CLIVE FOWLER ASSOCIATES
Tree Consultancy

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39 WARREN ROAD, WHITTON, TWICKENHAM, MIDDLESEX TW2 7DH

Mr Owain Nedin
Senior Planner
Nathaniel Lichfield & Partners
14 Regent's Wharf
All Saints Street
London
N1 9RL

29th January 2016

Dear Mr Nedin

Methodology - Trees in Relation to the Relocation of the Driveway at 16 Millfield Lane, Highgate, London.

1. I previously inspected trees at the above site on the 2nd June 2015 in order to assist in the preparation of proposals for a relocated driveway / parking area and subsequently prepared a report dated the 21st July 2015. The said report related to the relocation of the driveway to the south western corner of the property, however, following subsequent consultation with the Local Authority, it is now proposed to move the driveway slightly to the west of the existing gates which are located to the south east of the property. Since inspecting the trees in June 2015 much tree work has been undertaken, largely to the row of poplars on the site frontage. Due to this and the now amended location of the new driveway, I revisited on the 19th January 2016 and viewed the trees from the adjacent highway / public footpath area.

2. As the poplars have been pollarded since my original visit, thus reducing their aesthetic / amenity value, they have been regraded in some cases (in accordance with BS5837: 2012) and I have subsequently updated the attached Tree Survey Schedule (appendix ‘a’) and Tree Location Plan (appendix ‘b’) to take this into account.

3. Measurements of the trees provided in the attached schedule (appendix ‘a’) are approximate and stem diameters are measured at 1.5 metres from ground level unless stated. All inspections were carried out from ground level only and no specialist decay detection equipment was used to assess internal wood quality. In some cases it was not possible to fully inspect the trees due to adjacent obstructions or through them being situated in neighbouring land.

4. The information contained within the schedule has been collected in accordance with recommendations given in BS 5837: 2012 ‘Trees in Relation

to Design, Demolition and Construction - Recommendations'. I have also categorised each tree in accordance with the above Standard and they are colour coded on the attached drawing (appendix 'b') to aid their recognition.

The following categories apply;

A - Trees of high quality. (Green)

B - Trees of moderate quality. (Blue)

C - Trees of low quality. (Grey)

U - Trees in such a condition that they can not realistically be retained as living trees in the context of the current land use for longer than 10 years. (Red)

5. In addition to the above, each tree is assigned a subcategory (1 – 3) which are detailed in table 1 of BS5837: 2012. It is intended that each subcategory carries equal weight – for example an A 1 category tree would have the same retention priority as an A 2 tree.

6. The specification for pruning works are as per recommendations given in BS 3998 'Tree Work - Recommendations'. As you are aware, Local Authority permission would be required before any works are undertaken, due to the property being situated within a Conservation Area.

7. Also attached to this letter (appendix 'c') is a table that details required Root Protection Areas (in accordance with the above Standard). These areas should be measured from the centre of the trunk to the edge of tree protective fencing / ground protection.

The Trees.

8. The tree cover at this site is concentrated along its southern boundary where a number of close growing and recently pollarded poplars (T.10 & 13 – 16) form part of what was once a prominent roadside screen with an unbalanced ash tree (T.6) and a small and distorted horse chestnut (T.5) to their east. Poplar T.10, which is located close to a brick outbuilding, has had a large stem removed in the past and preliminary tests with a mallet were undertaken during my original visit and indicated that its trunk was extensively decayed. This tree has subsequently been pollarded and will require regular containment works in the future, if it is to be retained.

9. Other trees present towards the south east of the site include a rowan to the east of the existing entrance gates that is in a serious state of decline and which has had much of its crown removed since my previous visit (T.1), a cherry tree of poor form that grows close to the eastern boundary (T.2), and a small apple tree with extensive trunk decay (T.3). A further cherry tree grows to the west of the existing driveway (T.4) and has a number of cavities in its main framework and reduced vigour (see appendix 'a'). To the west of the

existing driveway and within the front garden area are three close growing silver birch trees that are of a good appearance (T.7 – 9), two small and insignificant Lawson cypress (T.11 & 12), and a hackberry (T.18) that unfortunately has a weak main stem union but is still of value due to the scarcity of the species.

10. To the south west of the front garden area are a severely unbalanced plum tree of limited future potential (T.19) and a small holly that has previously been crown lifted (T.20). To the west of the existing dwelling and close to the boundary with the neighbouring property are a multi stemmed bay of a shrub like appearance (T.19), a cherry tree with crown dieback and an area of decay in its main framework, and a well established magnolia (T.23) with a pronounced incline towards the east as a result of suppression from the group of common lime and sycamore's that grow in neighbouring land to the west (group 1).

Proposed development works.

11. I have previously been consulted on a number of options relating to the relocation of the existing vehicular entrance and driveway and have assessed such proposals in accordance with the recommendations provided in BS5837: 2012 (taking particular account of the required Root Protection Areas (RPA's) as detailed in appendix 'c').

12. The driveway option now proposed (Drawing No. 24818/16MR/P/01 – Rev. 22.01.2016) relates to the relocation of the access slightly to the west of the existing entrance in the south eastern corner of the garden. This action would necessitate the removal of cherry tree T.4 which has poor vigour and areas of decay, a small horse chestnut (T.5) with a severe lean towards the south east, and a larger ash which grows adjacent to the footpath and has an unbalanced crown due to previous suppression (T.6). Rowan tree T.1 is to be removed due to its very poor condition.

13. With the exception of ash tree T.6, all of the trees proposed for removal are placed within the lower retention categories as detailed in BS5837: 2012 (please see above). Although the loss of the ash is regretted, having regard to its current limited aesthetic value and the opportunity to provide replacement planting to its north east using semi mature planting stock of a large maturing species (in a location where the tree will be prominent as it develops), I am of the opinion that, subject to appropriate maintenance of the new planting, such loss would be mitigated within a relatively short period of time. Once established, the new tree will be of long term benefit to the amenity of the site and surrounding area. I recommend that the following species are considered;

    Ash (*Fraxinus excelsior*)
    English oak (*Quercus robur*)
    London plan (*Platanus x acerifolia*)

14. To the west of the proposed relocated driveway, the said works will be positioned within the Root Protection Area (RPA) of poplar tree T.10.

However, as detailed above and in appendix 'a', this tree is in very poor condition and it is therefore not appropriate to consider the use of any specialist construction methods in this area. It is also possible that the root growth from this tree into the proposed construction area has been obstructed or prevented by the previous construction of an outbuilding and associated steps at below ground level.

15. To the north west of the new vehicular entrance, care has been taken to ensure that no disturbance takes place within the RPA's of the group of close growing silver birches (T.7 – 9) and the regularly clipped bay that grows close to the corner of the dwelling (T.24).

16. To the east of the new driveway, some potential disturbance will take place within the RPA of cherry tree T.2 which is located close to the eastern boundary. Although this is a low quality tree, care will be taken to minimise such disturbance, which involves the careful lifting of existing hard surfacing and its return to landscape (which could be of potential benefit to the tree), and all works within its RPA will be carried out using hand held tools only. The removal of the existing hard surfacing will be undertaken in full accordance with Section 7.3.6 of BS5837: 2012 as detailed below;

7.3.6 Where an existing hard surface is scheduled for removal, care should be taken not to disturb tree roots that might be present beneath it. Hand held tools or appropriate machinery should be used (under arboricultural supervision) to remove the existing surface, working backwards over the area, so that the machine is not moving over the exposed ground (see 7.2.2 for protection of exposed roots). If a new hard surface is to be laid, it might be preferable to leave any existing sub-base in situ, augmenting it where required.

17. Following the removal of the existing hard surfacing, the new edging (as shown on the Tree Protection Plan at appendix 'e') will be placed upon the existing sub-base (ensuring that no excavations are required below such level) and all such works will be undertaken in accordance with Section 7.2 of BS5837: 2012 as detailed below;

7.2.1 To avoid damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil (other than piling) within the RPA is generally not acceptable, and topsoil within it should remain in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification. Such excavation should be undertaken carefully, using hand held tools and preferably by compressed air soil displacement.

Note: Due to the demands that manual excavation places on a development project, and limitations arising from health and safety considerations, it is not realistic to plan for excavation using hand held tools where there is a need for trench shoring or grading the sides of the excavation to a stable angle of repose.

7.2.2 Roots, while exposed, should immediately be wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should be done as soon as possible.

7.2.3 Roots smaller than 25mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25mm in diameter and over should be severed only following consultation with an arboriculturalist, as such roots might be essential to the trees health and stability.

7.2.4 Prior to backfilling, retained roots should be surrounded with topsoil or uncompacted sharp sand (builders sand should not be used because of its high salt content, which is toxic to tree roots), or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

18. Following the removal of the existing hard surfacing, no vehicles or machinery will be permitted to enter the newly opened ground and, should it be left open for any period of time prior to its replanting, tree protective fencing or ground protection in accordance with figure 3 or Section 6.2.3 of the above Standard (appendix ‘d’) must be installed.

19. I hope the above is of assistance to you and please contact me should you require any clarification or further information.

Yours sincerely

C. Fowler.

Clive Fowler, Dip.Arb (RFS), F.Arbor.A, MCIHort, Tech. Cert.Arbor.A

Appendix ‘a’
Tree details

Clive Fowler Associates: Tree Survey at 16 Millfield Lane, Highgate, London.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
1	Sorbus	23 at 1.2 m	Mature	- north 2 east - south - west	1.3 east	2.3	4	Poor	<10	U	Remove.	Poor quality tree with sparse foliage and several areas of dead / dying bark. Recently cut back leaving one branch to the east and large stumps.
2	Cherry	35	Mature	7.5 north 3 east 3 south 3.5 west	2 north east	2.2	5	Fair	10>	C 2	Remove dead wood. Remove climbing plants. Monitor condition.	Main crown framework arises at around 2.2 metres. Suppression to the west. Dense ivy on eastern stem hinders inspection. Overlong lateral to the north. Reducing vigour. Old root damage to the west.
3	Apple	16	Middle aged	2 north 2.5 east 3 south 2 west	2 north	1.8	4.5	Poor	<10	U	Remove hanging branches.	Small tree with extensive trunk decay with a basal opening to the west and a further opening at 2 metres on west side.
4	Cherry	29	Mature	4.5 north 3.5 east 3.5 south 2 west	2 north west	1.7	5	Poor	<10	U	Remove to allow development.	Main crown framework arises at around 2 metres with a cavity at the base of the three framework stems. Further cavity in limb to the north east. Suppressed to the west. Reduced vigour.
5	Horse chestnut	28	Young	3 north 3 east 3.5 south 2 west	2.5 west	1.5	6	Good	20>	C 2	Remove to allow development.	Group tree with a severe lean towards the south east. Suppressed to the west. Previously reduced. Forms small unbalanced part of joint canopy. More recently further reduced.

Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
6	Ash	40	Middle aged	4.5 north 5 east 5 south 1.5 west	4.5 north east	5	12	Good	20>	B 2	Remove to allow development.	Group tree with a trunk incline towards the north east. Main framework arises at around 3.5 metres. Suppressed to the west. Previously pollarded and subsequently crown lifted. Recently reduced.
7	Silver birch	20	Middle aged	4 north 3 east 1.5 south 3 west	2.5 north west	2.3	10.5	Good	20>	B 2	Remove dead wood.	Slender tree with a well defined main stem that forms part of a joint canopy of three trees of the species. Severely suppressed to the south.
8	Silver birch	19	Middle aged	3.5 north 4 east 3 south 2.5 west	3.2 south	1.9	10.5	Good	20>	B 2	Remove dead wood.	Slender group tree forming part of joint canopy with resultant suppression to the west. Upper crown incline towards the east.
9	Silver birch	23	Middle aged	5 north 3.5 east 4 south 4 west	3.5 north west	2.3	11	Good	20>	B 2	Remove dead wood.	Slightly larger tree in group with two main stems forming high in crown and a well defined trunk with light branching until that point. Damage to surface root to the north west.

Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
10	Poplar	64	Mature	-	-	-	6.5	Poor	<10	U	Closely monitor condition.	Previously hazardous tree growing tight against outbuilding to its east. Large stem previously removed to the west at 2.5 metres. Trunk appears to be extremely decayed when tapped with a mallet. Recently pollarded.
11	Lawson cypress	9	Young	1 north 1 east 0.5 south 1 west	1.2 north west	1.5	4	Fair	10>	C 2	No action.	Insignificant tree with suppression to the south. Grows beneath canopy of larger trees.
12	Lawson cypress	13	Young	2 north 2.5 east 1.5 south 2 west	2 north	1.7	4	Fair - poor	10>	C 2	Remove dead wood.	Understorey tree which has previously lost its top and has large amounts of dead wood / reducing vigour.
13	Poplar	55	Mature	-	-	-	6.5	Good	10>	C 2	No action.	Previously large group tree with a trunk incline towards the south east and its main framework arising at around 3.5 metres. Previously suppressed to the west. Recently pollarded. Regular containment works recommended to this group / row due to the nature of the species.

Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
14	Poplar	56	Mature	-	-	-	5.75	Fair	10>	C 2	No action.	Trunk incline towards the south. Main crown framework arises at 4.5 metres with three main stems. Previously hemmed in to the east and west. Wire constricting trunk at 1.5 metres. Ivy hinders inspection. Recently pollarded.
15	Poplar	47	Mature	-	-	-	5.5	Fair	10>	C 2	No action.	Smaller tree of the species in group which was previously hemmed in to the east and west. Three main stems arise at around 4 metres with evidence of previous pollarding and dieback. Grows close to road. Recently re-pollarded.
16	Poplar	69	Mature	-	-	-	5.75	Good	10>	C 2	Monitor condition.	Two main stems arise at around 3.8 metres and grow towards the west. Further large stem removed at this point to the east - possibly allowing the development of decay with a column of disrupted bark below. Further ribs in trunk to the east and north west warrants regular inspections. Sunken column on south side of trunk. Recently pollarded.

Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
17	Wayfaring tree	15 at 0.1 m	Mature	4 north 3.5 east 2.5 south 2 west	0.2 south	1.8	3.5	Fair	10>	C 2	No action.	Shrub like understorey tree with reduced vigour.
18	Hackberry	18, 20 & 20	Middle aged	5.5 north 5 east 5 south 6.5 west	1.6 south west	2.5	8.5	Fair	20>	B 2	No action.	Uncommon species with two congested stems with a weak union arising at 0.8 metres - further dividing at 1.1 metres. Well balanced crown with large amounts of small diameter dead wood. Reduced vigour. Exudations noted from weak fork.
19	Plum	14 at 1 m	Mature	5 north 4 east 2.5 south 0 west	1.5 south east	1.1	3	Good	10>	C 2	No action.	Low quality sucker growth with a severe trunk lean towards the north east.
20	Holly	8	Young	1	2 north	1.7	3.5	Good	10>	C 1	Remove stumps.	Slender tree which has been crown lifted - leaving numerous stumps. Previously reduced.
21	Bay	9, 7 & 10	Young	1.5 north 1.5 east 1 south 1 west	Ground level	Ground level	4	Good - fair	20>	C 2	No action.	Shrub with three main stems and smaller dens basal growth. Stem to the south has areas of decay / dead bark.
22	Cherry	34	Mature	3 north 3.5 east 4 south 1.5 west	2 south east	1.8	4	Poor	<10	U	Remove dead wood. Consider removal.	Main framework arises at 1.7 metres with the large framework stem to the south east having significant decay. Insect frass noted under ivy on trunk. Crown dieback.

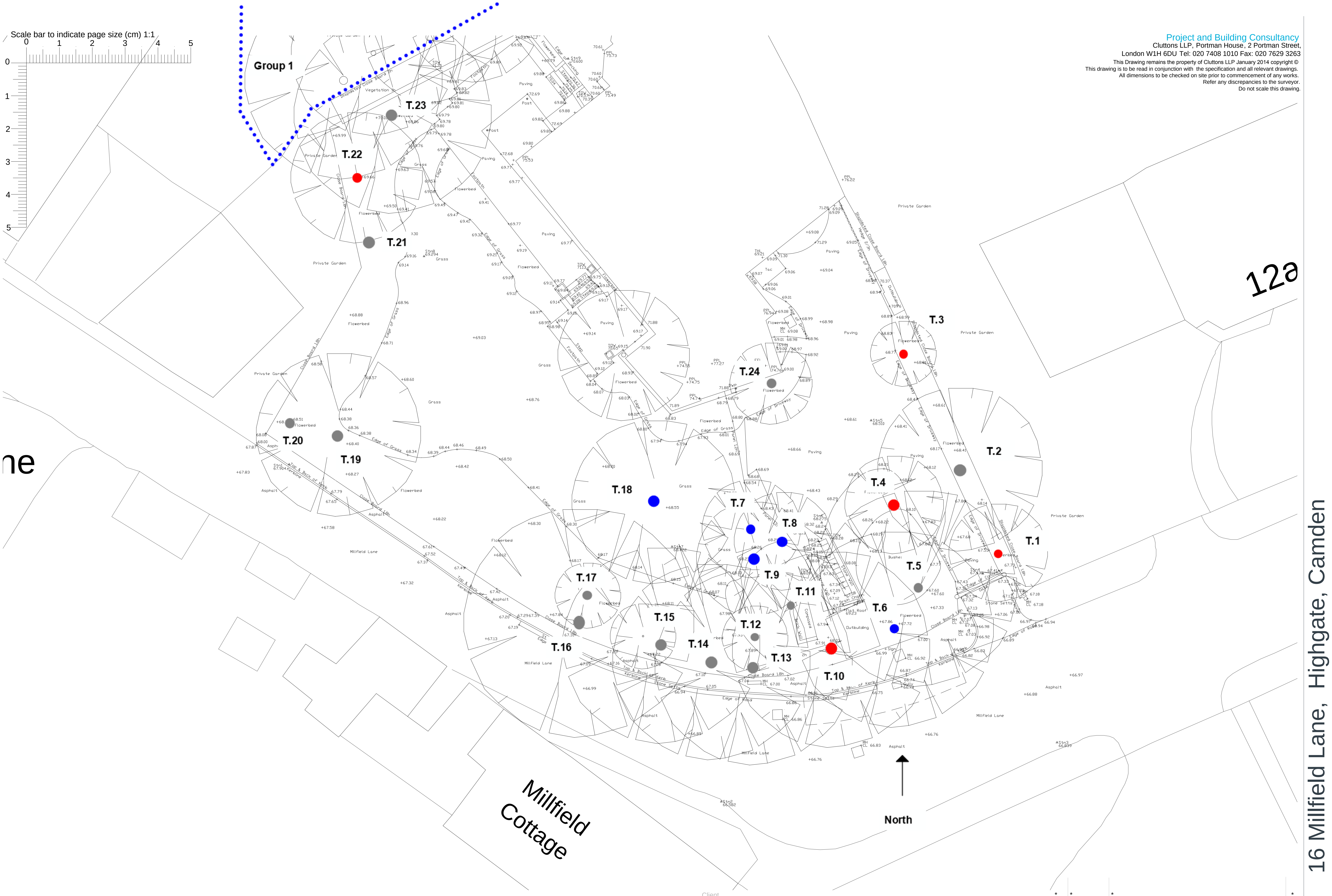
Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

No.	Species	Diameter @ 1.5 m (cm)	Age Class	Crown radius (m)	Height to 1st branch (m)	Crown height (m)	Height (m)	Condition / vitality	Estimated remaining contribution (years)	Category	Works	Notes.
23	Magnolia	11 & 16	Mature	3.5 north 8 east 3.5 south 0 west	0.7 south west	1.2	4	Good	20>	C 2	No action.	Severe trunk incline towards the east - limited growth to the west. Large secondary stem to the west at 0.7 metres. Crossing branches.
Group 1	Common lime & Sycamore	70 (est.) - largest stem	Mature	5.5	-	3.8	18 - tallest	Good	20>	B 2 (est.)	No action - in neighbouring ownership.	Close growing row consisting largely of regularly pruned lime trees - with a larger Sycamore to the north. Not closely inspected.
24	Bay	30	Mature	0.5 north 1.5 east 2.5 south 2 west	Ground level	Ground level	5	Good	20>	C 1	Maintain in present form.	Regularly clipped tree / shrub growing close to house. Well defined single stem with developing basal growth.

Notes: Diameter at 1.5 metres refers to trunk diameter. Categories are as defined in BS 5837 (2012) - **A = High quality - B = Moderate quality - C = Low quality - U = Less than 10 years life expectancy - poor quality.** Crown height clearance / height to first branch = from ground level - Estimated remaining contribution = probable life expectancy as assessed at time of inspection. All measurements are approximate.

Appendix ‘b’
Tree locations

Project and Building Consultancy
Cluttons LLP, Portman House, 2 Portman Street,
London W1H 6DU Tel: 020 7408 1010 Fax: 020 7629 3263



Tree Categories: A, B, C, U

Tree Location Plan.
(January 2016).
Originally produced in colour.

Client	-	Rev	Date	Amendment	By

CLUTTONS

Title	Existing Site Plan	Drawing No	24818/16MR/E/01	Rev	-
Checked by	-	Drawn by	ga	Scale	1:200@A3
Date	April 2015	Drawing Status	Prelim		

Appendix ‘c’
Recommended Root Protection Areas

Clive Fowler Associates : Recommended Root Protection Areas (Radius) at 16 Millfield Lane, Highgate, London.

Tree No	Species	Recommended Distances for Root Protective Areas (Metres).	Comments.
1	Sorbus	n/a	Remove - poor condition.
2	Cherry	4.25	Careful removal of existing hard surfacing within RPA required - using hand held tools only and in full accordance with Section 7.3.6 of BS5837: 2012. Install new paving edging within protection area on existing sub-base - ensuring that no excavations are required below such level. Ensure that no vehicles or heavy equipment enter the newly opened ground within its RPA. Protect with a combination of fencing and ground protection in accordance with figures 2 or 3 and Section 6.2.3 of BS5837: 2012 (which will be largely provided by the existing driveway - which must be reinforced if necessary).
3	Apple	2	No alterations proposed within RPA. Poor condition.
4	Cherry	n/a	Remove to allow development.
5	Horse chestnut	n/a	Remove to allow development.
6	Ash	n/a	Remove to allow development.
7	Silver birch	2.5	No alterations proposed within RPA.
8	Silver birch	2.5	As previous.
9	Silver birch	3	As previous.
10	Poplar	7.75	Excavation required within eastern part of RPA - in an area separated from the tree by the previous construction of an outbuilding and associated steps at a lower level. Poor condition.
11	Lawson cypress	1.25	
12	Lawson cypress	1.75	Located away from proposals.
13	Poplar	6.75	As previous.
14	Poplar	6.75	As previous.
15	Poplar	5.75	As previous.
16	Poplar	8.5	As previous.
17	Wayfaring tree	2	Shrub.
18	Hackberry	4	Located away from proposals.
19	Plum	1.75	As previous.
20	Holly	1	As previous.
21	Bay	2	As previous.
22	Cherry	4.25	Poor condition.
23	Magnolia	2.5	Located away from proposals.

Note 1. Root Protection Area Radii are shown in ¼ metre graduations. Note 2. It should be emphasised that the above relates to the distance from the centre of the tree to protective fencing.
Note 3. With appropriate precautions, temporary site works can occur within the protected area, e.g. for access for scaffolding (see BS 5837 - 2012).
Note 4. N/a = not applicable.

Clive Fowler Associates : Recommended Root Protection Areas (Radius) at 16 Millfield Lane, Highgate, London.

Tree No	Species	Recommended Distances for Root Protective Areas (Metres).	Comments.
Group 1	Common lime & Sycamore	8.5	Located away from proposals.
24	Bay	3.75	No alterations proposed within RPA. Protect with a combination of fencing and ground protection in accordance with figures 2 or 3 and Section 6.2.3 of BS5837: 2012 (which will be largely provided by the existing driveway - which must be reinforced if necessary).

Note 1. Root Protection Area Radii are shown in ¼ metre graduations. Note 2. It should be emphasised that the above relates to the distance from the centre of the tree to protective fencing.
Note 3. With appropriate precautions, temporary site works can occur within the protected area, e.g. for access for scaffolding (see BS 5837 - 2012).
Note 4. N/a = not applicable.

Appendix ‘d’
Extracts from BS5837:2012

Extracts from BS5837: 2012.

6.2 Barriers and ground protection

6.2.1 General

6.2.1.1 All trees that are being retained on site should be protected by barriers and/or ground protection (see **5.5**) before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers should be erected to create a construction exclusion zone. Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection should be installed (see **6.2.3**).

6.2.1.2 Areas of retained structural planting, or designated for new structural planting, should be similarly protected, based on the extent of the soft landscaping shown on the approved drawings.

6.2.1.3 The protected area should be regarded as sacrosanct, and, once installed, barriers and ground protection should not be removed or altered without prior recommendation by the project arboriculturist and, where necessary, approval from the local planning authority.

6.2.1.4 Where required, pre-development tree work may be undertaken before the installation of tree protection measures, with the agreement of the project arboriculturist or local planning authority if appropriate (see also **8.8.1**).

6.2.1.5 It should be confirmed by the project arboriculturist that the barriers and ground protection have been correctly set out on site, prior to the commencement of any other operations.

6.2.2 Barriers

6.2.2.1 Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

6.2.2.2 The default specification should consist of a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated in Figure 2. The vertical tubes should be spaced at a maximum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification should be prepared in conjunction with the project arboriculturist that provides an equal level of protection. Such alternatives could include the attachment of the panels to a free-standing scaffold support framework.

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

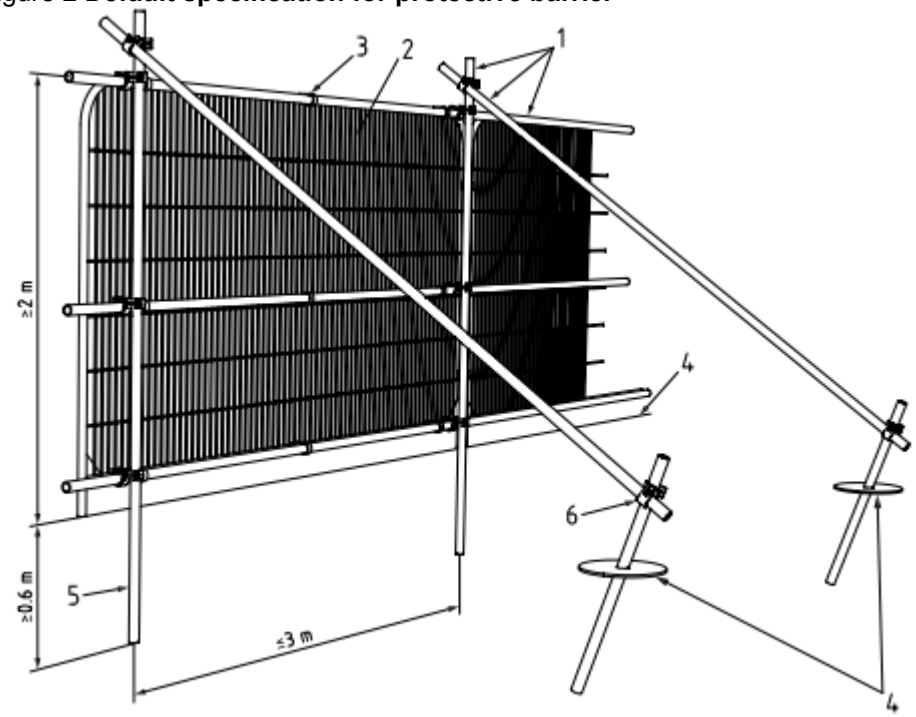
fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins (Figure 3a). Where the fencing is to be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray (Figure 3b).

NOTE 1 Examples of configurations for steel mesh perimeter fencing systems are given in BS 1722-18.

NOTE 2 It might be feasible on some sites to use temporary site office buildings as components of the tree protection barriers, provided these can be installed and removed without damaging the retained trees or their rooting environment.

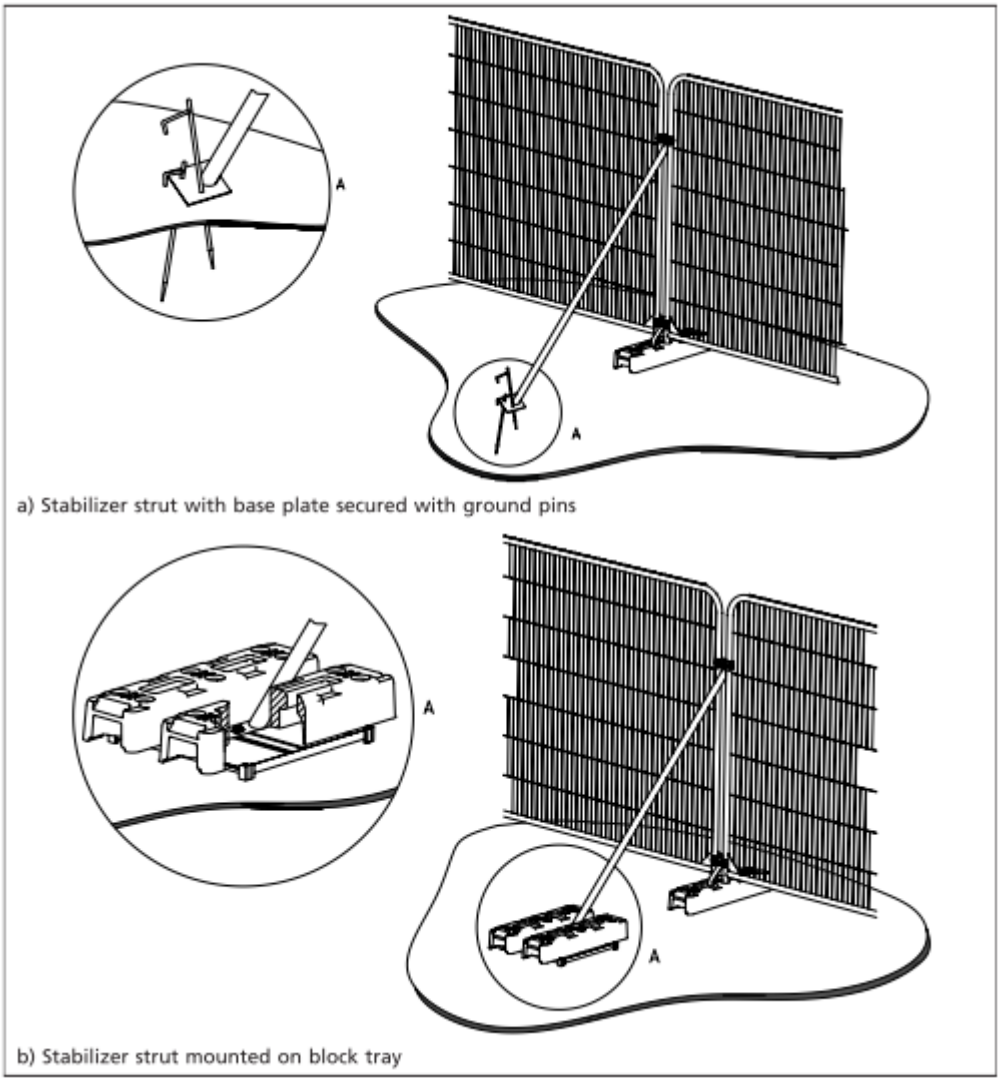
6.2.2.4 All-weather notices should be attached to the barrier with words such as: "CONSTRUCTION EXCLUSION ZONE – NO ACCESS".

Figure 2 **Default specification for protective barrier**



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

Figure 3 **Examples of above-ground stabilizing systems**



6.2.3 Ground protection during demolition and construction

6.2.3.1 Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate.

6.2.3.2 Where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site.

6.2.3.3 New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might comprise one of the following:

a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;

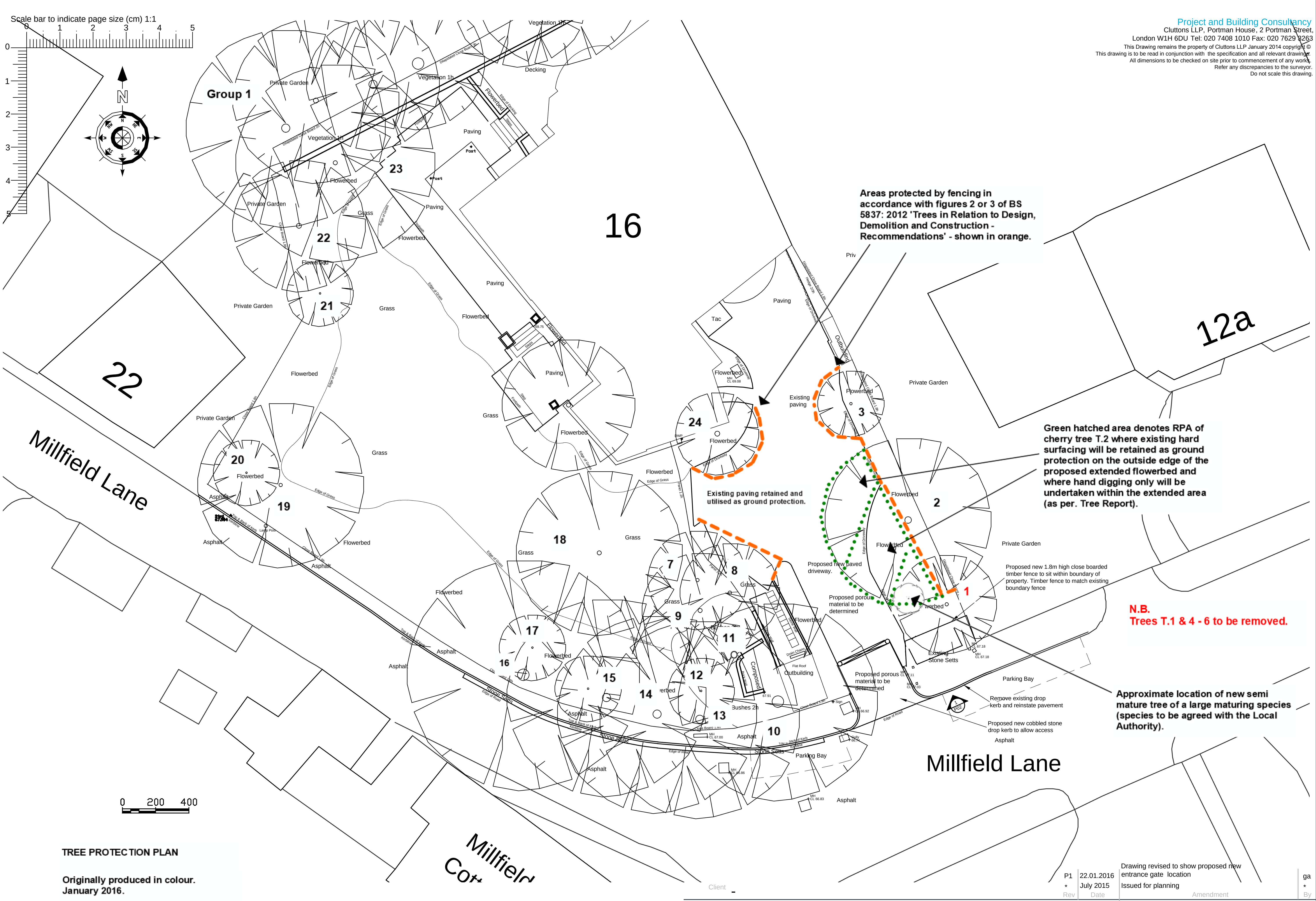
b) for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;

c) for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see **6.1**).

6.2.3.5 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

Appendix ‘e’
Tree Protection Plan.



Scale bar to indicate page size (cm) 1:1
N
Group 1
Private Garden
Vegetation 1h
Decking
Paving
Post
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
24
3
2
1
16
12a
22
Millfield Lane
Millfield Cott
Flowerbed
Grass
Asphalt
Stone Setts
Tac
Outbuilding
Existing paving
Areas protected by fencing in accordance with figures 2 or 3 of BS 5837: 2012 'Trees in Relation to Design, Demolition and Construction - Recommendations' - shown in orange.
Green hatched area denotes RPA of cherry tree T.2 where existing hard surfacing will be retained as ground protection on the outside edge of the proposed extended flowerbed and where hand digging only will be undertaken within the extended area (as per. Tree Report).
Existing paving retained and utilised as ground protection.
Proposed new paved driveway.
Proposed porous material to be determined
Proposed new 1.8m high close boarded timber fence to sit within boundary of property. Timber fence to match existing boundary fence
N.B.
Trees T.1 & 4 - 6 to be removed.
Existing Stone Setts
Parking Bay
Remove existing drop kerb and reinstate pavement
Proposed new cobbled stone drop kerb to allow access
Approximate location of new semi mature tree of a large maturing species (species to be agreed with the Local Authority).
Composed
Bushes 2h
0 200 400

TREE PROTECTION PLAN

Originally produced in colour.
January 2016.

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Rev	Date	Amendment	By
P1	22.01.2016	Drawing revised to show proposed new entrance gate location	ga
*	July 2015	Issued for planning	*

Client -

CLUTTONS

Title	Drawing No	Rev
Proposed Site Plan	24818/16MR/P/01	P1

Checked by	Drawn by	Scale	Date	Drawing Status
-	ga	1:200@A3	July 2015	Planning