Part V: Highway Infrastructure and Assets
Chapter 5: Verges & Street Trees

Update 22/4/26

5.1 Principle

5.1.1 Soft landscaping significantly enhances environmental character and quality and helps mitigate climate change. The inclusion of highway verges and tree lined streets within new development are often seen as ways to help achieve these goals. The Highway Authority supports the adoption of these areas subject to good design that ensures their longevity and appropriate long-term maintenance. Commuted sums are likely to be required in this respect. The acceptability of verges and street trees will be assessed based on demonstrable functional benefit, safety, and long-term maintainability rather than appearance alone.

5.1.2 In considering the inclusion of verges and street trees, proposals should demonstrate that their design, location, and specification respond to current and future climate conditions, including increased frequency of extreme rainfall, hotter and drier summers, and extended periods of water stress, so that features remain safe, viable, and maintainable over their intended lifespan. The design of verges and street trees should not rely on ongoing specialist intervention beyond what is reasonable for routine highway maintenance once adopted.

Verges

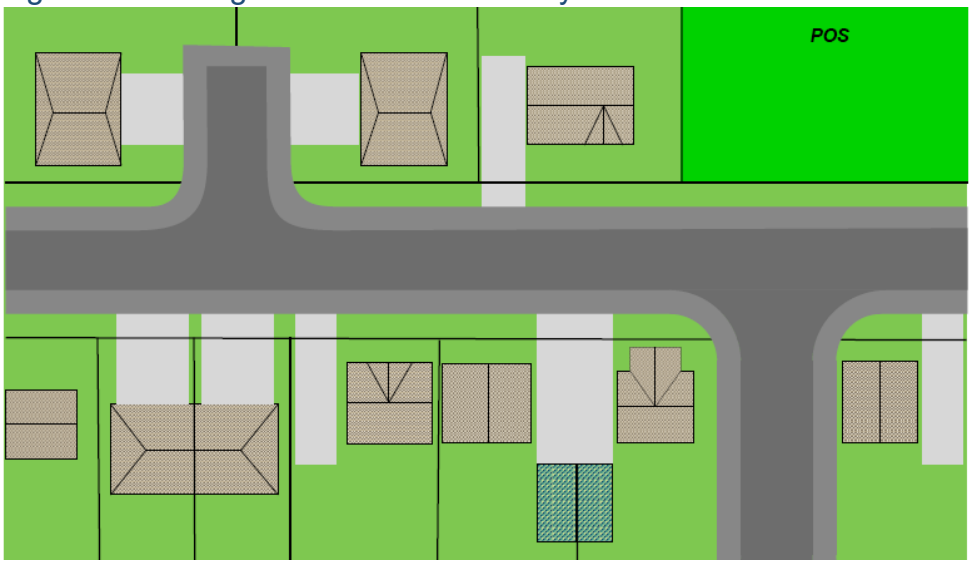
5.2 Purpose and management of verges

5.2.1 Proper provision and maintenance of highway verges is essential for road safety, environmental sustainability, and community well-being. This guidance aims to ensure that highway verges can be managed effectively and contribute positively to the landscape.

5.3 Design

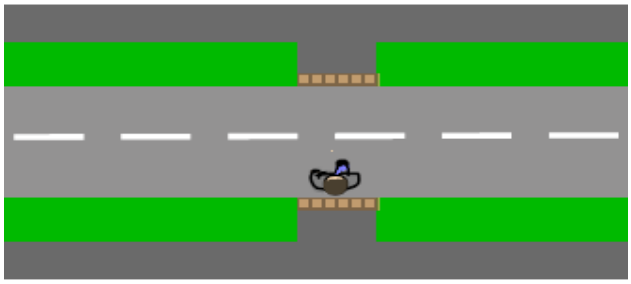
5.3.1 Highway verges should ideally be located at the back of a footway to avoid restricting pedestrians attempting to cross the street and so not to hinder access and egress from vehicles, see Figure 5.1. It is also more likely that adjacent residents or businesses would take on maintenance responsibility.

Figure 5.1 – Verge to the rear of footway



5.3.2 Verges adjacent carriageways may be appropriate where the speed or volume of passing traffic would warrant providing pedestrian segregation from the carriageway. Where this is desirable, pedestrian desire lines must be considered as part of the design process and appropriate pedestrian crossing points with tactile paving established that avoid dropped kerbs required for vehicular access, see Figure 5.2.

Figure 5.2 – Pedestrian crossing



5.3.3 It would not normally be appropriate to provide a verge adjacent the carriageway where there are likely destinations that would create a higher level of pedestrian crossing demand than that normally experienced in residential or industrial areas along the length of a street or part thereof (see Figure 5.3) unless frequent and obvious pedestrian crossing points have been incorporated into the design. This may be to access a row of shops, a school, or where parking has been provided on the opposite side of the carriageway to development.

5.3.4 When proposed, the inclusion of verges should be an integral part of the development and be consistent throughout the street layout rather than piecemeal. Isolated pockets of grass are often neglected so are unlikely to be supported, particularly if their only purpose is to deal with spare areas of land that could not be integrated into plot boundaries and would not otherwise be required for highway purposes. Where such areas cannot be avoided and are not on pedestrian desire lines so not required as footway, they should be hard paved in contrasting materials such as setts or cobbles to break up the expanse of tarmac. Verges should be a minimum of 1.0m wide (2.0m if containing services or if containing street trees) and a minimum of 10sq.m located in areas where residents or businesses would be likely to take on maintenance responsibilities. Verges abutting flank frontages, substations, or other areas where there is unlikely to be a close synergy with adjacent land should be avoided unless on a spine or distributer road with limited frontage development and in a location where a high level of verge maintenance would not be expected. Small parcels of grass between dropped kerbs are likely to be overrun by delivery drivers and visitors so should be omitted in favour of hard paving, see Figure 5.4.

Figure 5.3 – Poor pedestrian links across the carriageway and into the development

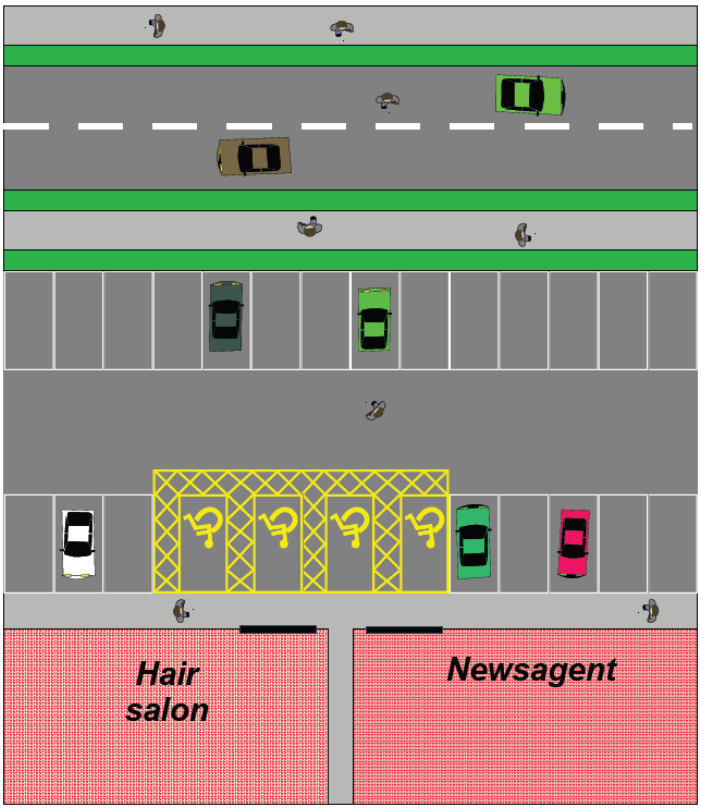
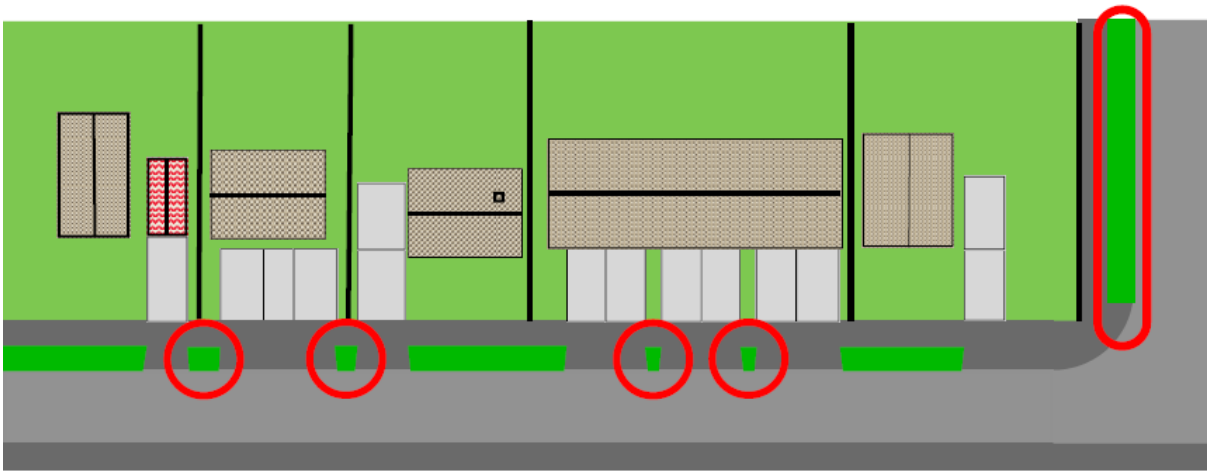


Figure 5.4 – Poorly thought-out verges



5.3.5 Where verges are intended to form part of a surface water management strategy, their design must be compatible with highway safety, structural integrity, and long-term maintenance requirements and should not rely on informal infiltration into compacted soils.

5.4 Visibility splays

5.4.1 Verges should generally avoid junction and forward visibility splays unless in rural areas where footways and or cycleways are absent. When that is the case, a minimum height of 300mm should be available between ground level and the bottom of the vertical height of the splay to allow for grass growth. Where less than 300mm would be available, physical measures may be required to prevent the growth of vegetation spanning the area, usually on crests or embankments, see Figure 5.5. Where verges are desirable adjacent footways or cycleways, it may be appropriate to locate the verge to the back of a footway / cycleway or switch the verge to the back of the footway / cycleway over the length of the splays, see Figure 5.6.

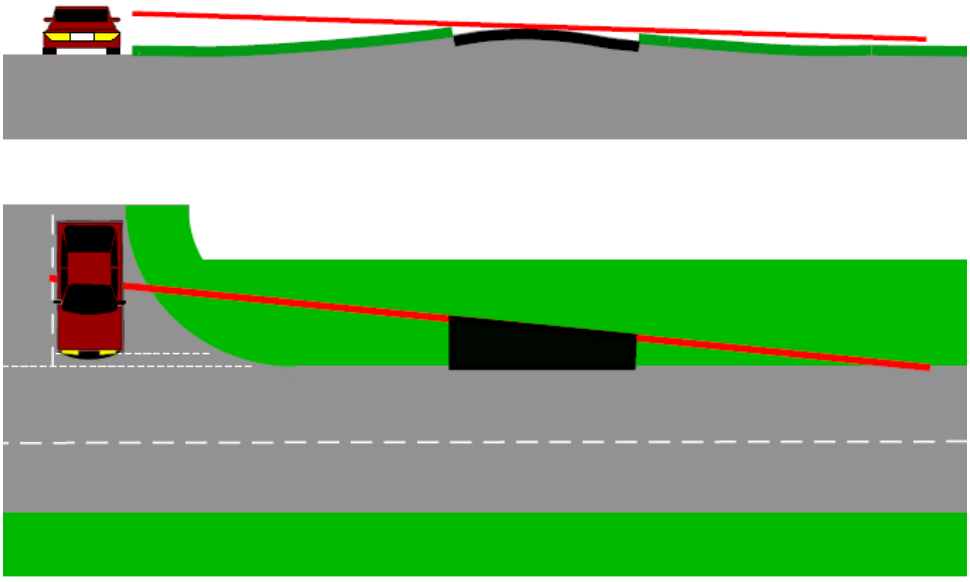


Figure 5.5 – Area of hard paving to prevent grass growth encroaching into the visibility splay

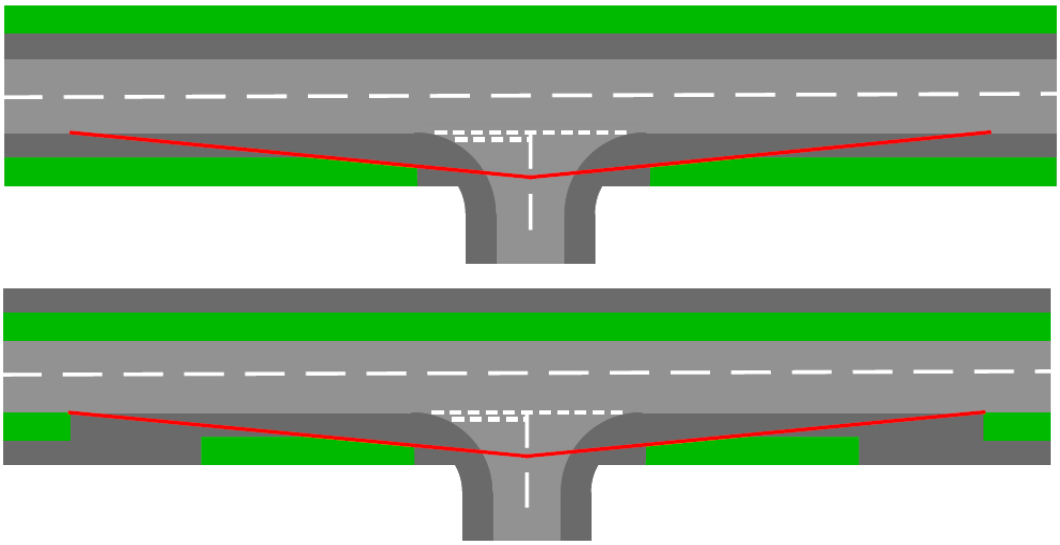


Figure 5.6 – Verges to the rear of visibility splays

5.5 Levels and margins

5.5.1 The general level of grass should be 10mm higher, (after settlement) than surrounding hard areas, including kerbs and edgings to facilitate mowing. In level areas, verges should be slightly domed rather than flat or dished to assist with drainage unless land drains are incorporated into the design. For ease of maintenance, slopes should not exceed 1 in 3 (33.3%), see Figure 5.8. Verges should not abut vertical structures such as fences or walls as mowing against them is impractical. Where physical boundaries are unavoidable a 225mm minimum width hard paved margin should be provided to remove the need for edging operations. Signposts, lamp columns, utility boxes, post boxes, guardrail, street furniture etc. should generally be placed in hard paved areas or be surrounded by a minimum width margin, see Figure 5.7. Verges should be designed to avoid prolonged saturation, rutting, or erosion during extreme rainfall events and to minimise maintenance requirements during extended dry periods, taking account of soil type, gradients, and surface runoff paths.

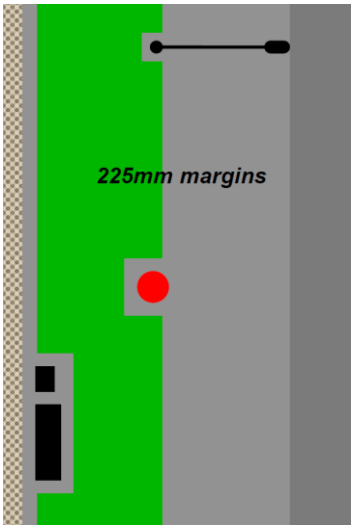


Figure 5.7 - Margins

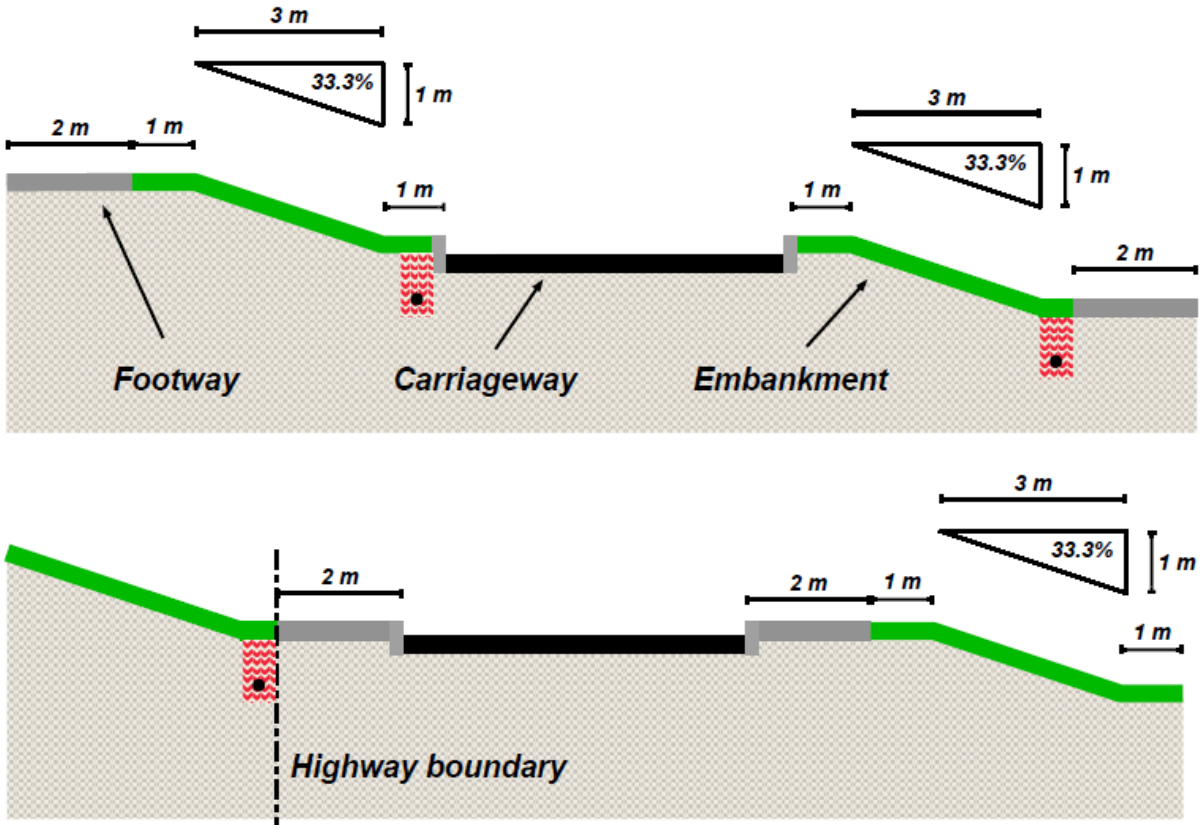


Figure 5.8 – Grass embankments (indicative sketch dimensions may vary depending on design)

Notes: Steeper embankments may be acceptable but not in areas that will require mowing.

The Highway Authority would not normally adopt an embankment less than 1.35m in height descending from a highway verge if not required to provide lateral support to the highway above.

5.6 Demarcation

5.6.1 A highway verge at the back of a footway or cycleway and abutting private gardens or soft landscaped areas must be clearly distinguishable to ensure that the extent of the highway and possible location of underground services is easily recognisable to adjacent residents or businesses. Restrictive covenants that prohibit interference may be appropriate. The back of the verge (extent of the public highway) must be demarcated by a concrete footway edging, see Figure 5.9. Sett or cobble patches should be provided to contain stop taps, hydrants etc.

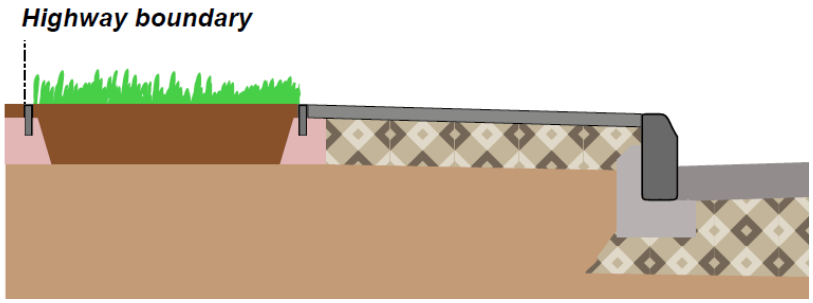


Figure 5.9 – Highway boundary demarked by concrete edging

5.7 On-street parking

5.7.1 High levels of car ownership, particularly in high density residential development or within industrial areas with insufficient off-street parking and or with poor links to public transport, can lead to parking on highway verges. Where this occurs frequently, verges quickly become unsightly as grass dies off and ruts appear. This often results in ponding and vehicles spreading mud. Ultimately, these areas may be hard

paved undermining the purpose of their inclusion in the first place. Therefore, verges should be avoided where on-street parking is likely to occur partially on the grass, e.g. on streets where the carriageway is narrow or where parking is likely to occur on both sides, unless measures are put in place to prevent this from happening. This could be by installing high kerbs, bollards, or positioning verges at the back of a footway, notwithstanding that the probability of footway parking should also be minimised. Additional infrastructure such as bollards are likely to be subject to a commuted sum.

5.8 Utility services

5.8.1 It is not appropriate to place trees in verges where verges are intended to contain services (service strips). Where trees are intended to be located adjacent service strips, root barriers and or deflectors should be provided, see Section 5.25 and Part V, Chapter 3: Utility Services.

Street Trees

5.9 Purpose and management of street trees

5.9.1 Street trees have an important role to play in our street scene. They provide many benefits including providing shelter, improving air quality, support for wildlife, climate moderation, enhancing the landscape, improving local amenity, and reducing the risk of flooding. For these reasons, the Highway Authority will not normally remove a street tree unless the tree represents a risk to road safety, or the tree is dead or diseased.

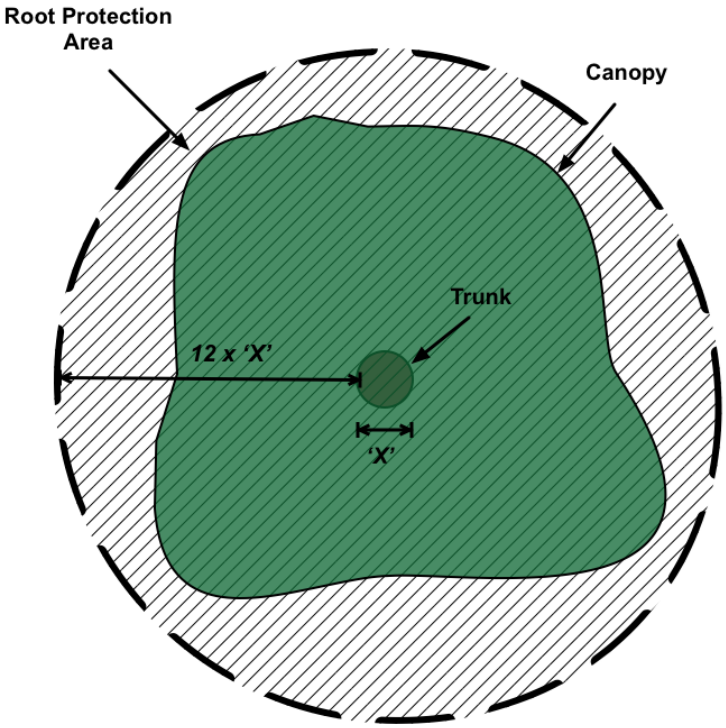
5.10 Development

5.10.1 When considering a development proposal, every effort should be made to avoid existing street trees and their roots which can spread a considerable distance beyond the spread of branches. The removal of trees from public spaces is almost always controversial which could delay the granting of planning permission. The Highway Authority may not support a proposal if it would have an adverse impact on the environment or where the proposed mitigation scheme does not provide a net gain to existing local street tree stocks in a form that is resilient to current and future development pressures considering the age, health, life expectancy, and biodiversity benefits of the existing tree(s).

5.11 Works close to trees

5.11.1 A Root Protection Area (RPA) is the minimum area around a tree deemed to contain enough roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. The extent of the RPA from the trunk is calculated by multiplying the diameter of the tree at 1.5m above ground level by 12 (see figure 5.10) but is capped as an area with a radius of 15m. This calculation should be undertaken by a trained arborist. The area should then be avoided to prevent damage to the tree's root system immediately under and just beyond the crown. There is no point identifying a tree to be retained which will have a large proportion of its roots removed as the tree will almost certainly die.

Figure 5.10 – Root Protection Area



5.12 Works within the RPA

5.12.1 Where the construction of hard surfaces cannot be avoided within the root protection area say to provide a vehicular verge crossover or to provide a new footway, a no-dig design should be used to avoid root loss due to excavation. In addition, the structure of the hard surface should be designed to avoid localized compaction, by evenly distributing the carried weight over the width of the works within the RPA. Such designs might include the use of a three-dimensional cellular confinement system to support the sub-base and act as a load suspension layer. Where this type of construction is required, site-specific and specialist advice should be sought from an engineer and an arboriculturist to ensure that it is fit for purpose (see figure 5.11).

Notes: It is often not possible to employ no dig techniques to form a vehicular crossover as this may result in an unacceptable crossfall gradient where the verge and or adjacent footway is higher than the carriageway.

The approved engineering design would likely have a waterproof surface (bituminous) and therefore reduce moisture infiltration and gas diffusion around the roots of the tree. The works should therefore cover no more than 20% cumulatively of the RPA or be no wider than 3.0m within it (see figure 5.12).

Figure 5.11 Surfacing near trees using a cellular confinement system

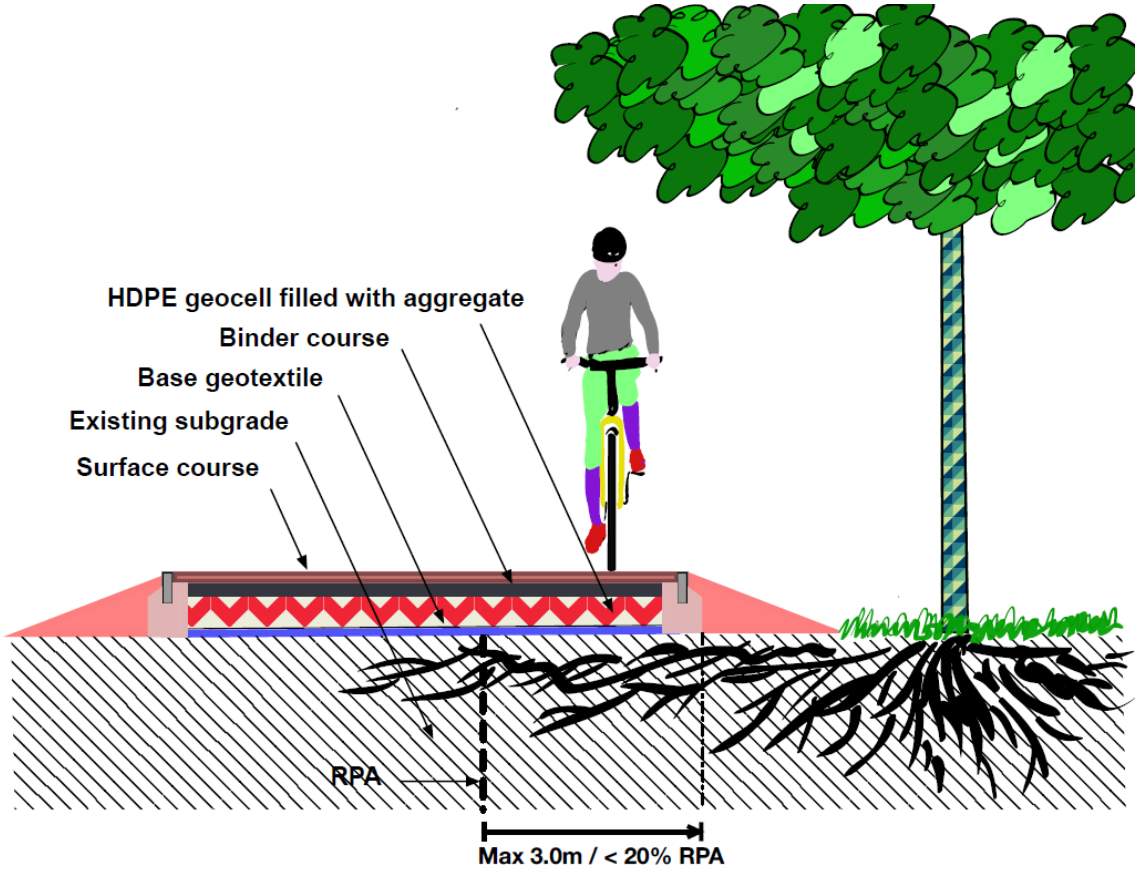
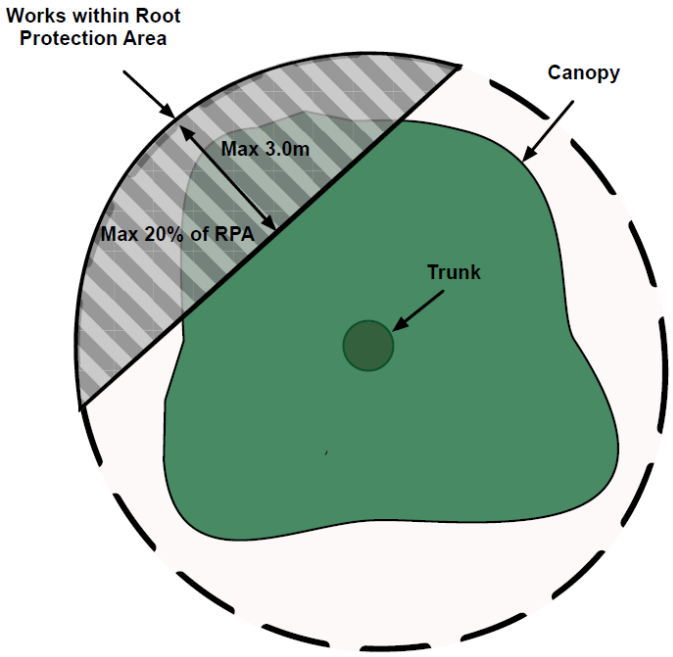
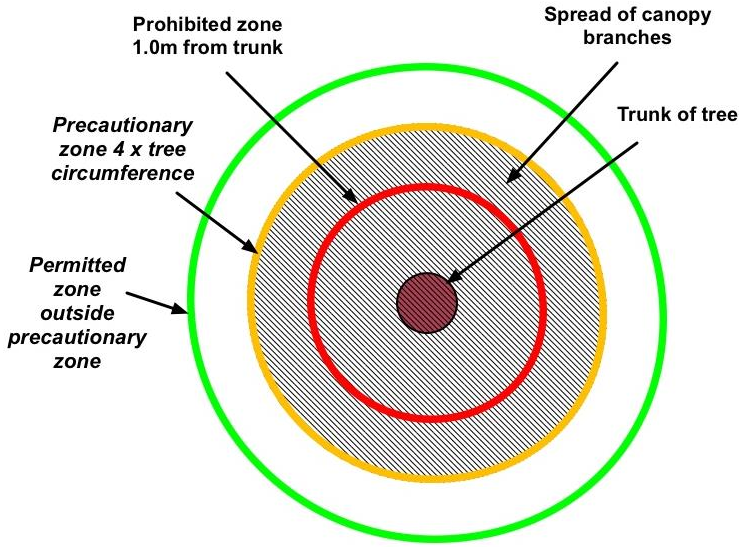


Figure 5.12 – Works within Root Protection Area



5.12.2 You should be aware that the Street Works UK have produced its own guidelines for the planning, installation, and maintenance of utility apparatus in proximity to trees which should be followed when carrying out utility works as part of development near street trees.

Figure 5.13 – Tree protection zone



See Appendix F – Street Works UK Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees Issue 3 – January 2026

5.13 Type of tree

5.13.1 Choosing the right tree is essential whether a replacement or a new tree to be planted in a new street. The list provided in Appendix D is not exhaustive and other appropriate species can be considered. Scale, urban tolerance, and the appropriateness of the form within the street are key considerations. All tree replacements should be looking to improve Biodiversity Net Gain with a greater focus on natives or native cultivars. Species selection should consider projected climate conditions over the anticipated life of the tree, including tolerance to drought, heat stress, and changes in rainfall patterns.

5.13.2 The species listed in Appendix D are typically better suited to the sometimes-difficult conditions found within urban areas and adjacent main streets and require minimal maintenance. To ensure a reasonable chance of a newly planted tree becoming established, it should be at least of heavy standard and be container grown or have a well-prepared root ball, (girth of 12-14cm, height 3.3m to 4.0m).

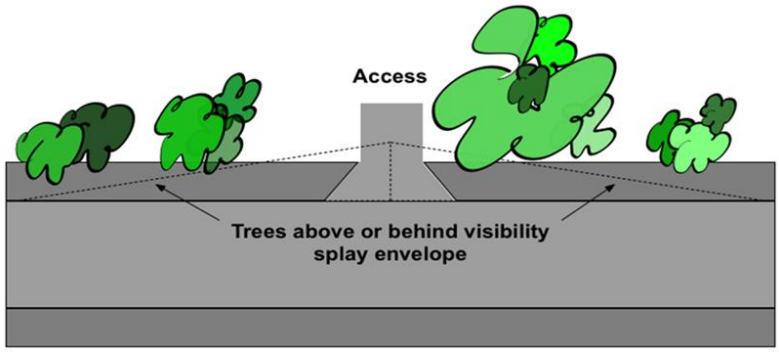
5.13.3 Tree species which are prone to epicormic growth issues should be avoided due to their potential to block visibility splays, and to obstruct footways and cycleways, as should species with brittle failure characteristics that tend to suddenly fail, causing branches to drop suddenly onto the street below.

5.13.4 This guidance does not set a minimum or maximum number of trees or extent of canopy cover. What is most important is choosing the right tree for the right place considering the size of the tree at maturity and the species. The tree must be able to grow freely without affecting the integrity of the highway, highway infrastructure such as bus shelters and street lighting, utility services, and buildings both above and below ground level.

5.14 Street tree plans

5.14.1 The details of a street tree planting scheme will require including on a layout plan of the proposed development. The plan must show nearby visibility splays if applicable (see figure 5.14), the new tree(s) location, size when mature, species, sufficient soil volume for root growth, as well as the location and potential constraints presented by existing and proposed utility infrastructure, drainage, gullies, soakaways, street lighting, road signs, bus stops and shelters etc. that would be within the vicinity of the proposed planting scheme. Where there are junctions or vehicular accesses, trees would typically be best located to the rear of a footway/cycleway to avoid visibility splays.

Figure 5.14 – Visibility splays plan view



Splays applicable to both junctions and accesses (dropped vehicular footway/verge crossovers)

5.15 Footway and cycleway widths

5.15.1 Where a tree is proposed to be in or adjacent a footway, a footway width of 2.0m should remain available considering the width of the trunk once the tree is fully grown and the surface treatment around the base of the tree (see table 5.2) as this should allow two wheelchair users to pass one another comfortably. Where this is not possible, due to existing physical constraints, 1.5m is regarded as the minimum acceptable width in most circumstances as this would give enough space for a wheelchair user and a walker to pass one another. The absolute minimum width where there is an obstacle is 1.0m, but not within a new street. A minimum footway width of 3m should be maintained at bus stops and a footway width of 3.5m to 4.5m is usually considered suitable by shops and other areas with high pedestrian activity such as adjacent schools which should not be compromised materially by a proposal that contains multiple trees that are closely spaced. In these cases, additional space may be required. The guidance provided in Department for Transport LTN 1/20 Cycle Infrastructure Design should be followed with respect the space requirements for cyclists.

5.16 Headroom – See Figure 5.15 & Table 5.1

5.16.1 The tree canopy should allow a clearance of 2.6m above a footway increasing to 2.7m over a cycleway. A carriageway clearance of 5.3m will be required where the crown is likely to overhang the path of motor vehicles.

5.17 Clearance – See Figure 5.15 & Table 5.1

5.17.1 The location of the tree must provide enough clearance from the edge of the carriageway to allow for the lateral overhang of the largest vehicle likely to pass i.e. projecting wing mirrors, the height of the vehicle, carriageway camber, and potential sway. A clearance of 0.6m is considered acceptable under normal circumstances which should be available from the time of planting up to when the tree reaches maturity. However, this distance may need to increase to protect visibility splays.

5.17.2 Trees must not be located too close to buildings. Consideration must be given to the eventual spread of the tree canopy. A separation distance of up to 6.0m may be required between trunk centres and façades/structures. A minimum distance of around 0.75-1.5m must be kept between the predicted canopy extent of a tree once mature and buildings/structures (including balconies). Consideration should also be given to the presence of windows, the light requirements of occupants, and their eventual view of the street. Trees may eventually overhang garden walls, railings, and other simple free-standing structures lower than 1.8m without clashing, but it does not necessarily follow that canopies may project over these structures without consent from the adjacent landowner. Covenants may be required to protect trees where the final extent is intended to project over land in third-party ownership.

Figure 5.15 - Typical clearance requirements

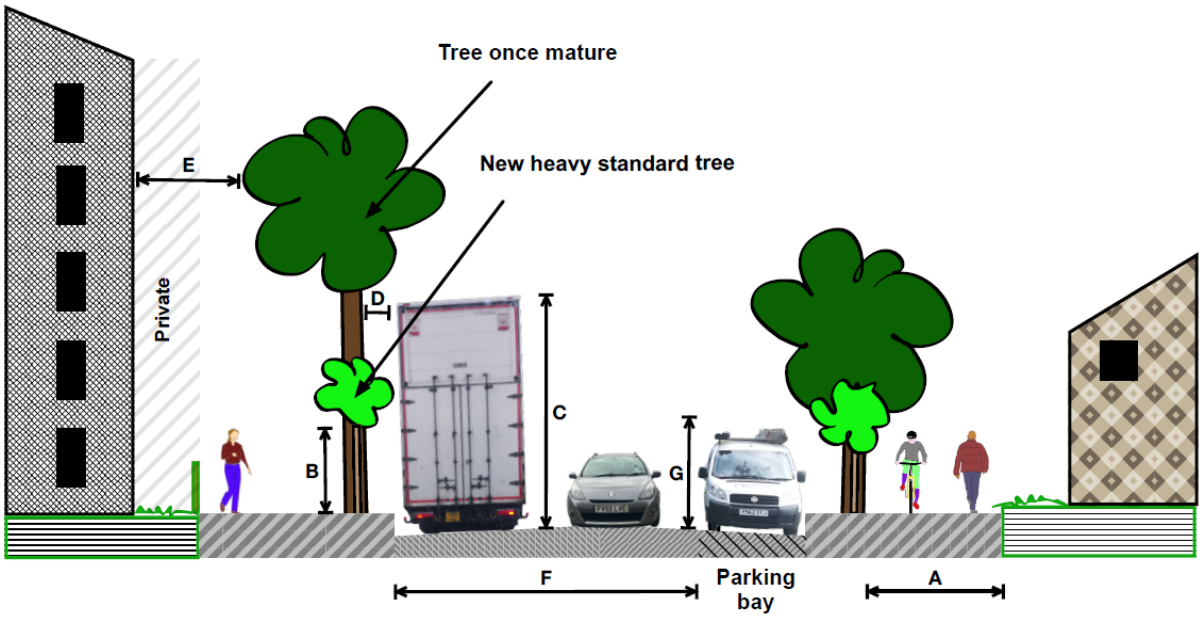


Table 5.1 – Typical headroom and clearance requirements

Summary table		**See figure 5.15**
Tree size	Minimum Heavy Standard (girth of 12-14cm, height 3.3m to 4.0m)	
Footway horizontal clearance	Normally 2.0m Minimum 1.5m where space is restricted Absolute minimum 1.0m but not in new build situations Minimum 3.0m near bus stops Generally, 3.5m to 4.5m near shops and other area with high numbers of pedestrians Note: Consideration must be given as to whether the surface materials around the tree is suitable for pedestrians (see Figure 5.5.4).	A
Cycleway horizontal clearance	The guidance provided in Department for Transport LTN 1/20 Cycle Infrastructure Design should be followed with respect the space requirements for cyclists. Note: The surface material around the tree must avoid the cycleway (see Figure 5.5.4).	A
Headroom	≥ 2.6m above a footway ≥ 2.7m above a cycleway ≥ 5.3m above a carriageway and loading bays ≥ 3.0m above designated car parking bays	B, C and G
Clearance from edge of carriageway	Usually 0.6m	D
Distance from buildings	Minimum 0.75-1.5m between canopy and building. (Landowner consent may be required should the eventual canopy spread extend over land in private ownership).	E
Carriageway width	Minimum carriageway width to be maintained between canopies <5.3m high where there are parking bays.	F

Summary table		See figure 5.15
Tree size	Minimum Heavy Standard (girth of 12-14cm, height 3.3m to 4.0m)	
Footway horizontal clearance	Normally 2.0m Minimum 1.5m where space is restricted Absolute minimum 1.0m but not in new build situations Minimum 3.0m near bus stops Generally, 3.5m to 4.5m near shops and other area with high numbers of pedestrians Note: Consideration must be given as to whether the surface materials around the tree is suitable for pedestrians (see Figure 5.5.4).	A
Note: All dimensions should be based on the eventual size of the tree once mature.		

5.18 Street safety

5.18.1 Once a tree is established even a small specimen is sufficiently immoveable to contribute to the severity of an accident where a vehicle leaves the carriageway even in a low-speed residential environment. The design of the street must consider whether the proposed location of a tree would materially add to this risk in terms of the tree's location in proximity to a bend or junction, the set back of the tree, and the likely speed of passing traffic. Consideration should also be given to how climate-driven factors such as increased canopy growth rates, heavier leaf fall, or prolonged shading may affect long-term visibility, surface condition, and winter maintenance.

5.18.2 If a tree trunk is expected to reach a large girth, the tree should be sufficiently set back so not to obscure the view of pedestrians wishing to cross the street especially if any epicormic growth is likely. Attention is needed at junctions, close to linking footpaths or alleyways, school accesses, and bus stops etc. An obstruction to pedestrian visibility may be exacerbated by a line of tree trunks forming an extended barrier to inter-visibility.

5.18.3 Sufficient space must be provided around the base of the tree to avoid the surrounding surface becoming distorted or cracked by roots as the tree matures. This is a particular issue for cyclists but can also lead to a trip hazard for pedestrians.

5.18.4 A closely spaced line of trees on the south side of a street can lead to the street surface remaining wet or even icy for extended periods which may be a problem particularly on bends. Leaf litter and other debris may also have safety implications for cyclists particularly when wet.

5.19 Street lighting, road signs, bus stops, and gullies

5.19.1 A planting scheme, both public and private, should avoid street lighting, road signs, and roadside drainage gullies which may be damaged by roots and become blocked with leaf litter. Bus stop/shelters should be avoided where trees may obstruct the visibility of waiting passengers and where a reduction in light may cause waiting passengers to feel vulnerable. Trees should be located equidistant between lamp columns or be located on the opposite side of the street. Lighting Columns when first installed should be sited so that it is not necessary to carry out substantial cutting back of trees, considering the fully mature spread of the tree. In new streets where trees are to be planted, the lighting should be designed in consultation with the landscape architects and/or by considering the landscaping plan or tree schedule. A tree should never be planted in front of a road sign and should be set back from a sign at a distance of at least the maximum spread of the tree canopy once fully grown. All street features should be considered at the design stage with equal importance to ensure satisfactory accommodation. It may be easier to find acceptable alternative locations for say signs or gullies that are likely to require less space than trees.

5.20 Soil volume

5.20.1 The planting hole, often referred to as a “tree pit”, should not be interpreted as the total space required to accommodate a tree. Adequate rooting volume is essential not only for tree growth but also for resilience to drought, wind loading, and prolonged dry periods. To ensure long-term survival, sufficient uncompacted soil volume must be provided to allow roots to develop without compromising the integrity of the highway or underground services.

The required uncompacted soil volume per tree should be derived using a realistic projection of the mature tree canopy. A commonly applied approach is to provide soil to an effective rooting depth of 600mm, reflecting that the majority of tree roots are typically concentrated within the uppermost layers of soil. This equates to providing 0.6m³ of soil for every 1.0m² of projected canopy area, calculated as follows:

Projected mature canopy area (m²) × Soil depth (0.6m) = Target uncompacted soil volume (m³)

Example (5.0m diameter mature canopy):
Canopy area = $\pi \times (2.5\,\text{m})^2 = 19.63\,\text{m}^2$
Required soil volume = $19.63\,\text{m}^2 \times 0.6\,\text{m} = 11.78\,\text{m}^3$

Soil area extent will often broadly correspond to projected canopy area where a 600 mm effective rooting depth is achieved, but this should not be assumed where soil depth is constrained or engineered systems are used.

Note: A minimum uncompacted soil volume of 5m³ is considered suitable for trees with a mature canopy diameter of up to 3.0 m.

5.20.2 The plan shape of the soil area does not need to be regular and may be adapted to suit site constraints. For example, continuous or shared planting pits may be used to increase available rooting space. Where soil volume is constrained by available area, it cannot be compensated for by increasing depth alone.

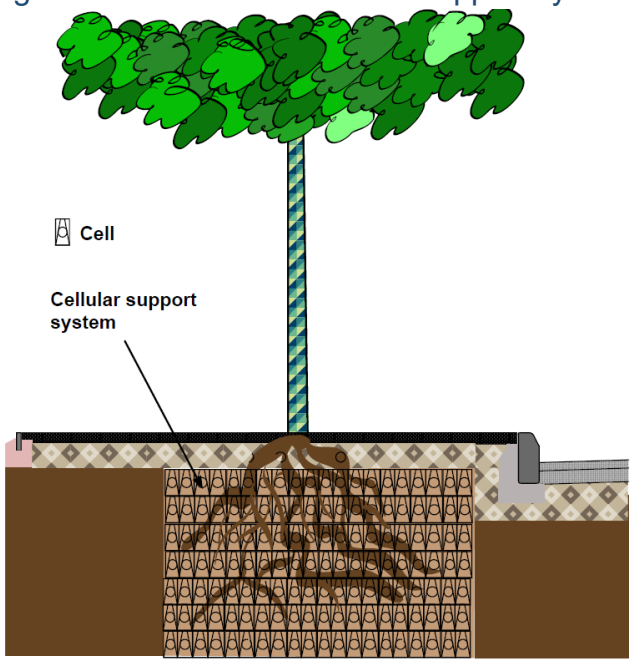
5.20.3 Construction activities can have a significant effect on soil structure and long-term rooting potential. Areas intended to provide uncompacted soil volume for street trees should be protected from trafficking, storage of materials, plant movements, and other sources of compaction during construction. Where this cannot be avoided, appropriate mitigation measures should be identified, such as temporary ground protection, restricted access zones, or soil remediation prior to planting. Only soil volume that remains uncompacted and biologically available to roots following construction will be taken into account when assessing compliance with this guidance.

5.20.4 The maximum useful depth of topsoil for tree planting is typically around 900mm. However, as the majority of a tree’s root system is generally concentrated within the uppermost 600mm of soil, this depth should be used for the purposes of calculating effective rooting volume. Excavation beyond this depth does not compensate for insufficient soil area and should not be relied upon to meet minimum soil volume requirements.

5.20.5Where root barriers, structural soils, modular cell systems, or other underground support structures are proposed, careful consideration must be given to their effect on the volume of usable, uncompacted growing medium available to the tree.

5.20.6 The load bearing requirements of hard surfaced areas require a compacted formation layer that is not compatible with root growth. In hard landscaped areas, where load bearing is required, the sub-surface may need to be engineered to provide sufficient support whilst avoiding compaction of the growing media. Various techniques and products are available including structural growing media, crate, and raft systems, or a combination of these, all of which will require the Highway Authority’s technical approval (see figure 5.16).

Figure 5.16 – Modular cellular support system



A modular cell support system resembles a stack of milk crates installed in the ground and filled with soil along with aeration and irrigation pipes. The cells provide load bearing support for the pavement, and prevents compaction of the soil so that water, oxygen, and nutrients can find their way to tree roots.

5.21 Trees to be removed from existing streets

5.21.1 To determine whether it is appropriate for a street tree(s) to be removed and whether the proposed mitigation scheme would adequately address the loss of amenity, the submitted details should include a plan of the existing tree(s), as well as a valuation of the tree(s) to be removed and of its replacements. The plan as existing shall accurately identify the location, size (diameter of trunk and spread of canopy), species of the tree(s) to be removed, and the proposed works including, if applicable, the visibility splays that will affect the tree(s). In considering suitable locations for replacement planting, the following approach will normally be applied:

- on the same street and within the immediate public realm where the tree is removed,
- elsewhere within nearby adoptable highway land where an equivalent function and amenity can be achieved,
- exceptionally, within the wider public realm where it can be demonstrated that a comparable benefit will be delivered.

5.22 Tree valuation

5.22.1 Valuing the amenity of trees is important for calculating loss of amenity and a suitable replacement value. The normal method, acceptable to the Highway Authority, would be for you to carry out a CAVAT assessment (Capital Asset Value for Amenity Trees) on both the tree(s) to be removed and the proposed tree replacement scheme. The replacement value must be no less than the value of the tree(s) to be removed.

5.23 Nesting birds

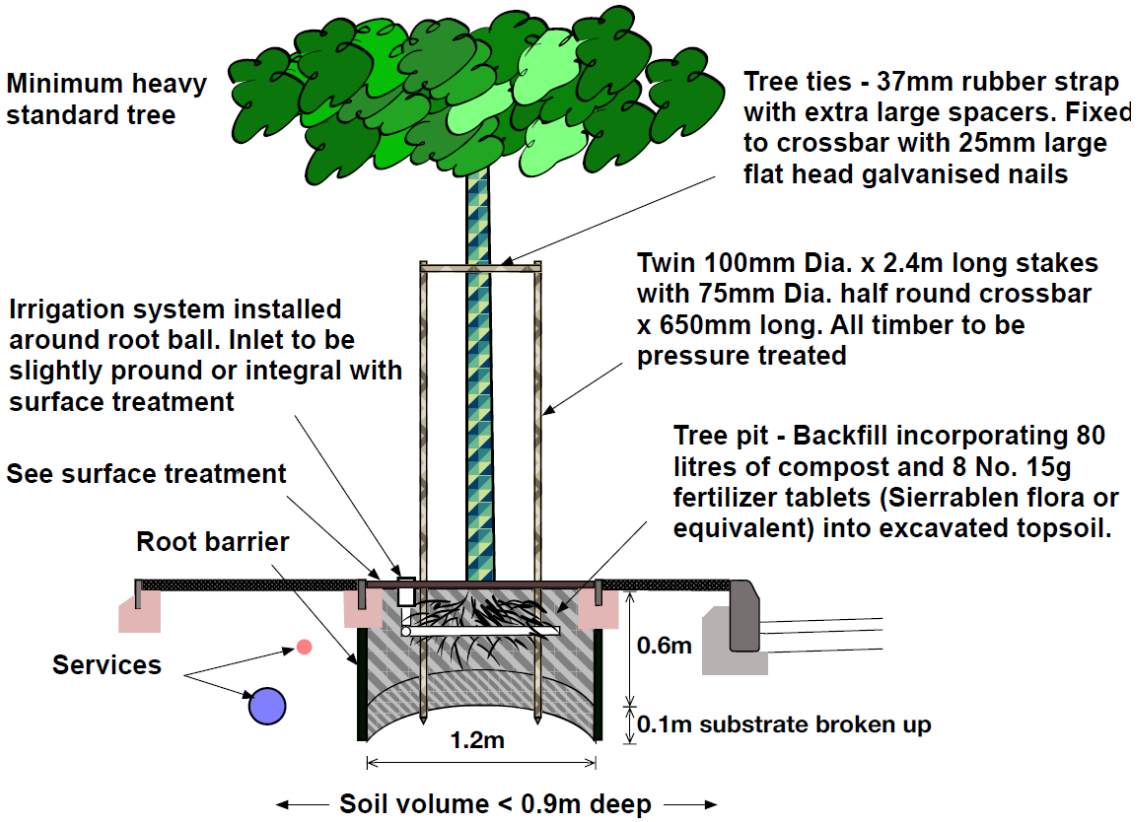
5.23.1 The removal of street trees, shrubs, or other vegetation should take place outside of the months of March to August inclusive to avoid the bird nesting season, unless a recent survey has been undertaken by a competent ecologist to assess the nesting bird activity on site during that period, and details of measures to protect the interests of nesting birds on site have been approved by the Highway Authority prior to implementation.

5.24 Tree planting and removal

5.24.1 All new trees must be planted in suitably formed tree pits (see figure 5.17). Tree removal and planting should be undertaken by appropriately qualified contractors who understand the technical requirements of pit size, irrigation, and staking. The design of tree guards, grilles and porous gravel should

be compatible with the location and will require approval by the Highway Authority. In most circumstances tree planting shall take place between the months of November and March inclusive. Where existing trees are to be removed to facilitate development or a replacement planting scheme, stumps and major roots within the footprint of new highway works or proposed tree pits shall be fully removed, unless otherwise agreed in writing by the Highway Authority.

Figure 5.17 - Tree pit indicative detail



Notes: Tree pit sizes should be increased where necessary to ensure pits are at least 300mm wider and 75mm deeper than the tree root system when fully spread.

A ground penetrating radar (GPR) survey should be undertaken to identify underground services as part of the design process. If a new tree pit cannot be excavated due to the location of utility services not previously identified or accurately located, the Highway Authority must be notified to agree an alternative location.

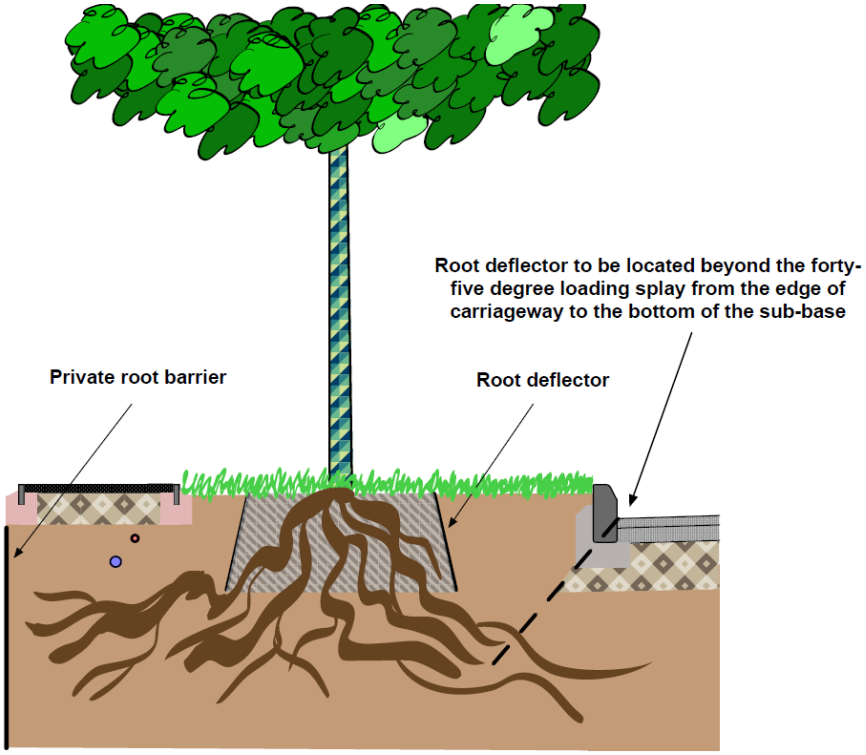
5.25 Root barriers and deflectors – See Figure 5.18

5.25.1 Suitable root barriers such a root-deflectors may be required where a street tree(s) is proposed in a hard-landscaped area (footpaths, footways, paved and blocked paved areas) and where services are close to a proposed street tree(s) to protect against damage to cables and pipes. A report identifying the location and potential constraints presented by the existing utility infrastructure within the vicinity of the proposed planting scheme will require submitting with the plan informed by a GPR survey as well as utility company records.

5.25.2 Depending on what needs to be protected and where it is in relation to the tree, different root management solutions are available. Continuous paved surfaces for example, require roots to be managed downwards at least 300mm to reduce the risk of pavement heave and other surface root damage. Deeper protection would be required near underground utilities. The standard depth of a water pipe is 750mm, whereas a high voltage cable could be up to 1200mm below ground level (see Part V, Chapter 3: Utilities).

5.25.3 Root barriers are constructed before planting and can incorporate single trees or protect an entire treeline. For established streets, creating root barriers around each tree is often the best solution, whereas for new streets and footways a long, straight barrier between the planted zone and services is preferred. Vertical root barriers should not be installed all round a tree and should only be used as required to protect underground services. It is also recommended that a root barrier be installed between trees and any proposed buildings in those cases where the face of the building would lie within the eventual root spread of the tree once it is mature, and similarly where private trees are to be planted close to the highway boundary. In both instances, the barrier would then be located beyond the highway boundary.

Figure 5.18 – Indicative street tree with root deflector



5.26 Above ground tree protection (guards and grilles)

5.26.1 Tree guards will be required in areas with a high level of pedestrian activity such as pedestrianized areas, near schools, stadiums, and shopping precincts or anywhere where tree damage is predicted due to carelessness or vandalism. Additional space may be required if the guard would reduce the available footway or cycleway width.

5.26.2 Tree grilles are likely to be required within footways and pedestrianized areas with a footfall that is greater than would be expected in a purely residential setting such as close to schools or shops or where the surface treatment around the tree is to form part of the width required for pedestrians, particularly the disabled. The design of the grille must consider whether vehicular traffic is anticipated. The aperture within the grille must be sufficient to accommodate the anticipated eventual girth of the tree trunk once the tree is mature or include internal rings which can be removed as the tree grows, see table 5.2.

Table 5.2 – Suitability of surface materials around street trees

Key High – H Medium – M Low – L Note: Not considered acceptable on first planting but included for completeness.		**Surface material**							
		Gravel – Resin bound	Bound shredded rubber	Gravel – Self-binding	Grilles	Mulch - Inorganic	Mulch - Organic	Rubber crumb	Bituminous
Tree care	Permeability of air and water	H	H	M	H	H	H	H	L
	Potential to improve soil fertility	L	L	L	L	L	H	L	L
Suitability for location	Pedestrian friendliness	H	H	M	H	L	L	H	H
	Cycle friendliness	L	L	L	L	L	L	L	L
	Resistance to disturbance	H	H	L	H	L	L	H	H
	Weed suppression	M	M	M	L	H	M	M	H
Installation / maintenance	Suitability on planting	M	M	M	H	H	H	L	L
	Suitability up to trunk of a young tree	L	L	M	L	H	H	M	L
	Flexibility of material	M	M	H	L	H	H	H	M
	Engineering difficulty	H	H	M	H	L	L	H	M
	Life expectancy	M	M	M	H	L	L	M	H
	Maintenance burden	H	H	M	M	L	L	H	L
Risk of damaging tree	Young tree if incorrectly installed	H	H	H	M	L	L	M	H
	Established tree if incorrectly installed	L	L	L	H	L	L	L	H
	If not maintained	M	M	L	H	L	L	M	M

Notes: The inclusion of each potential surfacing material in the above table should not be viewed as an indication of general acceptance. Each proposal will be treated on its own merits given the proposed location.

The low to high grading of each surface treatment against each section is for indicative purposes only. The suitability of the surface treatment in any given location should be confirmed by the manufacturer's specification and will be subject to technical approval. The London Tree Officers Association provides excellent detailed guidance on "Surface materials around trees in hard landscapes".

5.27 Tree maintenance

5.27.1 Replacement or new street trees will be subject to a 3-year establishment period where you will be responsible for watering at a frequency necessary to ensure establishment and survival of all trees that form part of a planting scheme. You may also remain responsible for replacing trees for an extended period in accordance with the planning permission should a tree die or be damaged.

5.28 Watering

5.28.1 For a heavy standard tree between 120mm to 160mm Green Blue Urban's "Urban Tree Planting Design Guide" estimates that a typical Plane tree will require water at a rate of 115lt to 150lt per month during the summer. Additional watering is likely to be required during periods of abnormally dry weather. Water should be applied by low pressure hose at a steady rate to avoid run-off and erosion of the surrounding area via an approved irrigation system installed at the time of planting. Where mulch has been used and is washed or displaced onto adjoining hard surfaces and/or grassed areas, this must be swept up and if not contaminated by weeds or rubbish returned to the planted area and spread to the original depth. Any mulch which has been contaminated by weeds or rubbish will require removing off site and replacing.

5.28.2 Water at a rate of 20 measured litres once a week between March and October for two-years minimum. In dry, hot, or windy weather, increase to 2 to 3 times a week. In wet weather the routine should generally be maintain in hard paved areas as rain runs off pavements. However, caution is required as continuing this routine during prolonged periods of wet weather could lead to drowning the tree where ground conditions are saturated.

5.29 Securing delivery

5.29.1 Where street trees are to be retained, removed, replaced, or newly planted as part of a development proposal, it may be necessary to secure appropriate measures through planning condition, legal agreement, and/or technical approval, depending on the nature and scale of the works and whether the trees form part of the adopted highway.

Matters that may be required to be secured include, but are not limited to:

- retention and protection of existing street trees, including approved arboricultural method statements and root protection measures,
- the felling of existing trees and removal of stumps where required to facilitate approved works,
- the location, species, size, and specification of replacement or new street trees,
- details of tree pits, soil volumes, irrigation systems, root barriers, guards and grilles,
- protection of underground utilities and highway infrastructure,
- timing of planting and restrictions associated with nesting birds,
- establishment, watering, replacement and maintenance periods,
- valuation of trees to be removed and appropriate mitigation or replacement provision,
- long-term maintenance responsibilities and, where appropriate, commuted sums.

The most appropriate mechanism for securing these matters will be determined on a site-specific basis by the Local Planning Authority in consultation with the Highway Authority, having regard to the relevant tests for planning conditions and the use of highway legal agreements.

5.30 Commuted sums

5.30.1 Where the Highway Authority considers that a commuted sum is appropriate, this will be calculated in accordance with the Commuted Sum Chapter of this guide. Consideration will be given to the eventual size of the tree, whether it is planted within a verge or hard landscaped area, the surface material around the tree, any underground structural support, the need for root barriers or guards and grilles, and the effect these will have on future maintenance costs.

-End-