

Arboricultural Method Statement – Swales.

Where swales are near trees but do not infringe as indicated in plan extracts 7a – 7h above, the Tree Protection Fencing must remain in-situ and not be moved back for operational purposes. The proposed swale route and width should be marked out on-site to guide the position of the swale and to ensure it does not infringe upon the Root Protection Area. The Project Arborist should review this once marked out on site.

The Project Arborist will supervise any access facilitation pruning of crowns, that will likely be required for:-

- Group 21 – side prune west side of the Cherry laurel (*Prunus laurocerasus*) hedge, using a hedge-cutter or box prune if preferred.
- Tree 45 – tip back low hanging branches to the west only in order to facilitate access for machinery.
- Tree 32 – crown lift in all directions to facilitate access to the west side.

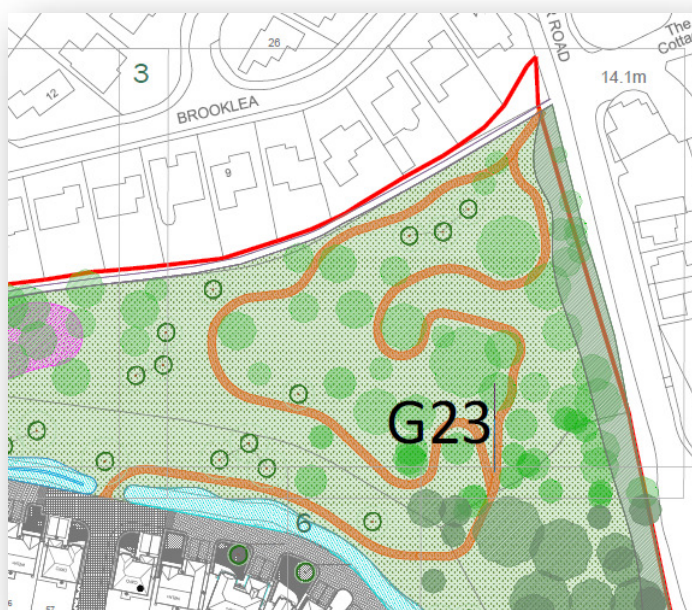
Use a mini-digger near trees 32 & 45 to minimise the requirement for pruning. Pruning must be kept to a minimum, keeping wounds as small as possible i.e. removing secondary branches only, where possible. Limbs will not be removed, and localised hand digging must be the alternative in such scenarios.

The swales should be constructed with the use of the smallest practical machinery, working on the site side away from the trees or by working back on themselves along the line of the swale ensuring the machinery's wheelbase does not enter the Root Protection Area. Where this cannot be achieved then the use of load bearing track mats must be used and approved by the Project Arborist, prior to usage. The Project Arborist will supervise the temporary setting back of the tree protection fencing in such cases. There must be no storage of materials, spoil or machinery etc. within the Root Protection Area of trees, during these operations.

Cycle-path / Public Right of Way

An upgrade in part (from St Cadoc's Close to Bellin Close) of the existing Public Right of Way will see the footpath/cycle-path created at a width of 3-m which will involve a widening of the existing. Trees within influencing distance of this path include those on-site and adjoining the site (primarily T116 and possibly T117). An upgraded / new footpath is noted within G23 as per the Landscape plan (EDP 5061), extract below:-

Plan Extract 8. Orange solid line - Upgrade & new path network within G23.



The upgrade should be of a no dig tree friendly construction ideally utilising the existing surface as a sub-base (refer to Arboricultural Method Statement – Footpath/Cycle-path below).

Arboricultural Method Statement – Footpaths & Cycle-path.

Laying of footpaths and cycle-paths across or through RPA's is particularly damaging to trees.

In the case of the path proposed within G23, the detailed Tree Survey⁶ for its north-east section should be used to define constraints. The Tree Constraints Plan for this specific section can also be found in the Appendices.

Tree friendly construction techniques are acceptable providing the existing ground levels are not lowered and the following design principals and working method are engaged. The detailed specifications should involve consultation with the Project Arborist in order to devise a specific Arboricultural Method Statement. However, the following principals will apply:-

Design Recommendations

1. The design recommendations should not require excavation or soil stripping into the ground, within the RPA – in other words, **NO DIGGING**. Scraping is not permitted unless using hand tools to remove turf or vegetation layers.
2. The structure of the hard surface should be designed to avoid localised compaction by evenly distributing the loading over the path /cycle-path width.
3. If the new surface is expected to be subject to de-icing salt application, an impermeable barrier should be incorporated to prevent contamination of the rooting area. Run-off should be directed away from the RPA.
4. Permeable hard surfacing can result in soil volume moisture content remaining at or near field capacity for long periods. Where there is a risk of waterlogging, the design should incorporate appropriate land drainage.
5. Land drainage within the RPA should be designed to avoid damage to the tree and the soil structure, e.g. sand slitting formed by compressed air soil displacement with the slits set radially to the tree.
6. The hard surface should be resistant to or tolerant of deformation by tree roots and should be set back from the stem of the tree and its above-ground root buttressing by a minimum of 500-mm to allow for future growth and movement. Resulting gaps may be filled using appropriate inert granular material.

NOTE- Appropriate sub-base options for this type of new hard surfacing include two-dimensional load suspension systems. Alternatively, elevated beams etc. can be used to support surfaces to bridge over the RPA or, following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater than 25-mm in diameter.

7. When designing the hard surface, account should be taken of finished levels in relation to adjacent structures, including existing paths crossovers and end links with roads.
8. If a permeable surface is to be used by construction traffic, this should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure that its permeability is retained (i.e. interstices should not become blocked during construction).
9. The excavation needed for the placement of kerbs, edgings and their associated foundations and haunchings can damage tree roots. Within the RPA, this should be avoided either by the use of alternative methods of edge support or by not using supports at all.

NOTE - For example, where kerbing is required for light structures, such as footpaths, above-ground peg and board edging might be acceptable. Where areas of hard surface require greater edge support, the use of sleepers (pinned in place where

⁶ Caerleon Uni_G23_BS5837 Tree Survey_TCP_August 202. S. Ambler

required), gabions or other non-invasive ground-contact structures, including the use of proprietary products, can provide appropriate solutions.

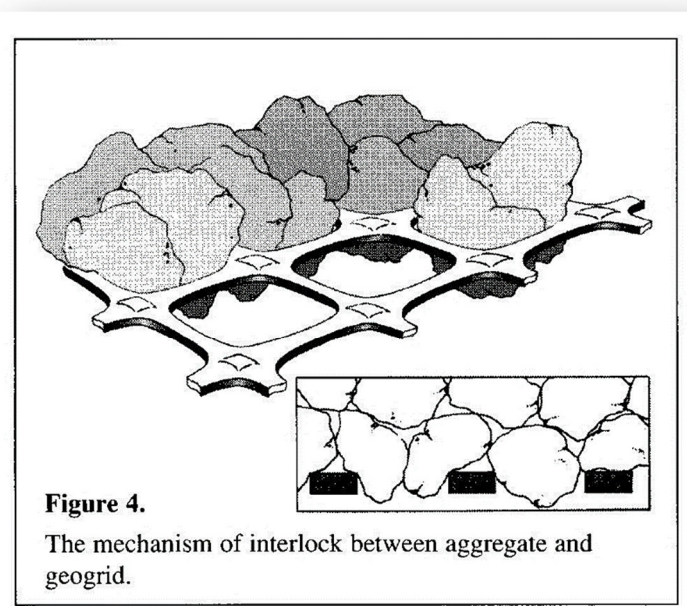
10. The soil structure including the area beneath the proposed new hard surface and adjoining it should be protected from compaction during installation. This may be achieved by; a) the use of temporary ground protection to safeguard the working area; b) constructing the new surface with machinery working forward from the surface as it is constructed (known as "rolling out").
11. Where herbicide is used to control vegetation prior to construction of hard surfacing, the manufacturer's guidance should be strictly followed, and care should be taken to avoid any damaging effects on trees or other vegetation to be retained.

NOTE - The use of appropriate geotextiles can provide a barrier that inhibits weed growth but allows water and gases to pass freely.

12. Raising levels should be achieved by use of a granular material which remains gas- and water-permeable throughout its design life.
13. Due to the highly alkaline leachate produced during the curing of wet concrete, concrete should not be poured within the RPA unless an impermeable liner has been installed.
14. New permanent hard surfacing should not exceed 20% of existing unsurfaced ground within the RPA

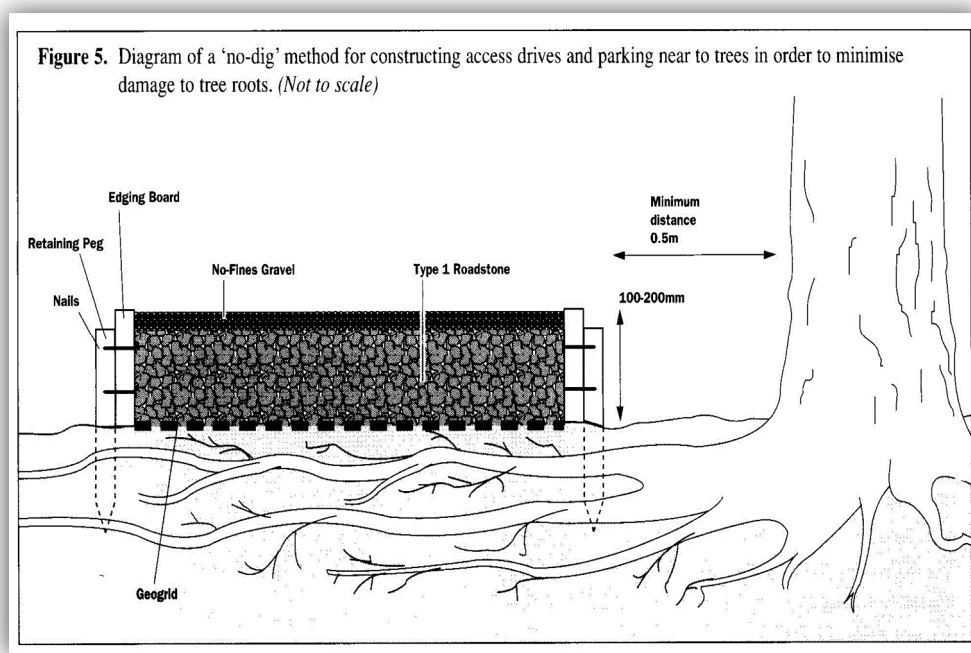
NOTE 5- a **geotextile**, which is usually used to prevent layers of different materials mixing while allowing water to pass through, is not designed to be load bearing. 'Load Spreading' materials are synthetic grids or webs designed to support paths/cycle-paths or roads on soft ground by distributing the load over a larger area than would normally occur. Such load spreading materials may be two or three dimensional. Here two-dimensional grids are deemed acceptable

15. When placed on a **two-dimensional grid**, appropriate, no-fines granular sub-base material penetrates the mesh, but is unable to pass through it, forming a positive interlock (refer to Figure 4). This interlock between aggregate and grid provides a reinforced platform and efficient load spread into the ground over a wider area than the footprint of the wheel on the surface. A suitable geogrid/aggregate combination constructed with the grid under tension should prevent rutting of the ground beneath construction.



16. The granular sub-base material should have a 'no-fines' content which means that even when it is compacted it should be freely draining and will allow oxygen to diffuse into, and damaging gases (e.g. carbon dioxide and methane) out of the soil.
17. An example of a no dig path construction is offered in Figure 5.

NOTE - For site-specific prescriptions and material specifications, advice should be sought from a qualified geotechnical or civil engineer who should work in consultation with an arboriculturalist.



Method for Constructing Access within RPA

Working Method

- 1) Kill ground vegetation using a translocated herbicide such as glyphosate⁷. After some time, gather up the dead organic material; this will prevent the build-up of anaerobic conditions beneath the construction, which might otherwise occur as vegetation begins to decompose.
- 2) Construction should ideally be undertaken between May and October when the ground is driest and least prone to compaction.
- 3) Take care when constructing not to compact the soil or cause root damage. There **must not** be any movement within the root protection area before the ground is protected by the load spreader and the sub-base. Then movement must only be along the line of construction.
- 4) Begin construction at the entrance to the site and 'roll-out' the path in front of the machinery which always remains over the sub-base.
- 5) Remove major protrusions such as rocks and tree or shrub stumps (stumps should be ground out rather than excavated to minimise soil disturbance).
- 6) Fill major hollows with sharp sand. DO NOT GRADE-OFF HIGH SPOTS
- 7) If necessary, for example when using two-dimensional grid, as a 'load spreader', a geotextile should be laid underneath and over the no fines sub-base.

⁷ Pesticides can be dangerous...refer to manufactures instructions and follow the advice on the label carefully. Pesticides should only be used by competent personnel.

- 8) Secure the synthetic load spreader under tension using long pins driven into the ground through the grid.
NOTE- before driving pegs or pins into the ground, check for underground services that could be damaged.
- 9) Construct an edging which is secured through the load spreader so that pressure on the running surface will force the edging outwards and so increase the tension on the load spreader. With boards attached to pegs driven into the ground through the geogrid. Pegs should be long enough to give sufficient support for the construction. Refer to NOTE above.
- 10) Cover the load spreader with a minimum of 100-mm of no-fines aggregate. This should not be tipped straight onto the synthetic material but should be placed at one end and then pushed onto the grid so that machinery moves on the spread sub-base, not directly on the geogrid and not on the ground either side of it.
- 11) Compact the sub-base to ensure binding with the geogrid and to minimise future rutting.
- 12) A further geotextile may be placed over the sub-base to prevent dry bedding materials or surfacing merging with the subbase.
- 13) Place the final surface which is likely to consist of gravel or tarmac, although paving slabs and brick pavements may be acceptable provided they are dry bedded on the sub-base and the joints are not sealed with grout, to allow for infiltration of water and gaseous diffusion.

Vision Splays

No trees are to be removed to achieve necessary vision splays under the current scheme.

Signage and CCTV

CCTV and signage is unlikely to be required and is not proposed as part of this scheme.

WHETHER DESIGN CAN BE MODIFIED TO ACCOMMODATE TREE RETENTION

The site layout has involved on-going consultations and site meetings between the developer, Local Planning Authority representatives and the Project Arborist in order to ensure tree losses are minimised and to ensure that all of the A rated trees and a significant proportion of the B category trees are retained.

There, a few specific minor design modification in relation to certain conflicts between trees and the development generally around retaining structures or swales and these are detailed elsewhere within the report.

There will almost certainly be a requirement for consultation with a Project Arborist in relation to forthcoming detailed designs for the retaining structures, footpath/cycle-path and swales which should occur early in the process.

WHETHER TREE LOSSES FROM THE DEVELOPMENT PROPOSAL CAN BE MITIGATED

Tree losses occurring as a direct result of this scheme are detailed on the Tree Protection Plan with Tree Retention / Removal in the Appendices. Mitigation is offered in the following forms and detailed within the Landscape Plans 5601 A, B, C & D (EDP):

Translocation of Trees.

The use of tree spade was considered for moving several semi-mature trees but due to access limitations, the anticipated root loss given their position in hard landscaped areas and a cost analysis with new planting the latter was favoured. As such a significant planting programme will be occurring most notably within G23 in mitigation of these losses.

Several smaller ornamental trees and shrubs are proposed for removal and includes: 1 x Persian ironwood (*Parrotia persica*), 4 x *Magnolia grandiflora* and a small glade of young Japanese maple (*Acer palmatum*).

As certain trees on site are likely to pose a significant constraint to development, there is scope on this site to undertake mitigation planting particularly along the somewhat open north-east boundary abutting the Public Right of Way and within the woodland / parkland grouping of G23, thereby improving habitat connectivity.

Group 23 would also benefit from a wider management plan to consider tree condition, access facilities, interpretation and woodland management. The tree condition survey element is due to be undertaken in Autumn 2020 by Steve Ambler & Sons Tree Specialists Ltd.

Some of the proposed landscaping activities will need to be undertaken in accordance with the generic Arboricultural Method Statement detailed below:-

Generic Arboricultural Method Statement – Landscaping.

- Estate fencing (close board timber fencing) is often located on the far side of swales potentially in close proximity to tree groups when viewed on plans. However, the swales occur on the top of banks with the trees falling away, and the fencing located often on the top of existing retaining structures. Therefore, these ground level changes will protect the trees. However, should pinch points occur i.e. near plots 15-20, on-site measurements should be taken by the Project Arborist to ascertain if a conflict actually exists. In order to alleviate any issues. Given these level changes, the risk is deemed low.

Fencing – general.

The erection of fencing within a Root Protection Area has the potential to damage tree roots, their stability, and long-term survivability. Damage may be caused in several ways although the most common is during excavations for the support posts, which can sever structural roots, the larger, non woody roots that occur within several metres of the tree. To sever these can cause immediate stability and physiological issues and certainly provide entry points for decay organisms which later may become an issue affecting their stability.

Where possible, excavations should not occur within the Mechanical Effective Root-plate Radius (MERR). The MERR is a radial measurement established during work undertaken by Claus Mattheck⁸ and refers to the critical distances required to maintain the structural roots and stability of a tree. Structural roots differ from the finer feeding roots protected by the somewhat larger Root Protection Area. The MERR of any tree directly correlates to its trunk diameter when measured just above the root buttress flare. Such measurements will need to be undertaken by the Project Arborist and marked out on site to define the route of the fencing.

Excavations for post holes should not occur within the MERR or exceed 200-mm in diameter, be cut cleanly with a posthole borer and must be carefully positioned. They should not be spaced any closer than 1 metre apart when working within the RPA. Where feasible (subject to the fencing specification) panels or section should be shortened or elongated as required, in order to avoid post holes and the damage to structural roots.

If working in the MERR is unavoidable, it may only proceed using hand tools and under the supervision of the Project Arborist and the agreement of the Local Planning Authority and where the positioning of the fencepost is adjusted to avoid any large roots. These are often visible just along the surface close to the trunk and they should not be damaged during expletory works.

A posthole auger will be necessary to drive the postholes and care should be taken when using any mechanical driven rig within the Root Protection Area.

⁸ Mattheck. C. & Breloer. H. The Body Language of Trees. A Handbook for Failure Analysis

- 1) The auger operation should limit the diameter of the holes to 200-mm or below, with a minimum distance between the edge of each pile of 1000-mm where possible.
- 2) Auguring must avoid the Mechanically Effective Root-plate Radius (MERR) of any retained tree and these distances must be provided by the Arborist whilst on site.
- 3) The tree protection fencing should be temporarily moved to accommodate the works immediately prior to the operation and reinstated immediately upon completion of the operation where it applies.
- 4) Where using a rig, the auger operation should be carried out whilst on top of 'load spreaders' (track mats) sufficient to support the weight of the plant to protect the RPA from compaction and the underlying roots from compressive injury, this protection should include tracking inwards and outwards from the RPA.
- 5) Consider the height of the Rig with regard to prevent damage to overhanging branches.
- 6) The augured excavated material shall be collected carefully and removed from the RPA
- 7) Take precautions to prevent soil contamination, which may involve using a non-permeable sheet below the rig during its operation to prevent leaking fuel and hydraulic oil onto the soil.
- 8) Spill kits should be carried and in the event of any contamination, it shall be collected immediately and disposed of in a proper manner and the Arboriculturalist and Site Manager informed
- 9) Apply concrete to 'non-permeable sleeved' augured holes to prevent leachates entering the soil and great care shall be taken not to spill and contaminate the soil.
- 10) The Project Arborist shall be informed of the dates of these operation in order to supervise the activities when they occur near trees.

Generic Preparatory Works for New Landscaping

Turfing within the Root Protection Area of trees should be avoided in favour of seeding operations or more beneficial changed for well composted mulches to reduce competition and improve the rooting environment. Obviously, the use of mulch may not be visually acceptable in more formally landscaped locations in which case seeding is the more favoured option.

Where grass seeding is proposed within a Root Protection Area, the following method must be followed and us applicable to turfing if that is approved-

1. Ground levels should not be altered.
2. Any existing ground vegetation should be killed using an appropriate herbicide.
3. Dead vegetation may be raked or skimmed off using hand tools and removed from the Root Protection Area.
4. The ground can be only gently scarified to a depth not exceeding 25-mm. The use of rotavators must be avoided.
5. Ground scarification may only take place within the RPA of retained trees under the supervision of the Project Arborist.
6. Seed (or turf) may be laid directly onto this.
7. Care must be taken to avoid compaction so ideally done during dryish conditions avoiding working on wet and saturated soils.
8. The use of fertilisers must be avoided.
9. Ground must be protected where wheelbarrows or mechanical barrows or small plant is used, working off load spreaders that are suitable to support and distribute the load as agreed with the Project Arborist.
10. Any works within the RPA must be supervised by the Project Arborist.

The RPAs of retained trees should be excluded from landscaping where possible. Top soiling over and above the root-plate of tree' s is detrimental to their health even just 100-mm or so and where turf is added. Planting into the RPA is also damaging to roots.

The general treatment of areas around newly planted and existing trees should allow for adequate infiltration of water and free gas exchange, reduction of water evaporation and the retention of an open soil structure to encourage root growth. Care should be taken to ensure that grass or weed growth does not compete with young root growth by intercepting available water supply. Care

should also be taken to avoid the risk of damage to the stems of young trees from future strimming or mowing operations. An area with a radius of at least 500-mm from the stem of newly planted trees should therefore be kept free from competing vegetation by chemical weed control or by the more environmentally friendly option of mulching.

NOTE. Soft landscape finishes including mulch and cultivated beds will generally provide more favourable conditions for young tree establishment than most hard surfaces or highly competitive grass. The use of ground-cover shrubs with an appropriate organic mulch is particularly beneficial: this treatment suppresses weeds, reduces maintenance, discourages intrusion, and maintains a permeable open soil structure.

Soil Compaction and Remediation Measures

Soil that has been compacted will not provide suitable conditions for the survival and growth of vegetation, whether existing or new, and is a common cause of post-construction tree loss on development sites. Compacted soil will adversely affect drainage, gas exchange, nutrient uptake and organic content, and will seriously impede or restrict root growth. The risk of soil compaction is greatest in soils with significant clay content and in wet conditions. It can result from temporary or short-term loadings, such as the passage of a single vehicle, or from longer-term construction activities, including materials storage. The positioning of the Tree Protection Fencing (Appendices) on the Tree Protection Plan with Tree Retention / Removal often incorporates proposed planting areas beyond the retained trees, it does not however show protection for areas of new planting away from existing trees.

Soil compaction should be avoided in RPAs and areas where new planting or seeding is proposed which contain suitable ground conditions (fertile soil). Where soil compaction has occurred in RPAs or proposed planting areas, arboricultural advice should be taken before carrying out any remedial works. Remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure.

Use of Mulch

Open soil and shrub planting areas around newly planted trees should be mulched to inhibit weed growth, reduce groundwater evaporation, resist and mitigate soil compaction and reduce maintenance requirements, whilst allowing gas exchange and water penetration to roots. The mulch material should be weed-free, easy to apply, containable within the area of application and readily available. The choice of material will be informed by local availability of materials, site characteristics and aesthetic requirements. The mulch should be periodically replenished as it decomposes so that it does not become depleted, and ideally when the soil is warm and moist.

The materials that may be used for mulching include coarsely divided plant matter, such as well-composted wood chip, pulverized bark, leaf mould or green waste conforming to PAS 100, and these may be combined with well-rotted animal manure. If the sole intention is to conserve moisture, a layer of gravel or well-secured sheets of material such as permeable geotextile fabric may be used and may be covered for cosmetic purposes. Any such sheets should be maintained to avoid damage to the tree (e.g. by clogging, weed growth, restriction of air movement or constriction of the stem).

The mulched area should extend over as much of the root system as can be allowed by other site-usage requirements. The depth of organic mulch should not be so much as to inhibit aeration of the root system (normally no more than 100-mm depth). The area around the tree should be well-watered prior to the application of mulching material and the mulch should be periodically replenished as it decomposes, so that it does not become depleted.

Mulches should be kept away from direct contact with the bark of the stem, or of major roots, since this might encourage infection by pathogens by maintaining wet conditions.

NOTES

- Mulches that retain water encourage the development of roots near the soil surface and within the mulch itself. This can become a disadvantage owing to desiccation if the mulch is removed or not replenished.
- Although, by improving the soil texture and acting as a buffer for rainfall, mulches generally help to prevent extremes of soil wetness and dryness, they can prolong waterlogging on sites where drainage is seriously impeded. This in turn can harm tree roots and make them more susceptible to certain pathogens such as Phytophthora sp
- Further guidance on mulching is given in BS3998 Tree Works – Recommendations (2010).

IMPACT ASSESSMENT OF DEVELOPMENT ON TREES.

A realistic assessment of the probable impact of the proposed development on the trees and vice versa with due allowances for their future growth and maintenance requirements.

The majority of the trees are at or nearing maturity, so their future growth is not seen as an issue. The wooded groups would benefit from a long-term management plan.

The key 'A' rated trees on site have limited changes around them due to their location off site, near buildings that are due for retention or their position remains within public open spaces. The exception are trees 89, 89, 92, 101 and 102, which will be in close proximity to demolition operations which will require care and monitoring by the Project Arborist.

Steve Ambler & Sons Tree Specialists Ltd have been appointed to undertake a tree condition survey in the Autumn of 2020, within Group 23, due to its proposed increased usage as an informal open space and its location near a busy road.

Any potential damage to the proposed buildings as a consequence of the trees would consider (a) indirect damage through subsidence or heave (a matter related to geology), (b) Direct damage, physical damage caused by incremental growth, (c) The disruption to underground services, (d) Displacement, lifting or distortion, (e) The impact on branches on the super structure or (f) Structural failure of a tree.

The houses are often set back from the trees which are located beyond gardens with a linear buffer usually where the swales are positioned. One area where trees may come under pressure due to shading issues is immediately south of 'Felthorpe' Lodge. Whilst the broadleaved trees in this area are mature and highly visible on the entrance, there is perhaps scope to consider the removal of the Group 10 (EM/M, 'C' category) which is a row of evergreen conifers (Lawson cypress (*Chamaecyparis lawsoniana*)) which may come under pressure where residents could invoke assessments under the High Hedges Regulations (Anti – Social Behaviour Act 2014).

- a) **Indirect Damage.** The likelihood of damage occurring to the structure as a result of ground movement occurring through soil swelling and shrinking is dependent on local geological conditions and the presence of shrinkable clay soils beneath the foundations. This report has not considered the soil type in any detail or undertaken a laboratory soil analysis as part of this brief. The potential for direct damage should be taken into consideration throughout the design and construction process. For guidance on avoiding indirect damage by trees to structures, refer to NHBC Chapter 4.2.
- b) **Direct Damage.** This can sometimes occur through the annual incremental growth of the trunk or root buttresses through a process called 'secondary thickening'. The greatest risk of direct damage occurs when trees are close to building structures and occur with the expanding growth of the main trunk and roots although any likelihood of such damage diminishes rapidly with distance. Table A.1 of BS:5837 is produced below and provides advice on minimum distances to avoid damage. This is not deemed likely to be an issue as the layout allows space for retained trees but is possibly relevant when designing retention structures and estate fencing.

- c) **Displacement, lifting or distortion.** This can occur where lightweight structures are within influencing distance of trees and annual incremental growth of roots and buttresses have the ability to disturb paving, walls, porches, and garages. Advice in Table A1 should be followed (see below) when planting new trees or controlling seedling growth. This is not deemed likely to be an issue as the layout allows space for retained trees and newly planted ones.
- d) **The impact of branches on the super structure.** Where development occurs close to trees and branches interfere or have the ability to interfere at a later date due to their growth, can cause the LPA problems with repeated requests for trees to be trimmed. Here, the development appears to be mainly of sufficient distance away from any retained trees. Furthermore, woodland management operations will be required regularly and during these operations, problematic trees may be selected for removal to address any minor issues. This is not deemed likely to be an issue as the layout allows space for retained trees. The only trees in close proximity would be trees near existing buildings due for retention, namely T53, T60 and those near Felthorpe Lodge. Conversely the privacy screening they provide may be welcomed by resident/s.
- e) **Wind Dynamics.** As far as wind dynamics are concerned, the following matters are noted. Air deflected over or around such solid structures will be locally accelerated to create turbulence. The proposed development is within influencing distance of the trees as buildings or solid structures can have an effect on leeward wind patterns for a distance in excess of 30 times their height⁹, although the effects of the more damaging wind turbulence in respect of trees is much shorter than this with the more dramatic influence being at least twice the height of the structure. It is usually a problem where retained trees have thin stems without adequate stem taper, and which have usually resulted where they have developed at close spacing's and under mass shelter and particularly where a number of those trees have been removed. This is not deemed likely to be a significant issue as the layout allows space for retained trees and new housing is often replacing existing built structures. The only exception may be trees 89, 89, 92, 101 and 102 which have in the last 25 or so years been afforded protection from the elements by the three storey residential flats due for demolition and will now occur within an open space. As with the remainder of this site annual tree condition inspections are advised and any safety issues should be identified with recommendations actioned under the given priority rating (this also relates to point F below.
- f) **Large trees can sometimes cause apprehension to occupiers of nearby buildings especially during windy weather.** Whilst this is true in some instances, structural failure amongst trees is most common where a specimen is diseased or structurally defective or a stand is undermanaged. Well managed trees offer little risk to residences where under routine arboricultural inspections and providing any remedial works recommended during such an inspection are carried out by a competent tree surgeon.

The current site designation will afford tree protection for many trees, under statute law and all perspective purchases will be advised of any TPO's through the Land Search process. The LPA are able to consider applying further TPO's at any time where trees are considered under threat.

The level of risk exposure (target occupancy) for these trees will increase and impose a¹⁰ duty upon landowners to manage the trees. However, this is a reasonable expectation of any perspective landowner and should not be seen as detrimental to the health or long- term future of the trees or to the outcome of the application. Appropriate tree management under the guidance of an Arboriculturalist should be beneficial; it may however

⁹ Patch.D. Trees, Shelter and Energy Conservation. Arboricultural Research and Information Note 145/ARB/98

¹⁰ Failure Criteria for Solitary non-decayed trees Arboricultural Journal Volume 26 Number 1 April 2002.

suggest that management is required from time to time which up until now has been somewhat neglected certainly in recent years.

- g) **Leaves and fruits of some species may cause problems** and the accumulation of honeydew may be damaging to surfaces and vehicles. Here, the species of lime is noted which is associated with aphid activity and the production of honeydew excretions, although situated within the wooded area to the west and not in proximity to car parking facilities. Falling leaves are likely to impact on this development and Gutter Guards should be built into the scheme to prevent gutters from becoming blocked. There are no species found on this site that produce large fruits. Tree 59 (Lime sp) is perhaps the only potential issue in the future, in respect of honeydew production by aphids. But as it's an A rated tree and in maturity, it may not become an issue as its crown does not as yet overhang the proposed car parking bays for the retained TJ Webley building.
- h) **The relationship of windows to trees which may obstruct light need to be taken into account.** Plots 15-20, 81, 155, 112, Felthorpe Lodge, are likely to be devoid of morning and/or midday sun due to their juxtaposition to trees albeit deciduous species. The exception is group 10 by Felthorpe Lodge as discussed previously which may also cause shading in the afternoon and evening.

BRITISH STANDARD

BS 5837:2012

Allowance needs to be made for the swaying of stem and branches during storm conditions. Branches which are liable to strike the structure need to be removed or pruned back to a suitable branching point as appropriate (see BS 3998:2010).

Table A.1 Minimum distance between young trees or new planting and structure to avoid direct damage to a structure from future tree growth

Type of structure	Minimum distance between young trees or new planting and structure, in metres (m)		
	Stem dia. <300 mm ^{A)}	Stem dia. 300 mm to 600 mm ^{A)}	Stem dia. >600 mm ^{A)}
Buildings and heavily loaded structures	—	0.5	1.2
Lightly loaded structures such as garages, porches etc.	—	0.7	1.5
Services			
<1 m deep	0.5	1.5	3.0
>1 m deep	—	1.0	2.0
Masonry boundary walls	—	1.0	2.0
In-situ concrete paths and drives	0.5	1.0	2.5
Paths and drives with flexible surfaces or paving slabs	0.7	1.5	3.0

^{A)} Diameter of stem at 1.5 m above ground level at maturity

A.1.3 Allowance for future growth

Where the installation of paths or light structures such as walls is unavoidable near to trees, the design and construction specification needs to take account of future growth.

If it is necessary to build a wall or similar structure over a root greater than 50 mm diameter, provision for future diameter growth needs to be made by surrounding the root with uncompacted sharp sand, void-formers, or other flexible fill materials, and by laying an adequately reinforced lintel or raft over the surface.

THE EFFECTS THAT DEVELOPMENT PROPOSALS MAY HAVE ON THE AMENITY VALUE OF THE TREES

Relates to both trees on and near the site.

The loss of trees on the site has been considered earlier in the Report and a significant proportion of tree cover remains especially to the periphery of the site giving it a mature landscaped setting. This is further enhanced by the proposed planting under the landscaping scheme.

Trees often come under pressure when placed directly against housing or gardens and can come under pressure for pruning and /or tipping of garden waste and household rubbish, however space and buffers are often in place.

The location of trees to the south of house Plots 15-20, 81, 155, 112 & Felthorpe Lodge may come under the greatest pressure for pruning or removal via the Tree Preservation Order process, which most of the trees are protected under. However, there will be level changes with houses being in a slightly elevated position that will somewhat ease this pressure. Potential house buyers will be advised of the protection afforded to the trees under the Tree Preservation Order, during land searches. Also, these trees are in maturity and an obvious feature when viewing such houses.

THE END USE OF THE SPACE

The site is already extensively developed with buildings and car parks, and the proposed development mimics this developed footprint. The historic buildings are often associated with the trees of greatest amenity value and with both being retained, their status quo is maintained.

The investment in mitigation planting often of large planting stocks will enhance the groups of the greatest amenity value (G23, G6, G7 and the open spaces to the south-west), with an opportunity to introduce and replace unusual species and large species trees at maturity. These will grow in plentiful space, allowing them to reach maturity as an open grown specimen.

GENERAL COMMENTS AND OBSERVATIONS

Any construction work can have a negative effect on tree health and stability if their underground parts, which are frequently ignored, are damaged or severed. Above ground parts may become injured or broken through impact/collusion damage. Retained trees will require physical protection from such injury during the development phase from the onset. Barrier fencing must be installed to create an exclusion zone around the trees and enclose the necessary Root Protection Area. Its location and design must follow an approved¹¹ Tree Protection Plan. The type of barrier fencing recommended for this proposal is produced below in Figure 2 below and is taken from the British Standard. The positioning and suitability of the protective fencing must be assessed and signed off by the Project Arborist prior to all works commencing (enabling tree works may be excluded).

Providing the needs of the trees are catered for and that care is taken during construction to protect their roots and stems, it is reasonable to predict that no long-lasting disruption to the retained trees physiology is perceived.

The Arboricultural Method Statement (AMS) element of this report along with Tree Protection Plan (TPP) **must** be followed rigorously during construction. It is strongly recommended that a 'Project Arborist' is engaged for the duration of the demolition and construction period, to oversee tree protection matters and be on hand to provide any arboricultural advice and maintain a level of communications between the client and Local Planning Authority's Tree Officer through submission of monthly progress reports. As discussed consultation at the detailed design stage will be required with the Project Arborist throughout the project.

¹¹ Approved by the Local Planning Authority

GENERAL MATTERS

To prevent damage to the trees, including their roots, within the fenced area (RPA) there must be no...

- φ Alteration of ground levels, including soil stripping.
- φ Installation of drainage or services using conventional open trenching methods which would not be in accordance with BS:5837. The National Joint Utilities Guidance 4 (NJUG), which is a guide for utility companies when installing services, is not relevant under Planning Conditions and the more stringent protection measures under Section 7.7. of BS5837 Trees in relation to design, demolition and construction – Recommendations (2012), apply. Utility companies must be instructed accordingly and follow the aforementioned British Standard.
- φ Excavation of any kind.
- φ Storage of any materials or equipment, even on a temporary basis.
- φ Storage of oil, bitumen, cement or other harmful materials, mixed or discharged within 12-m of the trunk of any retained tree and making further allowances for any slope of the ground so prevent running contamination. Phytotoxic materials would include any mineral oil, fuels, cement mortar washings concrete washings, mortar.
- φ Fires must not be lit beneath or within 12-m of any tree canopies.
- φ Site operations such as deliveries, site machines, crane jibs etc should be organised to avoid damaging the trunk or crown of trees. Where this conflict is unavoidable then facilitation pruning should be carried out in advance, rather than after damage has occurred. This may also be required to allow demolition operations.
- φ Mechanical cultivation of the soil as part of landscaping operations.

Planning of site operations should take sufficient account of wide loads, tall loads and plant with booms, jibs and counterweights (including drilling rigs), in order that they can operate without encountering the RPA, trunks stems or branches of any retained trees. Such contact can result in serious damage to the trees and might make their safe retention impossible. Consequently, any movement of plant or machinery in proximity to trees should be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is maintained at all times. Access facilitation pruning should be undertaken where necessary to maintain this clearance if in accordance with good arboricultural practice (see Note, below).

NOTES

- In all instances, local planning authority consent for all tree work will be required.
- All tree work should be in accordance with BS3998 Tree Works – Recommendations (2010).

Drainage

New development can have an effect on the existing drainage pattern and ground water levels of a site, due to level changes, increased areas of hard surface and new drainage installations. The root systems of mature trees do not generally adapt as well as younger specimens to alterations to groundwater. Expert advice on both drainage and trees should be taken where groundwater conditions are liable to change.

NOTE. It is both good practice and, in many cases, a regulatory requirement to maintain existing groundwater conditions within, and reduce run-off from, a development site. This can be achieved, for example, using permeable hard surfaces and techniques associated with sustainable urban drainage systems (SUDS). Such techniques can be designed and implemented to benefit both existing and new trees. (SUDS water might need to be treated/filtered and/or tree rooting areas protected from direct contamination in risk areas.)

AUDITABLE SYSTEM OF ARBORICULTURAL SITE MONITORING, INCLUDING A SCHEDULE OF SPECIFIC SITE EVENTS REQUIRING INPUT OR SUPERVISION.

Successfully retaining trees on any development site depends on several controls being in place. A determination and willingness by all parties is required but primarily the Site Manager will have overall responsibility to ensure that control measures are observed. Communication early in the procedure between the client, site manager, Arborist and Local Authority Tree Officer or other appointed staff, which is fundamental in maintaining a level of arboricultural care.

The engagement of a Project Arborist is probably the single most essential component towards ensuring success. This should involve regular 'drop-in' visits by an appointed Arborist who will be responsible for monitoring tree protection measures and offer advice when needed.

A line of communications must be in place between the Project Arboriculturalist, Site Manager, and Local Planning Authority Tree Officer as a minimum requirement. Details are provided below. Should any queries arise in relation to the protection of trees on this development site then please contact the Arborist on call, during normal office hours.

Such visits must be recorded to form an auditable trail and regular Reports submitted to the Local Planning Authority. The number of visits will be dependent on the type and density of the development and the matters requiring arboricultural input. The number of visits required may also be stated within planning conditions or altered by the LPA at any time during the permitted development.

Schedule of Watching Brief Visits

- The Project Arborist should attend site on a weekly basis given the statutory protection afforded to many trees on site, their quality and quantity.
- Watching Brief Reports must be submitted to the LPA and the developer at the end of each month.
- The Report will include details of the visit, list any concerns, recommend remedial actions to protect trees where necessary and will include photographs.
- Where applicable arboricultural works over and above those listed in the AIA/AMS and requiring the written permission of the Local Planning Authority may be sought via the Arboricultural Watching Brief report.
- The suitability of the root protection fencing will be assessed to ensure it remains fit for purpose.
- The Project Arborist must supervise all approved works that occur within any Root Protection Areas.
- The Project Arborist must be consulted and /or supervise all those items listed as 'Site Specific, Arboricultural Events' , below.

Communications List (all to be confirmed)

Mr. Vaughan Lewis (Principal Project Arborist)

Sunnydale Bungalow
28a Intermediate Road

Brynmawr
Ebbw Vale
NP23 4SF

Email – vaughan@steveamblerltrees.com

Telephone – 07961 322908

Ms. Katie. Partington & Scott Ambler (Project Arborist)

Steve Ambler & Sons Tree Specialists Ltd

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NP23 4SF

Email - katie@steveamblertrees.com

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Mob: 07772 998734

Mrs. Shona Carle (Woodlands Officer)

Newport City Council

Environment & Economy Department

Civic Centre

Newport

NP20 4UR

Email - shona.carle@newport.gov.uk

Telephone - 01633 232191

Matthew Coyle (Site Manager)

Redrow Homes

Email: matthew.coyle@redrow.co.uk

Mob: 07776964821

SITE SPECIFIC ARBORICULTURAL EVENTS

- Appoint a Project Arborist for the duration of the development to monitor and advise on tree protection and liaise with the Local Planning Authority where required.
- Fully implement the Recommendations within the Findings Table (Table 2). All works to be supervised by the Project Arborist and undertaken by a suitably qualified and competent tree surgery operative.
- Demolition works near trees (also covered in part within a previous ¹²report)
- Early consultation required with the Project Arborist in order to take on-site measurements where the swales and /or fencing may be close to the Root Protection Area of trees. If conflicts occur then swales and fencing will be set back from Root Protection Areas. Project Arborist to undertake site supervision in certain locations if pinch points occur.
- Installation of Tree Protection Fencing.
- Landscaping activities within Root Protection Area.
- Consultation required with Project Arborist should the route of service runs change and they occur near or within the Root Protection Area of trees.

¹² Caerleon University Campus AMS_TPP Phase 1 demolition July 2020

REPORT LIMITATIONS

It must be stressed that this arboricultural impact assessment is not a risk assessment or a detailed report on the health and condition of the trees. It has been produced as a desktop review.

Every attempt has been made to provide a realistic and accurate assessment of the impact of the development on the trees. . no liability can be accepted for any tree related issue or tree and building interactions in the absence of information or where information is unclear or misleading.

This report is based on the tree circumstances and condition at the time of the original tree survey. It must be recognised that the circumstances may be altered radically over the course of time and any development process and that such changes cannot be accurately predicted. The report does not provide any specific long-term tree management recommendations.

The effect this new development may have on localised wind turbulence has not been assessed during this inspection. As trees grow, they respond and mechanically adapt to their surroundings and exposure limits. With the erection of dwellings in close proximity to existing trees, new turbulence is created. The author accepts no liabilities to any failure subsequent upon such new imposed, artificial conditions.

This report does not consider **indirect** damage resulting from the extraction of moisture from shrinkable clay soils by tree roots causing **subsidence** or by **heave** occurring through soil rewetting following removal of trees on this site. Such problems are almost entirely restricted to areas of shrinkable clay soils and as I have **not** considered a soil analysis as part of my present brief, this aspect is **not** addressed at this time.

LEGAL CONSTRAINTS

The legal constraints of any site should be considered in early planning and well before any work commences on site. Such legal constraints should be fully considered from the outset to avoid time delays. The legal constraints referred to here are general constraints relating to arboriculture only and not any other legal matter that may arise.

Tree Preservation Orders and Conservation Area Status

The law on TPOs is in **Part V111 of the Town and Country Planning Act 1990 Town and Country Planning (Trees) Regulations 1999**. When any tree/s are protected by a TPO or are situated within a Conservation Area, it is an offence (1) cut down (2) uproot (3) top (4) lop (5) wilfully damage or (6) wilfully destruct a tree without the express written permission from the Local Planning Authority (LPA), there are exceptions. An LPA may grant permission if considered reasonable following the submission of an application for consent to undertake the works or where in accordance with an Approved Planning Application or under the exemptions within the Town and Country Planning Act 1990 of dead, dying, or dangerous. It is advisable to consult the LPA and an Arborist prior to conducting any tree works under these exemptions.

Statute and Common Law.

A landowner or land manager should be aware that both statute and common law dictates regular inspections of trees on land in their control are necessary where such trees could cause injury or damage in the event they should fall or shed any parts. A person suitably qualified in arboriculture should undertake such routine inspections and any remedial tree works recommended should be carried out within the time constraints specified, to prevent injury or damage occurring. A landowner should retain records of all inspections and any remedial tree works that have resulted from such inspections. The **Arboricultural Association** at Ampfield House, Ampfield, near Romsey, Hampshire. Telephone 01794 368717 are able to provide advice on suitably qualified persons or indeed suitable qualifications a person should hold to undertake qualified inspections.

GLOSSARY OF TERMS

Adventitious; Latent or dormant bud on stem or root often invisible until stimulated into growth which occurs from an unusual place i.e. not a twig, leaf or bud.

Arboriculture: the culture and management of trees as groups and individuals, primarily for amenity and other non-forestry purposes.

Arboriculturalist: person who has, through relevant education, training and experience, gained recognised qualifications and expertise in the field of trees in relation to construction.

Architecture: in a tree, a term describing the pattern of branching of the crown or root system.

Arboricultural Implication Assessment (AIA) study, undertaken by an arboriculturalist, to identify, evaluate and possibly mitigate the extent of direct and indirect impact on existing trees that may arise as a result of the implementation of the site layout.

Arboricultural Method Statement; methodology for the implementation of any aspects of development that has the potential to result in loss of or damage to a tree.

Assessment: in relation to tree hazards, the process of estimating the risk which a tree or group of trees poses to persons or property (THIS INVOLVES A VISUAL INSPECTION FOR DEFECTS AND CONTRIBUTORY SITE FACTORS, AND SOMETIMES ALSO A DETAILED INVESTIGATION OF SUSPECTED DEFECTS)

Bole; (trunk) the main stem of a tree below its first major branch

Branch: a limb extending from the main stem or parent branch of a tree

Buttress zone: the region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper sides of the junctions

Canopy: the topmost layer of twigs and foliage in a woodland, tree or group of trees

Construction Exclusion Zone; this is an area established where construction is not permitted and usually correlates to the Root Protection Area.

Crown: in arboriculture the main foliage-bearing portion of a tree

Defect: in relation to tree hazards, any feature of a tree that detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.

Diameter (DBH) The diameter for each tree is in millimetres based on the diameter or circumference of the trunk measured at a height of approximately 1.5 metres above ground level, unless otherwise stated. All measurements are approximate

Dysfunction: in woody tissues, the loss of physiological function, especially water conduction.

Energy: the capacity to do work (THROUGH PHOTOSYNTHESIS, GREEN PLANTS ABSORB ENERGY FROM SUNLIGHT AND STORE IT IN THE FORM OF CHEMICAL COMPOUNDS WHICH ARE USED IN ENERGY-DEPENDANT PROCESSES SUCH AS GROWTH)

Failure: in connection with tree hazards, a partial or total fracture within woody tissues or loss of cohesion between roots and soil. (IN TOTAL FAILURE THE AFFECTED PART SNAPS OR TEARS AWAY COMPLETELY. IN PARTIAL FAILURE, THERE IS A CRACK OR DEFORMATION WHICH RESULTS IN AN ALTERED DISTRIBUTION OF MECHANICAL STRESS)

Group; the term 'group' is intended to identify trees that form cohesive arboricultural features either aerodynamically (e.g. trees that provide companion shelter), visually (e.g. avenues or screens) or culturally including for biodiversity (e.g. parkland or wood pasture).

Heave: in relation to a shrinkable clay soil, expansion due to re-wetting, sometimes after the felling or root severance of a tree which was previously extracting moisture from the deeper layers; also, in relation to root growth, the lifting of pavements and other structures by radial expansion; also, in relation to tree stability, the lifting of one side of a wind-rocked root plate.

Leader: in a tree, a topmost shoot that has apical dominance.

Preventive action: in a tree hazard management, action that helps to prevent injury to persons or damage to property.

Pruning: the removal or cutting back of twigs, branches or roots; in some contexts, applying only to twigs or small branches only, but more often used to describe all kinds of work involving cutting.

Retained Tree: a tree that has been considered suitable by an Arborist for retention and which during the design stage is selected for retention and incorporated within the development.

Risk: the likelihood of the potential harm from a particular hazard becoming actual harm.

Root Protection Area; this is a protection area established around the base of each tree to prevent physical, chemical or compaction damage occurring. Protection to the RPA is achieved through the erection of fencing or another suitable barrier.

Soil heave: see heave

Special Precaution Area; this is an area, usually within the root protection area, where construction or other activity may be permitted but only under the direction of a 'Arboricultural Method Statement' and the supervision of an Arborist.

Species The species is the given name of the tree which is usually provided in both the common and scientific names.

Subsidence: in relation to soil or structures resting in or on soil, a sinking due to shrinkage when clay soils dry out, sometimes due to extraction of moisture by tree roots.

Subsidence: in relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight.

Targets: in a tree hazard assessment (and with somewhat incorrect terminology), persons or property or other things of value, which might be harmed by mechanical failure of the tree or by objects falling from it.

Tree: a woody plant, which typically has a single main stem and, in maturity, attains a height of at least four metres and a stem diameter at breast height of at least 75-mm.

Tree Constraint Plan (TCP); plan prepared by an Arboriculturalist for the purpose of layout design showing the RPA and representing the effect that the mature height and spread of retained trees will have on layouts through shade dominance, etc.

Tree Preservation Order: in Great Britain, an order made by a local authority, whereby the authority's consent is generally required for the cutting down, topping or lopping of specified trees.

Tree Protection Plan: scale drawing prepared by an arboriculturalist showing the final layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement (AMS), which can be shown graphically.

Trunk: the single main stem of a tree.

Vigour: in tree assessment, an overall measure of the rate of shoot production, shoot extension or diameter growth (cf. vitality)

Visual Tree Assessment (VTA): in addition to the literal meaning, a system expounded by Mattheck & Breloer (1995) to aid the diagnosis of potential defects through visual signs and the application of mechanical criteria.

Wind exposure: the degree to which a tree or other object is exposed to wind, with regard both to duration and velocity.

Wind pressure: the force exerted by wind on a tree or other object.

Wind snap: the breaking of a tree stem by wind.

Windthrow: the blowing over of a tree at its roots.

REFERENCES

1. BS 5837: 2012 Trees in Relation to Design, Demolition and Construction - Recommendations
2. S. Ambler - Tree Survey, Tree Categorisation, and Tree Constraints Plan at Former Caerleon Campus. Feb-April 2019.
3. BS3998 Tree Works – Recommendations (2010).

APPENDICES

FLOW DIAGRAM – PLANNING FOR TREES IN DEVELOPMENT.

GROUP 23. NORTH – EAST SECTION – DETAILED TREE CONSTRAINTS PLAN

TREE PROTECTION PLAN WITH TREE RETENTION / REMOVAL

FLOW DIAGRAM – PLANNING FOR TREES IN DEVELOPMENT.

BS 5837:2012

BRITISH STANDARD

Annex B
(informative)

Trees and the planning system

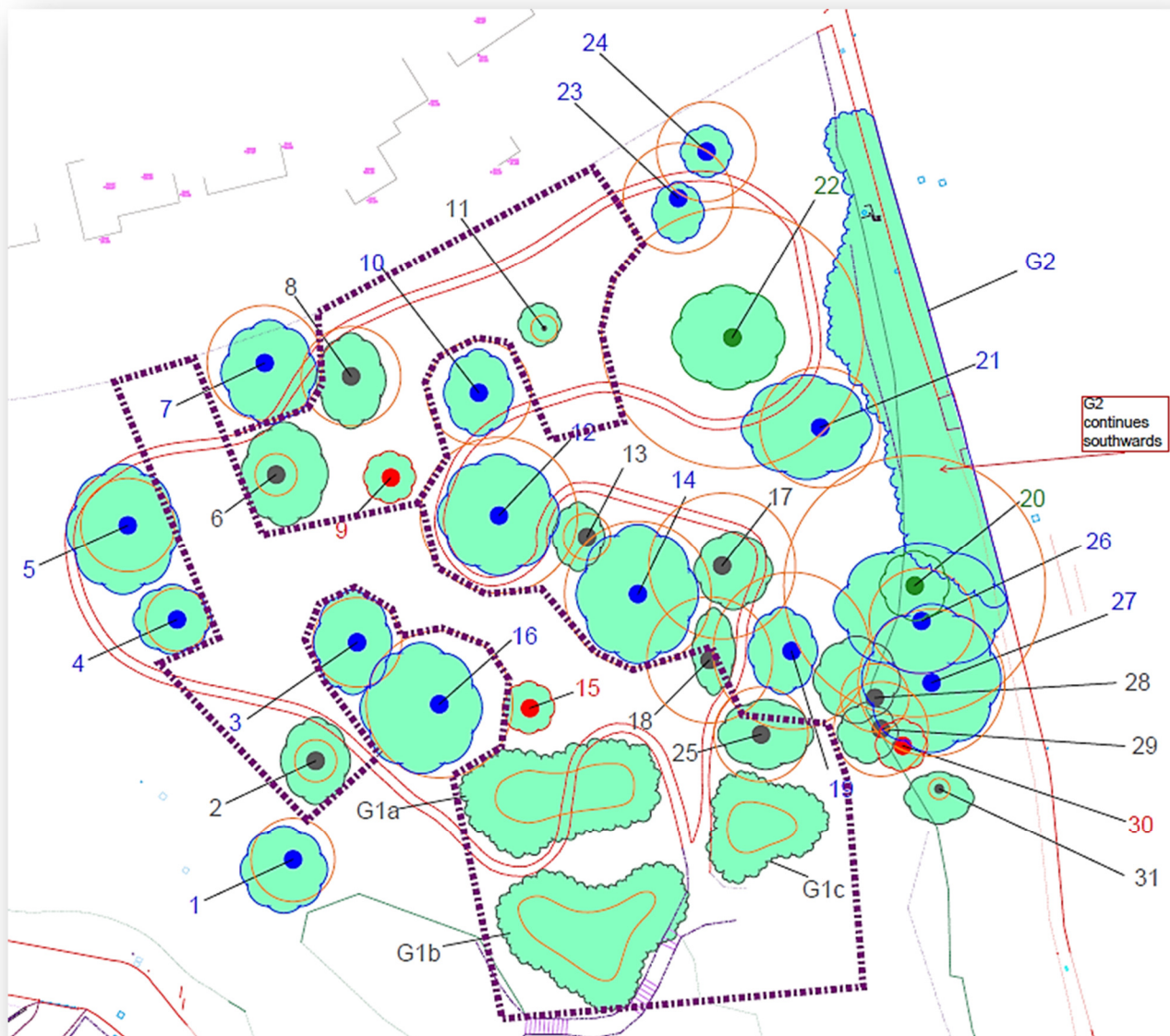
Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a tree preservation order or by their inclusion within a conservation area) or not, is a material consideration that is taken into account in dealing with planning applications. Where trees are statutorily protected, it is important to contact the local planning authority and follow the appropriate procedures before undertaking any works that might affect the protected trees.

The nature and level of detail of information required to enable a local planning authority to properly consider the implications and effects of development proposals varies between stages and in relation to what is proposed. Table B.1 provides advice to both developers and local authorities on an appropriate amount of information. The term "minimum detail" is intended to reflect information that local authorities are expected to seek, whilst the term "additional information" identifies further details that might reasonably be sought, especially where any construction is proposed within the RPA.

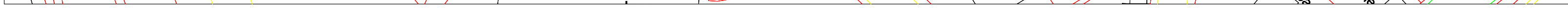
Table B.1 Delivery of tree-related information into the planning system

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions) Tree retention/removal plan (finalized) Retained trees and RPAs shown on proposed layout Strategic hard and soft landscape design, including species and location of new tree planting Arboricultural impact assessment	Existing and proposed finished levels Tree protection plan Arboricultural method statement – heads of terms Details for all special engineering within the RPA and other relevant construction details
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using a trenchless method Dimensioned tree protection plan Arboricultural method statement – detailed Schedule of works to retained trees, e.g. access facilitation pruning Detailed hard and soft landscape design	Arboricultural site monitoring schedule Tree and landscape management plan Post-construction remedial works Landscape maintenance schedule

GROUP 23. NORTH – EAST SECTION – DETAILED TREE CONSTRAINTS PLAN



TREE PROTECTION PLAN WITH TREE RETENTION / REMOVAL



(Please check all RPA's on site.)

(Please check all RPA's on site.)

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