



Wrexham Technology Park Moneypenny, Croesnewydd Road Arboricultural Impact Assessment

**Report Ref: TEP.4622.001
September 2014**

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Version 1.0
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**WREXHAM TECHNOLOGY PARK
MONEYPENNY, CROESNEWYDD ROAD
ARBORICULTURAL IMPACT ASSESSMENT**

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1.0 INTRODUCTION

- 1.1 TEP has been commissioned by AVID Consultants to conduct an arboricultural survey of land off Croesnewydd Road in Wrexham, North Wales. This report details the arboricultural impact of developing the site, subsequent mitigation recommendations and protective measures.
- 1.2 The survey was carried out in June 2014 by means of inspection from ground level by a qualified Arboricultural Consultant. Trees were assessed in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*.
- 1.3 Under the British Standard the assessment of trees is made objectively. The categorisation method identifies the quality and value of the existing tree stock.
- 1.4 A topographical survey was used to record the position of trees and vegetation (Ref: PMS14110). Where the age distribution and species mix of tree cover was relatively uniform, trees were plotted as groups. For the purposes of this report it is assumed that the detail on the drawing is accurate. A number of trees were not shown on the topographical surveys and therefore TEP's surveyor estimated their locations.
- 1.5 A total of 13 individual trees (T1-T13), 9 groups of trees (G1-G9) and 1 woodland (W1) were surveyed and mapped (refer to Drawing 1). All arboricultural information recorded during the survey is presented at Appendix 1.
- 1.6 This report provides the results of the survey and includes the following:
 - A schedule of all trees located on, or within influencing distance of the proposed development site (Appendix 1);
 - An assessment based on *BS 5837:2012*, of trees in terms of their potential value within any future development. On the basis of this assessment trees have been categorised into one of four categories: A, B, C or U (Appendices 1 & 2);
 - An assessment, based on *BS 5837:2012*, of the requirement for protection of trees during the construction phase (Section 6);
 - Advice on removal, retention and management of trees (Sections 5 & 7);
 - A Tree Constraints Plan detailing tree quality categories, canopy spreads and Root Protection Areas (**RPA**) for all trees surveyed (Drawing 1); and
 - A Tree Removal and Protection Plan detailing the development proposals, trees to be retained and removed, tree protection fencing alignment and areas of specialised ground treatment (Drawing 2).

2.0 THE SITE AND SURROUNDINGS

- 2.1 The site is located to the east of Croesnewydd Road on the eastern extents of Wrexham Town Centre in North Wales. The boundaries of the site extend southwards from a dismantled railway line off Croesnewydd Road in the north to a small woodland in the south. Open fields border the site to the east and west with a new residential development in the south east. A site location and context plan is shown at Figure 1.
- 2.2 The site comprises open agricultural fields and rough grassland, a small pond and a tree-lined defunct hedgerow. An area of ancient semi-natural woodland is adjacent to the boundary in the south-west corner.

Figure 1. Site location and context plan



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- 2.3 The topography of the site is generally flat. Two shallow ditches run through the central belt of trees and a small sunken pond is towards the central part of the site. The southern agricultural field has undulating levels.
- 2.4 Weather conditions during the survey were dry and bright.
- 2.5 Inspection of trees was restricted in some cases by dense vegetation. These trees were surveyed insofar as was possible from accessible areas of the site.

Development Proposals

- 2.6 The proposed development includes the construction of new office buildings in the northern half of the site with associated car parking and access. The development also includes the enhancement of the greenspace to the south with the introduction of a wetland area and two informal meadows. Access will be gained via a newly proposed roundabout and access road off Croesnewydd Road.
- 2.7 Detail of the proposals is shown on Drawing 2 and is based on the proposed site plan (Ref: 1406-02) supplied by the Carolyn Willits Design.

3.0 STATUTORY PROTECTION AND GUIDANCE

Woodland and Veteran Trees

- 3.1 For any woodland component of parkland and wood-pasture, national forestry policy and Natural Resource Wales includes a presumption against clearance of broad-leaved woodland for conversion to other land uses, and in particular seeks to maintain the special interest of ancient woodland. Ancient woodland and veteran trees are non-statutory designations. In this respect ancient woodland is defined as an area which has been wooded continuously since at least 1600 AD and a veteran as a tree of exceptional value for wildlife, in the landscape, or culturally because of its great age, size or condition.
- 3.2 On this site there are no ancient woodlands. To the south west of the site there is a small area of Ancient Semi-Natural Woodland.
- 3.3 Trees T4, T8 and T11 were noted as veterans due to either their great age or features such as stag-headed form, previous stem failures or cavities.
- 3.4 Veteran is a term describing a tree that is of interest biologically, aesthetically or culturally because of its age, size or condition. Key habitat features of a veteran tree can be evidence of decay processes, such as hollowing in the trunk; fruit bodies of fungi known to cause wood decay and cavities or rot holes (e.g. where limbs have broken off or bark is damaged); significant amounts of dead wood or many dead limbs and branches.
- 3.5 Veteran trees often provide a range of rich but scarce habitats supporting many rare and endangered species, and are an irreplaceable part of landscape and biological heritage.
- 3.6 For sites where veteran trees are valued for their historic, landscape and biological importance, the continuity of wildlife habitat is one of the fundamental issues. In such sites, it may be reasonable to have a key aim that there should be no avoidable loss of veteran tree habitat by using current best practice to maintain the wildlife and environmental value of the site while meeting obligations in law in respect of duty of care.

Tree Preservation Orders & Conservation Area Designations

- 3.7 Local authorities reserve the right to create Tree Preservation Orders (TPO) to protect the amenity value conferred to a location by a tree or group of trees. Where a TPO is in force, lopping, topping, felling, uprooting or wilful damage caused to a tree is prohibited and such actions may be prosecuted and incur an unlimited fine. Works to TPO protected trees must only be undertaken with the written consent of the local authority.
- 3.8 Wrexham City Borough Council have confirmed that the following TPO is in effect;
- *Wrexham Borough Council (Offa West Ward) Tree Preservation Order No. 43, 1989*
- 3.9 The distribution of currently protected trees, interpreted where possible in terms of their respective Orders is shown on Drawing 2 and a full breakdown of all TPO trees is listed in Table 1 below.
- 3.10 The site does not lie within a Conservation Area.

Table 1: Trees protected by a TPO

TEP Survey Reference	TPO Ref. No.
T2	T1
T3	T2
T4	T3
T6	T4
T7	T5
T8-T11	G1
T12, T13, G7 and G8	G2
W1	A1

Protected Species – Bats

- 3.11 Mature trees often contain cavities, crevices and hollows which are a potential habitat for roosting bats. Bats are afforded protection under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended), as well as under Schedule 2 of the *Conservation of Species and Habitats Regulations 2010*, and as such causing damage to a bat roost constitutes an offence.
- 3.12 A preliminary ground level appraisal of the wildlife habitat value of each tree was undertaken as part of the arboricultural survey. Trees T3, T5 – T8, T11 – T13 and group G7 had features such as cracks, crevices and minor branch cavities which are suitable features for roosting bats. The density and connectivity of trees within the immediate landscape also offer good foraging and commuting lines.
- 3.13 If any works are to be carried out to trees and groups then a more detailed, aerial visual assessment and/or dusk and dawn surveys should be undertaken by a suitably experienced ecologist to determine the presence/absence of roosting bats prior to any tree works being undertaken.
- 3.14 Should the presence of a bat roost be suspected whilst undertaking works on any other trees and groups on site, operations must be halted until a licensed bat handler or ecologist can provide advice.

Protected Species – Birds

- 3.15 Trees are a potential habitat for nesting birds, which (as well as their nests and eggs) are protected under the *Wildlife and Countryside Act 1981* (as amended). This makes it an offence to intentionally or recklessly, damage or destroy an active birds nest or any part thereof.

- 3.16 Due to the suitability of the trees within the survey boundary for nesting birds, all tree work should ideally be undertaken outside the bird nesting season (British bird nesting season: March to August inclusive).
- 3.17 If this is not possible then a detailed inspection of each tree should be undertaken by a qualified ecologist immediately prior to the arboricultural works. Should an active nest be found (being built, containing eggs or chicks) then any work likely to affect the nest must be halted and a working boundary of 5m left intact around the nest until the nest becomes inactive.

Woodland

- 3.18 The Natural Environment and Rural Communities (NERC) Act *Section 42* lists habitats of principle importance that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP). Approximately 0.3 ha of woodland noted as ancient semi-natural woodland and listed on the Forestry Commission's National Forest Inventory is adjacent to the southern boundary.

Figure 2. Location and extent of surrounding woodland. Green indicates all woodland on the National Forest Inventory, Orange indicates ancient semi-natural woodland.



4.0 TREE POPULATION

- 4.1 13 individual trees (T1-T13), 9 groups of trees (G1-G9) and 1 woodland (W1) were recorded within influencing distance of the site. A schedule of all trees and groups in terms of species, condition, age, management recommendations and *BS 5837:2012* quality categories is provided at Appendix 1.
- 4.2 The majority of the tree stock is located along a central belt across the middle of the site and comprises small hedgerow species interspersed with larger mature broadleaves. The hedgerow is now out-grown and contains small trees with dense, shrubby crowns. A higher proportion of third party trees skirt the southern and western boundary. They generally comprise large, mature broadleaves with the exception of a newly planted screening belt planted in the southern corner.
- 4.3 The most notable trees on site are T2 to T4 comprising sycamore and pedunculate oak and are located within the central belt of trees. They all have good form with only T3 having a slightly reduced vigour, smaller foliage and minor cavities. A pedunculate oak (T4) has a large stem girth and open and broad crown for its species; it is estimated to be approximately 400 to 500 years old and was noted as a veteran. It has a flared buttress with minor inclusions of a wire fence around its base and only a minor amount of deadwood within the canopy and is a particularly fine example of species.

Photograph 1. View looking south at trees T2 to T4 (right to left) within group G4



- 4.4 Groups G4 to G6 create a linear screen dividing the site into two across the centre. Group G5 also contains a number of smaller self-set trees around and adjacent to a seasonal pond and dry ditch. They comprise hawthorn, sycamore, wych elm, crack willow, goat willow, common osier, common alder and wild cherry; hawthorn and crack willow are the dominant species. They all have low, shrubby crowns with both single and multi-stemmed trees evident. A small number of specimens were either dying or standing dead, but the majority are generally in a good condition. They are good habitat, providing a natural green corridor across the open site.

- 4.5 Tree T5 is a standing dead tree towards the middle of the pond within G5. A full inspection was limited due to its location but in its current context is good wildlife habitat for fungal and invertebrate species.
- 4.6 Three self-set trees (G3) comprising multi-stemmed sycamore and hawthorn are scattered within the open fields. They have good vigour but small shrubby crowns.
- 4.7 Defining the site's southern and western extents, trees T8 to T13 comprising pedunculate oak, sycamore and common ash have been subjected to repeated root disturbance and mechanical damage by farm machinery. Subsequently the presence of dead wood, branch failures and stem cavities is common. In a large number of cases these 'defects' are remediable and do not detract from overall value. The natural ageing process of trees predisposes parts to structural deterioration and defective parts are often present in the healthiest of trees.

Photograph 2. Looking west at trees T8 to T11 and woodland W1 (right to left)



- 4.8 Woodland W1 lies to the immediate south of trees T8 to T13. It generally has smaller trees than the noted individuals with narrow and slender crowns due to the close proximity of other trees. They are however, in a good condition with areas of both dense and open canopy cover. Collectively the individual trees and woodland form a small area of ancient semi-natural woodland and have good wildlife qualities.
- 4.9 A small area of dense new planting (G9) has become established in the southern corner. It comprises common ash, goat willow, common alder and pedunculate oak. Although still a young age, they are in a good condition and with sympathetic management have the opportunity to become high value trees adding to the wooded landscape in the immediate area.
- 4.10 Tree and group locations, their quality categories and canopy spreads are shown on Drawing 1.

Tree Quality Categorisation

- 4.11 Under *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations* trees and groups are objectively assigned a quality category designed to quantify their value within any future development. Table 2 presents a summary of the categories presented in the British Standard. The full table has been reproduced at Appendix 2.

Table 2: Summary of BS 5837:2012 tree quality categorisation criteria

Category A	Trees of high value including those that are particularly good examples of their species and/or those that have visual importance or significant conservation or other value
Category B	Trees of moderate value including those that do not qualify as Category A due to impaired condition and/or those that collectively have higher value than they would as individuals; also trees with material conservation or other value
Category C	Trees of low value including those with very limited merit or impaired condition; trees offering transient or temporary landscape benefits
Category U	Trees with irremediable defects and anticipated early loss due to collapse; dead trees or those in immediate decline and those with infectious pathogens that threaten other trees

5.0 IMPACTS OF THE PROPOSED DEVELOPMENT

- 5.1 Table 3 lists the number and quality of trees that will require removal in order to facilitate the development proposals and those that can be retained. This is the result of an assessment based on the proposed site plan and discussions with the client regarding their application strategy.

Table 3: Arboricultural implications of the proposed development

	Tree Quality Category			
	A	B	C	U
Trees, groups and hedges that can be retained	T2, T4, T6, T7, T8, T9, T10, T11, T12, T13, G7, G9	T1, T3, G1, G8, W1	G2, G4 (part), G5 (part), G6 (part)	T5
Trees, groups and hedges that require removal to facilitate development	-	-	G3, G4 (part), G5 (part), G6 (part)	-

See Appendix 1, Arboricultural Data Sheets for subcategories

- 5.2 1 tree group and a part of a further 3 tree groups (totalling approximately 0.13 ha of canopy cover) must be removed to facilitate the development proposals. They are low value with some dying or suppressed.

- 5.3 There will be a low impact on habitat connectivity as some tree removal within G4 and G6 is required to connect the northern and southern portions of the site and part of G5 sits within the development foot print.
- 5.4 All remaining trees can be retained and protected. The installation of temporary fencing and will be required.
- 5.5 Where planning permission is granted, the retention schedule shown in Table 2 and Drawing 2 would normally form a part of that permission. Any change to this schedule would therefore be likely to require an application to vary the consent.

6.0 TREE PROTECTION REQUIREMENTS

Root Protection Areas

- 6.1 As per *BS 5837:2012*, the **Root Protection Area (RPA)** is calculated using each tree's diameter at 1.5 metres (refer to Appendix 1) and represents the minimum area around each tree that must be left undisturbed to ensure their survival.
- 6.2 Tree roots typically spread two times the width of the crown, although this figure may be significantly increased for certain species and where specific ground conditions are present. The majority of tree roots are found in the top 600 mm of soil and most of the fine roots that absorb water and nutrients are found in the top 100 mm.
- 6.3 The morphology of roots is influenced by past and present site conditions (the presence of roads, structures and underground services), soil type, topography and drainage. This means that a tree's roots may not be uniform in their extent and the **RPA** may not be a circular area centred on the tree stem.
- 6.4 On this site the majority of trees are growing in relatively homogeneous material. A number of trees along the southern and western boundaries have been subject to minor root disturbance and ploughing from farm machinery. Roots are unlikely to be absent in all these areas but where unfavourable conditions exist, growth will certainly be impeded.
- 6.5 The **RPA** has been adjusted or offset to most accurately represent the likely spread of roots for each individual tree (refer to Drawing 1).

Protective Fencing and Exclusion Zones

- 6.6 Temporary protective barrier fencing will be required to demarcate a **Construction Exclusion Zone (CEZ)** around retained trees. This must be put in place prior to the commencement of any development works, including bringing machinery or materials onto site or the erection of site huts.
- 6.7 The **CEZ** acts to protect both tree roots and branches and has been extended to incorporate canopy spread where appropriate.
- 6.8 Protective fencing alignment is shown on Drawing 2 and assumes that all trees identified for removal have been felled prior to installation.

- 6.9 The fencing must be fixed into the ground to withstand accidental impact from machinery and to ensure that a sufficient protective area is maintained. Details of recommended protective fencing are shown on Drawing 3.
- 6.10 A weatherproof notice stating 'Construction Exclusion Zone – Keep Out' must be fixed to each fencing panel. An example notice is shown on Drawing 3.
- 6.11 Any alteration to the fencing alignment to allow for approved activities will be made in agreement with the council's Arboricultural Officer.
- 6.12 The protective fencing must not be removed until the physical construction phase has been completed and all vehicles have been removed from site, to the satisfaction of the council's Arboricultural Officer.

Ground Contamination

- 6.13 Storage areas for liquids such as fuels, oil or paint should not be located within 10m of any trees on or within proximity to the site due to the risk of soil contamination caused by accidental spillage.
- 6.14 Particular care must be taken when working on or close to sloping ground to avoid unintentional runoff into the rooting area of retained trees.

Underground Utility Issues

- 6.15 No utility drawings were provided and no assessment has been made of the juxtaposition of tree roots and the likely location of new services. It has been presumed for the purposes of this report that all utilities will be installed outside of the **Construction Exclusion Zone** shown on Drawing 2.
- 6.16 Where the installation of services within the **Construction Exclusion Zone** of retained trees is unavoidable, appropriate work methods will be required to ensure the safe long-term survival of those trees. This process will require additional consultation with a qualified Arboricultural Consultant and is likely to be more expensive than conventional trench installation.

Ground Level Changes

- 6.17 A rise or reduction in soil level can have major implications on the longevity and health of the trees. Minor changes (up to 100mm) can be tolerated in some cases but is heavily dependent on tree species, condition and growing environment.
- 6.18 Existing ground levels within the **Construction Exclusion Zone** should be respected as far as is reasonably practicable. The advice of a qualified Arboricultural Consultant should be sought if level changes are required.

Drainage & Storm Water Run-off Issues

- 6.19 Drainage and storm water run-off requires due consideration and construction requirements (e.g. permeable surfacing) to prevent excessive and/or polluted run-off into the rooting area of trees to be retained.

7.0 MANAGEMENT RECOMMENDATIONS

Tree Work

- 7.1 In order to retain the dead tree T5 within the proposed wetland area as a habitat feature a crown reduction is recommended. The reduction should decrease the crown size by half and utilise fracture pruning and coronet cutting to increase available habitat for fungi and invertebrates.
- 7.2 No other tree works other than tree removals are required to facilitate the development proposals.
- 7.3 All tree surgery work should be carried out by a qualified contractor in accordance with *BS 3998:2010 Tree work – Recommendations*.

Mitigation for the removal of trees

- 7.4 Approximately 0.13 ha of canopy cover must be removed to facilitate the development proposals. Mitigation for their loss and associated habitat may be required in the form of replacement tree planting.
- 7.5 A large number of new trees are proposed within the enhanced greenspace, new wetland area and around the new car parking. Mitigation planting should take the form of native species as a continuation of the woodland belt beyond. Species selection could be tailored to add conservation and habitat value by increasing the range of native trees present and by the introduction of species such as wild service tree and yew.
- 7.6 Aftercare is vital to the survival of newly planted trees. Provision should be made for a minimum of two years maintenance of newly planted trees and include watering, formative pruning and the checking of tree ties and stakes.
- 7.7 In respect of trees, a sustainable development will be one whereby the total number, value or function provided by trees is maintained or increased or where the long-term prospects of the existing tree stock can be substantially improved. Net gains in biodiversity may be demonstrated where the number of tree species, variety of tree ages or range of niche habitats can be increased. Native, old, large or dead trees are likely to have a relatively significant impact on a scheme's environmental credentials, as will the connectivity of trees, hedges and woodland.
- 7.8 It is the recommendation of this report that mitigation in the form of tree planting has the potential to result in a net gain of both long-term tree cover and quality (estimated at 10 years post-construction). This is wholly dependent on appropriate species selection, tree quality and high establishment rates.
- 7.9 The extent of mitigation planting will ultimately be determined in agreement with Wrexham County Borough Council.

Post Construction Tree Care

- 7.10 Hazard recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Even those in good condition can suffer from damage or stress. Following site development, regular (annual or biennial) inspections of all retained trees should be undertaken by a qualified Arboricultural Consultant.

8.0 SUMMARY

- 8.1 Based on an objective assessment made in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*, there are 12 Category A, 5 Category B, 5 Category C and 1 Category U tree features on or within influencing distance of the site.
- 8.2 1 tree group and a part of a further 3 tree groups (totalling approximately 0.13 ha of canopy cover) must be removed to facilitate the development proposals. They are low value with some trees within the groups dying or suppressed.
- 8.3 The majority of trees on site are in a good condition; a few specimens recorded are fine examples of species whilst only a small number of trees have impaired condition. The majority of the tree stock is located along a central belt across the middle of the site and comprises small hedgerow species interspersed with larger mature broadleaves. A higher proportion of third party trees skirt the southern and western boundary. They generally comprise large, mature broadleaves with the exception of a newly planted screening belt planted in the southern corner.
- 8.4 Wrexham County Borough Council has confirmed that a number of trees across the site are protected by a Tree Preservation Order (Ref: *Wrexham Borough Council (Offa West Ward) Tree Preservation Order No. 43, 1989*), for full details see sections 3.7 - 3.10. The site does not lie within a Conservation Area
- 8.5 Trees T3, T5 – T8, T11 – T13 and group G7 had features such as cracks, crevices and minor branch cavities which may be suitable features for roosting bats. The density and connectivity of trees within the immediate landscape also offer good foraging and commuting lines.
- 8.6 Protective barrier fencing will be required to demarcate a Construction Exclusion Zone (CEZ) around retained trees prior to the commencement of development. Fencing alignment is shown on Drawing 2 and details of the recommended Heras fencing are shown on Drawing 3. This will restrict movements on the site which should be considered early in the construction process.
- 8.7 A large number of new trees are proposed within the proposals. Mitigation planting should take the form of native species as a continuation of the woodland belt along the southern boundary. Species selection should seek to add to the dominant pedunculate oak but could add conservation and habitat value by increasing the range of native trees present by the introduction of species such as wild service tree and yew.
- 8.8 It is the recommendation of this report that mitigation in the form of tree planting has the potential to result in a net gain of both long-term tree cover and quality (estimated at 10 years post-construction). This is wholly dependent on appropriate species selection, tree quality and high establishment rates.

APPENDIX 1

ARBORICULTURAL SURVEY DATA SHEETS

APPENDIX 1: Arboricultural Survey Data Sheets



Surveyor **RMG**
 Date **18.06.14**
 Town **Wrexham**
 Site **Western Gateway**
 Dwg Ref **D4622.001**

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
Trees																			
T1	Sycamore	13.0	360.6	2.0	3.0	4.0	4.0	3.0	3.0	N	Middle Age	Good	Inspection restricted due to dense vegetation; good crown vigour and form; no significant defects	B,1	4.3	58.8		Long	
T2	Sycamore	15.0	610.0	1.0	6.0	4.0	5.0	4.0	2.0	NE	Middle Age	Good	Located in G4; dense crown to ground; good vigour; dense vegetation understory; basal area inspection restricted; heavy mast; no significant defects	A,1,2	7.3	168.3		Long	*
T3	Pedunculate oak	10.0	620.0	1.0	4.0	5.0	4.0	4.0	3.0	S	Middle Age	Fair	Located in G4; open crown; small leaves and moderate vigour; good form; large branch tear within crown; bark wounds; good occlusion; minor cavities; bat potential	B,3	7.4	173.9		Long	*
T4	Pedunculate oak	16.0	1390.0	1.0	9.0	9.0	11.0	9.0	6.0	S	Mature	Veteran	Located in G4; large open, broad crown; large stem girth for species; possibly 400-500 years old; flared buttress; excellent form and vigour; minor inclusion of wire fence at base; minor deadwood for age and species; excellent specimen	A,1,2,3	15.0	707.0		Long	*
T5	Unknown	16.0	350.0	1.0	3.0	3.0	3.0	3.0			Middle Age	Dead	Located on edge of seasonal pond; standing dead tree; reduced branch work - only the main limbs left; minor holes and cavities; bat potential	U	0.0	0.0		Short	
T6	Pedunculate oak	15.0	700.0	1.0	4.0	4.0	5.0	4.0	6.0	S	Mature	Good	Located in G5; inspection restricted due to dense vegetation and ivy; stem girth approximated; good form and vigour; crown raised to 6m; dense crown; ivy clad; minor dead wood; no significant defects; bat potential	A,1,3	8.4	221.7		Long	*
T7	Pedunculate oak	15.0	800.0	1.0	5.0	4.0	4.0	5.0	2.0	N	Mature	Good	Located in G5; Inspection restricted due to dense vegetation and ivy; stem girth approximated; good form and vigour; dense crown; ivy clad; minor dead wood; no significant defects; bat potential	A,1,3	9.6	289.5		Long	*
T8	Pedunculate oak	14.0	970.0	1.0	8.0	4.0	6.0	4.0	6.0	N	Mature	Veteran	Stag-headed form; moderate dead wood; good vigour and condition in lower crown; vigorous epicormic shoot growth; bat potential	A,3	11.6	425.7		Long	

APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T9	Pedunculate oak	11.0	1050.0	1.0	6.0	11.0	12.0	8.0	6.0	S	Mature	Good	Large, open broad crown; slight asymmetry; good vigour; minor dead wood; good condition for age and size; no visible defects	A,1,2,3	12.6	498.8		Long	
T10	Sycamore	18.0	848.6	2.0	8.0	8.0	8.0	8.0	6.0	S	Mature	Good	Twin-stemmed; excellent form and vigour; open, broad crown; no visible defects	A,1,2,3	10.2	325.8		Long	*
T11	Common ash	13.0	650.0	1.0	5.0	4.0	6.0	4.0	3.0	E	Middle Age	Veteran	Historic upper crown and stem failure; stem tear / wound with moderate cavitation; lower crown has good vigour and new re-growth in a good condition; bat potential	A,3	7.8	191.1		Long	*
T12	Common ash	18.0	800.0	1.0	8.0	6.0	4.0	9.0	4.0	S	Mature	Good	Asymmetric crown due to T22; good vigour; minor and moderate deadwood; some minor broken branches and cavities; bat potential	A,2,3	9.6	289.5		Long	*
T13	Common ash	17.0	750.0	1.0	8.0	6.0	8.0	3.0	3.0	E	Mature	Good	Asymmetric crown due to T22; stem leans to east; good vigour; minor and moderate deadwood; some minor broken branches and cavities; bat potential	A,2,3	9.0	254.5		Long	*

Groups

G1	Sycamore; hawthorn; goat willow	from 6 - 12	<100 - 300	50+							Young to Middle Age	Good	Linear screen planting belt; dense canopies; some smaller dead stems; nettle and bramble understory; generally good vigour throughout	B,2,3	Refer to Drawing	n/a		Long	
G2	Hawthorn	3.0	<100	5+							Young	Fair	2 trees; multi-stemmed; overgrown with dog rose, bramble and nettle; good vigour	C,2	Refer to Drawing	n/a		Long	
G3	Sycamore; hawthorn	from 1 - 4	<130	3.0							Young	Good	Scattered group within field; self-set; multi-stemmed; low, dense crowns; good vigour	C,2	Refer to Drawing	n/a		Long	
G4	Hawthorn; sycamore; wych elm	from 5- 8	<150	20+							Young to Middle Age	Good	Linear screen planting / out-grown hedgerow; single and multi-stemmed; some dead stems; majority have good vigour; dense cover and crossing branches	C,2,3	Refer to Drawing	n/a		Long	
G5	Crack willow; common osier; common alder; wych elm; hawthorn; goat willow; wild cherry	from 6-8	<250	200+							Young to Middle Age	Good	Long linear belt of screen planting / lapsed hedgerow; dense cover and ground vegetation; generally good vigour; some minor dead elm stems; single and multi-stemmed; crossing branches	C,2,3	Refer to Drawing	n/a		Long	
G6	Goat willow; common ash	up to 6	<150	30+							Young to Middle Age	Good	Scattered, self-set trees located around seasonal pond; dense low crowns; good vigour	C,2,3	Refer to Drawing	n/a		Long	

APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
G7	Common ash; sycamore	up to 18	490 - 620	6.0							Middle Age to Mature	Good	6 trees; 5 ash, 1 sycamore; linear group adjacent field; single and multi-stemmed; large straight stems; good form and vigour; minor root damage from ploughing; minor and moderate cavities within upper crowns; some larger broken branches; bat potential	A,2,3	Refer to Drawing	n/a		Long	*
G8	Common ash	13.0	250 - 320	5.0							Middle Age	Good	2 trees; single and multi-stemmed; good form and vigour; dense crowns; no visible defects	B,1,2	Refer to Drawing	n/a		Long	*
G9	Common ash; goat willow; common alder; pedunculate oak	up to 6	<100	200+							Young	Good	New and dense screen planting; good vigour; low crowns	B,2	Refer to Drawing	n/a		Long	
Woods																			
W1	Pedunculate oak; common ash; sycamore; crack willow; goat willow; elder; hawthorn	up to 16	up to 650	100+							Mixed Age	Good	Small woodland to the south of the site and behind T1-T13 and G7-G9; trees in generally good condition; tall and slender stems; areas of dense and broken canopy cover; good wildlife habitat	B,2,3	Refer to Drawing	n/a		Long	*

APPENDIX 2

SURVEY METHOD

APPENDIX 2: SURVEY METHOD

The survey of trees is conducted from ground level only. The nature of the soils on site is not assessed.

Trees are dynamic living organisms with a constantly changing structure; even trees in good condition can suffer from damage or stress. The information recorded is presented as being correct at the time of survey.

The following features of each tree, group of trees or wood may have been recorded in the Arboricultural Survey Data Sheets at Appendix 1.

Species	The common name is given. The Latin name may also be given if further clarification is required.	
Height	Top height of tree recorded in metres.	
Stem Diameter	For single-stemmed trees the measurement is taken at 1.5 metres above ground level and recorded in millimetres. For multi-stemmed trees an average all stems measured at 1.5m above ground level is used. For tree groups a range from minimum to maximum diameters is provided based on measurements taken using one of the aforementioned methods.	
No. of Stems	A count of stems arising below a height of 1.5 metres.	
Crown Spread	The N, S, E and W branch spreads are recorded in metres to provide a representative crown shape.	
Height of Lowest Branch	Crown clearance above ground level recorded in metres.	
Direction of Lowest Branch	The direction of growth of the first significant branch from the point of attachment.	
Maturity	Young	Trees that can reasonably be relocated or replaced like for like, without undue cost;
	Middle Age	Trees in the established growth stage of their life with the potential to continue increasing in size;
	Mature	Trees that have reached their ultimate size, given their location and surroundings;
Condition	Good, Fair, Poor. An overall assessment of a tree's physiological and structural state in which factors that may increase its susceptibility to the effects of development are taken into account. Veteran. Trees that are in such a condition as to significantly increase their biological, cultural or aesthetic value. This is characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.	
Comments	A brief evaluation and description of the tree with comments on form, vitality, health and any significant defects or symptoms of ill-health.	

BS 5837 Tree Quality Assessment

The tree quality assessment is based on Table 1 of BS 5837:2012 (See below). Four categories (A, B, C and U) are used to denote tree quality (A= High, B = Moderate, C = Low, U= Unsuitable for retention). Subcategories (1-3) denote the specific function value of the trees and the reasoning behind the allocation of a specific category (the subcategories may be used in combination but do not accumulate collective weight).

Root Protection Area (RPA)

The RPA is allocated to ensure that a sufficient area is left undisturbed during development. It is provided as an area (m²) and as the radius of a circle (m) typically plotted from the centre of the stem.

The RPA is calculated using a mathematical equation included in BS 5837:2012 (Section 4.6 and Table D.1) and is based on a tree's stem diameter. In some cases the RPA may need to be adapted to best reflect the likely area and position of roots required to ensure survival; this may be based on criteria such as the tree's condition, species, crown spread and any barriers to growth. Any alteration must be justifiable but is made at the Arboricultural Consultants discretion.

Recommendations

Recommendations for arboricultural works, etc. are based on the **current** land use, and take into account the tree or group attributes without bias to the proposed development.

Estimated Remaining Contribution

An estimation of the life expectancy as healthy functioning tree. This will be influenced by species and the condition of the tree at the time of survey.

Long	> 40 years
Medium	20 – 40 years
Short	less than 20 years

APPENDIX 2: SURVEY METHOD

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
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 <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>	See Table 2		
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
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)	See Table 2
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	See Table 2
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	See Table 2

British Standards Institute (2012) BS5837:2012 Trees in relation to design, demolition and construction – Recommendations.
p.9

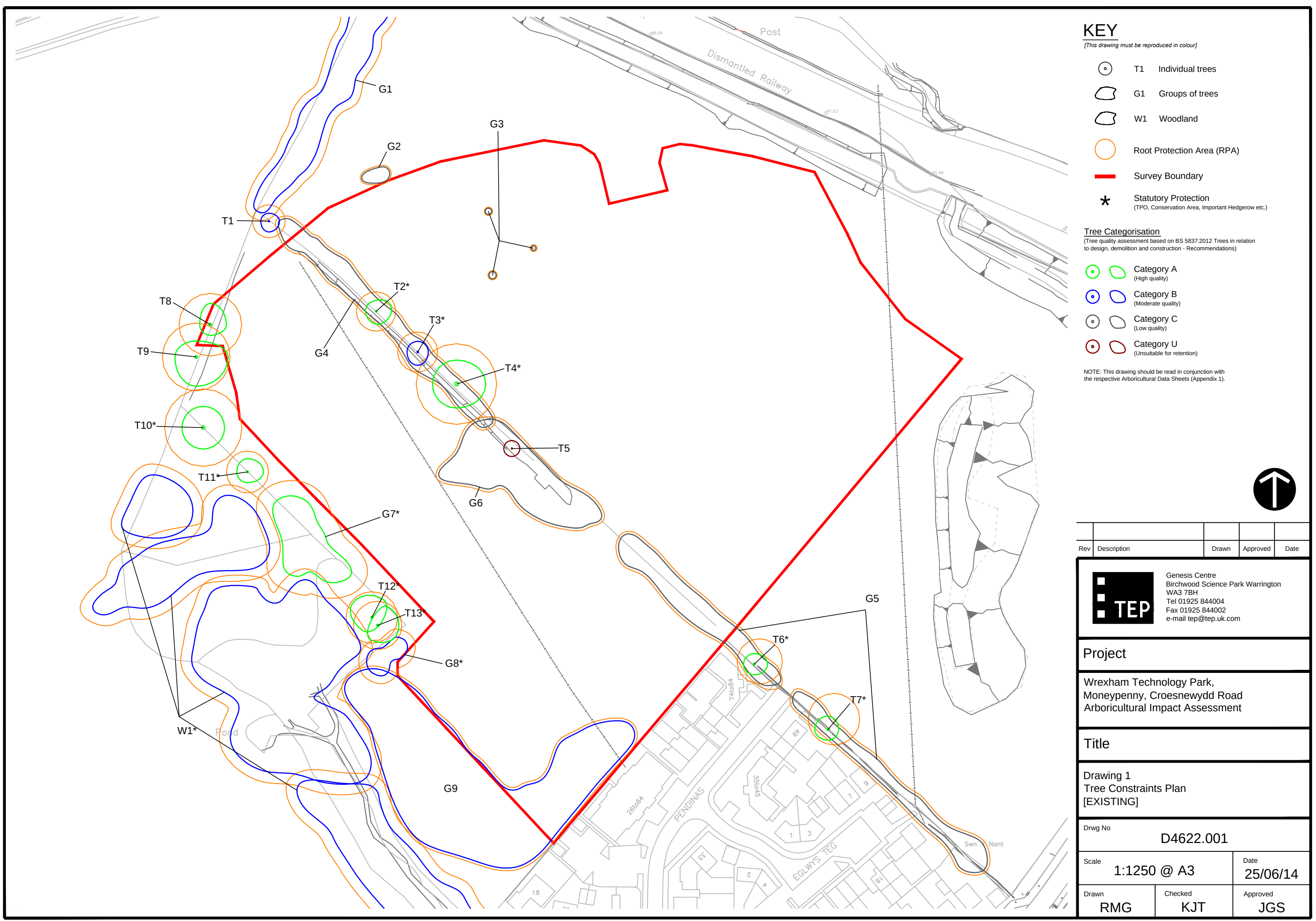
NOTES:

All young trees are assessed as quality category 'C' but this does not preclude their retention within a development.

For hedges the height, canopy spread and number of stems is recorded but they are not assigned a quality category.

DRAWING 1

TREE CONSTRAINTS PLAN



KEY

[This drawing must be reproduced in colour]

- T1 Individual trees
- G1 Groups of trees
- W1 Woodland
- Root Protection Area (RPA)
- Survey Boundary
- Statutory Protection (TPO, Conservation Area, Important Hedgerow etc.)

Tree Categorisation

(Tree quality assessment based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Unsuitable for retention)

NOTE: This drawing should be read in conjunction with the respective Arboricultural Data Sheets (Appendix 1).



Rev	Description	Drawn	Approved	Date
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Genesis Centre
Birchwood Science Park Warrington
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Tel 01925 844004
Fax 01925 844002
e-mail tep@tep.uk.com

Project

Wrexham Technology Park,
Moneypenny, Croesnewydd Road
Arboricultural Impact Assessment

Title

Drawing 1
Tree Constraints Plan
[EXISTING]

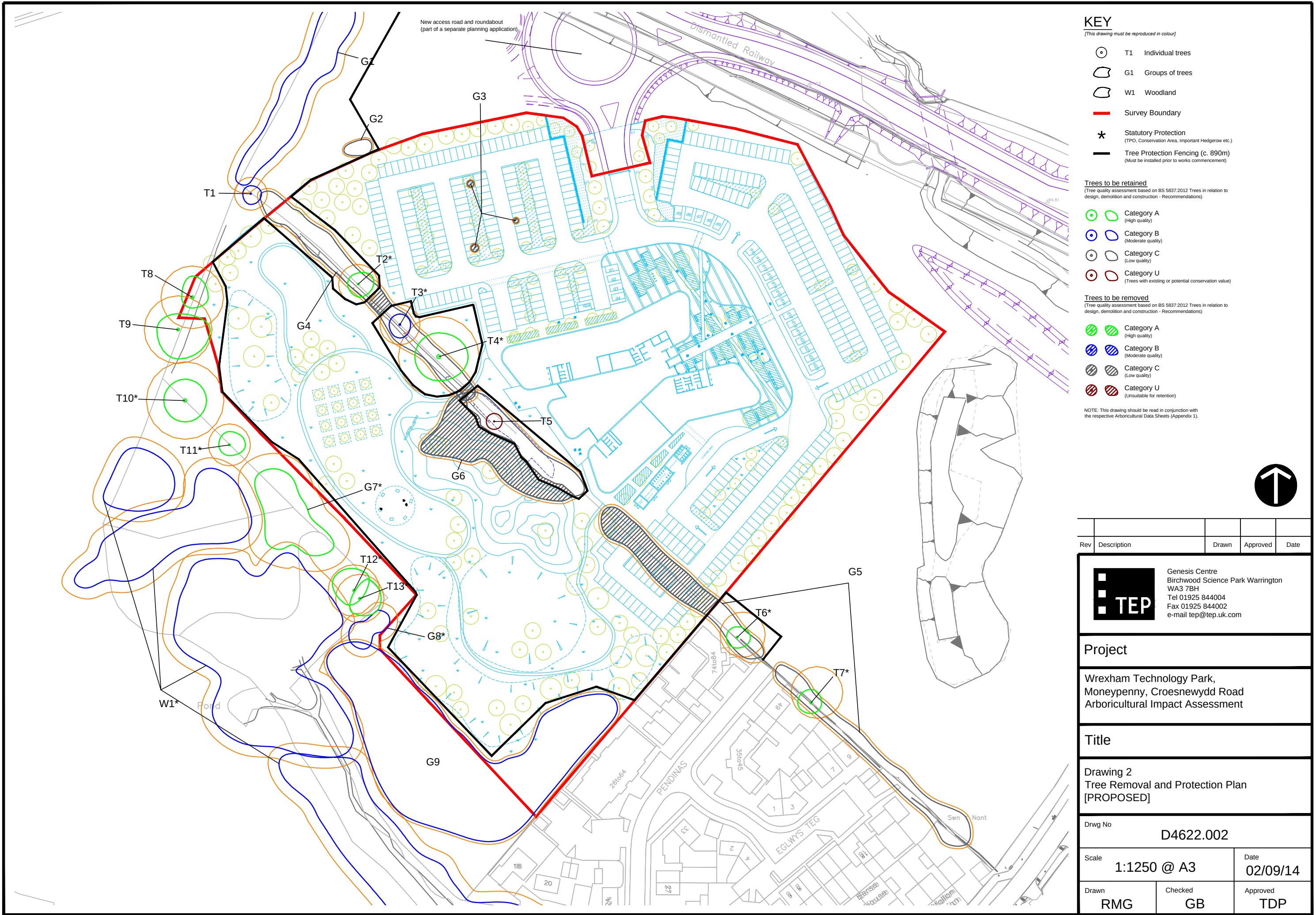
Drwg No D4622.001

Scale 1:1250 @ A3 Date 25/06/14

Drawn RMG Checked KJT Approved JGS

DRAWING 2

TREE REMOVAL AND PROTECTION PLAN



KEY
[This drawing must be reproduced in colour]

- T1 Individual trees
- G1 Groups of trees
- W1 Woodland
- Survey Boundary
- Statutory Protection
(TPO, Conservation Area, Important Hedgerow etc.)
- Tree Protection Fencing (c. 890m)
(Must be installed prior to works commencement)

Trees to be retained
(Tree quality assessment based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Trees with existing or potential conservation value)

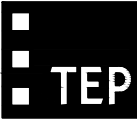
Trees to be removed
(Tree quality assessment based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Unsuitable for retention)

NOTE: This drawing should be read in conjunction with the respective Arboricultural Data Sheets (Appendix 1).



Rev	Description	Drawn	Approved	Date
-----	-------------	-------	----------	------



Genesis Centre
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Project

Wrexham Technology Park,
Moneypenny, Croesnewydd Road
Arboricultural Impact Assessment

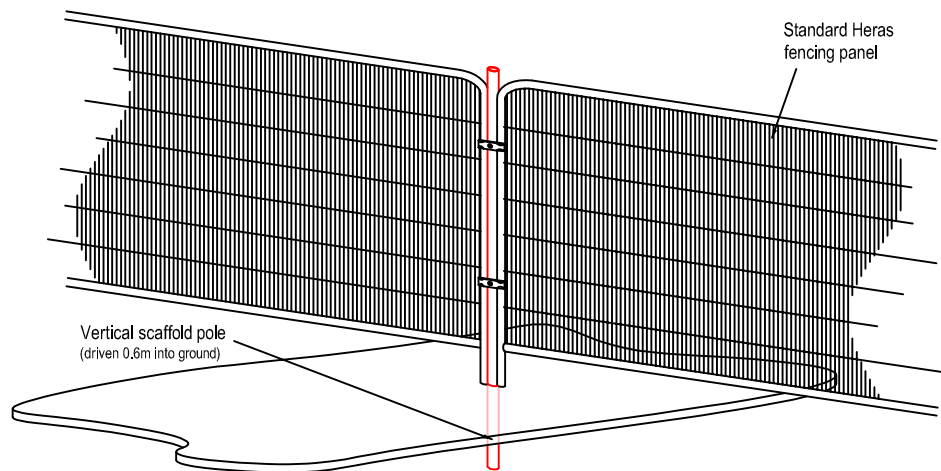
Title

Drawing 2
Tree Removal and Protection Plan
[PROPOSED]

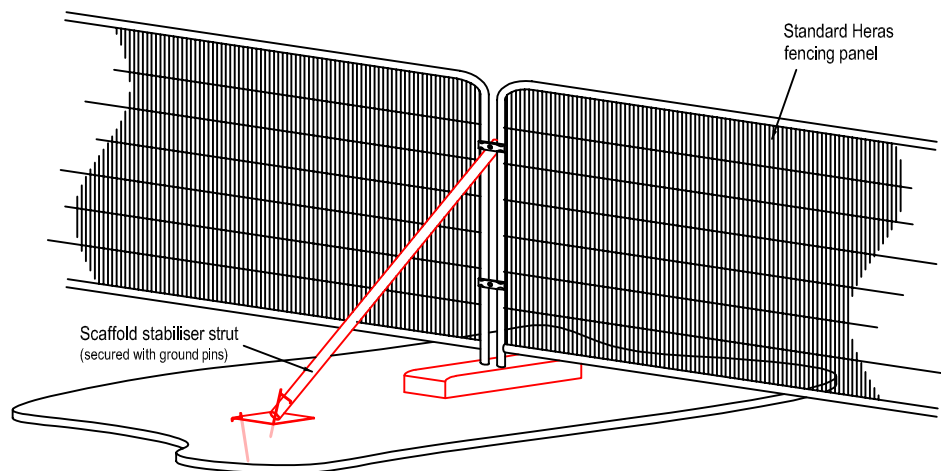
Drwg No D4622.002		
Scale 1:1250 @ A3	Date 02/09/14	
Drawn RMG	Checked GB	Approved TDP

DRAWING 3

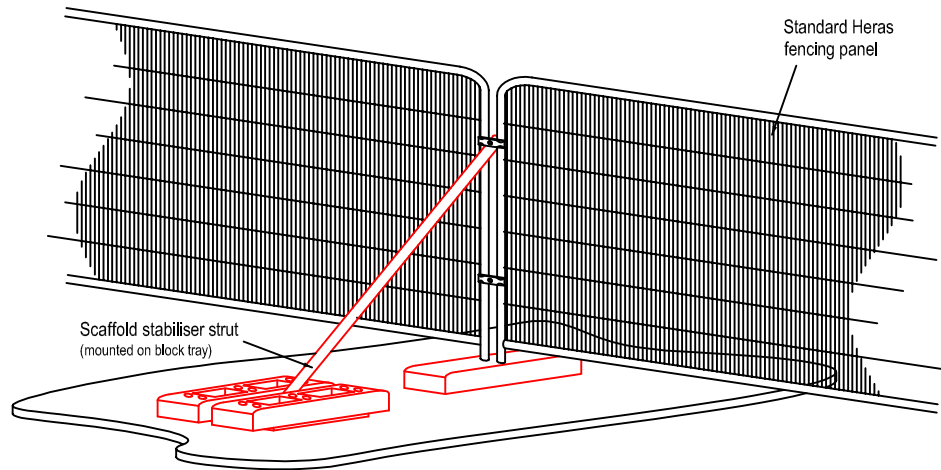
TEMPORARY TREE PROTECTION FENCING



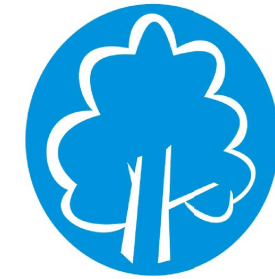
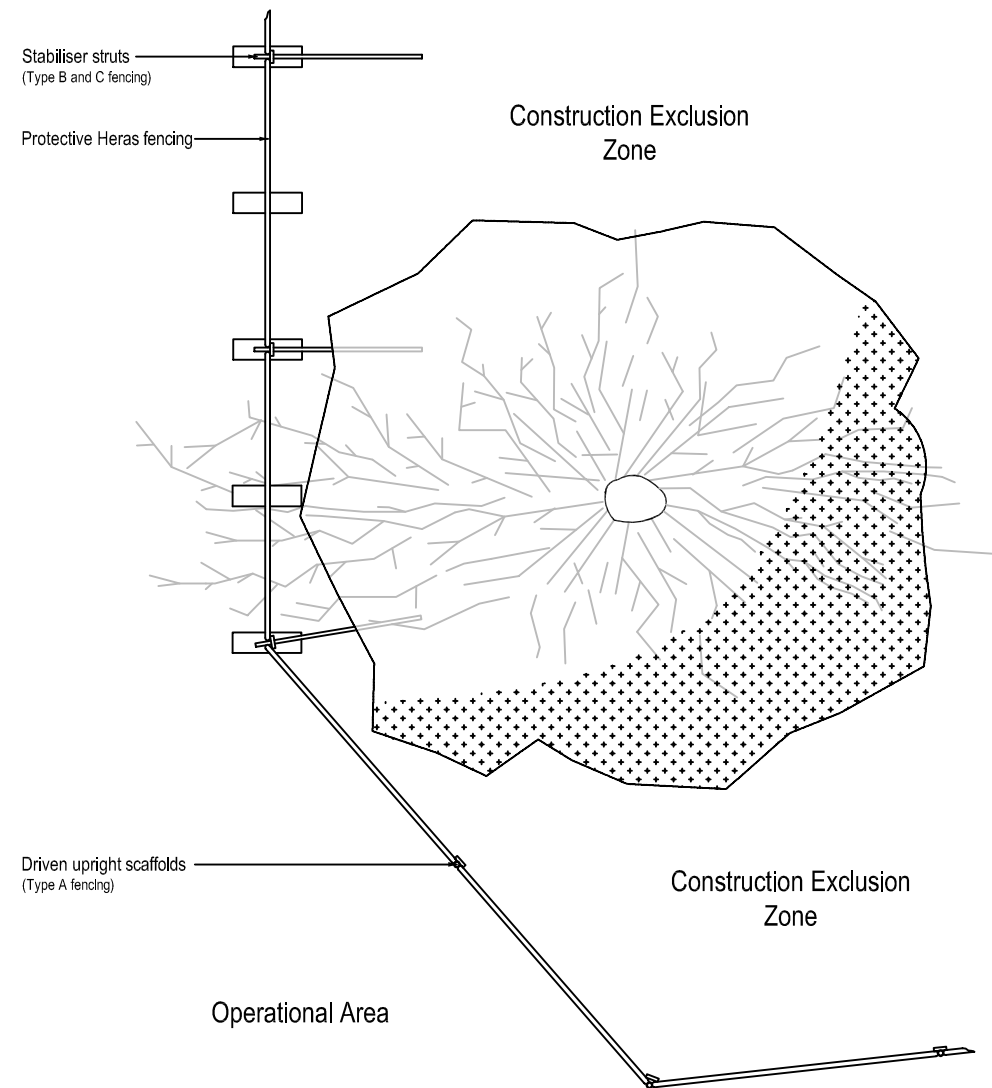
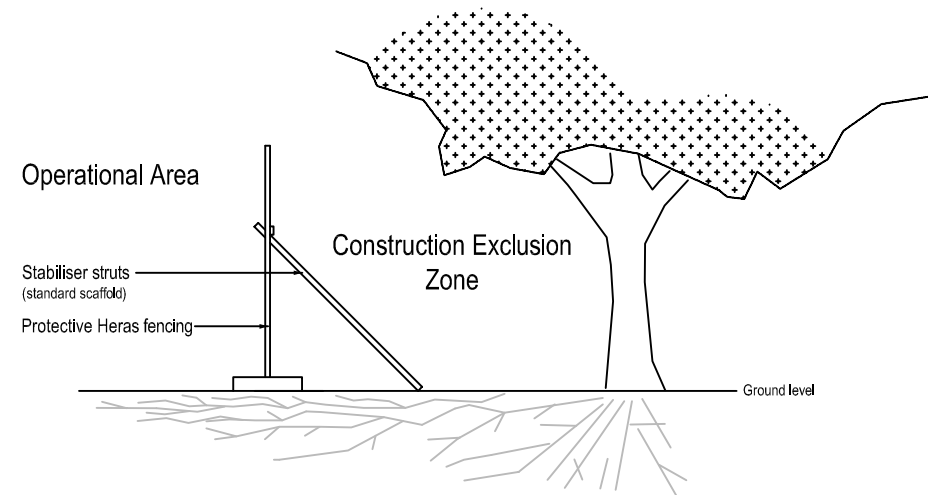
Type A Tree Protection Fencing: for use as standard
(see Tree Protection Plan for layout)



Type B Tree Protection Fencing: for use as directed
(e.g. where Type A would cause unacceptable damage to roots or underground services)



Type C Tree Protection Fencing: for use as directed
(e.g. on hard surfaces)



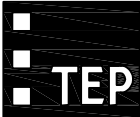
PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.



TREE PROTECTION AREA KEEP OUT !
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

Tree Protection Notice to be attached to fencing 1.5m from the ground, facing out of the Construction Exclusion Zone and located at regular intervals along the fence line.

The notice must be at least A4 in size

Rev	Description	Drawn	Approved	Date
 Genesis Centre Birchwood Science Park Warrington WA3 7BH Tel 01925 844004 Fax 01925 844002 e-mail tep@tep.uk.com				
Project				
TEP Standard Detail				
Title				
Temporary Tree Protection Fencing (Detail for tree protection around Construction Exclusion Zones)				
Drwg No D.TREE_FENCING.001				
Scale NTS @ A3		Date 30/04/12		
Drawn TDP	Checked ROS	Approved JGS		