

Hole Farm Community Woodland Town and Country Planning Application

Arboricultural Impact Assessment and Method
Statement

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Hole Farm Community Woodland

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1 Introduction

1.1 Purpose of report

- 1.1.1 The purpose of this report is to provide the information necessary for Brentwood Borough Council (BBC) to meet the duty placed upon them by s.197 of the Town and Country Planning Act 1990. This duty requires that local planning authorities “ensure, *whenever it is appropriate, that in granting planning permission for any development adequate provision is made, by the imposition of conditions, for the preservation or planting of trees.*”
- 1.1.2 This report assesses the potential effects of development on trees and puts forward proposals for mitigation where appropriate. In order to avoid additional, or otherwise unforeseen adverse arboricultural impacts, it is essential that the mitigatory measures described within this report are implemented in full during site clearance and construction.

1.2 Scope of report

- 1.2.1 The scope of this report has been determined with reference to British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations¹ (BS 5837). It includes reference to the following:
- a. A tree survey schedule;
 - b. An Arboricultural Impact Assessment;
 - c. An Arboricultural Method Statement (heads of terms).
- 1.2.2 Root protection areas (RPAs) have been identified and represent the minimum area around a tree (m²) deemed to contain sufficient roots and rooting volume to maintain a tree’s viability. Initially plotted as a circle, RPAs have been adjusted to account for the constraint to root growth presented by the B186 Great Warley Street.
- 1.2.3 The BS 5837 gives recommendations and guidance on the relationship between trees and the design, demolition, and construction process. It sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures. These recommendations and guidance have been applied throughout this report and form the basis of the Arboricultural Impact Assessment (AIA) and Arboricultural Method Statement (AMS).

¹ British Standards Institute. 2012. BS 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations*. London: BSI.

1.3 Professional Credentials

- 1.3.1 John Mitchener has 17 years' experience of working as an arboricultural consultant and local authority tree officer. As a consultant, John has worked on projects for clients which include Network Rail, National Highways, Welsh Government, and local authorities. John is a professional member of the Arboricultural Association since 2009.

1.4 Project Description

- 1.4.1 The creation of a community woodland facility comprising: vehicular access into a 94-space car and coach park, with EV charging points and overflow area; substation; an open sided visitor shelter; a modular café with covered outdoor seating area, bin store, cycle parking and WC facilities; demolition of a grain store and development of a community building including staff welfare and office facilities and outdoor terrace; staff and disabled car parking; demolition of an agricultural machinery store and construction of a Forestry England Barn; service yard and vehicle turning circle; surfaced and unsurfaced woodland paths; creation of six new ponds; countryside heritage and interpretation boards and informal natural play areas at Hole Farm Lane, Great Warley, Brentwood, Essex CM13 3JD (the site)

2 Baseline data collection

Study area

- 2.1.1 The study area has been determined as a 15m buffer around all elements of the Project with the capacity to adversely impact existing trees, tree groups, hedges, and wooded areas. A 15m buffer has been applied as a means of ensuring compliance with BS 5837 which recommends that all trees whose Root Protection Areas (RPAs) extend into the developable area are surveyed and any impacts subsequently assessed. The BS 5837 caps RPAs with a maximum radius of 15m.
- 2.1.2 The extent of the study area has been amended to exclude the B186 Great Warley Street. This is because the presence of the carriageway will function as a barrier to tree root growth, thereby negating the possibility of any impact to trees along its north-eastern side.
- 2.1.3 The study area has been further amended to exclude Hole Farm Lane on the basis that it is an established and substantial access route. This means that construction work to resurface with tar and chip can be undertaken without risk of damage to the roots of nearby trees.

Desk study

- 2.1.4 A desk study was undertaken in January 2023. The purpose of the desk-based study is to identify the presence of any statutory and environmental designations which may apply to arboricultural features within the study area.
- 2.1.5 The desk study reviewed existing arboricultural information available in the public domain. The study has considered the following sources.

Tree Preservation Orders and conservation areas

- 2.1.6 BBC is responsible for implementing legal controls imposed through Tree Preservation Orders (TPOs) and conservation areas within the study area. The statutory status of trees was checked via the Council's website².

Ancient and veteran trees

- 2.1.7 The potential presence of ancient and veteran trees within the study area was checked using the Woodland Trust's Ancient Tree Inventory³.

Ancient woodland

- 2.1.8 The potential presence of ancient woodland within the study area was checked using Natural England's Multi Agency Geographical Information for the Countryside (MAGIC) map⁴.

Tree survey

- 2.1.9 The tree survey was undertaken in August 2022. The survey was conducted by John Mitchener (Arboricultural Consultant) with Ordnance Survey MasterMap and National Tree Inventory data used as base mapping.
- 2.1.10 The tree survey has been undertaken with reference to BS 5837. The tree survey was undertaken without reference to any site layout proposals. Tree quality assessments account for health, condition and an estimated remaining contribution based on current site conditions.
- 2.1.11 Further details on the methodology used to obtain tree survey data are provided in Appendix A: Tree Survey Methodology.

2.2 Desk study and tree survey results

- 2.2.1 The desk study identified the absence of any records of TPOs, conservation areas, ancient and veteran trees, and ancient woodland within the study area.
- 2.2.2 The tree survey recorded the presence of 33 trees, 11 tree groups, six hedges and two wooded areas. These comprise five high-quality trees, five moderate-quality trees, three moderate-quality tree groups and two moderate-quality wooded area. Also included are 21 low-quality trees, eight low-quality tree groups, three low-quality hedges, two very-low quality trees and three very-low quality hedges.
- 2.2.3 Details of the surveyed trees, tree groups, hedges and wooded area are provided in Appendix B: Tree Survey Schedule and in Plates C.1 to C.6.

² Brentwood Borough Council, 2023. My Property [Online] Available at: myproperty.brentwood.gov.uk/ [Accessed 10 February 2023].

³ Ancient Tree Inventory, 2023. Ancient Tree Inventory [Online] Available at: [Tree Search - Ancient Tree Inventory \(woodlandtrust.org.uk\)](http://Tree Search - Ancient Tree Inventory (woodlandtrust.org.uk)) [Accessed 10 February 2023].

⁴ MAGIC (DEFRA), 2023. Multi Agency Geographic Information System for the Countryside [Online] Available at: [Magic Map Application \(defra.gov.uk\)](http://Magic Map Application (defra.gov.uk)) [Accessed 10 February 2023].

3 Arboricultural Impact Assessment

- 3.1.1 The scope of this Arboricultural Impact Assessment (AIA) has been established with reference to BS 5837 Clause 5.4 'Arboricultural Impact Assessment'. The scope of assessment is defined as including an evaluation of the direct and indirect arboricultural effects of the Proposed Scheme.
- 3.1.2 This AIA includes specific reference to the effects of any tree loss and other potentially damaging activities which would foreseeably occur in the vicinity of retained trees. Where necessary, further reference is made concerning those matters which require inclusion within an Arboricultural Method Statement (AMS).
- 3.1.3 The spatial relationship between surveyed trees and elements of the Project with the capacity to damage existing trees and hedges is presented in Plates C.1 to C.6.

3.2 Tree and hedge removals

Proposed building cluster

- 3.2.1 Five trees will be removed to facilitate demolition, construction, and an increased level of occupancy.
- 3.2.2 Low-quality BS 5837 category C trees T3 and T4 will be removed to facilitate demolition whilst low-quality tree T6 will be removed to permit construction and resurfacing works at the entrance to the building cluster.
- 3.2.3 Very-low quality BS 5837 category U trees comprise two willows *Salix* spp. which are in poor physiological condition and in terminal decline. These trees, recorded as T8 and T12, are therefore at increased risk of breakage or collapse. They shall be removed to prevent them becoming a health and safety risk during construction and subsequent occupation.

Proposed car park

- 3.2.4 Approximately 52m of very-low quality BS 5837 category U hedgerow shall be removed in order to facilitate construction of vehicular and pedestrian access to the B186 Great Warley Street.
- 3.2.5 A 40m long section of hedgerow H18 shall be removed to provide for the car park entrance. An additional 6m long section of hedgerow H18 and a 6m long section of hedgerow H27 shall also be removed to provide for pedestrian gated access.
- 3.2.6 Hedgerows H18 and H27 are elm *Ulmus* sp. This species is susceptible to infection with Dutch elm disease *Ophiostoma novo-ulmi*, once infected plants usually die soon after. It is for this reason that hedgerows H18 and H27 has been categorised as being of very-low quality. It is foreseeable that these hedgerows may die, in whole or in part, irrespective of any future development work.

Proposed lorry turning

- 3.2.7 The location of the proposed lorry turning area has been determined with reference to the RPAs associated with trees forming moderate-quality wooded area W33.
- 3.2.8 The proposed lorry turning area has been positioned outside of the RPAs. This means that its construction will not require the removal of any trees, nor will it generate any foreseeable adverse arboricultural impacts.

3.3 Tree surgery

- 3.3.1 Construction of the Project does not include a foreseeable requirement for tree pruning.
- 3.3.2 However, if a requirement for pruning does arise then this shall be assessed by a competent and suitably experienced arboriculturist. All pruning work shall be specified in accordance with British Standard BS 3998:2010 *Tree work - recommendations*⁵ and included within the AMS. This shall ensure that pruning is only undertaken in instances where it does not adversely impact the health or appearance of any retained tree.

3.4 Construction impacts

- 3.4.1 Construction impacts may arise in instances where construction work occurs within the RPA of a retained tree. Impacts are most likely when construction requires excavation or compaction of the soil and therefore risks causing damage to tree roots and the rooting environment.
- 3.4.2 Elements of the Project which have the capacity to generate construction impacts include the formation of new surfaced pathways, the installation of gate posts, and the installation of underground services and utilities.
- 3.4.3 New surfaced pathways are currently proposed within the RPAs of high-quality trees T41 and T51, moderate-quality tree T37 and moderate-quality tree groups G45 and G49. In instances where the pathway does not make use of existing farm tracks, it will be necessary to ensure construction accords with BS 5837 Clause 7.4. This will require pathways to be constructed with minimal excavation and to use a cellular confinement system sub-base.
- 3.4.4 It is envisaged that the alignment of surfaced pathways will be reviewed during detailed design and, where appropriate, the alignment will be amended to avoid construction within RPAs. In instances where pathways are within RPAs then recommendations included within BS 5837 Clause 7.4 will be strictly adhered to. Adoption of this methodology will prevent damage to tree roots and the rooting environment of retained trees.
- 3.4.5 Access gates, other than those associated with the proposed car park, will be constructed with due regard for tree roots where they are located within the RPA of retained trees. Adverse impact shall be avoided by undertaking additional tree survey work in areas where trees have not yet been surveyed, by

⁵ British Standards Institute. 2012. BS 5837: 2012 *Tree work – Recommendations*. London: BSI.

locating post holes away from important tree roots and by undertaking all excavatory work with hand tools only.

- 3.4.6 Construction impacts shall be avoided by ensuring that all construction work within the RPA of retained trees shall be designed in conjunction with advice provided by a suitably qualified and experienced arboriculturist. A specification and construction methodology shall be compiled which avoids significant adverse impacts and shall be included within the AMS.
- 3.4.7 Construction impacts shall be avoided, or minimised to acceptable levels, through adherence to the following design principles:
- a. Underground services and utilities shall be routed outside the RPA wherever this is reasonably practicable. In instances where this is unachievable, they shall be grouped together to limit the extent of any incursion;
 - b. Replacement hard surfacing within the RPA shall retain any existing sub-base where practicable. Where this is not practicable, or where new surfacing is to be installed within the RPA, then a minimal dig design utilising a cellular confinement system sub-base shall be used;
 - c. Foundations for gate posts and fencing shall be excavated using hand tools only. In instances where tree roots over 25mm diameter are encountered then arboricultural advice shall be sought on whether roots may be severed. If roots cannot be severed without detriment to a tree, then the gatepost or fencing shall be relocated.
 - d. Areas of RPA within which there is to be no construction activity shall be defined as Construction Exclusion Zones (CEZ). During construction the CEZ shall be protected with suitable fencing or ground protection.

4 Arboricultural Method Statement (Heads of Terms)

- 4.1.1 This Arboricultural Method Statement (AMS) describes, in principle, the tree protection measures that shall be applied during site clearance and construction.
- 4.1.2 This AMS has been compiled with reference to BS 5837. In instances where deviations from the recommended approach are required then adequate tree protection shall be achieved through a combination of supervision by the Arboricultural Clerk of Works (ACoW) and adherence to the relevant working methodology.
- 4.1.3 This AMS is a 'living document.' This means that it shall be reviewed, and where necessary updated, in response to changes to the design and/or construction methodology. It is envisaged that this AMS will be reviewed at the following stages of design and construction:
- i. Detailed design and discharge of any relevant planning conditions;

- ii. Contractor engagement;
- iii. Pre-commencement;
- iv. Prior to any instance where the overarching site clearance or construction methodology is amended.

4.1.4 This AMS must be read in conjunction with Plates C.1 to C.6.

4.2 Phasing of tree protection measures

4.2.1 It is essential that tree protection measures are phased correctly during construction. Tree protection measures shall be phased in the following manner:

- i. Review alignment of pathways during detailed design and, where appropriate, relocate outside of RPAs;
- ii. Define CEZ and tree protection measures, finalise AMS and appoint Arboricultural Clerk of Work;
- iii. Undertake tree removals;
- iv. Install tree protection fencing and ground protection (if required);
- v. Site clearance and construction in accordance with AMS;
- vi. Remove tree protection and ground protection once all construction activities have ceased;
- vii. Complete soft landscaping work.

4.3 Arboricultural monitoring and supervision

4.3.1 Arboricultural monitoring and supervision shall be implemented in accordance with the following details.

Nominated Persons

4.3.2 The client/contractor shall appoint an Arboricultural Clerk of Works (ACoW). This person shall be suitably qualified and experienced in the field of trees in relation to construction, and shall be available to:

- a. Attend an initial pre-commencement meeting and supervisory visits as required;
- b. Undertake site monitoring;
- c. Advise on all ad-hoc arboricultural matters which may arise.

4.3.3 The client/contractor shall further nominate a person to be responsible for all arboricultural matters onsite. This person must:

- d. Be present on site whenever work which has the potential to cause damage to retained trees is being undertaken;
- e. Be aware of their arboricultural responsibilities;
- f. Have the authority to stop any work that is causing, or has the potential to cause harm to any retained tree;
- g. Be responsible for ensuring that all site operatives are aware of their responsibilities toward retained trees and the consequences of any failure to observe those responsibilities;
- h. Make immediate contact with the ACoW and/or BBC in the event of any tree related problems occurring, whether actual or potential.

4.3.4 Once works commence the ACoW will undertake a programme of monitoring. This may include phone and email contact with the site manager, regular site visits and the direct supervision of work which has the capacity to cause damage to retained trees. The frequency of any monitoring will be determined by the intensity and proximity of works to trees and will be flexible enough to accommodate changes in the scheduling of tasks as they occur.

4.3.5 The ACoW will maintain a record of the arboricultural monitoring. This will provide a record of compliance with any agreed tree protection measures and will assist in the efficient discharge of planning conditions where required. The ACoW shall provide BBC with a written record of any monitoring within five working days of it having taken place.

4.4 Construction exclusion zone

4.4.1 The CEZ is based on the RPAs of all retained trees and those external to the Site. It is the area within which all construction activities are prohibited throughout the construction period. The default method of excluding access to the CEZ is through the installation of tree protection fencing. However, if access within the CEZ cannot be avoided then this may be facilitated through the installation of suitable ground protection.

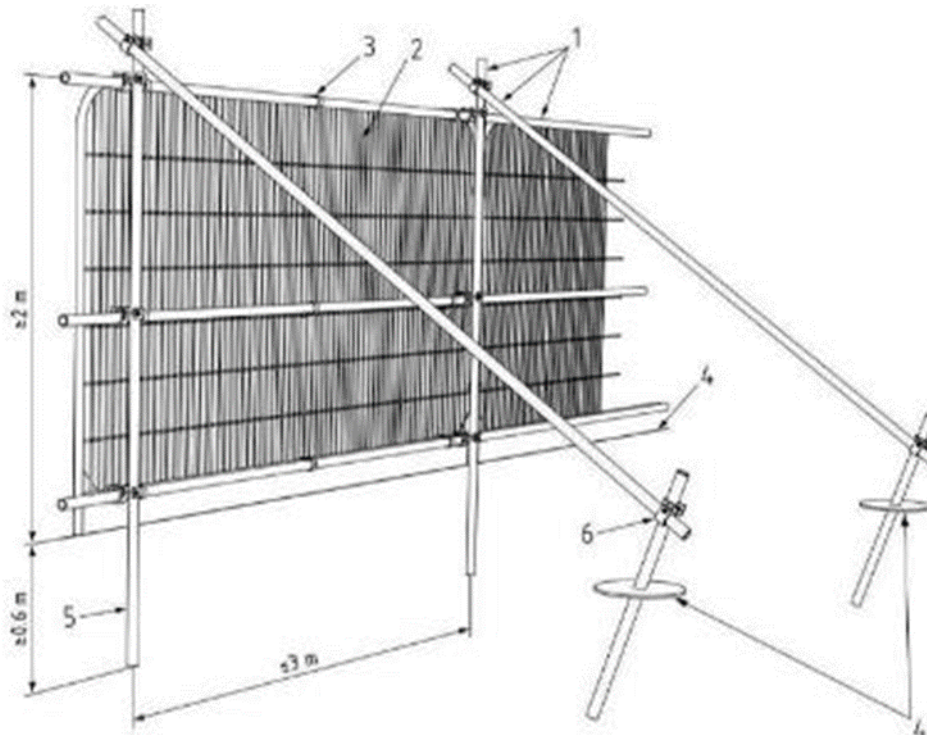
4.4.2 The CEZ is an arboriculturally sensitive area within which the following activities are prohibited unless approved and supervised by the ACoW and authorised by BBC:

- a. The lowering or raising of soil levels;
- b. Any form of excavation (whether mechanical or using hand tools);
- c. The storage of plant or materials;
- d. The storage, handling, or disposal of any chemical (including cement washings);
- e. Vehicular access;
- f. Fires or other means of waste disposal.

4.5 Tree protection fencing

- 4.5.1 Tree protection fencing will be erected in order to create a vertical barrier which prevents damage occurring to retained trees. This shall ensure the exclusion of access to the CEZ.
- 4.5.2 The location of the tree protection fencing shall be determined during detailed design and shall be specified on a Tree Protection Plan.
- 4.5.3 Tree protection fencing shall adhere to the following performance specification:
- It shall be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s).
 - It shall be adequately maintained to ensure that it remains rigid and complete.
 - It shall remain insitu until all potentially damaging construction activities are complete. Removal shall occur only with the approval of the ACoW.
 - Once erected, it shall not be altered or removed without the explicit approval from the ACoW and authorisation from Brentwood Borough Council.
- 4.5.4 A recommended specification for the tree protection fencing is provided in Figure 1.

Figure 1: Recommended specification for tree protection fencing



Key to Figure 1

1. Standard scaffold poles
2. Heavy gauge 2m tall, galvanised 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 0.6m)
6. Standard scaffold clamps

4.6 Ground protection

- 4.6.1 In the event that construction access is required within the CEZ then this shall be facilitated through the installation of ground protection. The purpose of ground protection is to create a horizontal barrier which prevents rutting or additional compaction of the underlying soil.
- 4.6.2 The requirement for ground protection shall be determined during detailed design. The location and extent of any ground protection shall be detailed on a Tree Protection Plan.
- 4.6.3 Ground protection shall adhere to the following specification as advised in BS 5837 paragraph 6.2.3.4:
- i. For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression resistant layer (e.g., 100mm depth of woodchip) laid onto a geotextile membrane;
 - ii. For pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g., 150 mm depth of woodchip), laid onto a geotextile membrane;
 - iii. For wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g., proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the loading to which it will be subject.
- 4.6.4 Ground protection shall be installed as follows:
- a. Dismantle tree protection fencing and re-erect in a secondary location around the edge of the proposed ground protection. No machinery is to enter the CEZ; re-erected fencing must prevent access to any part of the CEZ not to be covered by ground protection;
 - b. Clear the area within which the ground protection is to be installed. Shrubs and other woody vegetation should be cut to ground level;

- c. Install ground protection to the agreed specification. Obtain confirmation from the ACoW that the ground protection is acceptable;
- d. Ground protection shall be retained insitu until all construction work is complete.

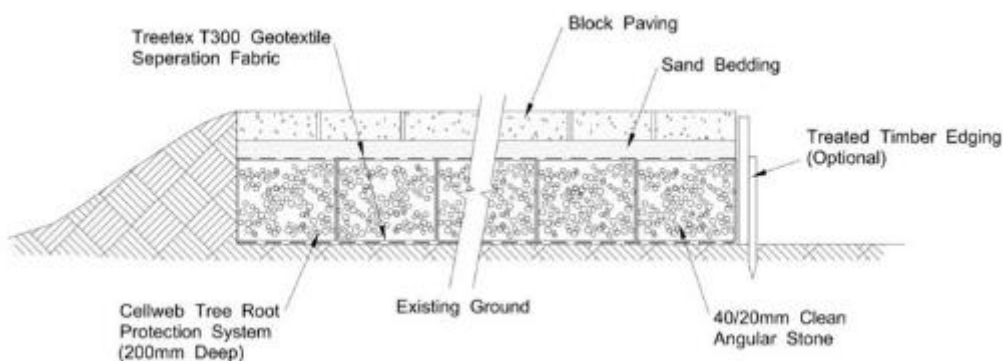
4.7 Cellular confinement sub-base

4.7.1 To ensure the preservation of tree roots, soil, and a suitable rooting environment all permanent hard surfacing within the RPA must be formed using a three-dimensional cellular confinement system (CCS).

4.7.2 An indicative cross-section of a CCS installation is provided in Figure 2. Details can be varied to suit individual applications as follows:

- a. The depth of the CCS (Cellweb Tree Root Protection System) may be between 70-200mm in depth dependent upon anticipate use and loadings (i.e., whether it is for pedestrian, light vehicle, or goods vehicle usage);
- b. As long as edging can be installed without excavation it may comprise treated timber boards and pegs, pinned wooden sleepers, proprietary metal edging or kerbs bedded onto the cellular confinement system;
- c. As long as the final surfacing remains porous to air and water options may include block paving, permeable asphalt, loose gravel, grass, or resin bound gravel;
- d. If desirable, abrupt level differences between the final surface and the surrounding ground may be graded out the deposition of lightly consolidated soil around the edge of the hard surfacing.

Figure 2: Indicative cross-section of CCS installation



4.7.3 The design of the CCS must be specified by a structural engineer or by the product manufacturer. Site analysis, to determine the soil type and load bearing capacity, may be required in order to inform design.

- 4.7.4 If ground levels beneath the CCS are to be raised or levelled then this must be achieved through infilling with clean angular stone, washed gravel, cobbles of structural spoil (do not level high spots or compact by rolling).
- 4.7.5 A methodology detailing the stages of CCS installation is provided below:
- i. Remove surface vegetation using hand tools or herbicides. Woody vegetation must be chemically treated to prevent re-growth and should then be cut to ground level (roots must not be dug or winched out);
 - ii. Remove any existing hard-surfacing or above ground structures (structures may be demolished to ground level with foundations left in-situ). Hand tools should be used in preference but, if machinery is required, this must operate outside the protected area and under the supervision of the Project Arboriculturist;
 - iii. Retain existing ground levels and infill to create a level surface;
 - iv. Lay out a non-woven geotextile membrane and pin in place;
 - v. Lay out CCS and pin in place;
 - vi. Install kerbs or edgings;
 - vii. Infill CCS with clean angular stone, Type 4/20mm or Type 20/40mm (M.O.T type 1 / crushed stone with fines must be avoided). Do not compact infill and infill by working towards the tree using infilled areas as a working platform;
 - viii. Cover with a non-woven geotextile membrane;
 - ix. Install porous wearing surface.
- 4.7.6 Notwithstanding the specification provided, all hard surfacing within RPAs must adhere to the design recommendation for low-invasive surfacing described in BS 5837 Clause 7.4. These include:
- a. No excavation of soil or lowering of soil levels shall occur without the explicit approval of BBC;
 - b. The hard surfacing shall be designed to resist deformation or localised soil compaction under all anticipated loadings, both temporary and permanent;
 - c. Hard surfacing must remain permeable to air and water throughout its anticipated lifespan;
 - d. Hard surfacing must be resistant to, or tolerant of, deformation by tree roots and should be set back from the stem of any retained tree.

4.8 Installation of gate posts and fencing within the RPA

4.8.1 Gate posts and fencing shall be installed in accordance with the following methodology.

- a. Unless otherwise undertaken, all trees within 15m will be surveyed and their RPAs calculated;
- b. Postholes shall be excavated using hand tools and under the supervision of the ACoW. Roots smaller than 25mm diameter shall be cut back to the edge of the excavation using a sharp saw or secateurs.
- c. The severance of, or damage to, roots over 25mm diameter shall be avoided. If such roots are encountered, then the excavation shall be backfilled, and the post relocated.
- d. In instances where posts are to be bedded in concrete, then the posthole shall be lined with an impermeable polythene bag.

Appendix A: Tree Survey Methodology

A.1 Survey methodology

A.1.1 The tree survey was undertaken in accordance with the following methodology:

- a. Arboricultural features have been recorded as tree groups or wooded areas where this has been deemed appropriate. Tree groups have been recorded on the basis that they form distinct arboricultural features either aerodynamically, visually or because they contain trees of similar cultural and biodiversity value. Wooded areas are recorded where larger expanses of trees exist and included features which may otherwise be referred to as corpses, spinneys, or shelterbelts.
- b. The trees have been inspected using the Visual Tree Assessment methodology as developed by Mattheck and Breoler.
- c. The tree survey was conducted from ground level only.
- d. No tissue samples were taken nor was any internal investigation of the subject trees undertaken.
- e. Tree heights and crown spreads have been estimated to the nearest 1m.
- f. Notes have been recorded where they relate to the quality of the arboricultural feature. Management recommendations have been provided where work is necessary for the abatement of a hazard which presents an unacceptable or intolerable level of risk to persons or property.

- g. Stem diameters have been measured in accordance with Annex C of BS 5837. Diameters of single stem trees on level ground have been measured at 1.5m above ground level. The combined stem diameters for multi-stemmed trees have been calculated in accordance with BS 5837 paragraph 4.6.1.
- h. By default, RPAs are calculated as an area equivalent to a circle with a radius 12 times the stem diameter and are capped at a distance of 15 metres.

A.2 Quality assessment

A.2.1 The quality of arboricultural features has been determined in accordance with BS 5837 Table 1. A summary of criteria applied to each quality category is provided in Table A.1. The purpose of the quality assessment is to enable informed decisions to be made regarding site layout, land use and design. The quality assigned to each survey item is listed in Table B.1.

Table A.1 BS 5837:2012 Table 1 – Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories)		
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		
	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)

	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation
<p>Category B Trees of moderate quality with an estimated remaining life expectancy of at least 40 years</p>	<p>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</p>	<p>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</p>	<p>Trees with material conservation or other cultural value</p>
<p>Category C Trees of low quality with an estimated remaining life expectancy of at least 40 years</p>	<p>Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories</p>	<p>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</p>	<p>Trees with no material conservation or other cultural value</p>

Appendix B: Tree Survey Schedule

Table B.1 Tree survey schedule

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
T1	Quercus robur (English oak)	8	1300	7.0	2.0	2.5	Mature	Good	Good	+40	A1/2	Historic pollard; Veteran features	15.0
T2	x Cupressocyparis leylandii (leylandii)	18	550	5.0	3.0	3.0	Early Mature	Good	Fair	+20	B1/2	Pruned to clear overhead power line	6.6
T3	Salix caprea (goat willow)	5	200	3.0	1.0	1.0	Semi-Mature	Good	Fair	+10	C2	-	2.4
T4	Prunus avium (wild cherry)	6	275	5.0	1.0	2.0	Semi-Mature	Good	Fair	+10	C2	-	3.3
T5	Salix caprea (goat willow)	3.5	150	3.0	0.0	1.0	Semi-Mature	(-)	(-)	+10	C2	-	1.8
T6	Salix caprea (goat willow)	3.5	150	3.0	0.0	1.0	Semi-Mature	(-)	(-)	+10	C2	-	1.8
T7	Aesculus hippocastanum (horse chestnut)	6	350	4.5	1.0	2.0	Semi-Mature	Fair	Poor	+10	C2	Part suppressed; Topped to clear overhead power lines	4.2

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
T8	Salix fragilis (crack willow)	7	250	4.0	0.0	1.5	Mature	Good	Poor	<10	U	Regeneration from cut stem; Major stem decay	3.0
T9	Salix x sepulcralis 'Chrysocoma' (weeping willow)	9	650	7.0	0.0	3.0	Mature	Good	Fair	+10	C2	Crown is pruned to clear overhead power line; Asymmetric crown	7.8
T10	Salix fragilis (crack willow)	6	250	4.0	1.0	1.0	Semi-Mature	(-)	(-)	+10	C2	-	3.0
T11	Salix babylonica var.pekinensis Tortuosa (corkscrew willow)	9	350	4.0	3.0	3.0	Mature	(-)	(-)	+10	C2	-	4.2
T12	Salix babylonica var.pekinensis Tortuosa (corkscrew willow)	9	400	4.0	3.0	3.0	Mature	Poor	Poor	<10	U	Declining tree	4.8
G13	Acer campestre (field maple)	7.0	400	4.0	0.0	1.0	Mature	Fair	Fair	10+	C2	Group of 2 trees	4.8
G14	Salix babylonica var.pekinensis 'Tortuosa' (corkscrew willow); Salix caprea (goat willow)	6.0	250	3.0	0.0	1.0	Semi-Mature	Fair	Fair	10+	C2	-	3.0

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
G15	Salix caprea (goat willow); Prunus cerasifera (myrobalan plum); Acer pseudoplatanus (sycamore); Salix fragilis (crack willow)	6.0	250	1.5	0.0	1.0	Semi-Mature	Fair	Fair	10+	C2	Infrequently maintained hedge with some emerging trees	3.0
H16	Fagus sylvatica (common beech); Cotoneaster	3.0	75	0.5	0.0	0.0	Semi-Mature	Fair	Fair	10+	C2	Maintained hedge	0.9
G17	x Cupressocyparis leylandii (leylandii)	8.0	250	3.0	2.0	2.0	Semi-Mature	Fair	Fair	10+	C2	-	3.0
H18	Ulmus sp. (elm)	3.0	75	1.0	0.0	0.0	Semi-Mature	Fair	Fair	<10	U	-	0.9
T19	Acer pseudoplatanus (sycamore)	10.0	250	3.0	4.0	4.0	Semi-Mature	Good	Fair	+10	C2	Canopy encroaching on overhead services	3.0
T20	Salix fragilis (crack willow)	11.0	300	4.0	2.0	4.0	Semi-Mature	Good	Fair	+10	C2	Leaning tree	3.6
T21	Fraxinus excelsior (common ash)	13.0	450	4.0	3.0	3.0	Early Mature	Poor	Fair	+10	C2	Declining tree	5.4
T22	Quercus robur (English oak)	7.0	700	3.5	3.0	4.0	Mature	Poor	Fair	+10	C2	-	8.4
T23	Salix caprea (goat willow)	5.0	250	3.0	0.0	0.0	Semi-Mature	Fair	(-)	+10	C2	-	3.0

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
T24	Fraxinus excelsior (common ash)	8.0	250	4.0	3.0	3.0	Semi-Mature	Fair	(-)	+10	C2	-	3.0
T25	Salix caprea (goat willow)	6.0	300	4.0	0.5	1.0	Semi-Mature	Good	Fair	+10	C2	-	3.6
H26	Crataegus monogyna (common hawthorn)	2.0	75	0.5	0.0	0.0	Early Mature	Fair	Fair	10+	C2	Maintained boundary hedge	0.9
H27	Ulmus sp. (elm)	3.0	75	1.0	0.0	0.0	Semi-Mature	Fair	Fair	<10	U	-	0.9
H28	Ulmus sp. (elm)	4.0	75	1.5	0.5	1.0	Semi-Mature	Poor	Poor	<10	U	Some dieback from Infection with Dutch elm disease	0.9
T29	Quercus robur (English oak)	8.0	450	4.0	2.0	2.0	Mature	(-)	(-)	+10	C2	-	5.4
T30	Quercus robur (English oak)	9.0	500	5.0	2.0	2.0	Mature	(Good/Fair)	(Good/Fair)	+20	B1/2	-	6.0
H31	Prunus spinosa (blackthorn); Crataegus monogyna (common hawthorn); Acer campestre (field maple)	3.0	100	1.0	0.0	1.0	Early Mature	Fair	Fair	10+	C2	-	1.2
T32	Salix fragilis (crack willow)	8.0	300	3.5	2.0	3.0	Semi-Mature	Good	Fair	+10	C2	-	3.6

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
W33	Quercus robur (English oak); Fraxinus excelsior (common ash); Carpinus betulus (common hornbeam)	13.0	600	3.0	1.0	2.0	Mature	(Good/Fair)	(Good/Fair)	20+	B2	-	7.2
T34	Salix caprea (goat willow)	2.0	75	1.5	0.0	0.0	Semi-Mature	(-)	(-)	+10	C2	-	0.9
G35	Acer campestre (field maple); Crataegus monogyna (common hawthorn); Ulmus sp. (elm)	6.0	250	3.0	0.0	1.0	Early Mature	Fair	Fair	10+	C2	Sporadic group; Infected with Dutch elm disease; Some dead/dying elm suckers	3.0
W36	Ulmus sp. (elm); Fraxinus excelsior (common ash); Acer campestre (field maple); Quercus robur (English oak); Crataegus monogyna (common hawthorn)	-	300	4.0	3.0	3.0	Mature	(Good/Fair)	(Good/Fair)	20+	B2	-	3.6
T37	Quercus robur (English oak)	8.0	650	5.0	2.0	3.0	Mature	(Good/Fair)	(Good/Fair)	+20	B1/2	-	7.8
T38	Quercus robur (English oak)	13.0	750	5.0	2.0	4.0	Mature	(Good/Fair)	(Good/Fair)	+20	B1/2	-	9.0

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
G39	Quercus robur (English oak); Prunus spinosa (blackthorn); Malus sylvestris (wild crab)	5.0	125	3.0	0.0	0.0	Early Mature	Fair	Fair	10+	C2	-	1.5
G40	Quercus robur (English oak)	5.0	150	2.0	1.0	1.0	Semi-Mature	Fair	Fair	10+	C2	Sporadic group beneath overhead power lines	1.8
T41	Quercus robur (English oak)	16.0	850	8.0	5.0	6.0	Mature	Good	Good	+40	A1/2	-	10.2
T42	Quercus robur (English oak)	12.0	750	6.0	3.0	5.0	Mature	(Good/Fair)	(Good/Fair)	+20	B1/2	-	9.0
T43	Quercus robur (English oak)	15.0	1200	6.0	3.0	4.0	Mature	Good	Good	+40	A1/2	-	14.4
G44	Prunus spinosa (blackthorn); Acer campestre (field maple)	5.0	150	2.0	0.0	0.0	Semi-Mature	Fair	Fair	10+	C2	-	1.8
G45	Quercus robur (English oak); Acer pseudoplatanus (sycamore); Carpinus betulus (common hornbeam)	15.0	600	5.0	2.0	3.0	Mature	(Good/Fair)	(Good/Fair)	20+	B2	-	7.2
T46	Salix caprea (goat willow)	8.0	500	5.0	1.0	1.0	Mature	(-)	(-)	+10	C2	-	6.0

Type/Ref	Species	Height	DBH	Crown Spread	LCH	LBH	Life Stage	PC	SC	ERC	Quality Category	Notes	RPA Radius
T47	Quercus robur (English oak)	7.0	200	3.0	1.0	1.0	Semi-Mature	(-)	(-)	+10	C2	-	2.4
T48	Populus alba (white poplar)	10.0	400	6.0	2.0	3.0	Semi-Mature	(-)	(-)	+10	C2	-	4.8
G49	Quercus robur (English oak); Aesculus hippocastanum (horse chestnut); Pinus sylvestris (Scots pine); Populus alba (white poplar); Acer pseudoplatanus (sycamore)	20.0	800	5.0	3.0	6.0	Mature	(Good/Fair)	(Good/Fair)	20+	B2	-	9.6
G50	Quercus robur (English oak); Aesculus hippocastanum (horse chestnut); Pinus sylvestris (Scots pine); Populus alba (white poplar); Acer pseudoplatanus (sycamore)	20.0	800	5.0	3.0	6.0	Mature	(Good/Fair)	(Good/Fair)	20+	B2	-	9.6
T51	Quercus robur (English oak)	7.0	1100	8.0	3.0	3.0	Mature	Good	Good	+40	A1/2	-	13.2
T52	Quercus robur (English oak)	7.0	1350	8.0	3.0	3.0	Mature	Good	Good	+40	A1/2	-	15.0

Table B.2 Key to Table B.1

Key:	Description:
Type / Ref	T - tree; G - tree group; W - wooded area; H – hedge / Individual reference number
Species:	Botanical name (common name)
Height:	Overall height (m) – maximum and minimum heights are recorded for tree groups, wooded areas, and hedges
DBH:	Stem diameter (mm) - calculated in accordance with BS 5837 paragraph 4.6.1. Maximum and minimum diameters are provided for tree groups, wooded areas, and hedges ¹
Crown Spread:	Spread of crown(m) - based upon the maximum lateral dimension
LCH:	Lowest crown height (m) ²
LBH:	Height of lowest significant branch (m) ²
Life Stage:	Young; Semi-Mature; Early Mature; Mature ³
PC:	Physiological condition - Good, Fair, Poor, Dead
SC:	Structural condition - Good, Fair, Poor
Estimated Remaining Contribution:	Estimated life expectancy - <10 years, 10+ years, 20+ years, 40+ years ⁴
Quality Category ⁵ :	BS 5837 Category - A (high-quality) B (moderate-quality) C (low-quality) U (very-low quality/unsuitable for retention) BS 5837 Sub-Category - the primary area of value - 1) Arboricultural 2) Visual 3) Cultural/Conservation
Notes:	General observations, particularly where relevant to the assigned BS 5837 category
RPA Radius:	Root Protection Area Radius (m). The radius of the circular Root Protection Area associated with the tree as measured from the centre of the stem. For tree groups, wooded areas and hedges the RPA radius is calculated using the maximum stem diameter.

¹ Measured at 1.5m above ground level

² Where an arboricultural feature abuts the edge of the site then only the portion of the crown within, or overhanging the site has been assessed

³ **Young:** recently planted and yet to fully establish; **Semi-Mature:** established but yet to attain mature stature (<25% life expectancy); **Early Mature:** Almost full height although crown still developing (<50% life expectancy); **Mature:** Full height and crown spread (>50% life expectancy)

⁴ Assumes that there will be no physical changes to the site or surrounding environs

⁵ Refer to **Table A.1** for detailed descriptions

Appendix C: Tree Impacts

- C.1.1 Plates C.1 to C.6 show details of the trees, tree groups, hedges and wooded areas recorded within the tree survey. Also shown are crowns, RPAs and elements of the Project which are of arboricultural relevance.
- C.1.2 Plate C.1 and Plate C.2 provide details of the trees and sections of hedge which are proposed for removal.
- C.1.3 Plate C.4, Plate C.5 and Plate C.6 provide details of areas where pathways shall be formed using a cellular confinement system sub-base

Plate C.1 Proposed building cluster and access track

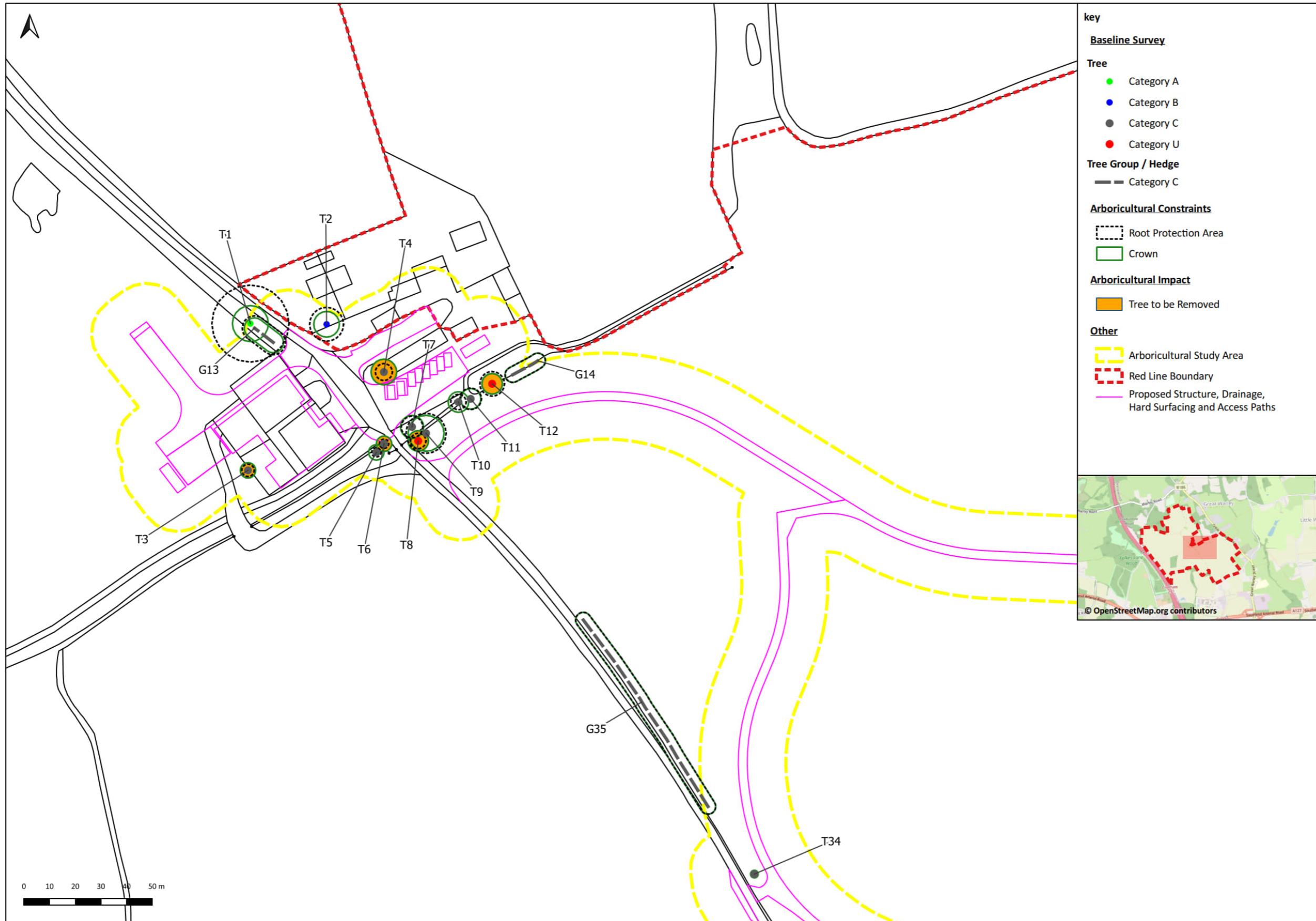


Plate C.2 Proposed car park and access track

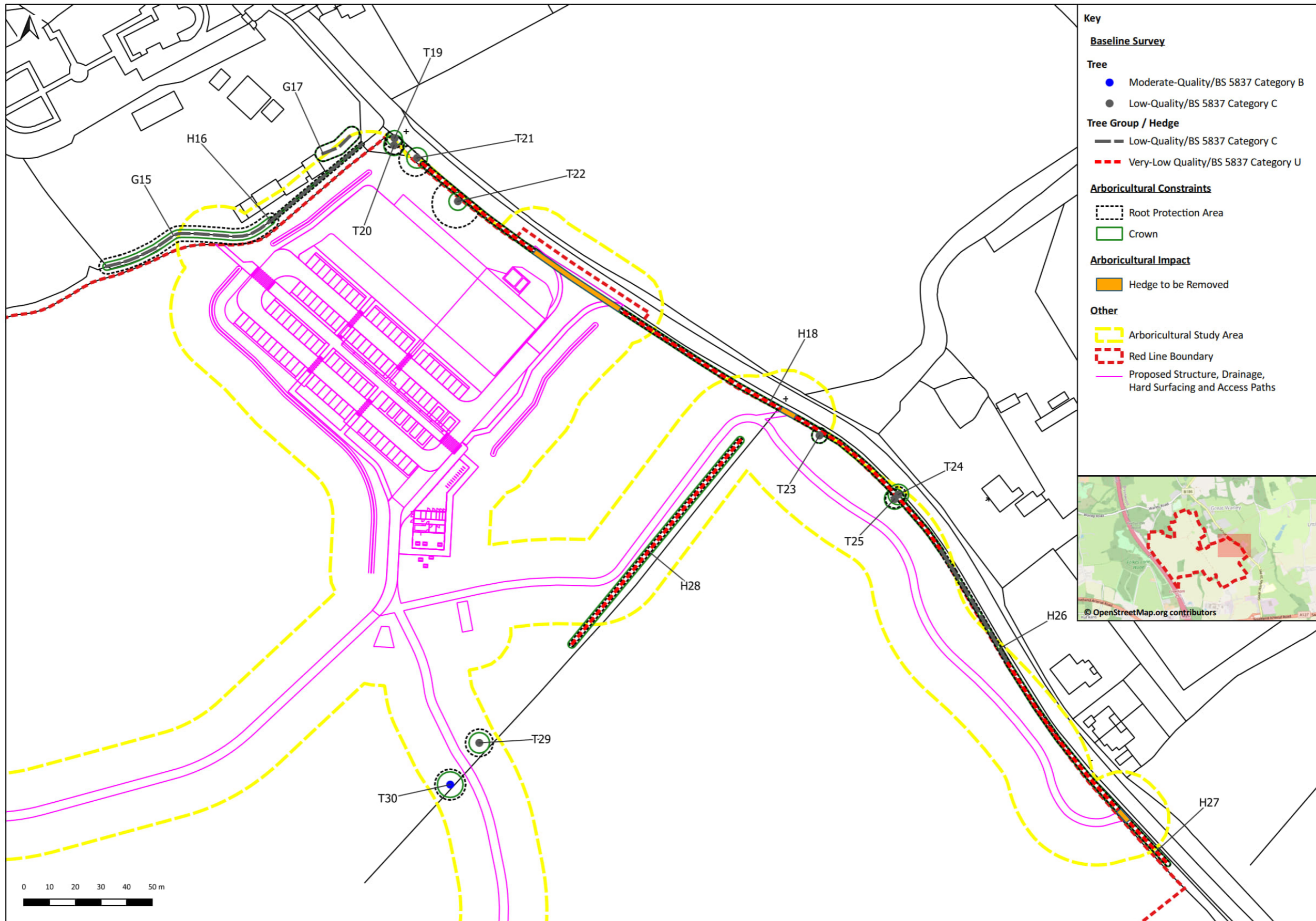


Plate C.3 Proposed access track and lorry turning area

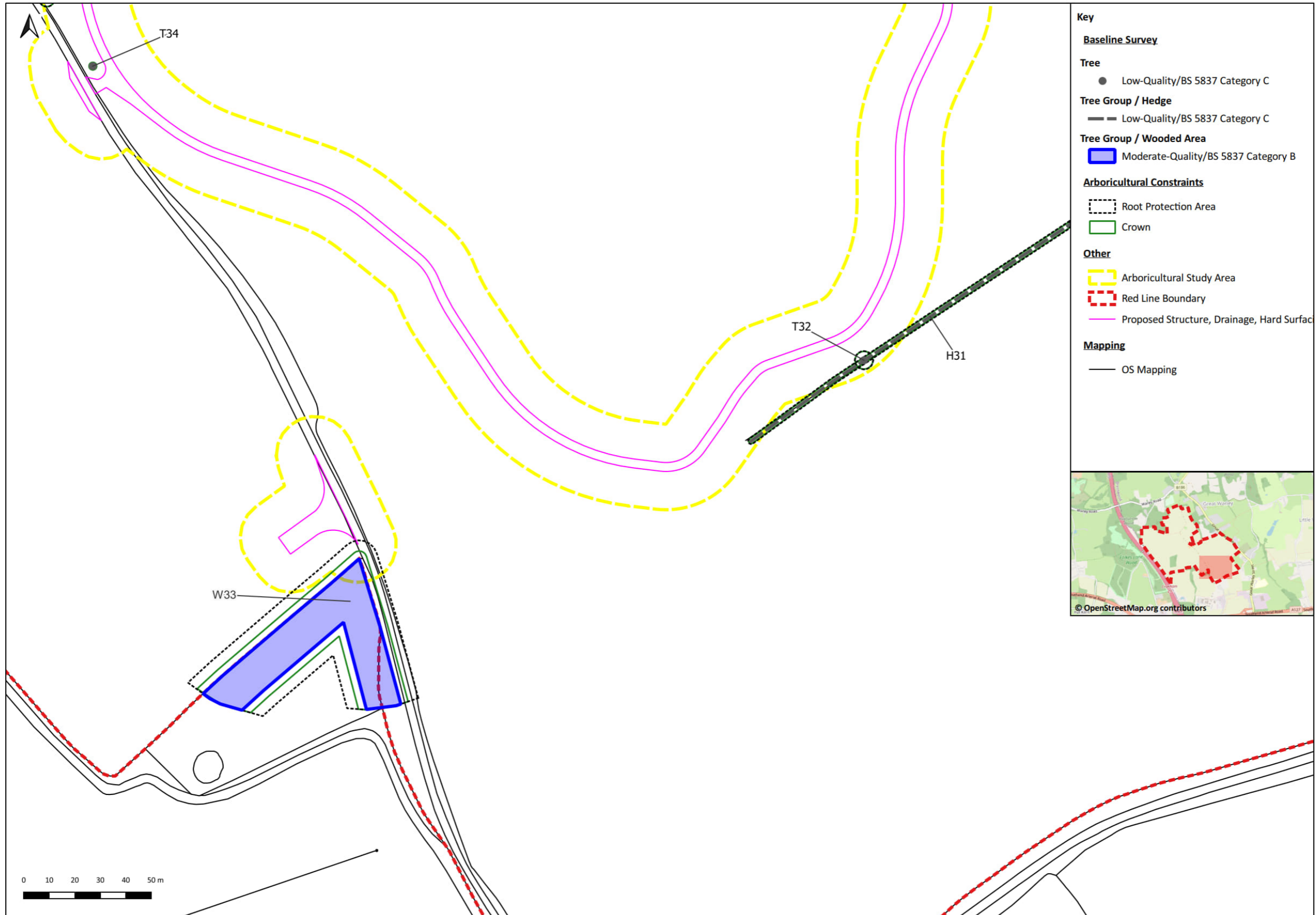


Plate C.4 Proposed access track

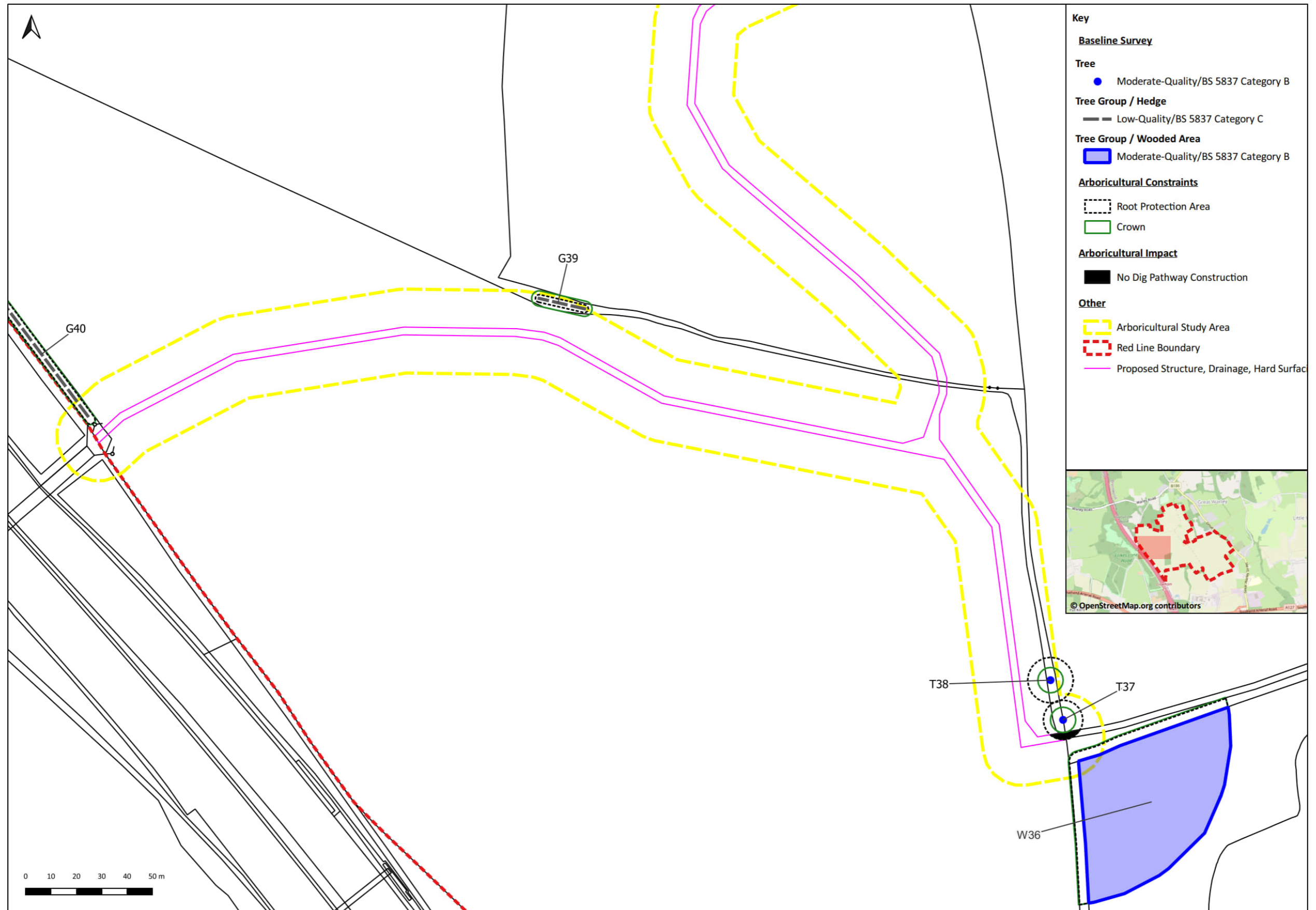


Plate C.5 Proposed access track

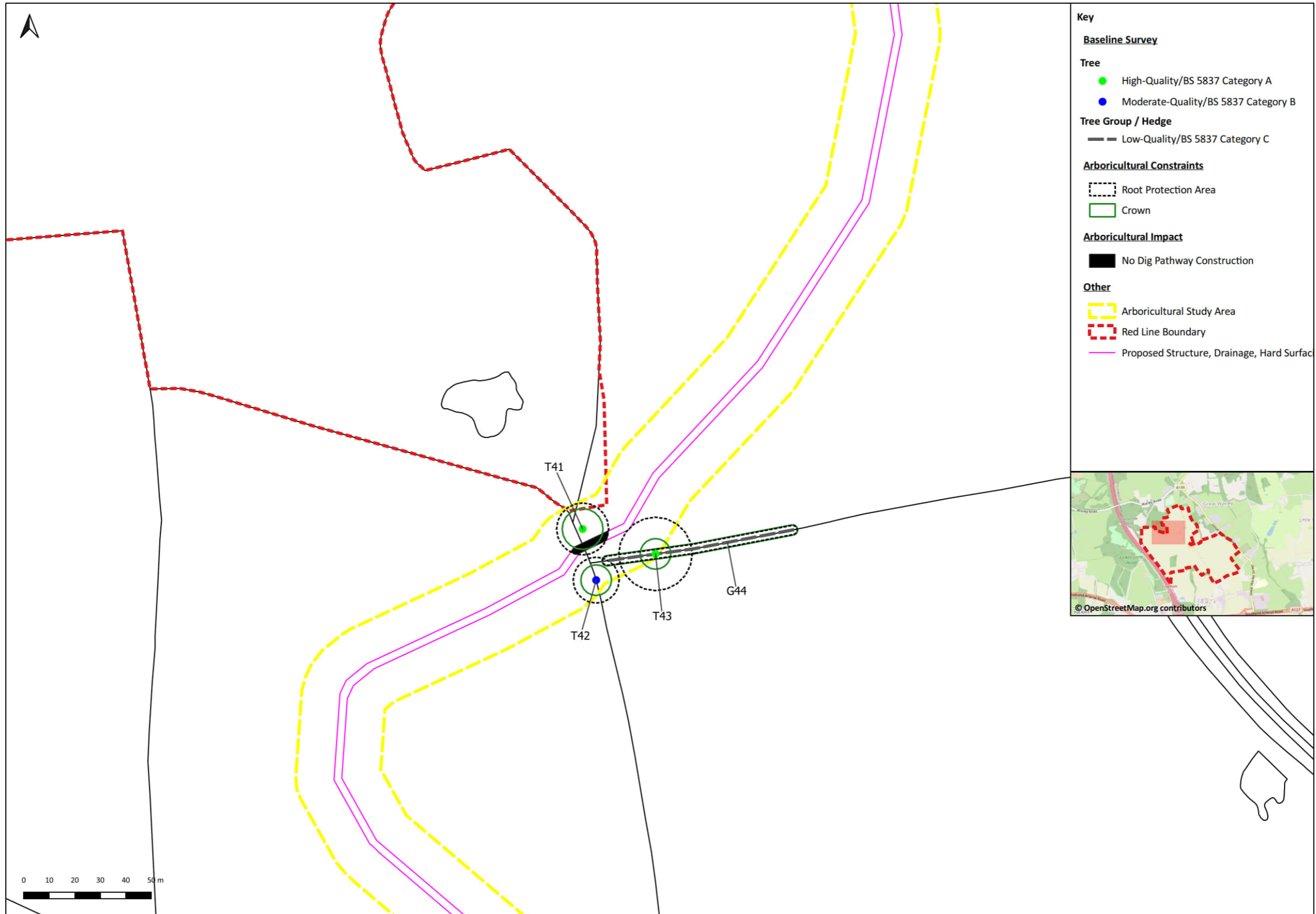


Plate C.6 Proposed access track

