Arboricultural Impact Assessment

BE1009.1a
15 Oakenrod Hill, Rochdale OL11 4ED

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Site address	15 Oakenrod Hill, Rochdale OL11 4ED
Grid reference	SD 88522 12938
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Client	Justyn Lambert (Magnus Architecture)
Date	27th August 2019

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Executive Summary

Bagshaw Ecology Ltd have been instructed by Justyn Lambert of Magnus Architecture to undertake an Arboricultural Impact Assessment of the land at 15 Oakenrod Hill, Rochdale OL11 4ED in relation to an application for planning.

The development proposals are to construct two new detached residential dwellings, and a detached garage building within the garden area of the existing property.

The site survey identified a total of 12 trees and two groups of trees with the potential to be affected by the development proposals.

The trees on the site include seven Category B trees of moderate-quality, four Category C trees and two groups of low-quality, and one Category U tree with an estimated life expectancy of <10 years.

According to the website of Rochdale Borough Council (2019), several trees located on the site are afforded protection by Tree Preservation Orders (TPOs).

In order to make the development proposals feasible, four Category B trees, and three Category C trees and one group will necessitate removal from the site. One Category C group will also necessitate partial removal.

To ensure the successful retention of the remaining trees on site, cellular confinement should be installed in all areas where a proposed access footpath passes over the RPA of trees.

Proposed terraced areas to the south of the proposed properties, and within the RPA of two Category B trees, should be constructed upon specialist foundations which will minimise potential damage to roots.

It is recommended that the Arboricultural Method Statement - provided in Appendix 4 - is followed throughout construction works. This includes further details regarding tree removals, along with specifications for cellular confinement and tree protection fencing.

Taking into account the existing tree cover which is to be retained, the site provides sufficient scope for the planting of six trees, which should seek to diversify species structure at the site, with native trees often providing the greatest ecological benefits.

1. Introduction

1.1. Background

Bagshaw Ecology Ltd have been instructed by Justyn Lambert of Magnus Architecture to undertake an Arboricultural Impact Assessment of the land at 15 Oakenrod Hill, Rochdale OL11 4ED in relation to an application for planning.

The purpose of the report is to:

- Assess the quality of the trees on and immediately adjacent to the site, in accordance with BS5837: 2012 – Trees in Relation to Design, Demolition and Construction: Recommendations (hereafter referred to as BS5837: 2012).
- Identify trees suitable for retention and for removal due to the proposed development.
- Prescribe tree protection measures to ensure that retained trees survive the proposed development and thrive after its completion.
- Prescribe arboricultural recommendations for the long-term management of trees on the site.
- To assess the site for its suitability for mitigation planting, and to specify planting requirements.

1.2. Site Details

The site is located at OS grid reference SD 88522 12938 and is accessed west off Oakenrod Hill. The site is bound by Oakenrod Hill to the north-west, mixed-broadleaved woodland to the south, and by neighbouring residential properties on all remaining aspects.

The site is approximately 0.16 ha in size, and at present is being used as the garden area of 15 Oakenrod Hill.



Figure 1: Aerial imagery showing approximate boundary of the site and surrounding area (Google Earth Pro, 2019)

1.3. Development Proposals

The development proposals are to construct two new detached residential dwellings, and a detached garage building within the garden area of the existing property.

2. Methods

2.1. Desk Based Study

The local council was consulted to determine if any trees on the site and immediately adjacent to the site are protected by Tree Preservation Orders (TPOs) and/or are within Conservation Areas. Cranfield (2019) was consulted as to the soil type of the surrounding area.

2.2. Site Survey

The site survey was carried out on 5th August 2019. The weather at time of survey was clear and dry; visibility was good.

The survey was carried out by Jack Delaney. Jack Delaney has worked within the arboricultural industry for ten years, holds an FdSc in Arboriculture, and is a Technician member of the Arboricultural Association.

All trees on site were inspected from ground level, using the Visual Tree Assessment (VTA) method (Mattheck *et al*, 2015). Any notable defects of trees were recorded, although the site survey did not constitute a full tree safety assessment.

Tree heights and crown clearances were measured to the nearest 0.5m with a clinometer. Crown spreads of trees were measured on their, north, east, south and west aspects to the nearest 0.5m.

The diameter at breast height (DBH) of trees was measured to the nearest 10mm. This was used to calculate the root protection area (RPA) of trees using methods prescribed in BS5837: 2012:

- For single stem trees, the RPA was calculated as a circle with a radius 12 times the DBH.
- For trees with 2-5 stems, the RPA was calculated using the formula:

  $$\text{RPA} = \sqrt{(\textbf{Stem 1 DBH})^2 + (\textbf{ Stem 2 DBH})^2 + \dots (\textbf{Stem 5 DBH})^2}$$

- For trees with 6 or more stems, the RPA was calculated using the formula:

  $$\text{RPA} = \sqrt{(\mu \boldsymbol{DBH})^2 \textbf{ x number of stems}}$$

In accordance with BS5837: 2012, trees were classified as either A, B, C or U, using the criteria shown in Table 1. Trees are further classified by the subcategories 1, 2 and 3, depending upon whether they have mainly arboricultural qualities, landscape qualities, or cultural values. The additional subcategory does not affect the retention value of the tree, e.g. a Category A2 tree does not have a higher value than a Category A1 tree.

Table 1: BS5837 Cascade Chart (adapted from British Standards, 2012)

Category	Definition	Retention	Colour code
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.	Highly desirable	Light green
Category B	Trees of moderate quality with an estimated remaining life expectancy of at least 20 years; trees lacking the special quality to merit category A designation.	Desirable	Dark blue
Category C	Trees of low quality with an estimated remaining contribution of at least 10 years, or trees with a stem diameter below 150mm; unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Feasible, but should be removed if posing a constraint to development	Grey
Category U	Trees that have serious, irremediable, structural and/or physiological defects, including those that will become unviable after removal of other category U trees.	Unfeasible	Dark red

2.3. Constraints

The survey was constrained by the season in which it took place. Some pathogens of trees, in particular fruiting bodies of decay fungi, are only visible at certain times of year.

3. Results and Assessment

3.1. Desk Based Study

According to the website of Rochdale Borough Council (2019), T2, T3, T4, T5, T7, T8, T9 and T10 are afforded protection by individual Tree Preservation Orders (TPOs).

Cranfield (2019) states that the surrounding area consists of freely draining, slightly acid, sandy soils. No further detailed soil analysis was carried out as part of the survey.

3.2. Tree Population Assessment

The site survey identified a total of 12 trees and two groups of trees with the potential to be affected by the development proposals.

The trees on the site include seven Category B trees of moderate-quality, four Category C trees and two groups of low-quality, and one Category U tree with an estimated life expectancy of <10 years.

There were no Category A trees of high-quality identified at the site.

Table 2: Summary of Tree Categories

Category	Description	Tree/group numbers	Totals
A	Trees of high-quality which should where be possible be retained throughout any proposed development	-	-
B	Trees of moderate-quality which should where possible be retained throughout any proposed development	T3, T4, T5, T7, T8, T9, T10	7 Trees
C	Trees of low-quality which should not be considered a constraint to development	T2, T6, T11, T12 G1, G2	4 Trees 1 Group
U	Trees which should be removed for sound management reasons, regardless of proposals	T1	1 Tree
		Total:	**12 Trees 1 Group**

Tree data can be viewed in **Appendix 1: Tree Survey Schedule**. Images of trees can be viewed in **Appendix 2: Images of Trees.** Tree locations can be viewed in **Appendix 3: Tree Constraints Plan.**

Tree species on and adjacent to the site include sycamore *Acer pseudoplatanus*, wych elm *Ulmus glabra,* ash *Fraxinus excelsior,* common lime *Tilia* x *europaea*, holly *Ilex aquifolium,* west-Himalayan birch *Betula utilis* 'Jacquemontii', silver birch *Betula pendula,* wild cherry *Prunus avium,* cherry laurel *Prunus laurocerasus*, European larch *Larix decidua* and privet *Ligustrum vulgare*.

4. Impact Assessment

4.1. Tree Removals

Prior to works commencing, T1, T2, T3, T4, T5, T6, T10 and T11 will necessitate removal.

G2 will also necessitate partial removal of its southern extent.

The southern portion of G2 is positioned within the footprint of the proposed entrance to the site, and therefore will necessitate partial removal to facilitate construction.

T1 is a Category U tree with an estimated life expectancy of <10 years, therefore removal is recommended for sound management and safety reasonings.

The RPAs of T2, T3 and T4 will be encroached upon by proposed hardstanding surfacing, by 32%, 35% and 41% respectively; these figures are above the recommended upper limit for cellular confinement to be a practicable option, and as such retention of these trees is unfeasible.

T5, T6, and T10 are all situated as such, that large proportions of their RPAs would be encroached upon by the footprint of the development, and therefore successful retention would also be unfeasible.

T11 is situated within the footprint of the proposed garage building, therefore without its removal, the development proposals would be unfeasible.

Although the removal of T3, T4, T5 and T10 - all Category B trees - is regrettable, a scheme of post-development tree planting can be undertaken at the site to mitigate for the removal of trees.

G2, T2, T6 and T11 contain only Category C trees of low-quality, and as such should not be considered a constraint to the development.

4.2. Root Protection Areas (RPAs) Affected by the Development

In addition to the trees which will require removal, the RPA of three trees will be impacted by the development proposals:

- The RPA of T7 will be encroached upon by approximately 2%, by a proposed access path to the south of the proposed properties.
- The RPA of T8 will be encroached upon by approximately 24%, by a terraced area and access path to the south of the proposed properties.
- The RPA of T8 will be encroached upon by approximately 24%, by a terraced area and access path to the south of the proposed properties.

Retention of the abovementioned trees is considered feasible, provided that the access footpath to the south of the proposed properties is constructed using minimal excavations, and upon a cellular confinement system.

Proposed terraced areas which encroach upon the RPA of T8 and T9 should also incorporate a design which will minimise the impact upon the tree roots, for example mini pile foundations – of the smallest feasible diameter.

5. Recommendations

5.1. Tree Works

Prior to works commencing, T1, T2, T3, T4, T5, T6, T10 and T11 will necessitate removal.

G2 will also necessitate partial removal of its southern extent.

According to the website of Rochdale Borough Council (2019), T2, T3, T4, T5, T7, T8, T9 and T10 are afforded protection by individual Tree Preservation Orders (TPOs). As such, consent from Rochdale Borough Council should be approved prior to the commencement of works to trees.

Killing or damaging a protected tree is a criminal offence and can result in an unlimited fine.

All tree works, including tree removals, should be carried out by a fully insured and suitably qualified arboricultural contractor who is able to comply with BS3998: 2010 – Tree Works: Recommendations.

5.2. Tree Protection

In order to ensure the successful retention of the retained trees on site, tree protection fencing should be installed as outlined in **Appendix 5: Tree Protection Plan**.

A proposed access footpath to the south of the proposed properties, which encroaches upon the RPA of T7, T8 and T9, should be constructed upon a cellular confinement system. This will allow for adequate infiltration of water and free gaseous exchange between tree roots and the atmosphere.

Proposed terraced areas to the south of the proposed properties which encroaches upon the RPA of T8 and T9, should be constructed upon a foundation design which will minimise the impact upon tree roots, for example mini pile foundations – of the smallest feasible diameter.

As the majority of tree roots are typically found within 1m of ground level, particular attention should also be paid to existing levels, and any further unavoidable excavations into the soil within the RPA of T7, T8 and T9 should be carried out by use of hand-operated tools only.

It is recommended that works follow an Arboricultural Method Statement (AMS). An **AMS** can be viewed in **Appendix 4**. This includes further details regarding tree removals and facilitative pruning, along with specifications for tree protection fencing and cellular confinement.

As aspects of the development may be subject to change, the AMS should be reviewed by an arboricultural consultant prior to the commencement of works on the site.

5.3. Mitigation

The development proposals will necessitate the removal of four Category B trees of moderate-quality, three Category C trees of low-quality, and one Category U tree with an estimated life expectancy of <10 years. As such, these removals should be mitigated for through a scheme of post-development tree planting at the site.

Taking into account the existing tree cover which is to be retained, the site provides sufficient scope for the planting of six trees, which should seek to diversify species structure at the site, with native trees often providing the greatest ecological benefits.

To ensure the best possible chances of successful establishment, trees planted should ideally be standard in size and should be planted in accordance with BS845: 2014 – Trees: from Nursery to Independence in the Landscape.

All trees should be affixed with a wooden stake, secured to the tree by a biodegradable cable tie. An organic woodchip mulch should be applied in a 1m radius around tree stems.

Suggested species include:

- Hornbeam *Carpinus betulus*
- Silver birch *Betula pendula*
- Sessile oak Quercus petraea
- Common alder *Alnus glutinosa*
- Wild service tree *Sorbus torminalis*

6. References

British Standards (2010). BS3998: 2010 – Tree Works: Recommendations. British Standards Institute, London

British Standards (2012). BS5837: 2012 - Trees in Relation to Design, Demolition and Construction: Recommendations. British Standards Institute, London

British Standards (2014). BS8545: 2014 – Trees: from Nursery to Independence in the Landscape. British Standards Institute, London

Cranfield (2019). *Interactive Soilscapes Viewer* [online]. Available at: >www.landis.org.uk< [accessed 20th 2019]

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Johnson, O., More, D. (2004). *Collins Tree Guide.* London: HarperCollins

Mattheck, C., Bethge, K., and Weber, K. (2015). *The Body Language of Trees.* The Karlsruhe Research Institute, Karlsruhe (Germany)

Appendices

Appendix 1: Survey Schedule

A plan of the tree locations can be viewed in **Appendix 3: Tree Constraints Plan**.

Key			
Species	Common name following Johnson & More (2004)	**Age**	Early mature; tree in 2/3 of estimated lifespan
Height	Measured to nearest 0.5m		Mature; tree in 3/3 of estimated lifespan
CC	Height of crown clearance, measured to nearest 0.5m		Over mature; tree that has exceeded its natural life span
Stems	Number of stems bifurcating below 1.5 metres		Veteran tree
DBH	Diameter at breast height (1.5m), in centimetres	**SULE**	Safe useful life expectancy of tree, in years
Crown spread	Measured to nearest 0.5m	**Category**	See BS5837 cascade chart (Table 1)
Age	Young sapling/newly planted tree	**#**	Denotes estimated value
	Semi-mature; tree in 1/3 of estimated lifespan		

Individual Trees

Tree No.	Species	Height	CC	Stems	DBH	Crown Spread				Age	Comments	SULE	Category
						N	E	S	W				
T1	Sycamore *Acer pseudoplatanus*	10.5	5	1	60	1.5	1.5	1.5	1.5	Early-mature	Dense ivy on main stem restricting VTA. Crown recently removed from tree. Limited arboricultural merit.	>10	U
T2	Sycamore *Acer pseudoplatanus*	13.5	7	1	43	5.5	4.5	3	6	Early-mature	Dense ivy on main stem and throughout crown restricting VTA. Asymmetrical crown spread due to proximity with adjacent tree.	21-40	C1

Tree No.	Species	Height	CC	Stems	DBH	Crown Spread				Age	Comments	SULE	Category
						N	E	S	W				
T3	Sycamore *Acer pseudoplatanus*	13	6.5	1	60	3	6	5	6	Mature	Dense ivy on main stem and throughout crown restricting VTA. No major visible defects, though lacks qualities for higher categorisation.	>40	B1
T4	Sycamore *Acer pseudoplatanus*	12	5.5	1	46	4.5	5.5	7	6	Early-mature	Multiple pruning wounds on main stem from previous crown raising works. Main stem leans somewhat to east. Ground levels around base of tree altered within last ten years.	21-40	B1
T5	Sycamore *Acer pseudoplatanus*	13	3	1	45	5	5.5	5	5	Early-mature	Multiple pruning wounds on main stem from previous crown raising works. Epicormic growth throughout crown. Ground levels around base of tree altered within last ten years.	21-40	B1
T6	Wych elm *Ulmus glabra*	6.5	2.5	1	15	4	4	2.5	4	Semi-mature	Self-seeded tree of limited arboricultural merit.	11-20	C1
T7	Sycamore *Acer pseudoplatanus*	15.5	3.5	1	74	6	5	6.5	6	Mature	No major visible defects, though lacks qualities for higher categorisation.	>40	B1
T8	Sycamore *Acer pseudoplatanus*	15	6	2	62 60	6.5	5	5.5	6	Mature	Dense ivy on main stem and throughout crown restricting VTA. Bifurcates into two co-dominant stems at ground level. Lacks qualities for higher classification.	21-40	B1

Tree No.	Species	Height	CC	Stems	DBH	Crown Spread				Age	Comments	SULE	Category
						N	E	S	W				
T9	Sycamore *Acer pseudoplatanus*	16	0	1	95	8	7	7	7.5	Mature	Positioned next to existing shed. Dense ivy on main stem and throughout crown restricting VTA. Bifurcates into multiple leaders at 5m. No major visible defects though, lacks qualities for higher categorisation.	>40	B1
T10	Sycamore *Acer pseudoplatanus*	15	6.5	1	90	6.5	0	7	7.5	Mature	Ground levels around base of tree altered within last ten years. Dense ivy on main stem and throughout crown restricting VTA. No major visible defects, though lacks qualities for higher categorisation.	>40	B1
T11	European larch *Larix decidua*	11	2	1	39	4	3	4.5	4	Mature	Situated on top of steep banking. No major visible defects .	21-40	B1
T12	West-Himalayan birch *Betula utilis* 'Jacquemontii'	11	6	1	24	3	5	3	0	Mature	Suppressed by adjacent tree, with asymmetrical crown spread predominantly confined to west. Bifurcates at 1.5m into two co-dominant stems. Limited arboricultural merit.	11-20	C1

Groups of Trees

Group No.	Species	Av. Height	Av. CC	Approx. Stems	Av. DBH	Av. Crown Spread	Av. Age	Comments	SULE	Category
G1	Silver birch *Betula pendula*, wild cherry *Prunus avium*, privet *Ligustrum vulgare*, ash *Fraxinus excelsior*, wych elm *Ulmus glabra*	5	2	20	10	2	Young	Linear group of self-seeded and planted young trees, located at bottom of garden.	11-20	C1
G2	Cherry laurel *Prunus laurocerasus*	2	0	20	10	1	Young	Linear group of trees on site boundary. Effective visual barrier, though of Limited arboricultural merit	11-20	C1

Appendix 2: Images of Trees



Plate 1: T1



Plate 2: T2 & T3



Plate 3: T4



Plate 4: T5 & T6



Plate 5: T7



Plate 6: T8



Plate 7: T9



Plate 8: T10



Plate 9: T11

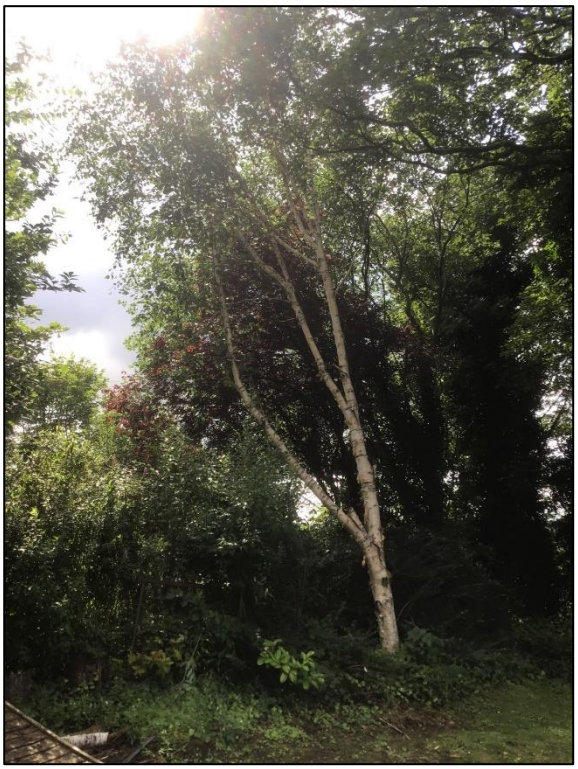


Plate 10: T12



Plate 11: G1



Plate 11: G2

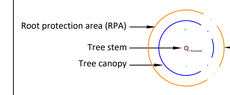
Appendix 3: Tree Constraints Plan

Project:	15 Oakenrod Hill
Drawn by:	Jack Delaney
Date:	27th August 2019
Scale:	1:100 @ A1

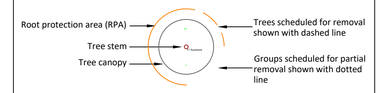
Do not scale off this drawing - to be reproduced in colour only

Key:

Category B trees of moderate quality

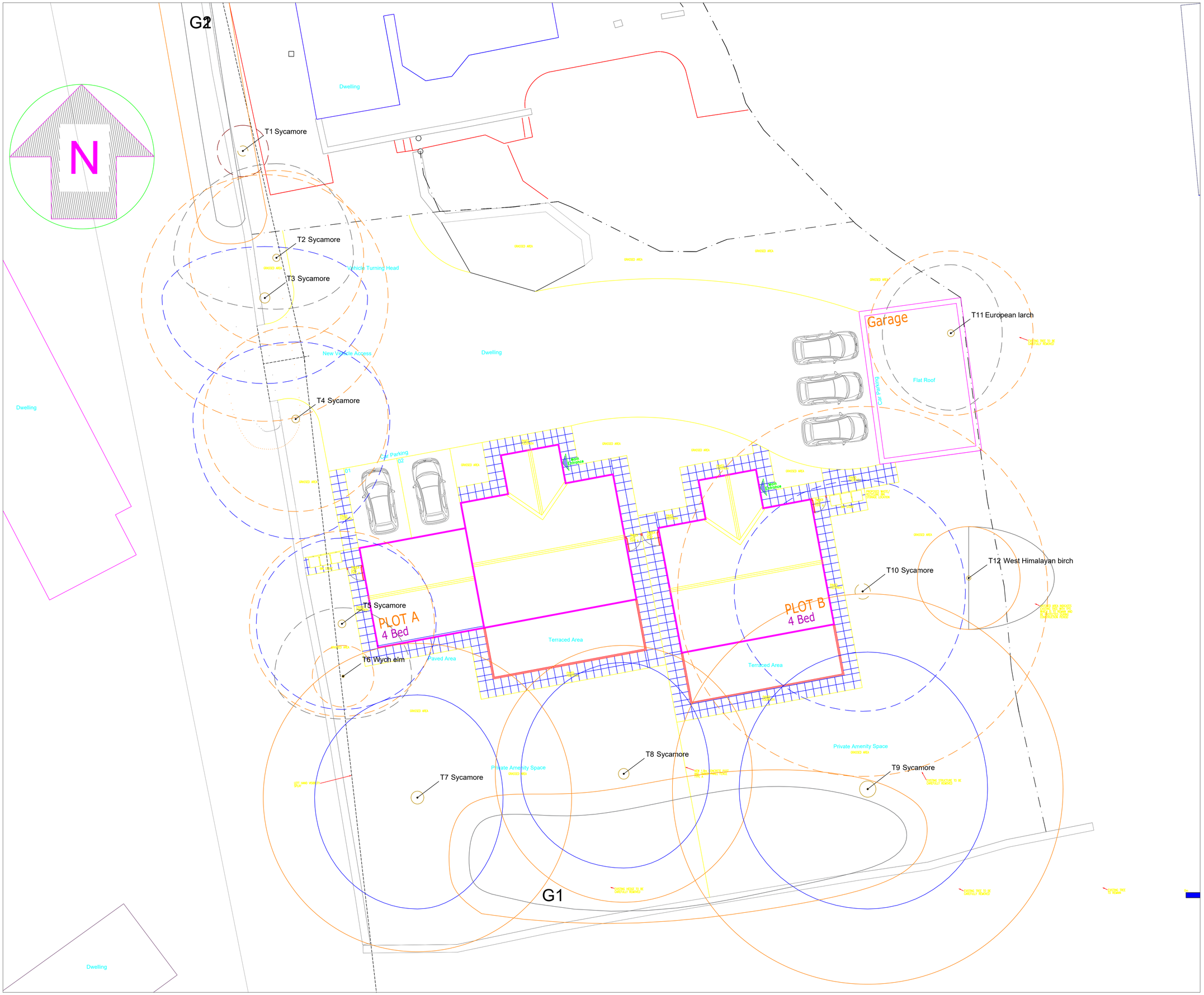


Category C trees/groups of low quality



Category B trees of moderate quality





Bagshaw Ecology

Appendix 4: Arboricultural Method Statement

1. Introduction

Bagshaw Ecology Ltd have been instructed by Justyn Lambert of Magnus Architecture to produce an Arboricultural Method Statement in relation to a proposed development of the land adjacent to 15 Oakenrod Hill, Rochdale OL11 4ED.

This document should be read in accordance with the Arboricultural Impact Assessment produced for the site.

The development proposals are to construct two new detached residential dwellings, and a detached garage building within the garden area of the existing property.

2. Timing of Works

The phasing of works should be carried out in accordance with Tab. 1, below.

Table 1. Timing of Works

Stage	Works
1	Site induction
2	Carry out tree removals
3	Install temporary tree protection fencing and ground protection
4	Carry out construction works (including installation of cellular confinement and specialist foundations – as specified in **Appendix 5: Tree Protection Plan**)
5	Remove tree protection fencing once works completed
6	Final inspection by arboricultural consultant

3. Site Induction

Prior to works commencing, all contractors should attend a site induction. All contractors should be briefed on arboricultural concerns arising from the development proposals, including tree root protection areas (RPAs). This method statement should be issued to all contractors on the site.

4. Tree Removals

Prior to works commencing, T1, T2, T3, T4, T5, T6, T10 and T11 will necessitate removal.

G2 will also necessitate partial removal of its southern extent.

According to the website of Rochdale Borough Council (2019), T2, T3, T4, T5, T7, T8, T9 and T10 are afforded protection by individual Tree Preservation Orders (TPOs). As such, consent from Rochdale Borough Council should be approved prior to the commencement of works to trees.

Killing or damaging a protected tree is a criminal offence and can result in an unlimited fine.

All tree works, including tree removals, should be carried out by a fully insured and suitably qualified arboricultural contractor who is able to comply with BS3998: 2010 – Tree Works: Recommendations.

5. Tree Protection Fencing

Prior to machinery entering the site, it will be necessary to ensure that all trees are adequately protected. This will require the installation of temporary of tree protection fencing on the site between the building and adjacent trees.

Tree protection fencing should consist of a vertical scaffold framework, well braced to resist impacts. The vertical poles should be spaced at a maximum interval of 3m and driven securely into the ground. Onto this framework, welded mesh panels should be fixed (see figure 1, below).

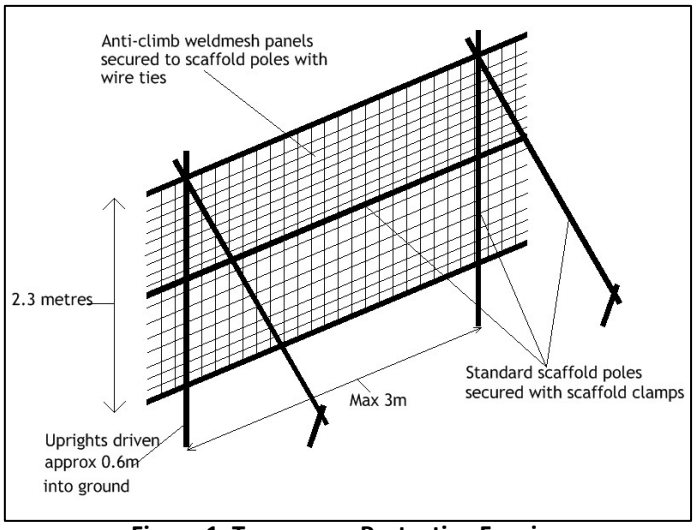


Figure 1. Temporary Protective Fencing

Laminated waterproof A3 signs should be fixed securely to fencing panels on each enclosure at 9m intervals. The signs should clearly read: ***'Protected Tree Zone, no storage or operations within fenced off areas'***.

Once the construction works have been completed, the tree protection fencing may be removed. This should be done with care to ensure that no damage to trees is caused.

6. Ground Protection

Where construction works have been justified within the RPAs of T7, T8 and T9, this has been facilitated with a setback in alignment of the protective fencing.

Prior to the commencement of construction works, ground protection should be installed as specified in **Appendix 5: Tree Protection Plan**; this should incorporate inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip) which are laid onto a geotextile membrane.

Any plant or machinery operating within the RPA of T7, T8 and, T9 should ensure it is operated on this ground protection.

7. Cellular Confinement System

The installation of the cellular confinement system should be undertaken in all areas where a proposed access footpath passes over the RPA of T7, T8 and T9, and should be installed in the following stages:

1. Level ground with hand tools only. No pruning of roots should be undertaken without notifying a consultant arboriculturist. Any vegetation removal may be carried out with a translocate herbicide (such as glyphosate).
2. Cover surface with a non-woven, geotextile separation filtration layer.
3. Install cellular confinement sheets.
4. Place 40/20mm clean angular stone into open cells.
5. Cover with second non-woven geotextile separation filtration layer

6. Install 75mm porous asphalt, or 60mm decorative gravel.

The extent of the proposed cellular confinement system can be viewed in **Appendix 5: Tree Protection Plan.**

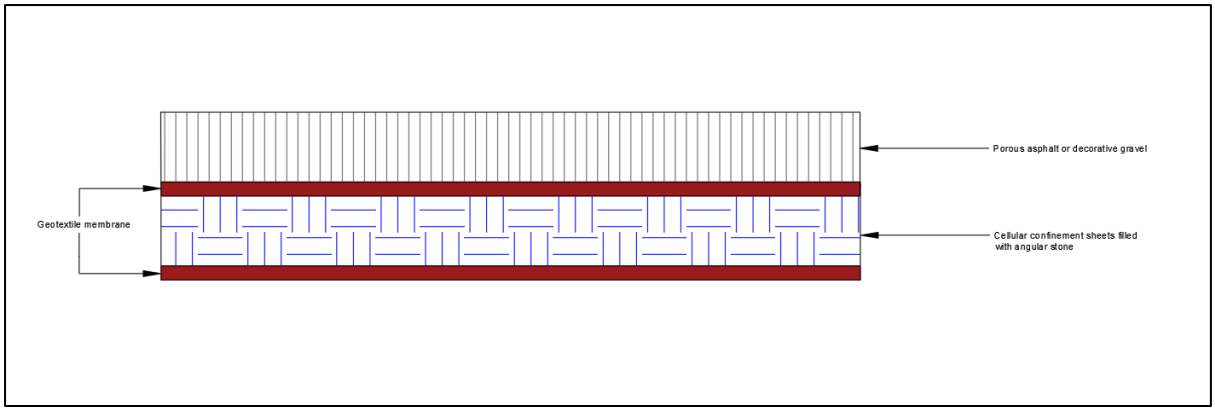


Figure 2. Cellular confinement construction

As the majority of tree roots are typically found within 1m of ground level, particular attention should be paid to existing levels, and any unavoidable excavations into the soil should be carried out by use of hand operated tools only.

In addition to the cellular confinement, the installation of sections of kerbstone within the RPA of T5, T6, T7, T8 and T9 should avoid trenching, and instead be constructed of a design which will minimise damage to tree roots (i.e. concrete pads with a 'floating' kerbstone laid across).

8. Precautionary Measures

No materials hazardous to tree health, such as oil, bitumen or cement should be stored within the protective fencing. Where possible this area should be extended to 10m away from the fencing.

Where there is a risk of polluted water runoff into RPAs, heavy duty plastic sheeting and sandbags must be used to contain any spillages and prevent contamination.

No fires should be lit within 20 metres of the protective fencing.

If any breach in the tree protection measures occurs it is the site manager's responsibility to report this to an arboricultural consultant so the appropriate measures may be taken. As there are trees on the site which are afforded protection by TPOs, any breach in the tree protection resulting in the death of or damage to trees could result in a criminal offence being committed.

9. Supervised works and further inspection

It is recommended that inspections by an arboricultural consultant are undertaken:

- Once the tree protection fencing and ground protection has been installed to determine if it is satisfactory.
- Upon completion of the development works.

After each inspection a letter should be submitted by the arboricultural consultant to the local authority tree officer to confirm if the method statement has been followed correctly and if trees have not been adversely affected by construction works.

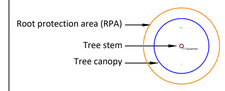
Appendix 5: Tree Protection Plan

Project:	15 Oakenrod Hill
Drawn by:	Jack Delaney
Date:	27th August 2019
Scale:	1:100 @ A1

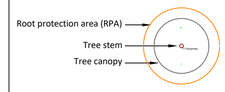
Do not scale off this drawing - to be reproduced in colour only

Key:

Category B trees of moderate quality



Category C trees/groups of low quality

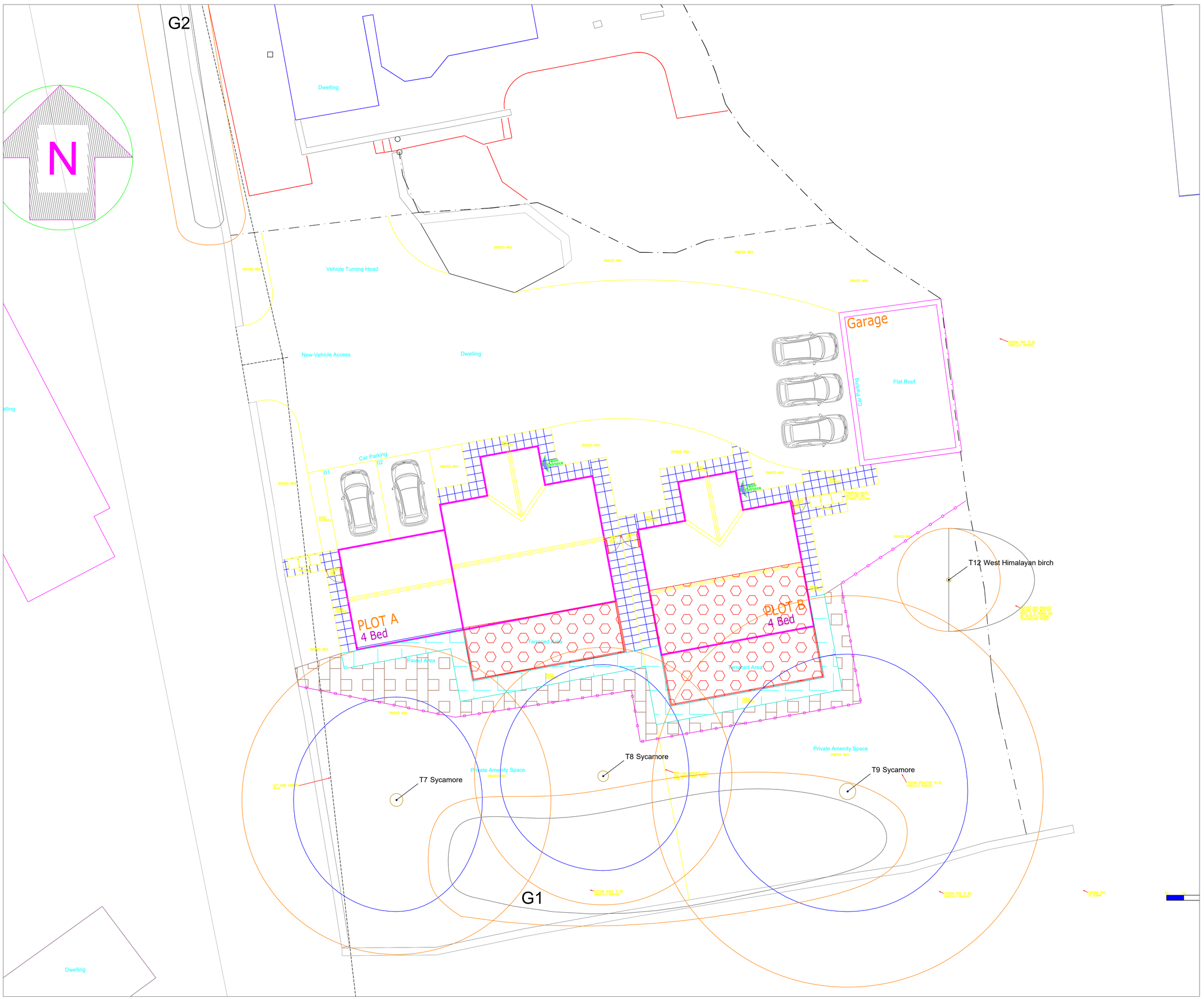


Tree Protection Fencing

Cellular Confinement

Mini Pile Foundations

Ground Protection



Bagshaw Ecology