Nottinghamshire County Council

Part V: Highway Infrastructure and Assets
Chapter 1: Materials

Update 22/4/26

1.1 The Highway Authority's specification

1.1.1 All highway works must normally be in accordance with the *Specification for Highway Works* published by Her Majesty's Stationery Office as Volume 1 of the Manual of Contract Documents for Highway Works (MCHW) and comply with the *Notes for Guidance on the Specification for Highway Works* published as Volume 2 (NGHW), unless otherwise stated or amended by this design guide.

1.1.2 Where drainage works are intended to be offered for adoption by a sewerage undertaker, they must comply with the Sewerage Sector Guidance (SSG) published by Water UK and approved by Ofwat, including Appendix C: Design and Construction Guidance (DCG). All works must also comply with the Highway Authority's standard details and drawings. If proposals are not covered by standard drawings, scheme-specific drawings must be submitted for approval.

1.2 Site surveys, tests and investigations

1.2.1 You must arrange any site surveys, tests and investigations that the Highway Authority need before you submit your design to the Highway Authority. These must cover:

- a land survey including features such as watercourses, ditches, existing drainage systems and outfalls; and services and existing foundations,
- a survey of existing trees and other soft landscape features including the condition of each tree, its size and form and details of tree preservation orders and so on,
- nature-conservation surveys,
- details of how surface water run-off will be dispersed,
- consultation with the Environment Agency, Internal Drainage Board, and Lead Local Flood Authority as appropriate,
- the depth of the water table and perched water tables,
- the impact on adjacent developments and land,
- a risk assessment of chemical contamination,
- the presence of hazardous materials,
- the stability and acceptability of earthworks,
- an assessment of subgrade strength,
- the frost susceptibility of subgrade,
- the suitability of subgrade soils for lime or cement stabilisation (if required) and
- the possible recycling of on-site materials.

1.3 Sampling and testing goods and materials

1.3.1 You must arrange and pay for all the sampling and testing outlined in the Highway Authority's Specification. You must also submit one copy of these test results to the Highway Authority's Engineer. The Engineer reserves the right to carry out any sampling and testing deemed necessary to confirm that the goods and materials meet with the Specification including core samples. If the Highway Authority find the work does not meet the Specification, you will be required to pay for the associated costs to the authority. A list of the likely samples of goods and materials required can be found in the Specification.

1.4 Marking the highway boundary

1.4.1 It is important that there is clear demarcation between public and private space. You must define the highway boundary by continuous 50mm x 150mm edging type EF to BS EN 1340 unless the Highway Authority agree otherwise.

1.5 Fencing and barriers

1.5.1 The Highway Authority will not adopt any fencing erected on the highway boundary unless it is provided as a safety feature at the top of any highway structure or is a safety or noise barrier. A commuted sum would likely apply in all instances.

1.5.2 Safety fences and barriers must comply with Section 2 of 'Highway Construction Details' published by Her Majesty's Stationery Office as Volume 3 of the MCHW. Safety fencing should not generally be included within residential developments.

1.6 Existing boundaries

1.6.1 You must make it clear to purchasers of individual property at the time of sale that you are transferring ownership and responsibility for existing highway boundaries to them. The lack of maintenance and cutting back of hedges is a common problem for the Highway Authority, particularly where the hedge had enclosed farmland or had not been regularly maintained previously. If you erect new fencing to the inside of existing hedges and fences the purchaser may mistakenly believe that the original hedge or fence is the Highway Authority’s responsibility. Access to hedges should be available to both sides for maintenance.

1.7 Pedestrian barriers

1.7.1 It may sometimes be necessary to introduce barriers to pedestrian movement. Where they are required, consideration should first be given to amending the layout or the use of features that can guide pedestrian movement whilst also contributing to the amenity of the street.

1.8 Pedestrian guardrails

1.8.1 Where it is not possible to avoid the use of barriers by design and where using a staggered barrier is not appropriate at the ends of footpaths, you must provide an agreed length of pedestrian guardrail which runs parallel to the edge of the street, leaving a clearance of 450mm from the carriageway. You may need to widen the footway to maintain the standard footway width past the guardrail. You must use guardrails where the number of pedestrians makes it necessary for you to channel them to the appropriate crossing point. You should take care to make sure that the guardrails do not interrupt visibility. You should normally use high visibility pedestrian guardrail.

1.9 Noise fencing

1.9.1 Unless the Highway Authority agree otherwise, noise fencing should be subject to a private maintenance agreement. However, it must meet the design requirements for a highway structure. Where it is necessary to adopt as a highway structure, you must pay the Highway Authority’s design checking fees and a commuted sum for its future maintenance.

1.10 Earthworks

1.10.1 All earthworks must comply with Series 0600 (MCHW) Table 6/1, 6/2, and 6/5, and the contract specific details; classification, definition, uses, compaction requirements, etc. should be set out in accordance with Series 0600 (NGHW) Appendices 6/1, 6/2, 6/7 and 6/8. Embankments and other areas of fill must be formed with acceptable material excavated from within the site or imported on to the site, meet the requirements of the Highway Authority’s specification for use in the permanent works, and have the approval of the Highway Authority’s Engineer to be used in that location.

1.11 Constructing the site access and roads external to a development

1.11.1 The design and construction of works on classified roads and other roads (existing or proposed) not covered by this design guide must normally comply with the 'Design Manual for Roads and Bridges' published by Her Majesty's Stationary Office.

1.12 Internal development streets

Listed below are the street types covered by this design guide. The construction varies according to the street type. It is essential that you mark the street category clearly on the plans you submit for approval in line with the abbreviations in the table.

Table 1.1

Street & Road category	Abbreviation
Residential Street	RS
Residential access way	RAW
Major industrial access road	MajIAR
Minor industrial access road	MinIAR

1.13 Subgrade assessment

For design purposes, you must establish the CBR before you begin construction. You should notify the Highway Authority in advance of site tests to establish the subgrade strength and give the Highway Authority the opportunity to be present at such tests. You should provide the Highway Authority with copies of all test results.

You should use soil-classification tests to give the types of soil and 'Equilibrium CBR' based on material type, using the table below unless the Highway Authority agree otherwise. That is the soil strength when the material is neither gaining or losing moisture (equilibrium moisture content (EMC)).

Table 1.2

Type of soil	Plasticity index	Equilibrium CBR%
Heavy clay	50 or greater	Less than 2
Heavy clay	40 to 49	2
Heavy clay	30 to 39	2
Silty clay	20 to 29	3
Sandy clay	10 to 19	4
Silt	Less than 10	1
Sand (poorly graded)	Non-plastic	20
Sand (well graded)	Non-plastic	40
Gravel (poorly graded)	Non-plastic	40
Sandy gravel (well graded)	Non-plastic	60

1.14 Carriageway sub-base and capping layer

1.14.1 Use the table below to find the thickness of capping and sub-base you need to use.

Table 1.3

CBR Value	Materials within 450mm of surface must not be frost susceptible					
	Residential Street (250mm Bituminous layer thickness)		Residential Access Way (200mm Bituminous layer thickness)		Industrial Road (300mm Bituminous layer thickness)	
	Capping	Sub Base	Capping	Sub Base	Capping	Sub Base
< 2%	550	200	500	250	600	150
2%	400	200	350	250	450	150
3%	300	200	250	250	350	150
4%	250	200	200	250	300	150
5% to 15%	200	200	200	250	250	150
> 15%		200		250		150

1.14.2 The foundation design should not vary frequently along the street. You should select an appropriate value for each significant change in the subgrade properties. Where the equilibrium CBR falls between values in the above table, you should round down the value to the lower value. When the subgrade CBR is sufficiently below 2% that capping with sub-base is not sufficient to support the pavement, special measures will be required and must be approved by the Highway Authority. The use of geotextiles will only be acceptable in limited circumstances, and relevant advice is contained within the Design Manual for Roads and Bridges, as amended.

1.15 Capping materials

1.15.1 Permitted material for capping shall be Class 6F2 or recycled material to Class 6F3 complying with the MCHW Specification for Highway Works Table 6/1 and 6/2. You must test the capping layer as necessary to demonstrate that it has an in-situ CBR of 15% (or equivalent test result). The Highway Authority may approve other materials if you have previously demonstrated to the Highway Authority that they will achieve an in-situ CBR of 15% (or equivalent test results). Where specifically permitted by the Engineer, material stabilised using cement or lime or both shall comply with clauses 614, 615 and 643 of the MCHW.

1.16 Sub-base

1.16.1 Sub-base must be Type 1 to Series 800 MCHW, Clause 803, and NCC Appendix 7/1.

1.17 Surface, binder courses and bases

1.17.1 Table 1.14 below gives the required minimum design thicknesses and options you have for the flexible and modular (block) materials you should normally use for different development street types. Permitted pavement options are specified in NCC Appendix 7/1. The use of Stone Mastic Asphalt (SMA) shall be in accordance with NCC Clause 971AR, and NCC Clause 972AR where appropriate.

Table 1.4

Road carriageway construction materials depth												
	Main street / Residential street				Residential access way and shared surfaces				Industrial access road			
	Bituminous			Block	Bituminous			Block	Bituminous			
			Notes				Notes					Notes
Surface course	40mm	SMA 10 surf 40/60 (PSV 55)	1,2,5	80mm	40mm	SMA 10 surf 40/60 (PSV55)	1,2	80mm	50mm	HRA 35/14 F surf 40/60 des (20mm pre-coats)		1
	40mm	HRA 55/10 Type F surf 40/60 des	2		40mm	HRA 55/10 F surf 40/60 des	2					
	40mm	AC 10 Close surf 100/150	2		40mm	AC 10 dense bin 100/150 rec	2					
Binder course	60mm	AC 20 dense bin 100/150 des	4	30mm sand 60mm AC20 dense bin 100/150 rec	60mm	AC20 dense bin 100/150 rec	4	30mm sand 110mm AC20 dense bin 40/60 rec	60mm	AC20 dense bin 40/60 rec		4
									60mm	AC20 HDM bin 40/60 des		4
Base	150mm	AC32 base 40/60 rec		100mm AC32 base 40/60 rec	110mm	AC32 base 40/60 rec			190mm	AC32 base 40/60 rec		3
									190mm	AC32 HDM base 40/60 des		3

1	Polished stone value (PSV) of course aggregate in surfacing course shall be determined in accordance with relevant investigatory level standards within the Design Manual for Roads and Bridges but not less than 55
2	HRA 50/10 bin 40/60 (material ref REG1) may be used for hand laying speed tables
3	Subgrade assessment for capping layer and sub-base design are covered above
4	Any binder course material laid as a running surface prior to the final surface course being laid must have a minimum PSV of 55 and an AAV (aggregate abrasion value) of 7. This includes under block paved surfaces in carriageways
5	Block paving not to be used on bus routes

Note: Higher-category roads not covered by the tables above must be designed on a site-specific basis in accordance with the Design Manual for Roads and Bridges, as amended.

1.17.2 Where an existing road is altered or improved to serve a development, the carriageway construction must be designed to provide an equivalent structural capacity and service life to that required for the proposed site access. In most cases, the minimum bituminous layer thickness should not normally be less than that required for the relevant access road type, unless otherwise agreed.

1.17.3 For example, where a residential street is widened to serve a development accessed by a residential street, the bituminous construction should normally be not less than 250mm (comprising 40mm surface course, 60mm binder course and 150mm base). It may be necessary to overlay the existing carriageway to achieve the required depth and to provide a durable tie-in.

1.17.4 The Highway Authority will not usually accept the use of block-paving for industrial roads where those roads are intended and accepted for highway adoption.

1.18 Concrete-block paving in carriageways

1.18.1 Where the Highway Authority agree that it is appropriate, you may lay concrete-block paving to carriageways, shared surfaces and other areas used by vehicles. The blocks should be laid instead of a bituminous surface course to the standard thickness and material specification including the sub-base and base layers for the street type in question. Note that a binder course will be required as per above table. Commuted sums may be payable.

1.19 High Friction Surfacing

1.19.1 You are required to provide high friction surfacing on the approaches to signal-controlled junctions, roundabouts, and pedestrian crossings unless the Highway Authority agree otherwise. This will be either hot applied (thermoplastic) or cold applied (thermosetting) and must be in accordance with the Highway Authority's Specification.

1.19.2 High friction surfacing must be applied for a minimum length of 50m ahead of the stop line on streets subject to a 30mph limit, but an increased length may be required due to the approach speed, accident record, average queue length, proximity of side streets and mix of traffic. Outside 30mph limits you should provide a minimum length equal to the stopping distance for the approach speed plus 10 m. On approaches to pedestrian crossings the high friction surfacing must be continued past the stop-line to the first line of crossing studs.

1.20 Coloured Surfacing

1.20.1 This will be either hot applied (thermoplastic) or cold applied (thermosetting) and must be in accordance with the Highway Authority's Specification. The Highway Authority will require the payment of commuted sums to cover the future maintenance of such surfacing.

1.21 Alternative materials for footways, cycleways, carriageways, and shared surface areas

1.21.1 Where for aesthetic, environmental, or other such reasons you propose to use an alternative surfacing material, the Highway Authority will be prepared to consider its use so long as the Highway Authority have agreed its use at an early stage, the material meets the requirements of quality, durability, maintainability and sustainability, and in the interest of highway safety the material must meet specification requirements. To ensure that the surface can be kept safe and durable, the Highway Authority will need you to pay a commuted sum to cover the excess maintenance costs of most alternative materials and surfaces. Where alternative materials are proposed in locations affected by street trees or root protection areas, designers must also demonstrate compliance with Part V, Chapter 5: Verges and Street Trees.

1.22 Resurfacing carriageways at junctions with existing roads and widening existing roads

1.22.1 Where a new carriageway is joined into an existing county road or an existing county road is widened or otherwise altered, you must overlay or resurface the full width of the existing carriageway or existing carriageway as amended for the full extent of the works and to a point where a reasonable tie-in can be achieved unless the Highway Authority agree otherwise. These requirements should be read alongside the pavement design principles set out in Section 1.17 and the design guidance for higher-category roads set out above.

1.23 Kerbs, footways, footpaths, cycleways and other similar paved areas

1.23.1 The construction should be in line with the two tables below. You should also refer to the standard drawings and the Highway Authority's Specification.

Table 1.5

Residential Footways – construction materials and depths				
	Bituminous		Block Paving	
Surface Course	25mm	AC6 dense surf 100/150	90mm	60mm blocks on 30mm bedding sand (compacted)
Binder Course	90mm	AC20 dense bin 160/220 rec	90mm	AC dense bin 160/220 rec
Sub-base	225mm (see note below)	Granular Type 1	225mm (see note below)	Granular Type 1

Note: The sub-base thickness is to increase to 270mm if likely to be parked on or over-run by lorries and to 365mm if CBR values are 2% or less.

Table 1.6

Footway construction at vehicular accesses serving greater than 5 dwellings			
		Access serving less than 25 dwellings	Access serving more than 25 dwellings
Bituminous	Surface course CGM	30mm	40mm
	Binder course DBM	85mm	60mm
	Base DBM	-	150
	Sub-base & Capping	270mm Type 1 GSB (see note above)	See CBR table
Block Paving	Blockwork	60mm	80mm
	Bedding sand (compacted)	30mm	30mm
	Base DBM	90mm	150mm
	Sub-base & Capping	270 Type 1 GSB	See CBR table

1.24 Concrete-block paving in footways

1.24.1 Where the Highway Authority agree that it is appropriate, you may lay concrete-block paving to footways and other pedestrian areas. The concrete block paving must comply with and be laid in line with the requirements of the Highway Authority's specification for concrete-block paving in footways. If you use block paving you may need to pay a commuted sum.

1.25 Pedestrian deterrent paving

1.25.1 You may use approved pedestrian-deterrent paving in areas where pedestrians are to be discouraged.

1.26 Footways and other hard-paved areas on industrial access roads

1.26.1 The construction should be in line with the below Table 1.7. Where a footway crossing is to be used to access an employment or commercial development, the footway crossing must be constructed in line with industrial access road requirements.

Table 1.7

Footway and paved areas on industrial access roads - construction		
	Bituminous	
Surfacing	40mm	HRA 55/10 F surf 100/150 des
Binder course	75mm	AC20 dense bin 160/220 rec
Sub-base	270mm increasing to 365mm for CBR values of 2% or less	Granular Type

1.26.2 Where there is a likelihood of regular parking on hard-paved areas or areas that would otherwise be grassed, you should use high-relief contour paving to deter vehicles.

1.27 Flush dropped pedestrian and cyclist crossing points

1.27.1 You must provide these at all points where pedestrians and cyclists cross or join a carriageway (including any access more than a simple vehicular footway crossing). These crossing points will normally be constructed to the Highway Authority's standard drawing.

1.28 Tactile paving surfaces

1.28.1 You should construct tactile paving surfaces at all controlled and uncontrolled crossing points in accordance with the government publication 'Guidance on the use of Tactile Paving Surfaces' and the Highway Authority's standard drawings.

1.29 Widening existing footways, footpaths and cycleways

1.29.1 You must overlay or resurface full width any existing footway, footpath or cycleway that is widened, unless the Highway Authority agree otherwise.

1.30 Traffic signs, road markings, studs and traffic signals

All traffic signs you use (including bollards, retro-reflecting road studs and road markings), whether permanent or temporary, must be the size, shape, colour and type prescribed in the Traffic Signs Regulations and General Directions, and the Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions.

1.31 Traffic signs

1.31.1 You must show the details of individual traffic signs, including their posts and foundations to the Highway Authority's standard drawings and specification including the making out of traffic sign schedule sheets.

1.32 Traffic Regulation Orders

1.32.1 Traffic regulation orders are required for cycleways and may be required for footpaths, to stop motor vehicles or cyclists using them. They may also be required for certain traffic signs and road markings. The successful making of an order is not guaranteed. But you must pay any costs the Highway Authority incur in making these orders or alterations to existing orders, whether or not the order is successfully made.

1.32.2 Before the Highway Authority make a TRO the Authority has to carry out a public consultation. This gives members of the public the opportunity to raise objections. Because of this, the time it takes to complete the process can vary. You must pay any costs the Highway Authority incur carrying out these consultations whether or not the making of an order is successful.

1.33 Changes to original road layout

1.33.1 You must provide signs warning of a new road layout in accordance with the Traffic Signs Regulations and General Directions on all approaches to all permanent alteration to the original road layout as soon as it is brought into use. You must maintain these signs for three months and remove them at the end of that time.

1.34 The electricity supply to illuminated traffic signs

1.34.1 Most illuminated signs are to be fed by an electricity company supply. However, certain signs must be fed by a Highway Authority private supply, for example, a bollard on a traffic island in the middle of the road.

1.34.2 Your layout plan must show the location of all signs and bollards that need illumination so that the Highway Authority can identify the requirements for the electrical supply. These will require incorporating into the street-lighting design.

1.34.3 You are responsible for arranging for the electricity company to provide the electricity supply to the illuminated signs or arranging for a Highway Authority private supply, providing test certificates in accordance with British Standards and paying for all aspects of the works including paying energy charges and maintenance of the illuminated signs before the Highway Authority issue the final certificate.

1.35 Bulk clean and lamp change' charges

1.35.1 Before the Highway Authority issue the final certificate of completion, you must undertake or meet the cost of a 'bulk clean and lamp change' for street lighting, illuminated signs and bollards if more than 3 years have elapsed since installation.

1.36 Road markings

1.36.1 You must provide road markings in accordance with the Traffic Signs Manual and the Traffic Signs Regulations and General Directions. You must show the location, colour and type of permanent road markings on your drawings which must comply with the Highway Authority's Specification.

1.37 Road studs

1.37.1 You must provide road studs in accordance with the Traffic Signs Manual, show the locations and positions of road studs on your drawings. These shall be cored and filled with white thermoplastic at pedestrian, cyclist, and equestrian crossings to form marks as shown in the Traffic Signs Regulations and General Directions.

1.38 Street name plates

1.38.1 You are required to apply to the district council as the street-naming authority for names to be given to any new lengths of road. The district council will specify the details that they require, and you may be able to submit suggested names for consideration. The district council will advise you of the names chosen, following the necessary consultations. It is your responsibility to arrange the erection of the street name plates which the district council has chosen. Any street name plates on private drives or unadopted 'roads' should clearly state that the road or drive is 'private' or 'unadopted'.

1.39 Traffic signal equipment

1.39.1 The Highway Authority will normally design the traffic signals within the highway works based on detailed road layout drawings you have supplied. The Highway Authority will normally supply and install all permanent traffic-control equipment to be installed as part of the highway works. You must pay the reasonable cost to the Highway Authority for designing, supplying and installing the equipment including a commuted sum towards the future maintenance of the traffic-signal equipment. You must allow the Highway Authority access at all reasonable times to any part of the site on which cables, pipes, ducts or other apparatus associated with the traffic-signal equipment is to be installed or is located so the Highway Authority can carry out any works the Authority need to do to install and maintain the cables, pipes ducts or other apparatus.

1.40 Street lighting

1.40.1 The street lighting design will require technical approval as part of a Section 38 or Section S278 designed submission unless undertaken by the Highway Authority as well amendments or removal of existing street lighting. This shall be produced in accordance with the British Standard and Manual of Contract Documents for Highways Works. Ducts to be adopted by the Highway Authority should be orange, have a nominal internal diameter of 100mm, and be solid. You should contact the Electricity Distribution Network Operator to determine their requirements.

1.40.2 You are responsible for ensuring that the street lighting design is undertaken, ensuring that the specification of equipment is in accordance with the Highway Authority's specification, marking the exact position of the street lights on site for the street lighting contractor, arranging for the electricity company to provide the electricity supply to the street lights, providing up to date test certificates in accordance with the British Standard, and paying for all aspects of the works including paying energy charges and maintenance of the street lights before the Highway Authority issue the final certificate of completion.

1.41 Alternative street lighting

1.41.1 The street lighting specification the Highway Authority provide will use 'standard' galvanised steel columns with road-lighting lanterns of the appropriate height and luminance. The use of heritage or other non-standard street lighting columns and lanterns will require the Highway Authority's approval at an early stage and will attract a commuted sum to cover the increased costs of maintenance and replacement associated with this type of equipment.

1.41.2 Streetlights may be mounted on buildings provided the necessary wayleave is secured for the lifetime of the development at no cost to the Highway Authority. In many settings, this may offer a better solution than providing columns and reduce street clutter.

1.42 Street furniture and street art

1.42.1 It is important to establish at an early stage (and certainly before any-planning application) what street furniture and so on is proposed within areas that are intended to be adopted as publicly-maintained highway, and who would be responsible for it. You may need to include this as part of a concept proposal that you are required to prepare for your proposed development. Details will be required as to who is to accept future maintenance responsibility. A commuted sum is likely to be payable for any assets not essential for highway purposes but to be maintained by us. The Highway Authority does not adopt public art.

1.43 Landscaping

1.43.1 Streets, footways, footpaths, cycleways, grass, shrubs, and trees should complement the appearance of the development and the character of the surrounding area. The appropriate use of a variety of soft and hard landscaping materials, and the incorporation of existing trees and other features should be an integral part of the initial design.

1.43.2 Developers need to recognise that planted areas for adoption should be designed for minimal maintenance and may not be considered appropriate for highway purposes. Therefore, the overall use of materials, planting and landscaping of any new development should be discussed at an early stage with the local planning authority and the Highway Authority. However, it is important for developers to appreciate that the issue of planning consent does not imply that all proposed landscaping will be accepted for adoption by the Highway Authority.

1.43.3 In residential and industrial areas environmental features such as planting boxes, public open spaces, grassed areas, existing trees, hedges and fences and landscaped areas will not normally be adopted by the Highway Authority. Where such features are proposed, the developer must agree with the local planning authority future maintenance arrangements.

1.44 Hard Landscaping

1.44.1 It may be preferable to use hard landscaping rather than grass or ground cover planting in small areas of verge and within visibility splays particularly if this is more appropriate for example in an urban setting.

1.45 Grass

1.45.1 Grass is the normal acceptable treatment for service strips, verges, and rural visibility splays either by way of grass seeding or the laying of turf in accordance with the Highway Authority's specification.

1.45.2 The use of verges between carriageways and footways will require careful consideration as grass at the side of a road can makes it difficult for some people to alight from cars, restricts pedestrian crossing movements, can become rutted due to on street parking, and can obstruct sight lines from junctions and accesses particularly when trees are incorporated within the verge. If verges are proposed, these may be located at the back of footways where they may cause issues if located at the edge of the carriageway and then can be maintained either by the frontages or by a management company. When highway adoption is considered appropriate, the Highway Authority is likely to seek a commuted sum for future maintenance.

1.46 Trees

1.46.1 Trees on or next to the highway can be severely damaged by construction and maintenance work to streets and footways. Wherever possible, the Highway Authority's policy is to retain, preserve and protect existing healthy highway trees when carrying out street construction. Protection measures must always be thorough. You should put them in place before the works begin and maintain them until the works are finished.

1.46.2 Tree roots need to absorb oxygen to survive, so most of a tree's root system is found in the aerobic (oxygen-rich) soil within the 600mm immediately below the surface. The tree's roots absorb nutrients and moisture from the soil and can extend well beyond the area taken up by its crown.

1.46.3 Highway construction and maintenance design should allow for all healthy existing trees and where appropriate, the planting of new trees. You should involve the Highway Authority's forestry officer or your consultant arboriculturalist who should advise at the planning and design stage on retaining existing trees and planting new specimens. You should consider the potential growth of retained trees, their future compatibility with new and existing highway features and how near new and existing service runs will be. You should identify an appropriate protection zone around the trees you are retaining and, wherever possible, you should exclude this area from the construction site. All necessary tree maintenance work, both before and after construction, should be carried out by trained operatives in consultation with the Highway Authority's forestry officer.

1.46.4 The Highway Authority will adopt trees that have been successfully retained or have been planted in verges and other highway related land. The Highway Authority will not adopt any tree retained within a development if the Authority know that it has been damaged by poor practices during construction and the appropriate protection measures have not been employed.

1.46.5 Trees should avoid sight lines from junctions and accesses and all new trees to be located in the highway should be within tree pits.

1.47 Bird nesting season

1.47.1 You must not remove or carry out work to existing or planted trees, shrubs, hedges and other vegetation during the bird nesting season. This is generally considered to be from March until the end of July but can cover a longer period. You should check for the presence of active nests outside that period.

-End-