informed of them when planning permission is granted. The policy of the Highway Authority is covered comprehensively in the Public Rights of Way Supplementary Planning Guidance document. In summary however, North Lincolnshire Council's policy as Highway Authority is that: -

(a) New developments should, wherever possible, take account of public rights-of-way over the land in question.

(b) Headland paths that run on the perimeter of development sites should be preserved wherever possible and where circumstances permit. This may involve creating landscaped buffer belts through which the footpath will run.

(c) Paths which now cross open land should be accommodated within the proposed site layout without diversion whenever practicable to do so.

(d) Paths outside the development boundary may be subject to increased usage as a result of the development. Where this is possible North Lincolnshire Council will pursue Section 106 agreements to bring those routes up to a higher specification.

4.5 Developers are reminded that, where it is necessary for rights-of-way to be diverted or closed, the requisite procedures under the Town and Country Planning Act, 1990 must be completed before works commence.

4.3 Cycle Routes

4.3.1 In view of the importance the Council attaches to cycling in North Lincolnshire, the Highway Authority wishes to promote the provision of cycle routes, but it is recognised that these facilities may not be required in every case. The Authority will advise on each particular case and on the use of joint footpaths/cycle routes.

(left) - footway located behind grassed verge

(right) - footway located next to carriageway

5. Public Transport Facilities

5.1 Careful planning will be required at an early stage in consultation with bus operators and the Highway Authority to ensure that a network of bus routes can be accommodated within proposed road layouts. In general, services should be restricted to the Primary and Secondary Distributor network, and the use of Access Roads by buses not encouraged. However it is recognised that in certain cases, bus services should be allowed to penetrate onto Access Roads if this makes a significant improvement to public transport operations and in such cases their design should incorporate the necessary provisions to permit safe use by buses.

5.2 Industrial estates should be designed so that in general, the walking distance along the footpath system to bus stops is no more than 400 metres. Bus stops should be spaced on average at two or three per kilometre. Staggered stops on opposite sides of the road should be located tail to tail and consideration should be given at important locations to the provision of bus shelters.

5.3 Bus stops should be located at or near a point where pedestrian routes converge but away from junctions and individual accesses so that disruption or delay to other traffic will be minimised.

5.4 On busy Industrial Roads and where buses may wait, (ie timing points), it may be necessary to provide lay-bys for buses.

5.5 Build outs or bus boarders should be considered to deter parking where bus stops are located. Also, consideration should be give to the provision of high (220mm), kerbs to improve boarding and alighting for passengers.

5.6 Bus operators should be consulted about the turning and manoeuvring characteristics of the buses they propose to use and for their requirements for footway widths at bus stops where shelters are to be provided.

5.7 General arrangement details for busbays and lay-bys, as well as advice on bus operations can be found in the Traffic in Urban Environments publication.

(right) - standard full width bus bay, (constructed in concrete)

6. On Site Vehicle Manoeuvring and Parking

6.1 There is a need to ensure that there is a consistent approach to maximum parking standards for a range of developments, and to this goal, the emerging PPG 13 proposes that a "*Threshold Level*" should be established to cover the whole country. It is the intention that for all developments above this level the parking standards laid down in the emerging PPG 13 and the emerging Regional Planning Guidance, (RPG) will be the standard applied by designers when establishing the parking needs for the development.

6.2 For developments below that level the standards to be applied shall be those established by the Council and the designer should consult the Draft Parking Provision Guidelines for new and change of use developments in North Lincolnshire.

6.3 From time to time these standards may be revised to take into account emerging government and Council policy, as well as changing patterns of vehicle usage and so the developer should always consult the Council before undertaking any substantial design work to establish the appropriate parking provision.

6.4 When designing internal layouts for industrial sites the close link between the provision of parking space and accommodation of manoeuvring vehicles must be acknowledged. Consideration should be given for the provision of both long and short term HGV parking, including terminal (layover) facilities where necessary. Additionally, sufficient areas must be provided around loading and off-loading facilities to enable HGV's to turn and manoeuvre. In the interests of safety it is preferable that these areas are segregated from the routes into and out of the car parking areas. It is also important that within each site there is adequate provision for the emergency services to gain access to all buildings and facilities.

6.5 The Highway Authority is conscious of the need to ensure that adequate and convenient provision has been made on site to prevent indiscriminate on street parking, which can seriously reduce highway capacity. A suitable general arrangement for parking and servicing facilities for a medium sized industrial unit is shown in figure 7.

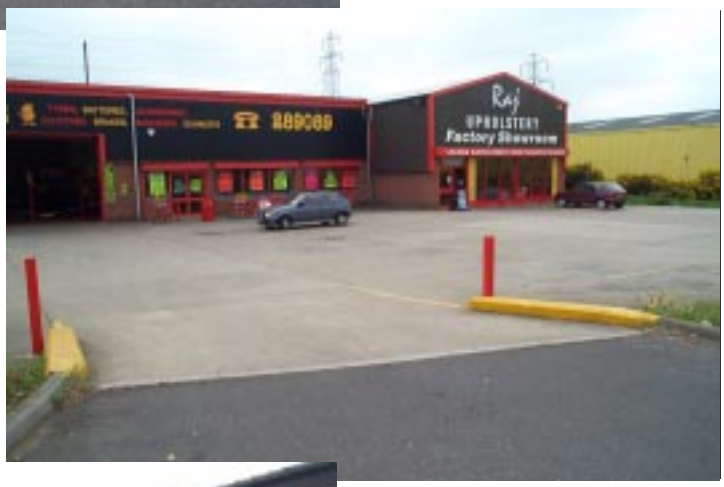
6.6 Guidance on vehicle parking and manoeuvring requirements is listed below: -

(a) All parking for private cars shall be 5 metres long by 2.5 metres wide.
(b) A parking bay suitable for a large articulated vehicle is 15 m long x 3.5m wide.
(c) A parking bay suitable for a rigid vehicle is 11m long x 3.5m wide.
(d) A parking bay suitable for a rigid vehicle with draw bar trailer is 18m long x 3.5m wide.
(e) Although there is no legal maximum, the normal height limit for commercial vehicles is

6.7.1 The Threshold Level for Use Class A2, (Financial and Professional Services) and Use Class B1, (Offices, Business Parks and Offices on Green Field Sites) is 1000 sq.m.

6.7.2 The Threshold Level for Use Classes B2 and B7, (Industry) and Use Class B8, (Warehousing) will be determined on an individual basis following consultation with the Council.

(lef) - layout for a large factory site. there is sufficient room for HGVs to manouevre, and car parking is segregated from the loading area



(right) - For a smaller site, again there is sufficient room within the site for manouevring, but HGV and car parking areas are not segregated

(left) - Parking suitable for office or high-tech types uses. Note the differing surface treatments of the isles and bays

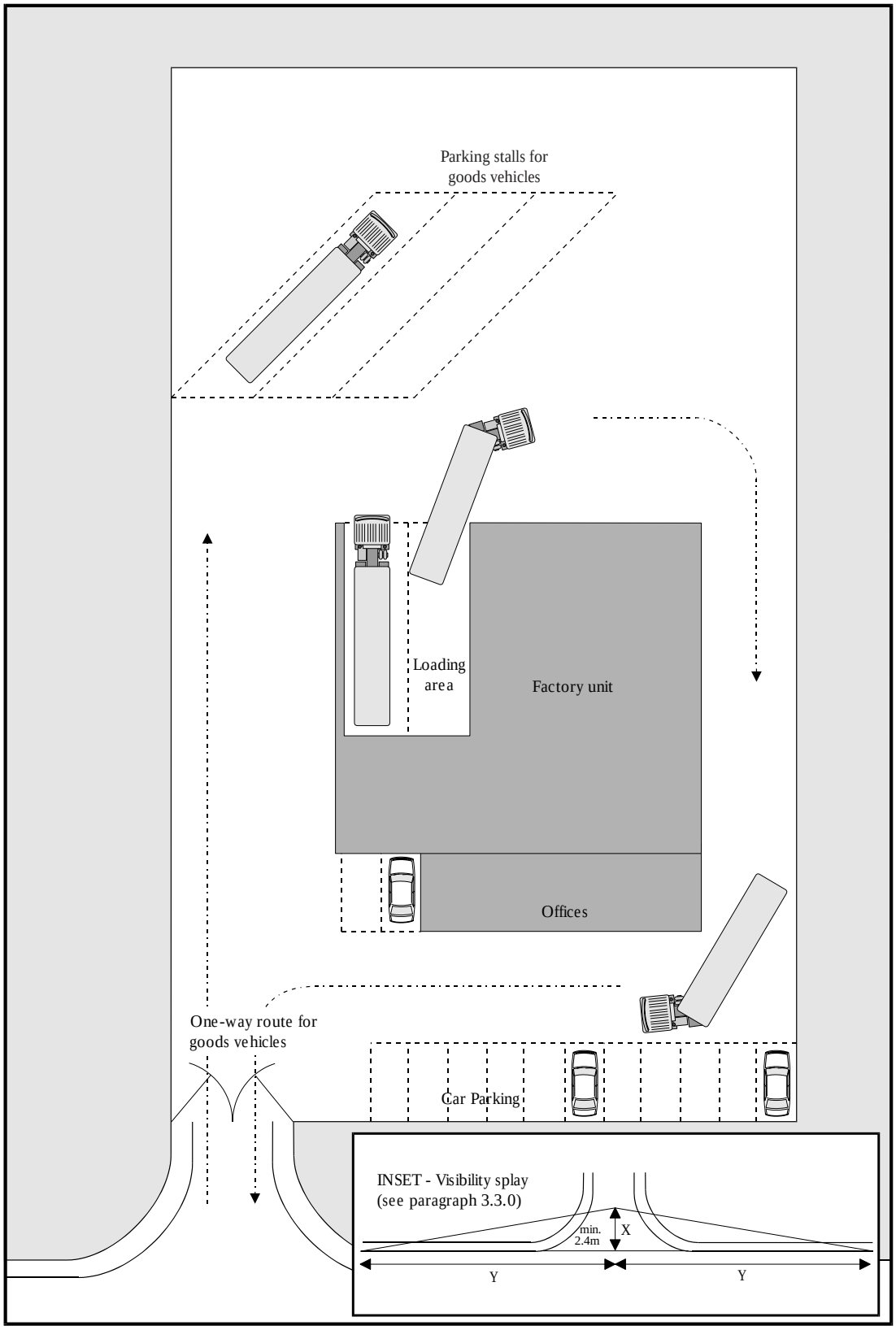


Figure 7 - Industrial Unit Layout

7. Utilities

7.1 In addition to providing for pedestrian and vehicular movement, roads and footpaths in industrial estates have an important function in providing routes for statutory and other underground services. These services are an essential integral part of the layout and the arrangement for the installation and future maintenance of service apparatus must be considered in the initial design of an estate. The location of mains in footpaths and landscaped areas, reproduced from the National Joint Utilities Group publication No 7, is shown in Figure 8.

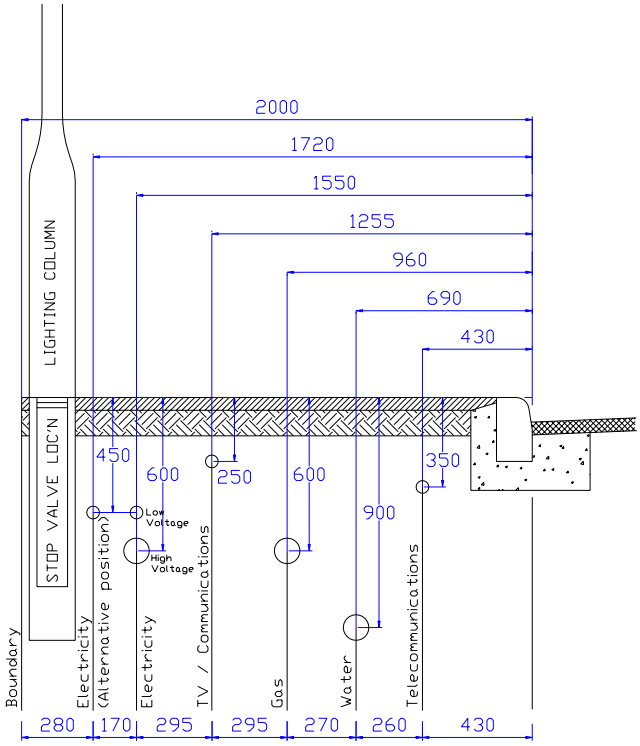


Figure 8 - Agreed Locations for Services in Footways (National Joint Utilities Group)

7.2 Developers are also reminded that their responsibilities to consult with and meet the costs of any works required in respect of statutory undertakers' plant that may be affected by the development. Non-statutory plant must not be laid within the prospectively maintainable highways until a licence has been issued by the Highway Authority under Section 50 of the New Roads and Street Works Act 1991. Developers are advised not to sanction or grant easements for such plant prior to receiving approval in writing from the Highway Authority.

7.3 Wherever possible services should be laid under footways or landscaped areas in order to minimise cost of installation, repair and reinstatement that would arise from laying services within the carriageway.

7.4 It will be necessary for Developers to consult the appropriate Water Company, The Environment Agency and the appropriate Drainage Board where required regarding disposal of both foul and surface water at the earliest opportunity.

8 Landscaping

(For further details please see Specification for Highway Landscaping and Planting)

8.1 Verges

8.1.1 Verges are a desirable feature on most Industrial Access Roads as they offer a good opportunity for landscaping and they provide space for locating public utilities apparatus.

8.1.2 The desirable minimum width of verge is 2m. Verges wider than 2m may be needed where it is considered necessary to locate all main drains outside the limits of the carriageways. Attention is drawn to the flexibility of verge provision set out in paragraph 15.1 (b).

8.1.3 Where a narrow verge cannot be avoided, alternative materials should be used which both reduce maintenance costs and improve the quality of the visual environment. The material considered best suited to this purpose is block paving.

8.2 Trees

8.2.1 Trees provide global and local benefit by absorbing CO_2 (reducing global warming), filters urban pollution and have beneficial health, economic and aesthetic benefits. The Council will require that all planning approvals include appropriate provision for the preservation and planting of trees. As part of this policy it wishes to encourage tree-planting schemes on Industrial Estate Roads but it is important that schemes should be considered at the earliest stage in the planning layout. The practice of isolated tree planting on narrow verges is rarely successful and does lead to maintenance problems. The preferred solution is to establish larger areas for tree planting well clear of underground services and carriageways and to secure their adoption either as amenity areas or as highway verge. In this respect attention is drawn to the flexibility in the road adoption standards in paragraph 15.1.

8.2.2 The written approval of the Highway Authority must be obtained in respect of every scheme for tree planting within the limits of maintainable or

prospectively maintainable highway. In those cases where the Highway Authority approves a scheme thereby accepting the future maintenance liability particular attention will be paid to the selection of species.

8.2.3 The criteria used in the selection of species are: -

(a) Suitability to the environment.
(b) Wide tolerance of soil types.
(c) Relative ease of procurement.
(d) Low maintenance demands.
(e) Compatibility with location within the highway.

8.2.4 Examples of the different species that may be planted within the adopted highway limits are given in the Specification for Highway Landscaping and Planting. It is recommended that the first zone of planting be limited to shallow rooting ground cover plants. Subsequent zones should integrate so as not to show rigid demarcation lines. It should, however, be noted that the lists given are not regarded as being exhaustive and other species may be approved for planting in these locations. It is recommended that in areas that have a definite rural character, the list should be used in the approaches to the site with a view to integrating with the surrounding landscape (see Para. 8.2.5). In the case of large developments that are in rural areas but which have, in themselves, a more urban atmosphere, a gradual transition from the native to species more appropriate for urban settings should take place. Approval will not be given to the planting of trees within 2 metres of undertakers' plant or drains. Similarly, the use of trees/shrubs with strong growing lateral root systems will not normally be allowed, in view of the possible damage to services and drainage systems. Existing trees should be incorporated into developments wherever it is practicable to do so, subject to the approval of the Highway Authority.

8.2.5 Strong preference will be given native species that maintain and enhance the local character and contribute to biodiversity i.e. maintaining the wealth of habitats and species. Guidance on the Landscape and Biodiversity is currently being prepared and developers should consult this document as part of the establishment of the landscaping scheme for the development.

9. Turning Areas

9.1 Turning areas as shown in Figure 9 will be required on all industrial culs-de-sac.

9.2 The turning areas shown have been designed to cater for large articulated vehicles and medium size rigid vehicles. The designs are a compromise between the need to avoid large paved areas on small developments and the need to cater for the movement of regular service vehicles.

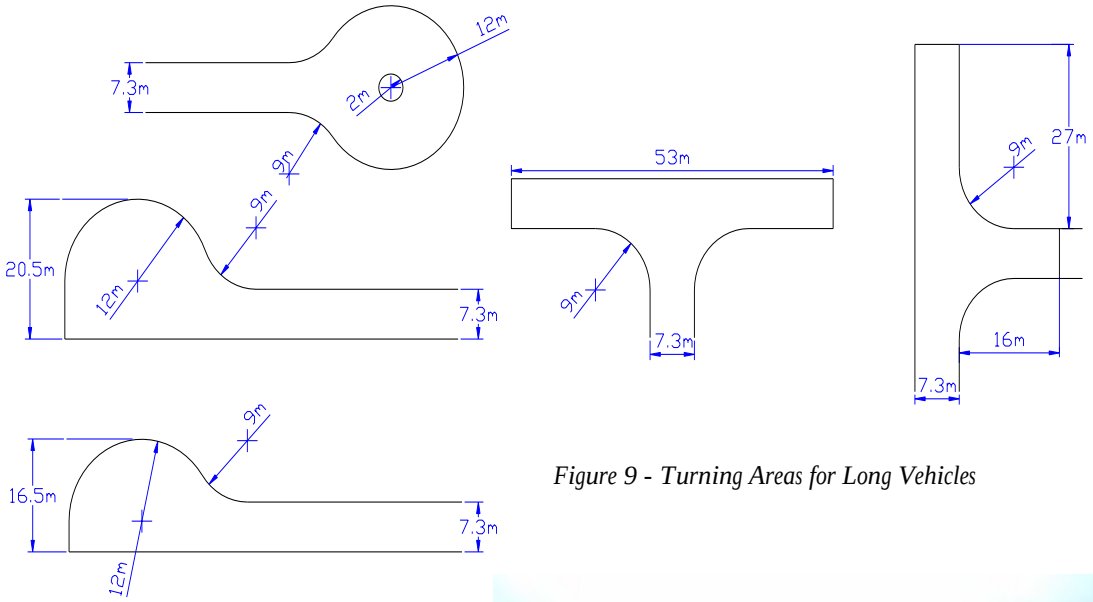


Figure 9 - Turning Areas for Long Vehicles

(right) - Large turning area suitable for articulated HGVs

(Left) - Turning area incorporated into the layout of an office car park

10. Forward Visibility

10.1 Adequate forward visibility must be provided on bends, relative to the estimated speed and stopping distance of vehicles as shown in Table 3.

10.2 A method of constructing a forward visibility curve around a bend is described below and shown in Figure 10.

(a) A line should be parallel to the inside curve, 1.5 metres into the carriageway to represent the path of the vehicle.
(b) The required stopping distance relative to the expected speed of the vehicle should be ascertained from Figure 11 and measured back along the vehicle path from tangent point A.
(c) The stopping distance should then be divided into equal increments of approximately 3 metres and the increment points numbered in sequence.
(d) The same stopping distance with the same number of increments shouldthen be repeated around the curve, finishing at a full stopping distance beyond the tangent point B.
(e) The area which has to be kept clear of obstruction should then be constructed by joining increments of the same number together, i.e. 1 to 1, 2 to 2, etc.

10.3 The graph shown in Figure 11 indicates that substantial reductions in mean vehicle speeds occur with successive reductions in curve radii below 100 metres. This data should, however, only be used as guidance to likely speeds on bends of 90 degrees or tighter. The data represents mean vehicle speeds only and as an additional safety factor it is recommended that 20% be added to these speeds when considering stopping distances and forward visibility which should be provided.

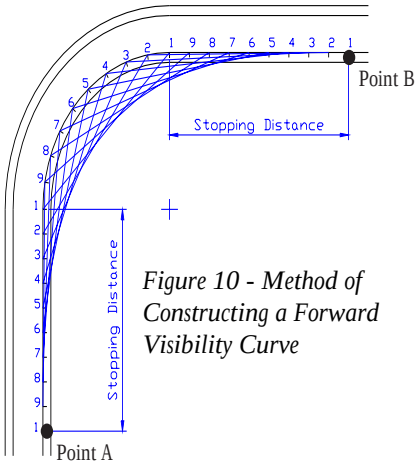


Figure 10 - Method of Constructing a Forward Visibility Curve

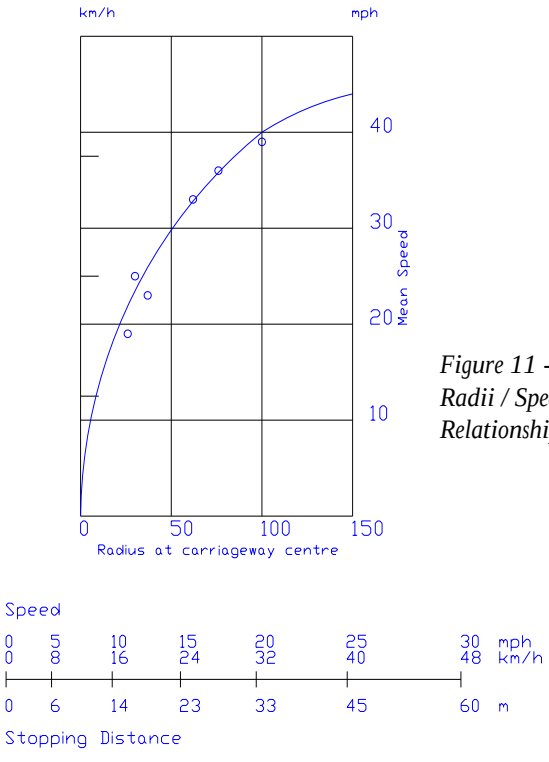


Figure 11 - Curve Radii / Speed Relationship

11. Sight Distances

11.1 Adequate sight distances must be provided for drivers of cars, HGV's and pedestrians along Industrial Access Roads both in the horizontal and vertical plane. Sight distance dimensions relate to a car driver eye-height of 1.05m above the carriageway, as opposed to the 2 metre eye height experienced by drivers of HGV's. Junction visibility splays are to be constructed as described in paragraph 3.2.2.

11.2 Visibility should not be restricted by trees, bridge piers, structures, boundary walls, fences, etc. However, it is not intended to adopt a totally rigid standard and care should be exercised to retain single healthy mature trees even if their retention does contravene minimum standards. However, this flexible attitude should not be taken to include retaining complete groups of trees within the visibility splay. In all cases, full visibility must be provided for an 'X' dimension of 2.4 metres.

11.3 The standards for sight distances at junctions are set out in paragraph 3.3.1.

11.4 Visibility splays, other than at an industrial unit access, must be incorporated into the highway. Developers will, therefore, be required to set out such splays and clear the area of fences, shrubs, bushes, etc. prior to the development commencing. This will be a condition of the Planning Consent.

12. Street Lighting

(For full details and specification please see Standard Specification for Highway Power Supplies and Street Furniture)

12.1 The standard of street lighting to be provided on Industrial Access Roads is generally to be in accordance with British Standard 5489: 1992 (parts 1-9 inclusive). The Highway Authority will determine the level of provision and any amendments to the specification.

12.2 The installation of street lighting should be related closely to the occupation of individual units and must not be left until the development as a whole is nearing completion. This practice will be a condition of the Planning Permission.

12.3 Lighting columns must be located within the limits of the highway, normally at the back edge of the footway or verge.

12.4 The Council's Consultancy Services Unit will provide a design service on a rechargeable basis. This will include the preparation of the necessary street lighting details required for the Section 38 Agreement. The Council's Commercial Services Organisation will erect the approved lighting on a rechargeable basis.

12.5 Where the Developer makes his own arrangements for the design and installation works, he must submit full design details to the Highway Authority before installation commences. The Electricity Company will only service the columns on receipt of a written order and will normally require prior payment before they will undertake connection work. On completion of the works the developer must submit to the Highway Authority a completion and inspection certificate to confirm that the works comply with the current edition of BS 7677, (formerly I.E.E. Regulations), together with "as built" electrical detail drawings and specification.

12.6 The energy costs and responsibility for routine maintenance will be accepted by the Highway Authority from the commissioning date of each lamp following receipt of the completion and inspection certificate and the 'as built' technical detail drawings and specification. Prior to adoption, however, the Developer will be responsible for the replacement and repair of damaged equipment.

(left) - Medern galvanised steel colums used to illuminarte a Primary Distributor road

13. Planning and Highway Authority Approval

13.1 The Transport Assessment Process

13.1.1 North Lincolnshire Council has adopted the Transport Assessment (TA) process for determining the nature and extent of off site highway works required by the development proposals. TA's are generally required in support of planning applications when one or more of the following criteria is met: -

(a) Business and industrial (B1 and B2) land uses with gross floor area exceeding 5,000 square metres.
(b) Warehousing (B8) uses with a gross floor area exceeding 10,000 square metres.
(c) Retail land uses with a gross floor area exceeding 1,000 square metres.
(d) Sites with in excess of 100 parking spaces.
(e) Sites with an estimated in/out peak hour trip rate in excess of 100 vehicles.

13.1.2 A TA provides the developer with the opportunity to gather in one document all the issues relating to the traffic impact of the development proposals. It should form a stand-alone document and contain all relevant information on assessment assumptions, base traffic, generated traffic, development type and size, assessment years and internal site layout. In general the TA should address the following areas: -

-	Description of the development	-	existing conditions
-	Traffic generated by development	-	Modal split (Car, bus etc.)
-	Trip distribution	-	Trip assignment
-	Assessment years	-	Highway impacts
-	Internal layout and circulation	-	Parking arrangements
-	Public Transport	-	Pedestrians / cyclists

TA's should also include a nontechnical summary and a glossary of terms.

13.1.3 The TA process has been adopted nationally, and is based on the guidance produced by the Institution of Highways and Transportation. This guidance has been used as the basis for a guide to the process produced by North Lincolnshire Council. Copies of this guide, and general advice on the TA process can be obtained from the Transportation Team.

13.2 Traffic Safety

13.2.1 North Lincolnshire Council seeks to promote the safe and efficient use of the highway network and to this extent any new development will have an effect on the adjoining roads. As part of this aim it seeks to: -

(a) Reduce the risk of injury from traffic.
(b) Encourage the transfer of resources to sustainable modes.
(c) Encourage social inclusion.

13.2.2 In order to achieve these overall goals the developer will be expected, as part of the evaluation and design process, to: -

(a) Assess the change in risk of injury from all modes of traffic generated by the development and to include proposals to remedy or reduce this risk.
(b) Identify the types of traffic that will be generated by the development and explain how transfer to sustainable modes will be achieved.
(c) Explain and demonstrate how the development will encourage social inclusion for: -

(i) People with disabilities.
(ii) Access for vulnerable road users.

13.3 The Planning and Highway Approval Process

13.3.1 Application for planning permission for development involving Industrial Access Roads should be made to the Planning Authority. At this stage, the Council will need to be satisfied that the following aspects of the development are in accordance with current requirements: -

(a) The design and geometric layout of the proposed new roads including visibility splays at the junctions with existing highways.
(b) The surfacing materials and kerbing details to be utilised in the road works.
(c) The surface water drainage.
(d) The positioning of the utilities' plant and any associated ducts under the maintainable highway.
(e) The street lighting design.
(f) The access layout for individual units.

13.3.2 In order to speed up this process, it is important that the applicants ensure that the drawings submitted with their application include these details and are consistent with the standards set out in this Guide and the Construction Guide.

13.3.3 The establishment of an engineering specification for new estate roads will take place concurrently with the planning process and will be the subject direct negotiations between the Developer and the Highway Authority. The

Highway Authority will issue a Construction Approval Notice immediately after the technical and engineering details have been accepted. No work may commence on site before the Highway Authority has agreed full details, issued the Approval Notice and the inspection fee has been paid. The Highway Authority's specifications are set out in the Development Roads Construction Guide; but the following drawings will be required: -

(i) an accurate site survey plan showing the highway, site boundary and other relevant details. All levels on the survey plan must be in metres and related to Ordnance Datum at Newlyn with benchmark locations and values clearly identified.

(ii) a site layout plan of the entire scheme at 1:2500 or 1:1250 scale, including details of the external highway network including details of the existing external highway network

(iii) 1:500 scale layout plans showing: -
  - (a) comprehensive highway details
  - (b) comprehensive highway drainage details and means of disposal of highway water.

(iv) longitudinal sections, to a horizontal scale of 1:500 and an appropriate vertical scale showing:-
  - (a) existing and proposed highway levels,
  - (b) highway drainage details

(v) a typical cross section drawn to a natural scale of 1:20 showing the proposed highway construction.

(vi) drawings and calculations required for retaining walls and other structures. These plans shall be accompanied by the relevant Approval in principal submission and design check certificate from consultants who are familiar with the technical approval procedures. (Reference Documents BD 2/89 and BA 32/89 pt. 1 from the design manual for Roads and Bridges). In any event no works shall be commenced until the Highway Authority have issued a written approval of the submitted structural details referred to above. This should remove any potential impediment on this element of the design from jeopardising the future adoption of the access road as highway maintainable at the public expense.

(vii) details of Statutory Services and other Agency's apparatus, mains, cables and ducts.

(viii) a drawing detailing the setting out information for the proposed highway network

(ix) an approved Street lighting design.

13.3.4 The scales used in the above drawings are to be approved metric scales e.g. 1:500, 1:200, 1:100, and 1:50.

13.3.5 Evidence must be provided that CDM regulations will be complied with during all stages of the road design and construction, and that a Planning Supervisor has been appointed. In addition the Health and Safety file should be passed to the Highway Authority prior to adoption of the Industrial Roads.

13.3.6 Unless alternative details are agreed with the Highway Authority, the construction will be one of the alternatives described in the Development Roads Construction Guide.

14. Legal Requirements

14.1 Normally the Highway Authority will require that indusrial roads will be completed to the approved standards in pursuance of the provisions contained in the Highways Act 1980. Before construction begins, the Developer will therefore be required either: -

(a) To secure the payment of the estimated cost of highway works, under the Advanced Payments Code provisions as set out in Section 219 of the Highways Act, 1980 or;
(b) To make an agreement with the Highway Authority under Section 38 of the Highways Act 1980 and provide a Bond of Surety.

14.2 The Highway Authority operates a detailed policy with regard to Advance Payments Code and Section 38 Agreements. Developers should consult the Highway Authority at the earliest opportunity to avoid the risk that new roads will not be adopted as public highway. Developers are advised that until such time as there exists a deposit under the Advance Payments Code or an agreement under Section 38, Local Land Charge Searches will disclose the omission to prospective purchasers.

14.3 In certain situations Industrial Access Roads are exempt from the provisions of Advance Payments Code. The exemptions under these provisions within North Lincolnshire are as follows: -

Where the building is proposed to be erected on land belonging to or in the possession of -

(a) The British Railways Board, The British Waterways Board, or any wholly owned subsidiary (within the meaning of the Transport Act 1968) or joint subsidiary (within the meaning of Section 51 (5) of the Act) of any of those bodies; or
(b) The Council of a County or District; or
(c) The Commission for the New Towns or a New Town Development Corporation; or
(d) Where the building is to be erected by a company the objects of which include the

provision of industrial premises for use by persons other than the company, the constitution of which prohibits the distribution of profits to its members and the cost of the building is to be defrayed wholly or mainly by a Government department; or

(e) Where three quarters of the street is likely to consist of industrial premises and there is little likelihood of the Private Street Works Code being exercised, the Highway Authority has the discretion to exempt frontages from the provisions of the Advanced Payments Code.

14.5 Where it is proposed to construct a building or structure over the highway, a licence under Section 177 of the Highways Act, 1980 is required from the Highway Authority.

14.6 Where the proposed development necessitates alterations or other works to be carried out within the existing highway it will be a requirement that the works are covered by an agreement under Section 62 of the Highways Act 1980. This agreement must be in place before any of the work commences.

15. Highway Adoption Standards

15.1 The Highway Authority will adopt roads and footpaths as highways maintainable at public expense subject to the following conditions: -

(a) Any verges and planted area adjacent to the carriageway will be adopted on the basis of an aggregate area of such verge or planted area not exceeding 6 square metres per metre run of carriageway (excluding visibility splays at junctions). For this purpose, verges and planted areas may be concentrated alongside certain carriageways in a development subject to the total area not exceeding the above aggregate. But, inevitably this will mean that verges and planted areas cannot be provided on all roads within that particular development.

(b) All other verges and planted areas which are not immediately adjacent to a carriageway, will be regarded as amenity areas and will not be adopted as publicly maintainable highway, and developers will have to make alternative arrangements for maintenance. It is intended that the amalgamation of verges and planted areas into larger more informal areas as envisaged by this clause will allow greater scope for the development of attractive landscaped and planted areas within the highway.

(c) Footpaths and cycleways adjacent to carriageways will be eligible for adoption. Footpaths and cycleways may, of course, be segregated from carriageways subject to the provisions set out in sub-paragraph (b) above for the adoption of grass verges. All other footpaths and cycleways will be considered for adoption on their merits and will not be adopted purely because they are provided.

(d) Parking areas will not normally be adopted.

15.2 The types of traffic signs and road markings required and their location will be advised by the Highway Authority. Their provision and installation is the responsibility of the Developer.

15.3 In order to ensure that construction is carried out in accordance with the approved drawings and specifications, all development will be inspected by representatives of the Highway Authority. Every facility must be given for these purposes; otherwise it may prejudice adoption. Failure to comply with these requirements could result in the Developer facing additional costs for any necessary investigation work and remedial works in respect of substandard materials or workmanship. The developer should also be aware that no inspections will be undertaken until the advised inspection fee has been paid and any works undertaken before inspections commence will be at the Developer's own risk as to their acceptability.

15.4 Following satisfactory completion of roads and footpaths, the work will be placed on maintenance period for a period of 12 months. At the end of the maintenance period and subject to a further satisfactory inspection, adoption will take place.

(left) - Ductile iron gulley cover, draining a channel of pre cast concrete channel blocks. (Hot Rolled Asphalt carriageway)

(right) - Pre cast concrete tactile paving blocks used as part of a dropped kerb

(left) - Concrete block paving used for the construction of a car park. Note the use of different colours to mark out the individual parking bays

16. References

1. Estate Roads Construction Guide,
Director of Environment & Public Protection, North Lincolnshire Council

2. Town and Country Planning Act 1990,
H.M.S.O. London

3. New Roads and Street Works Act 1991,
H.M.S.O. London

4. Designing for Deliveries 1983,
Freight and Transport Association, 1983, Hermes House, St Johns Road, Tunbridge Wells, Kent, TN4 9UZ

5. N.J.U.G Publication No 7 Recommended Positioning of Utilities Apparatus for New Works or New Development in Existing Streets 1997,
National Joint Utilities Group Secretariat, c/o The Electricity Council, 30 Millbank, London, SW1P 4RD

6. Department of Transport Advice Note TD 42/95,
H.M.S.O. London

7. British Standard 5489: Code of practice for Road Lighting, (parts 1-9), 1992,
British Standards Institution

8. Highways Act 1980,
H.M.S.O. London

9. Department of Transport Technical Memoranda TD 16/93 - Geometric Design of Roundabouts,
HMSO London

10 Transport in the Urban Environment 1997,
Institute of Highways and Transportation, London

11 Specification for Highway Power Supplies and Street Furniture,
Director of Environment & Public Protection, North Lincolnshire Council.

12 Specification for Highway Landscaping and Planting,
Director of Environment & Public Protection, North Lincolnshire Council.

13. Revision to Planning Policy Guidance (PPG) 13
NHSO, London

14. Yorkshire and the Humber Regional Planning Guidance, (RPG)
HMSO, London

15. Draft Parking Provision for New and Change of Use Developments
North Lincolnshire Council, Directorate of Environment and Public Protection

17. Utility Companies and Useful Contacts

ELECTRICITY

Yorkshire Electricity

200 Clough Road
Hull
HU5 1SN
Tel (01482) 492211 *(Switchboard)*
Fax (01482) 495228 *(Enquires for data management)*

TELECOMMUNICATIONS

British Telecom

Blackfriars House
9 Rougiers Street
York
YO1 1BA
Post Point 4U
Tel (01904) 657790
Fax (01782) 204846

GAS SUPPLY

Transco BG (British Gas)

North Trent District Head Office
PO Box 33
Greaseborough Road
Rotherham
S64 4QQ
Tel (01623) 413500
Fax (01623) 415401

Sub depots

1. Scunthorpe / Doncaster Area
   Dawes Lane
   Scunthorpe
   DN15 6HW
   Tel (01724) 857184

2. Grimsby Area
Catherine Street
Grimsby
DN32 9DA
Tel (01472) 242980

WATER (Supply)

- Anglian Water Services Ltd
PO Box 62
Waterside Road
Waterside North
Lincoln
LN2 5HA
Tel (0345) 145145

- Yorkshire Water PLC
PO Box 52
Broadacre House
Vicar lane
Bradford
BD1 5RQ
Tel (01274) 738816
Fax (01274) 372545

WATER (Drainage and Sewerage)

- Severn Trent Water Limited
Sherwood District
Great Central Road
Mansfield
NG18 2RJ
Tel (01623) 627824
Fax (01623) 627971

- Anglian Water Services Limited
PO Box 62
Waterside Road
Waterside North
Lincoln
LN2 5HA
Tel (0345) 145145

WATER (Internal Drainage Boards)

Ancholme Internal Drainage Board
Scunthorpe Internal Drainage Board

Pillar House
20 South Parade
Doncaster
DN1 2DP
Tel (01302) 342055

West Butterwick Internal Drainage Board
South Axholme Internal Drainage Board
West Axholme Internal Drainage Board

Manor Court House
Market Place
Epworth
DN9 1EU
Tel (01427) 872715

Crowle Area Internal Drainage Board

16 High Street
Crowle
Scunthorpe
DN17 4LD
Tel (01724) 710589

PIPELINES

Total Fina G.B. Ltd.,

Fina Line Operations
Buncefield Terminal
Hemel Hempstead
HP2 7HZ
Tel (01442) 263738 - *24 hour*

G P S S (Government Pipeline Storage System)
(Operated by Serco Gulf Engineering)

Serco Gulf Engineering
Islip Depot
Bletchingdone Road
Islip
Oxford
OX2 2TR
Tel (01865) 840100

Conoco Ltd

Humber Refinery
South Killingholme
DN40 3DW
Tel (01469) 571571
Fax (01469) 555674

RIVERS AND THE ENVIRONMENT

The Environment Agency

1. Northern Area Office
   Waterside House
   Waterside North
   Lincoln
   LN2 5HA
   Tel (01522) 513100
   Fax (01522) 512927

2. Midlands Area Office
   Trentside
   Scarrington Road
   West Bridford
   Nottingham
   NG2 5FA
   Tel (0115) 945 5722
   Fax (0115) 981 7743

CABLE COMMUNICATIONS

N T L Midlands Ltd
Daleside Road
Nottingham
NG2 3GG
Tel (0115) 952 2222

NORTH LINCOLNSHIRE COUNCIL

	Name	Address	Telephone No
1.	Transportation Manager *(Advice on Transport Assessments within Highway works & estate Road approvals)*	Church Square House Scunthorpe DN15 6XQ	01724 297470
2.	Traffic & Road Safety Manager *(Advice on Traffic & Road Safety matters)*	As 1 above	01724 297471
3.	Land reclamation Manager *(Advice on Road Lighting Design & site investigation)*	Waters Edge, Maltkin Road Barton upon Humber	01724 297510
4.	Highway Maintenance Manager *(Road Lighting Design & Road Opening orders etc)*	As 1 above	01724 296671& 297458
5	Building Control Manager *(Access for fire fighting appliances)*	As 1 above	01724 297400
6.	Development Control Manager *(Town & Country Planning Matters)*	As 1 above	01724 297492
7.	Environment Team *(Advice on landscape, species selection, Biodiversity & Public Rights of Way)*	As 1 above	01724 297393
8.	Highways Services *(Quotations for street lighting, furniture and name plates)*	Brigg Road, Scunthorpe DN16 1AX	01724 27118