ARBORICULTURAL CONSULTANTS

ARBORICULTURAL IMPACT ASSESSMENT

&

METHOD STATEMENT

AT

LAND NORTH OF 9 CHURCH LANE

TYDD St MARY

SPALDING PE13 5QJ

PREPARED FOR

Mr L CONNOLLY

DECEMBER 2017

SUMMARY

The purpose of this report is to provide a consideration of the arboricultural implications created by the proposed development. In accordance with the specifications and recommendations of BS5837:2012 "Trees in Relation to Design, Demolition, and construction – recommendations", I have inspected all the trees on and near the site that could be affected by the development and list their details in Appendix A.

The application is for a new detached two-storey property within the existing garden of 9 Church Lane, Tydd St Mary. The proposed development includes off-street parking for two cars to the front of the site and rear garden area.

The local Planning Authority (South Holland District Council) raised concerns regarding the location of the building in an earlier application and the potential impact on a mature horse chestnut within the boundary of the adjoining church (St Mary's). The current application positions the building outside the root protection area (RPA) of the tree and beyond the periphery of the potential mature crown spread.

The proposed development is unlikely to have any impact on the tree in question and no specialised construction methods will be required. There is existing hard standing within the garden on the southwest side of the RPA of the tree and this will be removed to create the lawn area and will provide a better rooting environment for the tree.

This report includes guidance on tree protection measures and providing these are adhered to there will be no adverse impact on the long-term potential of the tree.

1. Introduction

1.1. Instructions

1.1.1. We are instructed by Swann Edwards Architecture Ltd on behalf of their client Mr L Connolly of 9 Church Lane, Tydd St Mary, to inspect and report on a tree growing on land adjacent to the application site. We are to report on the tree, the current condition, amenity value, suitability for retention and comment on any potential impacts on the tree from proposed development and provide guidance on any necessary tree protection.

1.2. Drawings and Documents

1.2.1. We confirm sight of the following documents and drawings prior to the commencement of this report:

- Existing and Proposed site plans by Swann Edwards Architecture.

2. Report on site visit

2.1. General

2.1.1. The site was inspected on 8th November 2017 by G. Causey of Arboricultural Solutions LLP. All arboricultural data contained in this report was recorded at that time. Weather conditions were overcast with adequate visibility.

3. Tree inspection and methodology

3.1. Inspection

3.1.1. Trees likely to be affected by any developments were identified and inspected from ground level only and were not climbed. No invasive examination technique (such as increment boring, or internal decay detection) was carried out. As the inspection was visual only, no guarantee, either expressed or implied, of the internal condition of the wood of these trees can be given.

3.2. Marking

3.2.1. The site plan provided by Swann Edwards Architecture was converted for use in Arbortrail tree data collection software. Crown measurements were taken using a laser rangefinder (Leica Disto D510).

3.2.2. Each reference number on the plan refers to a survey sheet entry completed on site to show the following data:

- Sequential tree reference number (recorded on tree survey plan)
- Species - Common name followed by the Latin name for the first entry of each different species
- Height in metres
- Trunk diameter in millimetres, measured in accordance with Annex C of BS 5837:2012
- Crown radius measured at the four cardinal points – where only one measurement is given, the crown is symmetrical
- First significant branch height and direction of growth
- Crown clearance above ground level
- Life stage (young, semi-mature, early mature, mature, over-mature, veteran)
- General observations, particularly of structural and/or physiological condition, and/or preliminary management recommendations
- Estimated remaining contribution in years (less than 10, 10+, 20+, more than 40)
- Category U or A to C grading, to be recorded on the tree survey plan

3.2.3. Survey sheet entries are shown at Appendix A of this report.

3.3. Tree categorisation

3.3.1. Trees vary in, size, age, and landscape importance. All trees were categorised in accordance with the British Standard Trees in relation to design, demolition and construction - recommendations BS 5837: 2012. BS Categories have been entered in the tree schedule and are as follows:

U – **Trees unsuitable for retention**. Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

A - **High Category.** Trees of high quality with an estimated remaining life expectancy of at least 40 years.

B - **Moderate Category.** Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

C - **Low Category.** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

3.3.2. The site plan was edited to show the above and below-ground constraints relative to the proposed site, and to inform the developer of the potential conflicts with the tree population (refer to Appendix C drawings TPP_9CHURCHLNE_1). The root protection areas (RPAs) have been calculated using Trees in Relation to Design, Demolition and Construction - recommendations BS 5837: 2012. The RPAs of trees implicated in the design proposal have not been adjusted in shape to take into account site topography. Whilst the presence of roads and building foundations may restrict root spread, hard surfaces such as tarmac/paved footpaths are likely to have roots present beneath them but at a reduced volume.

3.3.3. The trunk diameter circle and crown outline show the BS Category in the following colours:

Category U	**Dark red**
High Quality (A)	**Light green**
Moderate Quality (B)	**Mid-blue**
Low Quality (C)	**Grey**

3.3.3. Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012 do not include arguments for or against development, or for the removal or retention of trees. Where development is likely to occur, the standard provides guidance on how to decide which trees are appropriate for retention.

4. Brief Site Description

4.1. General

4.1.1. The application site is part of the existing garden of 9 Church Lane adjacent to the Church of St Mary. There is a belt of mature trees around the perimeter of the church that provides screening to and from the existing building See Fig 1 below).



Fig 1: Mature tree belt in Church grounds with horse chestnut in the foreground

4.1.2. The belt of trees is an important landscape feature of high amenity value and making a significant contribution to the character of the church and immediate area.

4.2. Statutory Tree Protection

4.2.1. The Town and Country Planning (Tree Preservation) (England) Regulations 2012 allows for trees either as groups, or individuals, or as woodlands, to be protected by Tree Preservation Orders (TPO). These have the effect of preventing the cutting down, topping, lopping,

uprooting, wilful damage or wilful destruction of trees except in certain circumstances, other than with the consent of the local planning authority.

4.2.2. A Conservation Area (CA) is an area designated by the Local Planning Authority as one of "special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance". Special controls exist regarding demolition and alteration of buildings; Listed Building Consent must also be obtained for any demolition, even if the building is not itself listed. Similarly, trees are given some protection with the requirement for the local authority to be given six weeks written notice before carrying out any work on trees; this gives the authority time to decide if a TPO is necessary.

4.2.3. The site is outside the Tydd St Mary CA, but we are unaware if a TPO is in place on the tree in question. As the tree is within a CA, any works will require a written application to the Planning Authority as CA status overrides Common Law rights that would normally allow the cutting back of overhanging branches.

4.3. Development Proposal

4.3.1. The proposed development is a new two-storey detached residential property with off-street parking for two vehicles and rear garden area to include the planting of three trees on the east boundary of the site and mixed native hedge to the north boundary.

5. Tree Population

5.1. Tree schedule

5.1.1. Refer to appendix A for detailed records of individual trees and drawing Tree Protection Plan (Appendix C drawing number TPP_9CHURCHLNE_1) for the locations of the tree.

5.2. Tree T1 Horse chestnut (*Aesculus hippocastanum*)

5.2.1 A mature tree growing within a tree belt on the south boundary of the church. The tree has dense ivy on the trunk and into the crown and this may be a potential bat feature. However, dense ivy can lead to shed limbs during inclement weather due to the increased resistance to the wind (see fig 2 below).



Fig 12 Dense ivy on trunk and into crown.

The tree forms two main stems above 1.5m and is partially suppressed on the north side by adjacent trees. There is light deadwood in the crown that currently does not require attention. There is evidence of Horse chestnut leaf-miner (*Cameraria ohridella*) that leads to discolouration and defoliation of the leaves. Whilst the tree will usually flush normally the following spring, differences in climate, or interactions with other pests and diseases might lead to greater impact in the UK and this is currently being studied through long-term monitoring.

6. Arboricultural Impact Assessment

6.1. Summary of impact

Impact	Reason	Low value (Cat C & U) trees	Moderate value (Cat B) trees	High value (Cat A) trees	Potential design & mitigation techniques
Trees to be removed	Building construction and/or surfacing	N/A	N/A	N/A	
	Arboricultural reasons	N/A	N/A	N/A	N/A
Retained trees to be managed	Enabling works/space for development	N/A	Tree T1	N/A	Minor crown lifting over existing garden
Retained trees that may be damaged	Removal of existing structures	N/A	N/A	N/A	N/A
	Removal of existing surfacing	N/A	Tree T1	N/A	Removal of existing hard surfacing to be carried out using hand tools within the RPA
	Material storage/washing areas/welfare areas	N/A	Tree T1	N/A	All material storage/washing areas/welfare areas to be located away from the RPA unless ground protection in place. The existing hard surface can be used for storage
	Temporary access to construction areas	N/A	N/A	N/A	The development is of low intensity and heavy plant will not be used. The existing hard surface can be used
	Installation of new structures	N/A	N/A	N/A	Proposed development outside the RPA of the tree
	Installation of new surfacing	N/A	N/A	N/A	
	Excavations or ground level changes	N/A	Tree T1	N/A	No changes in levels within the RPA of the tree
	Installation of services*	N/A	N/A	N/A	N/A
	Landscaping works	N/A	Tree T1	N/A	Landscaping within the RPAs including grass to be carried out using hand tools – no mechanical cultivators to operate within the RPAs.

6.2. Arboricultural Impact Assessment

6.2.1. The development (refer to section 4.3 above and TPP_9CHURCHLNE_1) does not require the removal of any vegetation/trees. The footprint of the building is outside the RPA of the tree (T1) and therefore no special construction methods or foundation design will be required.

6.2.2. The foundation design must consider the proximity of mature trees within the adjacent tree belt and their water demand in relation to the soil type, and this is a matter for the structural engineer; Horse chestnut are considered to be of moderate water.

6.2.3. The property will not be shaded by the crown due to their relative positions. With reference to drawing TPP_9CHURCHLNE_1, the potential ultimate crown spread has been plotted, however, it is unlikely that the tree will reach this size due to surrounding trees providing a degree of suppression.

6.2.4. Changes in ground surface within the RPA of the tree has the potential to damage roots unless precautions are taken and these are dealt with in section 8 below.

7. Development

7.1. Threats to trees during development

7.1.1. These may be listed, in general terms as:

- Compaction of ground
- Covering rooting areas with impervious surfaces
- Excavations for foundations
- Excavation for service runs
- Alterations in ground level
- Access and movement of machinery
- Need for temporary site storage
- Crown damage by passage of high-sided vehicles

7.1.2. British Standard 5837 (1991) 'Trees in relation to construction' provided useful guidance for the assessment and formulation of measures for the mitigation of such threats. Using the experience gained from this Standard, it was revised and upgraded to 'Recommendation' status as British Standard 5837 'Trees in Relation to Construction' (2005). This British Standard was withdrawn on 30th April 2012 and replaced with Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012. To assist in the prediction of the likely impact of development on retained trees, a model is used. This model is based on the age, vitality and size of individual specimens.

7.1.3. The British Standard relies heavily on the creation of a protected zone (RPA) around each tree. This area should be protected from disturbance "to avoid unacceptable damage to the tree as a result of severance or asphyxiation of the root system." The recommended

minimum area (m²) for each tree to avoid potentially harmful disturbance have been calculated for all the trees surveyed and entered into the tree schedule (appendix A).

7.1.4. BS 5837: (2012) acknowledges that the shape of the tree root system may be affected by several factors and that the shape of the RPA should reflect this. Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system:

a) the morphology and disposition of the roots, when influenced by past or present existing site conditions (e.g. the presence of roads, structures and underground apparatus);

b) topography and drainage;

c) likely tolerance of the tree to root disturbance or damage based on factors such as species, age, condition and past management.

7.2. Root Damage

7.2.1. Trees that are growing satisfactorily have achieved equilibrium with their surroundings. Any construction work that affects this equilibrium could be detrimental to health, future growth and the safety of the tree.

7.2.2. The part of the tree most susceptible to damage is the root system, which, because it is not immediately visible, is frequently ignored. Damage or death of the root system will affect the health, growth, life expectancy and safety of the rest of the tree. The effects of such damage may only become evident several years later.

7.2.3. The majority of a tree's root system is generally considered to be in the top 600mm of the soil, extending radially in any direction for distances frequently in excess of the tree's height. However, roots are adventitious and if conditions suitable for root development exist to a greater depth, the roots may extend to depths of three metres or more. Works within the root spread may damage the root system.

7.2.4. Close to the trunk are the main structural roots that develop in response to the tree's need for structural stability. Beyond these major roots, the root system rapidly subdivides into smaller diameter roots; off this main system a mass of fine roots develops.

7.2.5. Tree root systems can be damaged in a number of ways during construction works. Root severance. Severing of a root will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving a mass of fine roots over a large area. The larger the root severed, the greater the impact on the tree.

- Damage to root bark. The bark protects the root and is essential for further root growth; it is loosely attached and easily damaged. If damage extends around the whole circumference, the root beyond that point will be killed.

- Compaction of the soil. Compaction of the ground reduces the space between soil particles, particularly in clay soils. A single passage of heavy equipment or the storage of materials can cause significant damage. Compaction can restrict or even prevent gaseous diffusion through the soil and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.
- Alterations in ground levels. Lowering the level will strip out the mass of roots near to the surface. Raising the ground levels will have the same effect as compaction.

- Covering the rooting area with impervious surfaces. This prevents natural diffusion of gases between the soil and the atmosphere and can lead to oxygen depletion in the soil.

- Direct toxicity of some materials. For instance, petrol or diesel spillage or lime in cement can kill underlying roots.

- Wounding. Minor wounds to root bark can allow pathogens into the tree root system that can lead to a further impairment of water absorption. The general debilitation of trees due to root severance can make them more susceptible to invasion by some decay fungi such as Armillaria spp.

- Damage to the fine roots by severance of a main root, or by compaction, or by alteration of levels, will prevent the fine roots absorbing the water and nutrients essential for tree growth. The effects of damage from different causes will be cumulative.

7.2.6. The effects of tree root damage may not be immediately apparent. If the root system is capable of rapid regeneration, the tree may recover without noticeable ill effects, though usually symptoms take several years to develop. The range of symptoms varies from minor branch dieback, to deterioration and ultimate tree death depending on the severity of the damage and the ability of the roots to regenerate.

7.2.7. The default position should be that structures are **located outside the RPAs of trees that are to be retained**. The cumulative effects of incursions into the RPA e.g. from excavations for utility apparatus are damaging and should be avoided. Where there is evidence that a tree has been previously subjected to damage by construction activity this should be taken into account when considering the acceptability of further activity within the RPA.

8. Arboricultural Method Statement

8.1. Phase 1: Undertake Approved Tree Works.

8.1.1. All tree works should be undertaken prior to any site works commencing. Motorised vehicles will be restricted to areas of existing compacted/hard surfaces, or where ground protection is in place, and should not be taken onto un-surfaced areas within the root protection areas as shown on drawing TPP_9CHURCHLNE_1. Refer to Table 8.2 below for tree works.

8.2 Tree Works

Tree No.	Recommended Works
1	Crown lift over garden to 4m height by careful removal of small branches on the underside of main overhanging lateral branches

NB: Plant and machinery must not enter the RPAs of retained trees unless ground protection is in place and the works supervised. A written application to the Council will be required to obtain consent for the tree works (Section 211).

8.3. Phase 2: Tree protection

8.3.1. All materials storage and mixing will be confined to areas outside the RPAs of the trees. Where mixing of materials is undertaken close to the RPAs, this should be on an impervious surface with no run-off to prevent chemical contamination of the RPA.

8.3.2. Tree T1 is outside the development area and is protected by the existing boundary railings forming a barrier between the existing house/garden and the tree. There is also hard standing present that can be retained during the main phase of building construction for the storage of materials. It is recommended that protective fencing is installed as shown in drawing TPP_9CHURCHLNE_1 to prevent damage to the crown of the tree and to prevent excessive soil compaction within the RPA where hard standing is not present. Details on tree protection are given in Appendix B sections 1.2 & 1.3 & figs 1 & 2 for reference.

8.3.3. The development is of low intensity, however, if a mechanical digger is to be used to excavate the foundations, it is advised that the digger operates from the existing hardstanding adjacent to the RPA of the tree.

8.4. Excavations in RPAs

8.4.1. No excavations are planned within the RPAs of retained trees/hedges.

8.5. Changes of Surface

8.5.1. There is existing compacted stone and hardstanding within the RPA of the tree and this is likely to be removed to allow for the landscaping of the rear garden. The existing hard surfaces should be retained as ground protection for the duration of the construction of the main building. Following completion of the main construction phase, the landscaping of the rear garden can be carried out in. The hard surfacing can be broken up by use of a pneumatic hammer and the broken sections removed by hand. Whilst it is unlikely that significant roots will be present beneath the hard surfacing, a mechanical digger should not be used as there is potential for roots to be ripped out of the ground in error. The compacted stone should not be scraped up by digger but should be removed using hand tools if required. Top soil can used in the garden area to achieve a suitable level but must not exceed 200mm depth over the existing soil level within the RPA of the tree; this volume of soil would also cover much of the compacted stone. The proposed lawn area will allow for a larger surface area for gaseous exchange and water infiltration to the tree and is a more amenable environment for tree roots. Refer to Appendix B Section 1.5. for further details.

8.6. Installation of Services

8.6.1. All new services should be kept outside the RPAs of trees. However, where new services must be installed in RPAs, great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be carried out by hand according to the guidelines in Appendix B section 1.4.

8.7 Landscaping

8.7.1. It is proposed to plant a mixed native species hedge along the north boundary and this will require minor excavations within the RPAs of the trees in the belt. All planting must be carried out using hand tools (refer to Appendix B section 1.6.). No herbicides should be used to clear weeds as this will be taken up by the tree roots and likely lead to long-term damage.

8.8. Other tree-related site works

8.8.1. **Pre-commencement site visit:** This is a small-scale development not requiring specialised construction methods or significant tree protection measures and therefore it is not considered necessary to arrange site meetings for this aspect. Any modifications to the proposed development may require that the tree report is updated.

9. General

9.1.1. Limitations of report: This report is intended to highlight to designers the arboricultural implications of the development proposal on the existing tree population.

9.1.2. Arboricultural Standards: Any tree works should be done in accordance with the British Standard Recommendations for Tree work, BS 3998 as modified by later research. Works should be undertaken by properly qualified and experienced tree contracting company as recommended by a local authority or one approved by the Arboricultural Association. A Register of Contractors is available from:
The Arboricultural Association
The Malthouse
Stroud Green
Standish
Stonehouse
Gloucestershire GL10 3DL
UKTel +44 (0) 1242 522152
Fax +44 (0) 1242 577766
Email: admin@trees.org.uk.

9.1.3. Statutory wildlife implications: Wildlife in this country is afforded protection under the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000. Statutory protection is given to birds, bats and other species that inhabit trees. Tree work is governed by these statutes and advice should be sought from an ecologist before undertaking any works that may constitute an offence.

Graham M Causey B.Sc.(Hons), F. Arbor. A, R.F.S Cert Arb. LANTRA Professional Tree Inspector

APPENDIX A TREE SCHEDULE

Tree No.	Species	Height (m)	DBH (mm)	Crown radius (m)				FSB & direction	Lower crown height (m)	Life stage	General observations	Est. Rem'ing contrib'n	BS Cat	RPA as circle of radius (x)m	RPA (m^2)
				N	E	S	W								
T1	Horse chestnut	12	740(1)	6.5	6.5	5.5	7.8	5SW	2.5	EM	In neighbouring property Basal growth Ivy on stem – unable to inspect stem Stem divides above 1.5m Light deadwood in crown Heavy ivy in crown Limited public visibility Full crown Chestnut leaf-miner Compacted stone on south side Large stones set in ground on southwest side of tree and hard surfacing present Potential bat features present	40+	**B2**	8.9	248

KEY

Y = Young
SM = Semi-mature
EM = Early-mature
M = Mature
OM = Over-mature
V = Veteran

H = Hedge
G = Group
B = Shrubs
K = Small tree
W = Woodland

TREE QUALITY ASSESSMENT CASCADE CHART

Category and definition	Criteria (including subcategories where appropriate)		
Trees unsuitable for retention **Category U**	Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low-quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve*	
Trees to be considered for retention	**1 Mainly arboricultural qualities**	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

APPENDIX B TREE PROTECTION

1.1. Pre-commencement site meeting.

1.1.1. A pre-commencement site meeting is advised prior to any works commencing on site, to agree all the approved processes with the relevant concerned parties.

1.2. Protective fencing and ground protection.

1.2.1. All trees to be retained on site should be protected by barriers and ground protection where applicable. Barriers should be in place before any materials or machinery is brought onto site. Once in place, barriers and ground protection should be considered sacrosanct and should not be altered or removed without prior recommendation by an arboriculturist and approval of the local planning authority. Barriers should be fit for excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

1.2.2. The protective fencing is to be erected prior to any site works or demolition works.

1.2.3. The barrier is to comprise of a vertical and horizontal framework (Figure 1 below), well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Weldmesh panels, such as Heras, should be securely fixed with wire or scaffold clamps to this framework. Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification should be prepared in conjunction with the project arboriculturist that provides an equal level of protection. Such alternatives could include the attachment of the panels to a freestanding scaffold support framework.

1.2.4. Where retained trees are near the existing buildings, a higher specification hoarding will be required to prevent damage from falling rubble. In place of the weldmesh, panels solid hoarding should be used, for example, scaffold boards.

1.2.5. Where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority. For example, 2 m tall welded mesh panels on rubber or concrete feet might provide an adequate level of protection from cars, vans, pedestrians and manually operated plant. In such cases, the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to

a base plate secured with ground pins (Figure 2 below). Where the fencing is to be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray

1.2.6. It is advised that a plan be pinned up on site in highly visible areas such as in the site huts, so that all ground staff involved in the demolition and construction works have a point of reference for tree protection issues. All demolition and construction workers should be briefed on the importance of tree protection prior to works commencing. Special attention must be paid to ensure that protective fencing remains rigid and complete during all works.

1.2.7. Where it is agreed that vehicular or pedestrian access for construction purposes is necessary within the RPA, ground protection measure will be required to prevent damage to the soil structure within the RPA.

1.2.8. For pedestrian access within the RPA, the installation of ground protection in the form of a single thickness of scaffold boards over a compressible layer laid onto a geotextile, or supported by scaffold, is likely to be acceptable.

1.2.9. For wheeled or tracked vehicle, access within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of proprietary systems or reinforced concrete slabs. The structure must use a no dig design (see methodology described in 1.7 below) to prevent root severance and must prevent localised soil compaction by distributing the load across the track width. Such a system may include the use of three-dimensional cellular confinement systems (CCS) as a component of the sub-base, to act as a load suspension layer.

1.2.10. New permanent hard surfacing should not cover more than 20% of the RPA or be wider than 3m within it; it should be constructed to be permeable to moisture and gas.

1.3. Construction exclusion zone

1.3.1. Once the construction exclusion zone (CEZ) has been protected by barriers and/or ground protection, demolition/construction can take place.

Inside the Construction Exclusion Zone (CEZ) of the protective fencing, the following prohibitions shall apply:

- No mechanical digging or scraping
- No hand digging
- No storage of plant, equipment or materials
- No vehicular or plant access
- No fire lighting
- No washing down of vehicles or machinery
- No handling, discharge or spillage of any chemical substance, including cement washings

- No action likely to cause localised waterlogging
- No change in ground levels
- No construction of a hard surface
- No earthworks

1.3.3. To inform site personnel of the purpose of the fencing, information notices shall be fixed to the fencing at 5m intervals. These notices shall be of all-weather construction and shall be in the form of the example provided at Figure 4 below, and replaced as and when necessary.

1.3.4. In addition to the above, further precautions are necessary adjacent to trees outside the CEZ:

- Materials that will contaminate the soil, e.g. concrete mixing, diesel soil and vehicle washings, should not be discharged within 10 metres of the tree stem. This should take into consideration the topography of the site and slopes to avoid materials such as concrete washings running towards trees.

- Fires should not be lit in a position where their flames can extend to within 5m of foliage, branches or trunk. This will depend on the size of the fire and the wind direction.

- Notice boards, telephone cables or other services should not be attached to any part of the tree.

1.4. New Services

1.4.1. **Service connections:** The location of all new service routes should ideally be outside of the root protection zones of the trees to be retained to avoid damage to tree roots. All proposed service installations should be carried out in accordance with the guidelines set out in NJUG Publication No.10, and Section 11.3.5 and 11.7 of BS5837:2005. Great care should be taken to preserve and work around roots greater than 25mm in diameter, and clusters of smaller roots avoiding damage to bark. Where it is necessary to sever roots greater than 25mm in diameter, arboricultural advice must be sought. Where smaller roots must be severed, they should be cut back cleanly using secateurs or a sharp pruning saw. Where possible, services laid through protected areas need to be installed at a depth preferably not less than 750mm deep in order to preserve the maximum number of roots, and avoid conflicts between the tree roots and the utility service run. The trench should be kept as narrow as possible to reduce the potential amount of root severance. Backfilling of trenches should be carried out using the excavated soil, which should be worked in around roots and lightly "tamped" not compacted and preserving the original soil profile. The backfill should be left proud of surrounding levels to allow for settlement. Trenches must not be left open overnight, and arboricultural supervision should be provided during excavation of trenches through protected zones. If the trench is to remain open for any period during the day to prevent the roots from drying out, it is advised that moist Hessian sacking be wrapped around the exposed roots, and/or trench to prevent desiccation from occurring. All existing site

services that are already within the root protection areas that are to be made redundant will still need to comply with the above to prevent any damage to roots within these areas.

1.5. Removing Surfacing in RPAs

1.5.1. Roots are frequently found beneath or adjacent to existing surfacing or built structures and care is needed. Damage to the roots may be by direct physical damage or compaction of the soil from the weight of plant and machinery or repeated pedestrian movement. This is generally not a problem whilst surfacing is in place as the load is spread and additional protection is not required. However, once the existing surface is removed and the soil below exposed significant damage can occur to the soil structure and directly to the roots in a very short time. The following rules must be followed:

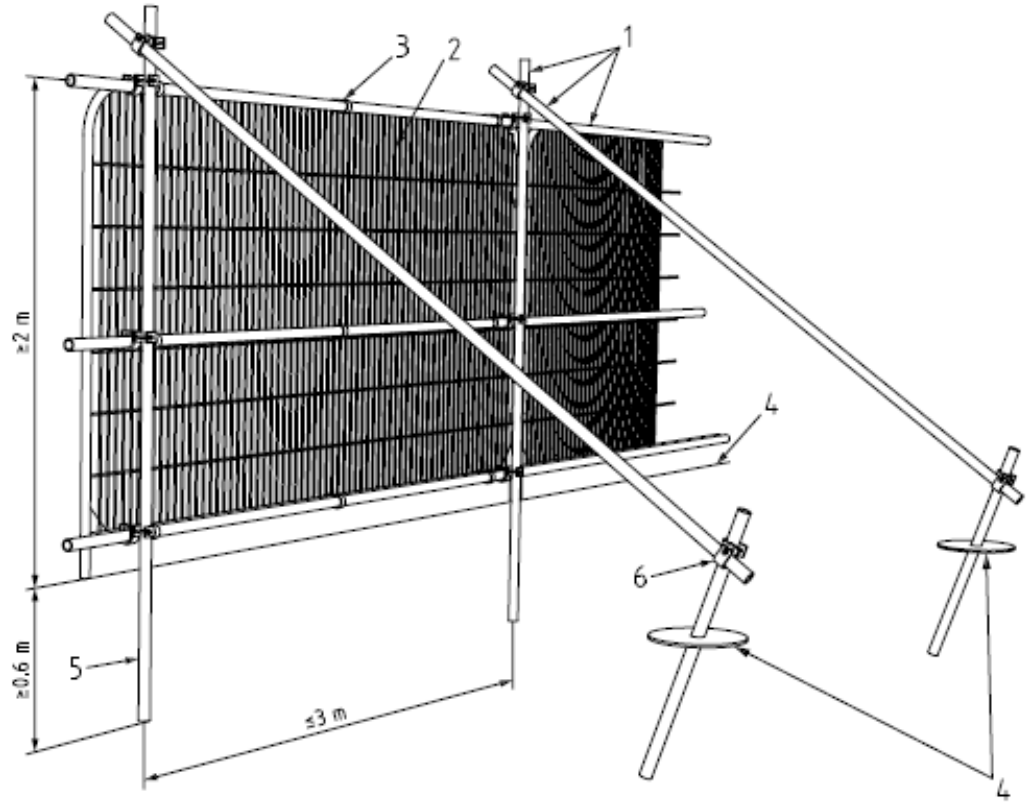
1. No vehicular activity or repeated pedestrian access into the RPAs unless on existing hard surfacing or custom designed ground protection, this must be designed for anticipated loads.
2. Regular vehicle and pedestrian access routes must be protected from compaction by temporary ground protection.
3. RPAs exposed by the works must be protected as set out in BS 5837:2012 until there is no risk of damage from construction activity

Appropriate tools for manually removing debris may include a pneumatic breaker/drill, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow. Secateurs and a bow saw must be available to deal with any exposed roots that have to be cut. Machines with a long reach may be used if they can work from outside RPAs or from areas protected by ground protection designed for the loading within the RPA. Debris to be removed from RPAs manually must be moved across existing hard surfacing or temporary ground protection to prevent compaction damage. If possible, leaving below ground structures in place should be considered if their removal may cause excess root disturbance.

1.6. Soft Landscaping

1.6.1. Soft landscaping includes the re-profiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the construction/installation of solid structures or compacted surfacing. No significant excavation or cultivation, especially by rotovators, should be carried out within the RPAs. Where new designs require levels to be increased to tie in with new structures or the removal of an existing structure has left a void below the surrounding ground level, good quality and relatively permeable top soil should be used for the fill. It should be firmed into place but not over compacted in preparation for turfing or careful shrub planting

Figure 1: Tree Protective fencing



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Figure 2: Tree Protective fencing (alternative)

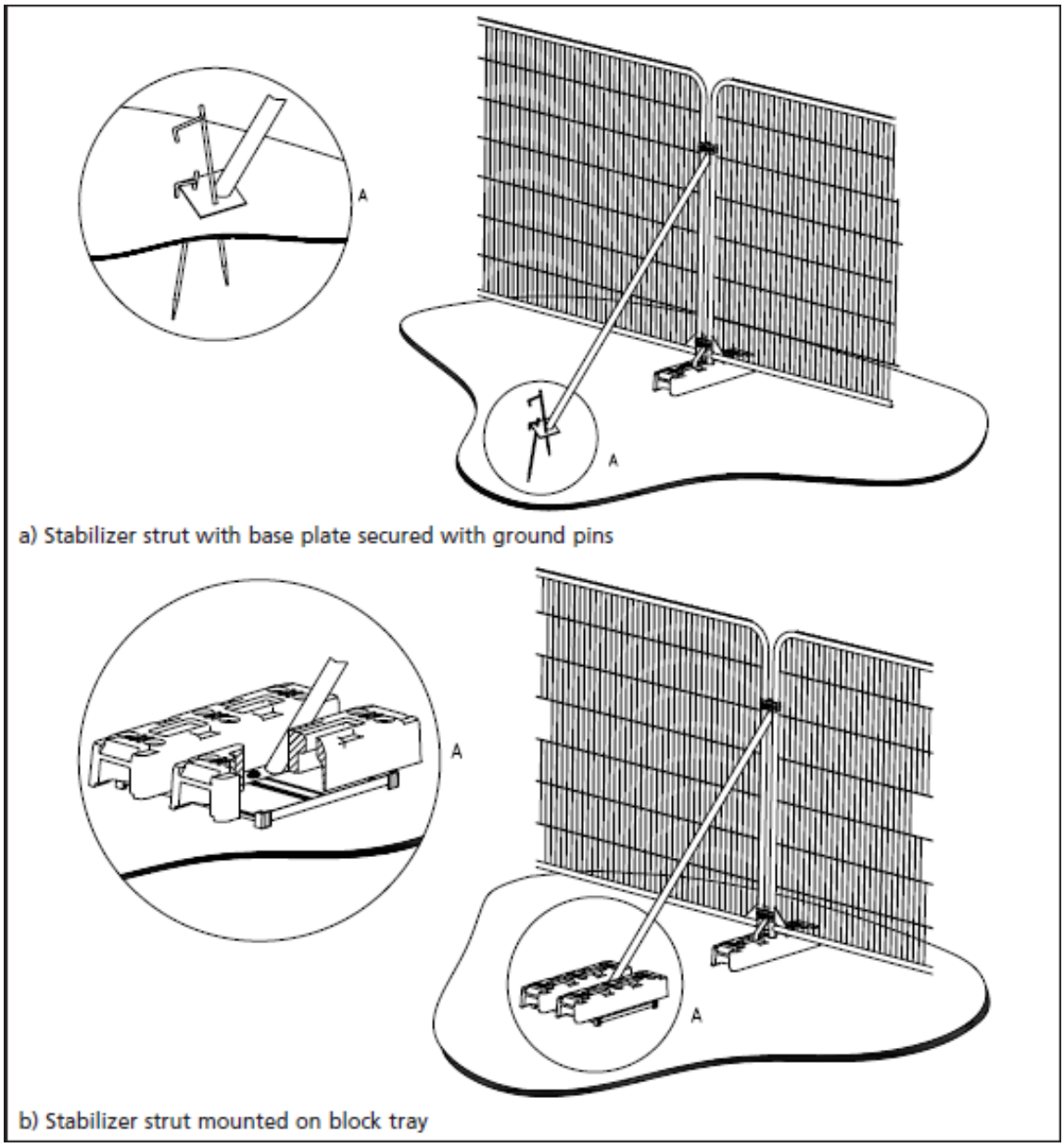
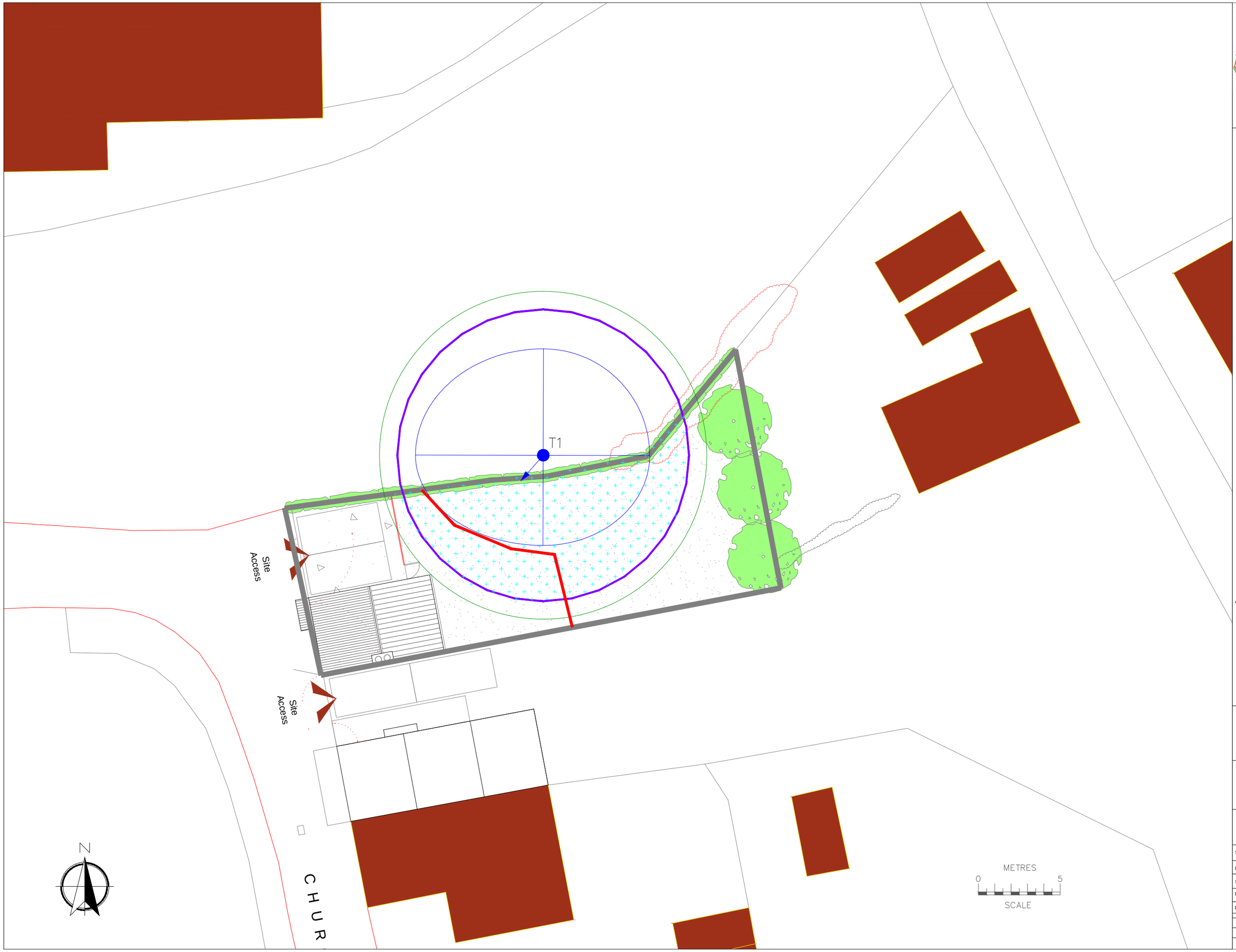


Figure 3: Example of warning notice



APPENDIX C TREE PROTECTION PLAN



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EMAIL: grahamcausey@gmail.com
fionacritchley2016@gmail.com

KEY

BS CAT B

ROOT PROTECTION AREA (RPA)

ULTIMATE CANOPY SPREAD*

DIRECTION OF 1ST SIGNIFICANT BRANCH OVER SITE

PROTECTIVE FENCE

AREA OF HAND-DIG ONLY

*ULTIMATE SPREAD UNLIKELY

DRAWING TITLE

TREE PROTECTION PLAN

PROPOSED SITE

PROJECT

LAND NORTH OF
9 CHURCH LANE

CLIENT

Mr L CONNOLLY

SCALE	1:200@A3
DATE OF ISSUE	DEC 2017
SURVEYOR	GMC DATE
DRAWN BY	GMC
DRAWING No.	TPP_9CHURCHLNE_1 REV A

No.	DATE	REVISION