



Western Gateway, Wrexham Technology Park - Access Road Arboricultural Impact Assessment

Report Ref: TEP.4598.001
July 2014

Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH

T: 01925 844004
F: 01925 844002
E: tep@tep.uk.com
W: www.tep.uk.com



**Western Gateway,
Wrexham Technology Park - Access Road
Arboricultural Impact Assessment
Report Reference: TEP.4598.001
Version 1.0
July 2014**

**Prepared by:
Robin Grimes
Arboricultural Consultant**

**TEP
Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH
Tel: 01925 844004
Fax: 01925 844002
e-mail: tep@tep.uk.com**

for

**Ramboll UK Limited
2nd Floor
The Exchange
St. John Street
Chester
CH1 1DA**

Written:	Checked:	Approved:
RMG	KJT	JGS



**WESTERN GATEWAY,
WREXHAM TECHNOLOGY PARK - ACCESS ROAD
ARBORICULTURAL IMPACT ASSESSMENT**

CONTENTS	PAGE
1.0 INTRODUCTION	1
2.0 THE SITE AND SURROUNDINGS.....	2
3.0 STATUTORY PROTECTION AND GUIDANCE	3
4.0 TREE POPULATION.....	6
5.0 IMPACTS OF THE PROPOSED DEVELOPMENT.....	8
6.0 TREE PROTECTION REQUIREMENTS	9
7.0 ARBORICULTURAL RECOMMENDATIONS	11
8.0 SUMMARY	13

APPENDICES

Appendix 1:	Arboricultural Survey Data Sheets
Appendix 2:	Survey Method

DRAWINGS

Drawing 1:	Tree Constraints Plan:	D4598.001
Drawing 2:	Tree Removal and Protection Plan:	D4598.002
Drawing 3:	Temporary Tree Protection Fencing:	D.TREE_FENCING.001

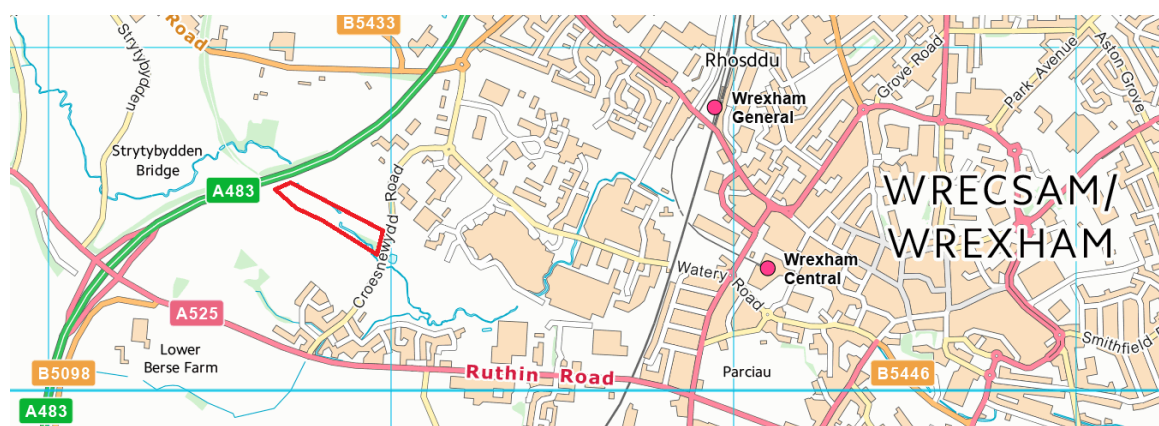
1.1 INTRODUCTION

- 1.2 TEP has been commissioned by Ramboll UK to conduct an arboricultural survey of a strip of land leading off Croesnewydd Road in Wrexham, North Wales. This report details the arboricultural impact of developing the site, subsequent mitigation recommendations and protective measures.
- 1.3 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*.
- 1.4 Under the British Standard the assessment of trees is made objectively. The categorisation method identifies the quality and value of the existing tree stock.
- 1.5 A topographical survey was used to record the position of trees and vegetation (No Reference). 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 survey and therefore TEP's surveyor estimated their locations.
- 1.6 A total of 9 individual trees (T1-T9), 5 groups of trees (G1-G5) and 2 woodlands (W1-W2) were surveyed and mapped (refer to Drawing 1). All arboricultural information recorded during the survey is presented at Appendix 1.
- 1.7 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 westwards from Croesnewydd Road stopping at the A483; belts of screen planting and woodland define the site to the north and south. A site location and context plan is shown at Figure 1.
- 2.2 The site comprises a stretch of dismantled railway and limestone aggregate, large areas of screen planting, shelterbelt and woodland with smaller areas of open, rough grassland. The River Gwenfro runs from west to east, intersecting the site midway via a culvert that runs underneath the old railway. An overgrown public footpath also runs underneath the railway further to the west via an underpass.

Figure 1. Site location and context plan



Contains ordinance survey data @ crown copyright and database right 2014

- 2.3 The topography of the site is generally flat across the dismantled railway. Two shallow embankments slope down, away from the aggregate to both the north and south. Croesnewydd Road to the east sits at a slightly elevated level to the railway.
- 2.4 Weather conditions during the survey were dry and sunny.
- 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 a new access road and roundabout linking Croesnewydd Road to a proposed development site towards the south west. An attenuation pond is also proposed to the south-east of the roundabout.
- 2.7 Detail of the proposals is shown on Drawing 2 and is based on the proposed site plan (Ref: 61033427-H-100-01) supplied by the client.

3.0 STATUTORY PROTECTION AND GUIDANCE

National Planning Policy Framework (NPPF)

- 3.1 The NPPF assumes protection of all ancient woodland and veteran trees unless it can be clearly demonstrated that the need of, or benefits of, development outweigh the loss. 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 or veteran trees. To the south west of the site there is a small area of Ancient Semi-Natural Woodland.

Tree Preservation Orders & Conservation Area Designations

- 3.3 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.
- 3.4 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*
- 3.5 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.
- 3.6 The site does not lie within a Conservation Area.

Table 1: Trees protected by a TPO

TEP Survey Reference	TPO Ref. No.
T3	T32
T7	T34
G3 (3 common alder, 1 sycamore)	T22 – T25
W2 (1 common ash, 1 sycamore, 3 common alder)	T26 – T30

Protected Species – Bats

- 3.7 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.
- 3.8 A preliminary ground level appraisal of the wildlife habitat value of each tree was undertaken as part of the arboricultural survey. A number of trees within the larger groups 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.
- 3.9 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.
- 3.10 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.

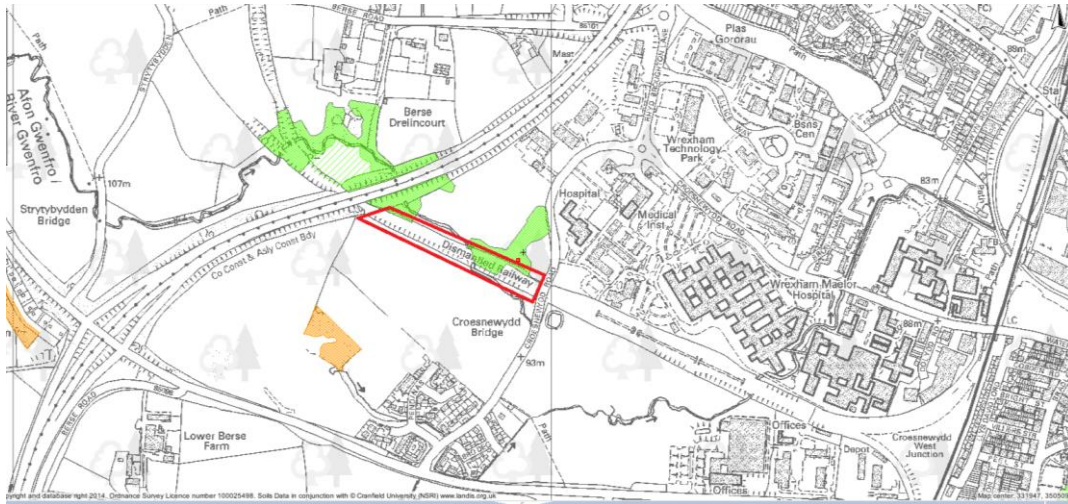
Protected Species – Birds

- 3.11 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.
- 3.12 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).
- 3.13 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

- 3.14 UK BAP priority habitats are those that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP). Approximately 0.1 ha of woodland noted as Deciduous Woodland BAP Priority Habitat and listed on the Forestry Commission's National Forest Inventory is within the survey boundary.

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



Invasive Species

- 3.15 Himalayan balsam is classed as an invasive weed under the *Wildlife and Countryside Act 1981* (as amended). Any material containing Himalayan balsam is classed as controlled waste under the *Environmental Protection Act (Duty Of Care) Regulations 1991*, which requires all producers, carriers and disposers of waste to follow a code of practice and keep records. Under provisions made within the *Wildlife and Countryside Act 1981*, it is an offence to spread Himalayan balsam. Liability may also extend in situations where a landowner has knowingly permitted the spread of the plant onto neighbouring land.
- 3.16 Himalayan balsam was noted in large pockets throughout woodlands W1 and W2.

4.0 TREE POPULATION

- 4.1 9 individual trees (T1-T9), 5 groups of trees (G1-G5) and 2 woodlands (W1-W2) 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 site has an abundant tree cover along its entire length. Tree density in the east is much higher than that in the west and comprises screen planting and woodland of mixed deciduous broadleaves with a young, self-set understory. Trees in the west are generally mature or maturing, open grown and synonymous with the embankments of the River Gwenfro and dismantled railway they border. 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.
- 4.3 The most notable trees on site are T4 to T9 comprising silver birch, pedunculate oak, common ash and wych elm. All have excellent form and condition; T8 and T9, a mature ash and wych elm respectively are both multi-stemmed and have minor bark wounds and included unions, neither of which detracts any arboricultural value. The two silver birch (T4 and T5) are particularly good examples of species and a pedunculate oak (T7), whilst still only middle aged, has the form and quality to become an excellent specimen. However, their visual amenity is slightly diminished due to their location.
- 4.4 Two larger groups of trees were recorded as woodlands (W1 and W2) along the stretch of the River Gwenfro and dismantled railway that intersect the site. Both woodlands have a dense canopy cover of tall narrow trees with high crowns and slender stems. Towards the east nearest Croesnewydd Road, both woodlands have a dense, self-set understory and large pockets of Himalayan balsam either side of the dismantled railway. Trees are generally in a good condition however a small number of dead stems and broken branches are evident, reducing arboricultural value. They provide good wildlife connectivity within the wider landscape and form a natural green corridor along an area of open fields.

Photograph 1. View looking west into W1 and W2 from Croesnewydd Road.



Photograph 2. Looking north-west into woodland W1



- 4.5 Two particularly noticeable trees within woodland W1 are trees T1 and T2, a multi-stemmed common alder and sycamore respectively. They have grown together with close stems and a shared rooting area located on the edge of the River Gwenfro and the embankment of the culvert. They are both ivy clad and have some minor to moderate foliage dieback within the upper crown, however this is not deemed detrimental to overall health and vitality.
- 4.6 Within the last few years the road layout at Croesnewydd Road has been modified; the road has been slightly widened and an intersection constructed. Consequently, tree cover in this part of the site generally comprises younger, self-set trees interspersed with larger middle-aged trees. Groups G1-G3 reflect this change in layout by virtue of their diminished condition and stature. Species recorded generally comprised hawthorn, common ash, common alder and sycamore; a number of larger alder and sycamore are located to the south in G3 with good form and condition.
- 4.7 Groups G4 and G5 in the western half of the site are two linear groups of screen planting along the dismantled railway. G4 is densely stocked whereas G5 is more scattered, both with dense ground vegetation. They comprise a mixture of deciduous broadleaves in a good condition. There are some minor dead stems and broken branches towards the canopy extents and they have reduced visual amenity due to their location but with some sympathetic management they have the opportunity to become high value trees.
- 4.8 Tree and group locations, their quality categories and canopy spreads are shown on Drawing 1.

Tree Quality Categorisation

- 4.9 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	Hedge
Trees, groups and hedges that can be retained	T5	T3, G3, G4 (part), G5 (part), W1 (majority), W2 (part),	G1	-	-
Trees, groups and hedges that require removal to facilitate development	T4, T7, T8, T9	T1, T2, T6, G4 (part), G5 (part), W1 (part), W2 (part)	G2	-	-

See Appendix 1, Arboricultural Data Sheets for subcategories

- 5.2 7 individual trees and approximately 0.5 ha of canopy cover comprising both groups and woodlands must be removed to facilitate the development proposals. The majority of these are moderate value and located within the proposed new road layout area.
- 5.3 The greatest impact of this development will be the loss of 4 high value trees to the west of the site due to the location of the new roundabout and road; 1 tree (T7) is currently protected by a Tree Preservation Order. All 4 trees are in excellent condition and good examples of species. Their loss represents a depreciation in arboricultural value across the site. However, they are located internally amongst dense tree cover and in an area with minimal footfall, thus their loss will have little visual impact
- 5.4 There will be a moderate impact on habitat and wildlife connectivity due to the removal of trees within G2, G4, G5 and woodlands W1 and W2. Although there is an abundance of self-set re-growth, a high proportion of trees are in a good condition and have the potential to become high value trees adding to the character of the site.
- 5.5 Trees to the north of the River Gwenfro, to the west of the site and remaining trees in woodland W2 can be retained and protected. The installation of temporary fencing and ground protection will be required.
- 5.6 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. However, barriers to root growth are likely to be areas of hard-standing and the aggregate of the dismantled railway. 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.
- 6.20 The maintenance of existing water bodies and hydrology patterns will also be required where this relationship is relied upon for tree survival. This is considered to be the case for a large portion of trees within W1, W2 and G5 adjacent the River Gwenfro.

7.0 MANAGEMENT RECOMMENDATIONS

Tree Work

- 7.1 Following completion of felling works, an inspection should be undertaken by an arboricultural consultant to assess the finished woodland edge. During this visit, minor additional works may be specified. These would typically include pruning, reshaping and possibly additional felling of trees that appear to be vulnerable to windthrow or are otherwise unsuitable for retention.
- 7.2 All tree surgery work should be carried out by a qualified contractor in accordance with *BS 3998:2010 Tree work – Recommendations*.

Pre-start Site Meeting

- 7.3 To reinforce the required tree protection measures and avoid the requirement for ongoing arboricultural supervision a pre-start meeting should be arranged between the site contractor, a qualified Arboricultural Consultant and the council's Arboricultural Officer.
- 7.4 During the meeting the trees identified for removal will be marked up, the alignment of protective fencing will be marked out and any technical or logistical issues discussed.

Mitigation for the removal of trees

- 7.5 7 individual trees and approximately 0.5 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.

- 7.6 It will not be possible to fully mitigate for the loss of canopy cover, arboricultural value and habitat in the short term. However, if the open spaces to the east and west of the proposed roundabout and south of the proposed attenuation pond can be fully utilised to create new areas of young woodland, then this would reinstate the existing arboricultural and habitat value over the long term and may also offer some improvements in form and species diversity.
- 7.7 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.
- 7.8 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.
- 7.9 The National Planning Policy Framework (NPPF) is a material consideration in the planning process and promotes a presumption in favour of sustainable development. In terms of the natural environment, development should minimise impacts on biodiversity and provide a net gain in biodiversity where possible.
- 7.10 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.
- 7.11 It is the recommendation of this report that mitigation in the form of tree planning has the potential to result in a balance of long-term tree cover (estimated at 40 years post-construction). This is wholly dependent on appropriate species selection, tree quality and high establishment rates.
- 7.12 The extent of mitigation planting will ultimately be determined in agreement with Wrexham County Borough Council.

Post Construction Tree Care

- 7.13 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 5 Category A, 9 Category B and 2 Category C tree features on or within influencing distance of the site.
- 8.2 7 individual trees and approximately 0.5 ha of canopy cover comprising both groups and woodlands must be removed due to the position of the new access road and roundabout. The majority of these are moderate value.
- 8.3 The greatest impact of this development will be the loss of 4 high value trees to the west of the site, one of which is currently protected by a Tree Preservation Order. The loss of these trees represents a loss in arboricultural value across the site. However, due to their location towards the far west of the site their loss will have little visual impact. There will be a moderate impact on habitat and wildlife connectivity due to the amount of trees being removed from woodlands and groups.
- 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 3.3-3.6. The site does not lie within a Conservation Area
- 8.5 No individual trees were found to have features of a size and condition desirable to bats and/or owls. However, a number of trees within the larger groups had features such as cracks, crevices and minor branch cavities which are suitable features for roosting bats.
- 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 pre-start meeting between the site contractor, a qualified Arboricultural Consultant and the council's Arboricultural Officer will allow for marking up of tree removals and tree protection fencing and any technical or logistical issues to be discussed.
- 8.8 It will not be possible to fully mitigate for the loss of canopy cover, arboricultural value and habitat in the short term. If the open spaces within the new development can be fully utilised to create new areas of young woodland, then this would reinstate the existing arboricultural and habitat value over the long term. Mitigation planting should take the form of native species as a continuation of the woodland belt beyond and new species such as wild service tree and yew for added diversity.
- 8.9 It is the recommendation of this report that mitigation in the form of tree planning has the potential to result in a net balance of long-term tree cover (estimated at 40 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 - Access Road**
 Dwg Ref **D4598.001**

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	Common alder	16.0	599.7	3.0	4.0	2.0	6.0	3.0	1.0	NE	Mature	Fair	Multi-stemmed; kinked stems; asymmetric crown; moderate dieback; moderate dead wood; ivy clad; good wildlife habitat; growing into T2	B,3	7.2	162.7		Long	
T2	Sycamore	16.0	495.2	2.0	3.0	5.0	6.0	7.0	4.0	SW	Middle Age	Good	Twin-stemmed; growing in T1; open broad crown; ivy clad; good vigour	B,1,3	5.9	110.9		Long	
T3	Common alder	15.0	586.3	4.0	5.0	3.0	4.0	4.0	2.0	S	Mature	Good	4 stems from large bole; located on riverbank edge; inspection restricted due to location; good vigour; slender stems; high crown	B,2,3	7.0	155.5		Long	*
T4	Silver birch	15.0	310.0	1.0	4.0	6.0	5.0	5.0	2.0	E	Middle Age	Good	Excellent form and vigour; open, broad crown for species; within G5	A,1	3.7	43.5		Long	
T5	Silver birch	16.0	290.0	1.0	4.0	5.0	4.0	4.0	4.0	S	Middle Age	Good	Excellent form and vigour; open, broad crown for species; within G5	A,1	3.5	38.0		Long	
T6	Silver birch	9.0	310.0	1.0	4.0	4.0	4.0	4.0	2.0	W	Middle Age	Good	low dense crown; good form and vigour; dog rose within crown	B,1	3.7	43.5		Long	
T7	Pedunculate oak	12.0	410.0	1.0	5.0	4.0	5.0	4.0	2.0	N	Middle Age	Good	Open, broad crown; good form and vigour; no visible defects	A,1,2	4.9	76.0		Long	*
T8	Common ash	14.0	608.5	7.0	6.0	4.0	5.0	6.0	2.0	N	Mature	Good	Multi-stemmed at base; minor dead wood in lower crown; some included unions and stem wounds; good occlusion and wound wood; good vigour	A,1,2	7.3	167.5		Long	
T9	Wych elm	14.0	585.0	9.0	5.0	5.0	4.0	4.0	1.0	S	Mature	Good	Multi-stemmed at base; minor dead wood in lower crown; some included unions and stem wounds; no cavitation; good occlusion and wound wood; good vigour; some minor exposed roots	A,1,2	7.0	154.8		Long	
Groups																			
G1	Common ash; crack willow; hawthorn; sycamore	up to 9	up to 240	9+							Young to Middle Age	Good	Dense shrubby growth on boundary and in fence; crossing branches; minor broken branches	C,2,3	Refer to Drawing	n/a		Long	
G2	Common alder; hawthorn; cotoneaster	up to 9	up to 160	20+							Middle Age	Fair	7/8 trees; all multi-stemmed; linear feature along fence line and new access road entry; some trees have moderate vigour; some have dense, healthy crowns	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	(*)
G3	Common alder; sycamore; hawthorn	up to 11	up to 240	20+							Young to Middle Age	Good	Limited inspection due to location within dense ground vegetation; crowns have good form and vigour; scattered group; locations approximated	B,2,3	Refer to Drawing	n/a		Long	*
G4	Silver birch; goat willow; elder; common alder; pedunculate oak; common ash	up to 10	up to 280	30+							Young to Middle Age	Good	Scattered group along south of disused railway; single and multi-stemmed trees; younger oak; good vigour; dense crowns	B,2,3	Refer to Drawing	n/a		Long	
G5	Silver birch; wych elm; sycamore; hawthorn; pedunculate oak; common ash	up to 14	up to 360	200+							Young to Middle Age	Good	Dense, linear group north of disused railway; some larger birch; self-set understory; some minor dead stems along riverbank; good screening and wildlife	A,1,2,3	Refer to Drawing	n/a		Long	

Woods

W1	Common alder; silver birch; common ash; sycamore; hawthorn; hazel; crack willow; goat willow; dog rose	up to 16	up to 400	300+							Mixed Age	Good	Dense, small woodland; abundant self-set trees and young shoots; tall narrow stems; single and multi-stemmed; high canopy; overgrown bramble understory; some minor dead stems; some pockets of Himalayan balsam	B,1,2,3	Refer to Drawing	n/a		Long	
W2	Common alder; sycamore; hawthorn; goat willow; dog rose	up to 15	up to 350	200+							Young to Middle Age	Good	Small linear woodland; dense canopy; some self-set understory; some larger trees with tall, slender stems and narrow crowns; single and multi-stemmed trees; good alder specimens; Himalayan balsam throughout	B,1,2,3	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

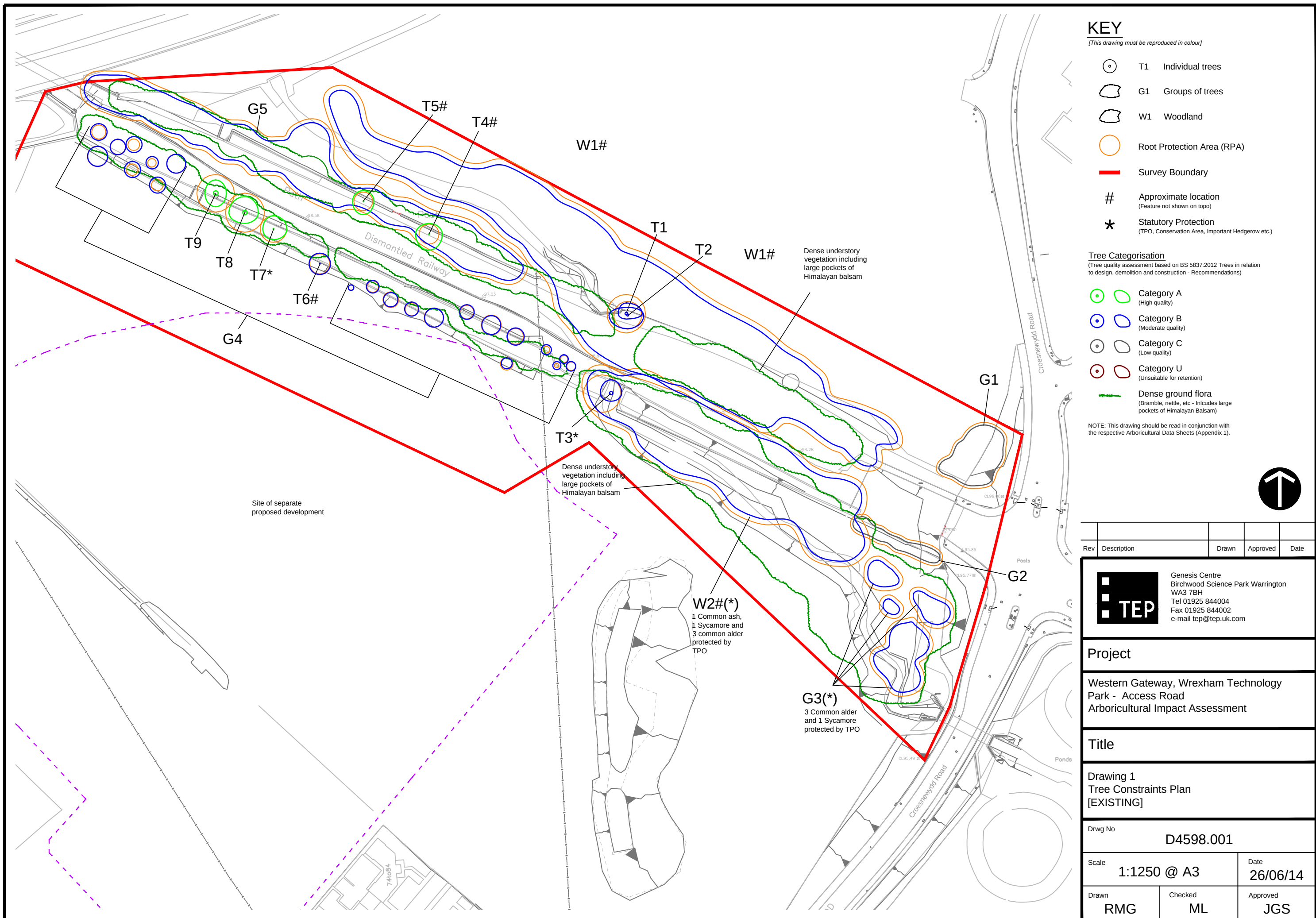
NOTES:

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.

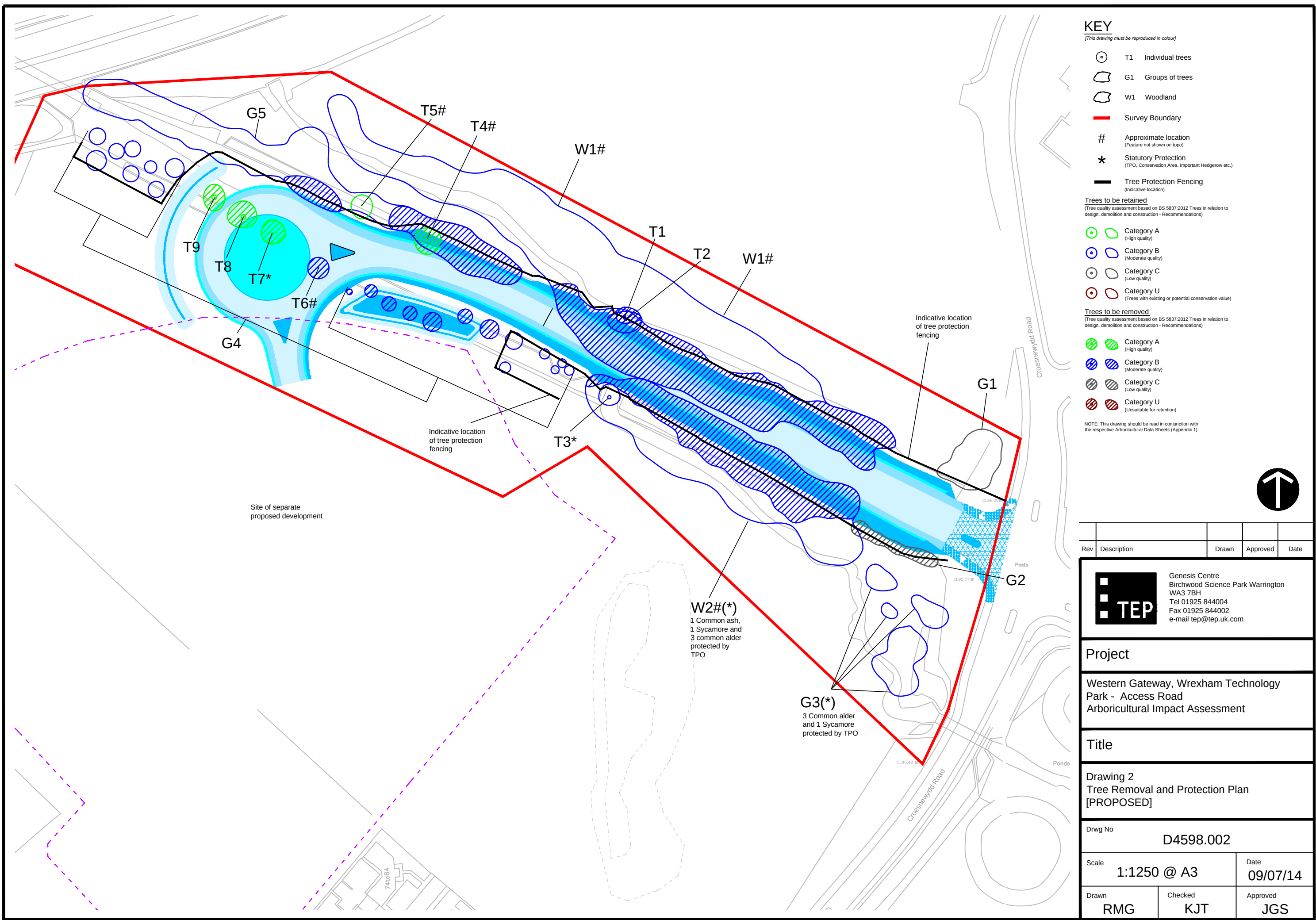
DRAWING 1

TREE CONSTRAINTS PLAN



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
- # Approximate location (Feature not shown on topo)
- * Statutory Protection (TPO, Conservation Area, Important Hedgerow etc.)
- Tree Protection Fencing (Indicative location)

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
Birchwood Science Park Warrington
WA3 7BH
Tel 01925 844004
Fax 01925 844002
e-mail tep@tep.uk.com

Project

Western Gateway, Wrexham Technology Park - Access Road
Arboricultural Impact Assessment

Title

Drawing 2
Tree Removal and Protection Plan
[PROPOSED]

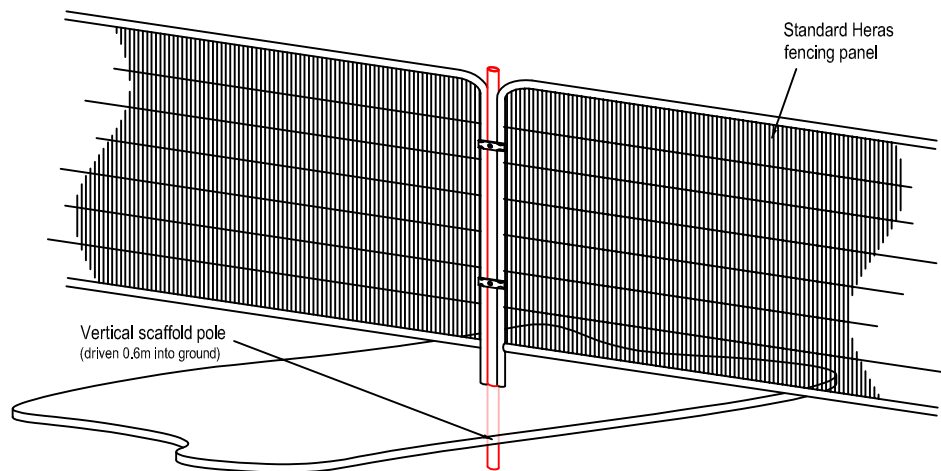
Drwg No		D4598.002	
Scale	1:1250 @ A3	Date	09/07/14
Drawn	RMG	Checked	KJT
		Approved	JGS

W2#(*)
1 Common ash,
1 Sycamore and
3 common alder
protected by
TPO

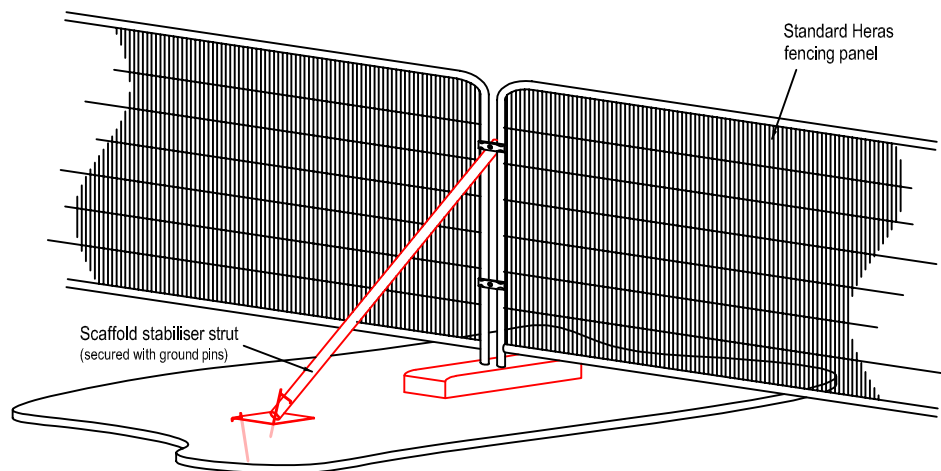
G3(*)
3 Common alder
and 1 Sycamore
protected by TPO

DRAWING 3

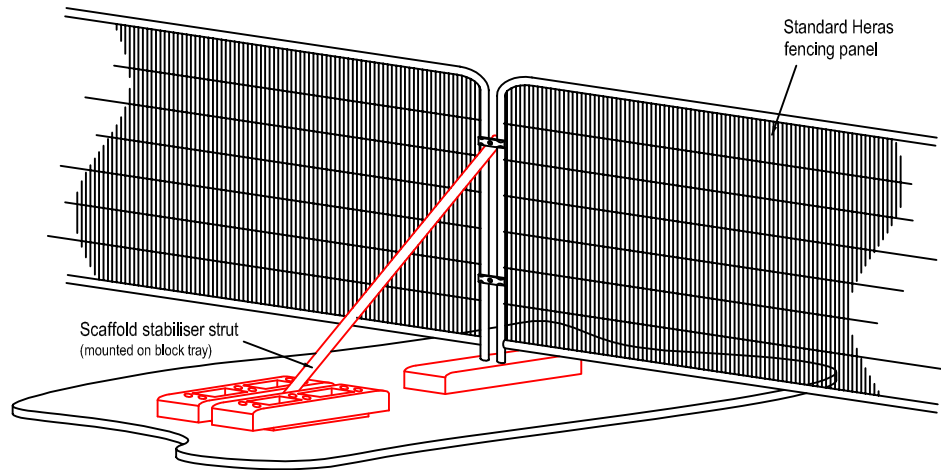
TEMPORARY TREE PROTECTION FENCING



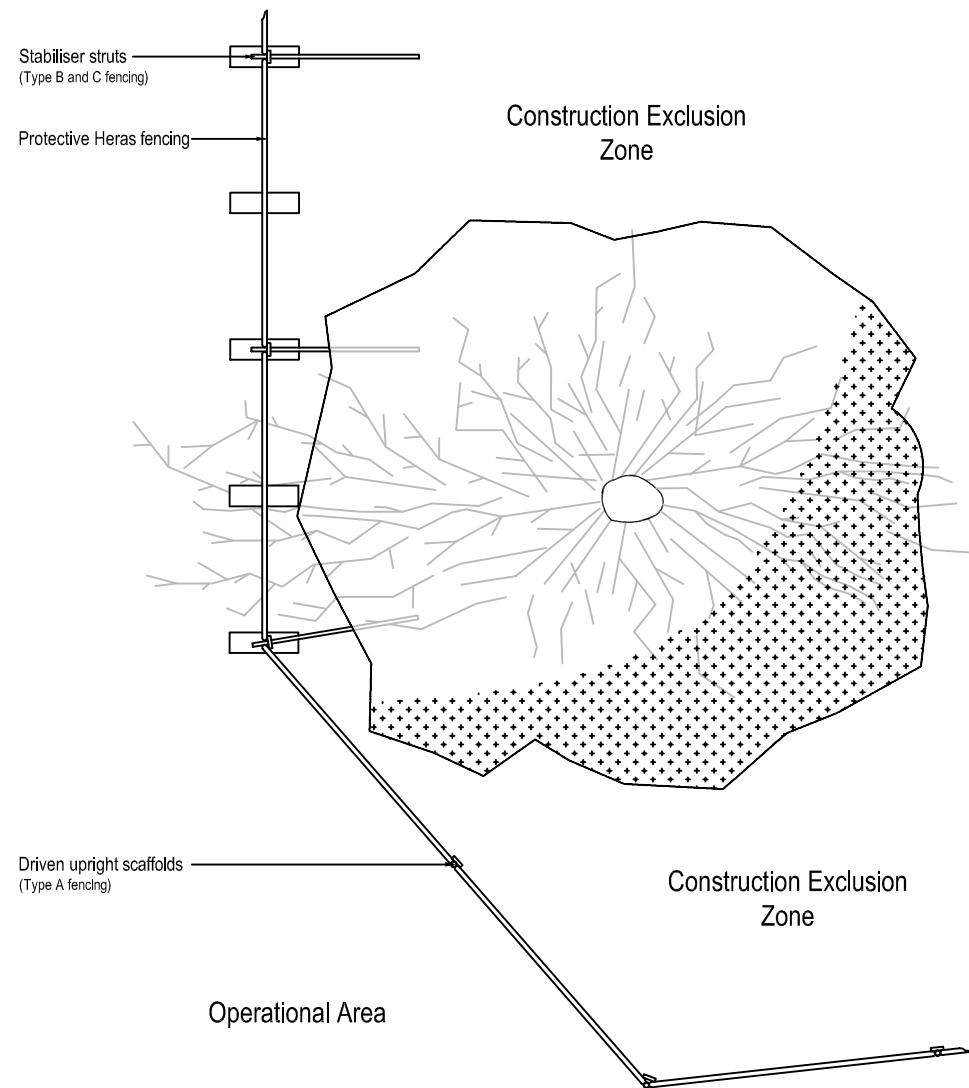
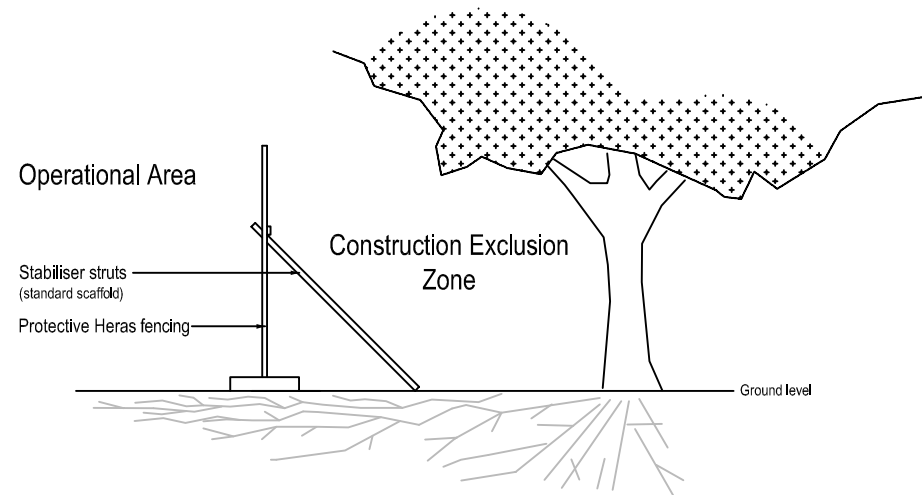
Type A Tree Protection Fencing: for use as standard
(see Tree Protection Plan for layout)



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)



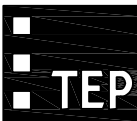
PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.



**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		