



**Arboricultural Impact
Assessment, Method Statement
& Tree Protection Plan**

**Ellenor Hospice, Gravesend,
Kent**

November 2021

Ellenor Hospice, Gravesend, Kent

Arboricultural Impact Assessment, Method Statement & Tree Protection Plan

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Faithful and Gould

Wellington Gate
7-9 Church Road,
Tunbridge Wells
Kent,
TN1 1HT

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Phlorum Limited

Southern Office: Unit 12, Hunns Mere Way, Brighton, BN2 6AH

T: 01273 307 1670 E: info@phlorum.com W: www.phlorum.com

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1. Executive Summary

- 1.1 Phlorum has been instructed by Faithful and Gould to provide an arboricultural impact assessment and arboricultural method statement to support amendments to an existing planning permission application at Ellenor Hospice, Coldharbour Road, Gravesend, for the refurbishment and extension of the current facility. It is firstly noted that this report is prepared in the context of an extant planning permission for a scheme that is similar to that now proposed. The vast majority of impacts are little different to that which would already occur.
- 1.2 This report complies with the planning policies of Gravesham Borough Council and complies with the recommendations of British Standard BS5837:2012, *Trees in relation to design, demolition and construction – Recommendations*.
- 1.3 The survey was carried out on 24th January 2019. The tree constraints plan and tree survey schedule can be found at Appendix 1 and Appendix 2 respectively.
- 1.4 Tree stock at the site is predominately comprised of semi mature Norway maple, field maple, silver birch and common lime, planted in linear groups adjacent to Marks Square and Packham Road. These groups were likely planted to screen the building from adjacent properties on Marks Square and Packham Road following the original construction of Ellenor Hospice. No tree preservation orders are present at the site and the site is not located within a conservation area. The key arboricultural features of the site are:
 - Tree group G2 running between the site and Marks Square.
 - Trees T6, T7, T8 and T10 to the north adjacent Packham Road.
 - Tree group G5 and G6 located between the site and Coldharbour Road.
 - Individual trees T14, T15, T16, T17 and T18.
- 1.5 The proposed layout has been overlaid with the tree constraints plan in order to identify the impacts to the trees to inform this impact assessment and this information has formed the basis of the tree retention plan (Appendix 3), the root protection area incursion plan (Appendix 4) and the tree protection plan (Appendix 5).
- 1.6 The removal of eight individual trees, two tree groups and the partial removal of two tree groups is required in order to facilitate the proposed development.
- 1.7 A high-quality landscaping scheme to provide an attractive setting for the site could readily be secured by appropriate planning condition.
- 1.8 Subject to the generic and specific tree protection measures recommended within the arboricultural method statement at section 3 of this report being adhered to, we consider that the proposals represent a minor impact on the amenity of the locality in so far as it is contributed to by trees. Furthermore, as the proposed new planting establishes it will progressively make a positive contribution to the age and species diversity of trees in the area, the extent of local canopy cover and the amenity of the locality.

2. Introduction

Instruction

- 2.1 Phlorum Ltd has been instructed by Faithful and Gould to provide an arboricultural impact assessment and arboricultural method statement to support a full application at Ellenor Hospice, Coldharbour Road, Gravesend, for the refurbishment and extension of the current facility. It is noted that this report is prepared in the context of an extant planning permission for a scheme that is similar to that now proposed. The vast majority of impacts are little different to that which would already occur.
- 2.2 This report complies with the planning policies of Gravesham Borough Council and complies with the recommendations of British Standard BS5837:2012, *Trees in relation to design, demolition and construction – Recommendations* (the British Standard).

Objectives of Report

- 2.3 This report has been undertaken with the following objectives:
-  To identify the tree removals and pruning works that will be required as a result of the proposed development and to assess the impact of the tree works.
 -  To assess the potential impact the proposed construction works will have on retained trees and provide recommendations for mitigation measures to reduce the impact on the trees.
 -  To provide a protection methodology for retained trees throughout the demolition and construction period, including the above ground and below ground parts of the trees as well as their rooting medium.
- 2.4 This report includes the following:
-  A tree constraints plan and tree survey schedule at Appendices 1 and 2 respectively
 -  An arboricultural impact assessment at section 3. A tree retention plan at Appendix 3.
 -  An arboricultural method statement at section 4 and a tree protection plan at Appendix 4.

Documents and Information Provided

- 2.5 The following documents were used to aid the preparation of this report:
-  Initial Arboricultural Report.
 -  R H Partnership's Proposed Site Plan, reference P0299-RHP-ZZ-XX-PL-A-1003-P13.
 -  Studio Engleback's Therapeutic Garden Layout, reference 429/013.
 -  Studio Engleback's Tree Setting Drawing, reference 429/011.
 -  Fairhurst's Drainage Strategy, reference FAH-00-XX-DR-C-0010-P3.

Limitations of Report

- 2.6 The following arboricultural impact assessment and method statement has been prepared for the proposal stated in paragraph 1.1 and using the plans and information listed in section 1.3. The report should not be relied upon if the stated proposal or proposed design changes unless the author confirms the changes do not have a bearing on the arboricultural impacts or recommended mitigation measures.

3. Arboricultural Impact Assessment

Site Visit

- 3.1 The survey was carried out on 24th January 2019. The tree constraints plan and tree survey schedule can be found at Appendix 1 and Appendix 2 respectively.
- 3.2 Tree stock at the site is predominately comprised of semi mature Norway maple, field maple, silver birch and common lime, planted in linear groups adjacent to Marks Square and Packham Road. These groups were likely planted to screen the building from adjacent properties on Marks Square and Packham Road following the original construction of Ellenor Hospice. No tree preservation orders are present at the site and the site is not located within a conservation area. The key arboricultural features of the site are:
- Tree group G2 running between the site and Marks Square.
 - Trees T6, T7, T8 and T10 to the north adjacent Packham Road.
 - Tree group G5 and G6 located between the site and Coldharbour Road.
 - Individual trees T14, T15, T16, T17 and T18.

The Proposals

- 3.3 The proposed layout has been overlaid with the tree constraints plan in order to identify the impacts to the trees to inform this impact assessment and this information has formed the basis of the tree retention plan (Appendix 3), the root protection area incursion plan (Appendix 4) and the tree protection plan (Appendix 5).

Tree Removals

- 3.4 Trees to be removed for the proposed development are shown with dashed outlines on the tree retention plan at Appendix 3 and are shaded to indicate their BS5837 tree category. A summary is listed at Table 1 below.

Table 1: Tree removals summary

Tree number	Species	Category	Justification for tree removal
T1	Silver Birch	C1+2	To facilitate construction of enhanced vehicular access from Marks Square.
T2	Silver Birch	C1+2	To facilitate construction of enhanced vehicular access from Marks Square.

Tree number	Species	Category	Justification for tree removal
T3	Field Maple	C1 +2	To facilitate construction of enhanced vehicular access from Marks Square
T4	Field Maple	C2	To facilitate installation of new generator.
T12	Nordman Fir	C1	Remove due to facilitate extension of car park.
T15	Silver Birch	B1+2	Due to direct conflicts with proposed building extension
T16	Field Maple	C1	Due to direct conflicts with proposed building extension.
T17	European Ash	B1+2	Due to direct conflicts with proposed building extension.
G1	Silver Birch	C1+2	Remove due to conflicts with proposed foul drain.
G5	Field maple	B1+2	Remove due to facilitate extension of car park.
G6 x 7	Norway maple & Japanese cherry	B1+2	Partial removal due to direct conflicts with proposed building extension.
G7 x 15	Lawson cypress, Silver birch, Cherry & Willow	C1 + 2	Partial removal to facilitate construction of external storage and workshop and implement proposed landscaping scheme.

Mitigation Planning

- 3.5 The density of existing tree stock at the site is considered to be high. The removal of trees as a direct result of the proposed development will be mitigated by planting new trees during the soft landscaping phase of development. The detailed soft landscape proposals and tree planting specification has been provided on the tree setting plan referenced in section 1.3 of this report. The extensive soft landscaping and tree planting strategy is considered suitable and appropriate compensate for the loss of trees as a result of the development.

Access Facilitation Pruning

- 3.6 Based on the information currently available, the western crown extent of tree group G2 will require crown lifting to 3m to provide sufficient clearance to construct a new storage structure. The intensity of pruning is minimal and will not impact upon the trees physiological condition or amenity value.
- 3.7 All works are to be carried out in accordance with B33998:2010 *Tree works – Recommendations*.
- 3.8 Based on the information currently available, it is anticipated that the crowns of all remaining retained trees will be located a sufficient distance from proposed construction activities and expected construction access routes so as not to require pruning.
- 3.9 Any additional requirements for pruning that cannot be predicted at this stage in the design process (e.g. for contractor compound or movement of large or specialist plant machinery) shall be discussed at the pre-commencement meeting with the project arboriculturist and agreed with the local authority arboricultural officer.

Building Footings in Proximity to Trees

- 3.10 The proposed services building will encroach the rooting area of 11 trees within G2 by between 3% and 13% their total root mass. The use of an above ground foundation will not be possible and excavations will be required in order to tie the new foundation slab in to existing and proposed site levels. Taking the trees maturity and size into consideration, the root impacts associated with the levels of encroachment are deemed minor and therefore pre-emptive tree removal and/or the use of engineered solutions is not considered necessary.
- 3.11 Similar to the above, a new cycle store will encroach the rooting area of a single tree within G2 by 4% its total root mass. It is likely the new store will be of low impact design. However, irrespective of the final cycle store design, the level of encroachment within the trees rooting area is deemed minimal and the use of an engineered foundation solution is deemed unnecessary.
- 3.12 Best practise guidelines should be followed for foundation depths in proximity to trees. This will be determined by a structural engineer and should be guided by information in this report as well as appropriate sampling to determine soil profiles at the site.

Hard Standing in Proximity to Trees

- 3.13 The extension of the existing vehicular parking area will result in the removal of tree group G5 and minor incursion into the root protection area of six retained trees within group G2.

- 3.14 Encroachment of new surfacing within an individual retained trees rooting area is less than 5% their total root mass. The use of an above ground, engineered surface to mitigate root impacts is therefore not deemed necessary. This is due to the minimal level of incursion and the complexity of tying an engineered surface into the existing site level
- 3.15 A new footpath, incorporated into the developments landscaping proposals, will encroach the root protection areas of retained trees within G6 and G7.
- 3.16 Where hard standing is constructed within the root protection areas of retained trees, an engineered solution is required to mitigate harm to the roots and the viability of the rooting medium. The design of the hard standing should therefore result in the following three outcomes:
- The hard standing should be constructed without the need to sever or prune shallow roots (most tree roots are usually found near to the surface).
 - Compaction of the underlying soil should be avoided both during the construction period and post development.
 - The hard standing should not significantly inhibit moisture ingress and gaseous diffusion into or out of the soil.
- 3.17 The detailed specification (including levels) for the new hard standing to be constructed within root protection areas shall be provided by an engineer but must be signed off by the project arboriculturist before implementation to ensure the roots and rooting medium are adequately protected. To achieve the three outcomes described above, the design for hard standing within root protection areas must adhere to the following basic specification (see also Appendix 4):
- Within the root protection areas, the hard standing shall be constructed directly onto the existing ground level without soil stripping. The surface vegetation (e.g. grass sward) shall be carefully removed using hand tools but the underlying soil must be fully retained and protected. If necessary, a layer of sharp sand (or other inert granular fill) may be used to fill divots to create a level surface onto which the hard standing can be constructed.
 - The hard standing must be constructed onto a three-dimensional cellular confinement system (such as CellWeb TRP or equivalent product signed off by the project arboriculturist) filled with no-fines angular stone. This will provide a permeable base for the surface that will spread loads to reduce compaction of the soil beneath (compacting the rooting medium will have a significant detrimental impact on root function and the health of surrounding trees).
 - CellWeb TRP is available from 75mm-200mm depth, depending on the soil conditions and the load it is designed to support. Further guidance should be sought from the geocell manufacturer when specifying the detailed surface design. In some cases, it may be necessary to lay additional sub-base beneath the cellular confinement system, however this must also be permeable and laid onto the existing ground level.
 - The cellular confinement system shall be installed directly onto a geotextile membrane (such as a TreeTex® 300). A second membrane shall be installed above the cellular confinement system as well. These membranes will prevent soil, construction debris and other materials migrating through the cellular confinement system, which would otherwise impact on the porosity of the completed surface.

- The wearing course for the new surface must be permeable (loose gravel, resin bound gravel, porous asphalt or permeable block paving) to allow continued moisture ingress and gaseous diffusion with the rooting medium.
- Although a three-dimensional cellular confinement system should not in itself require edge supports, edge restraints may be needed for the wearing course. Standard kerb stones set in concrete haunches that are usually dug into the ground will not be suitable for use within root protection areas due to the likely damage to shallow tree roots. As an alternative, one of the following edging types may be used:
 - Treated timber, peg and board edging.
 - Proprietary metal or plastic edging strips.
 - Railway sleepers affixed to the ground.

Services

- 3.18 A new generator, affixed to a concrete raft foundation, will be installed within close proximity to group G2. Minor incursion into the root protection area of a single retained tree within G2 will occur to provide a sufficient foundation and provide access around the generator. Taking the trees maturity and size into consideration, the root impacts associated with the installation of the generator foundation is deemed minor and therefore additional tree removal beyond T4 and/or the use of engineered solutions is not considered necessary.
- 3.19 Details of the routing of services for the proposed development are not currently available. All underground services should be located outside the root protection areas of retained trees and above ground services should be located outside the anticipated mature crown spreads. Sympathetic methodology to enable the installation of services within root protection areas (in certain instances) is available, however there will always be a potential arboricultural impact and arboricultural advice must be sought regarding the suitability of these methods before they are relied upon. If it is achievable, root protection areas should always be completely avoided.
- 3.20 Once details of the routing of new services become available, prior to commencement, these shall be reviewed by the project arboriculturist. The arboriculturist shall then confirm either that no works will be carried out within root protection areas or provide details of the methodology required to ensure the works are carried out in accordance with NJUG4 '*Guidelines for the planning, installation and maintenance of utilities in proximity to trees*' and BS5837: 2012.

Landscaping in Proximity to Trees

- 3.21 New permanent garden fencing and the installation of a vegetated serpentine wall will be installed within the root protection areas of numerous retained trees throughout the site. The final specification for fencing and/or the serpentine wall is to be confirmed on the date of this report. Within root protection areas a fencing type that requires only postholes (no trenching) must be used. The level of the fences must also follow existing ground levels as there may be no re-grading of levels within root protection areas.

- 3.22 Tree/shrub planting and turfing will occur within the root protection areas of retained trees. In order to protect both tree roots and the condition of the rooting medium, these works must occur sensitively as described in the arboricultural method statement.

Post Development Tree Pressures and Management

- 3.23 The proposed development has been assessed to determine the likely impact of tree shade, and also the likely future pressure to prune or remove additional trees.
- 3.24 None of the buildings proposed habitable spaces are expected to be shaded to the extent that it inhibits future residents reasonable use or enjoyment of the property and/or its garden area, thereby leading to pressure to fell or severely prune the trees in a manner the local planning authority could not reasonably resist.
- 3.25 To reduce maintenance issues and costs, the final roofing material for the proposed service building and cycle store and their associated guttering will need to consider the control of seasonal nuisances, especially the build-up of leaf litter and detritus. This issue is considered simple to address through the use of appropriate materials and drainage solutions.

Conclusions

- 3.26 Retention of trees along Marks Square and Peckham Road has been prioritised to ensure a continued vegetative screen between the site and adjacent residential properties. However, to provide adequate space within the site to facilitate construction, the loss of trees is inevitable. The majority of trees to be removed are those on the site's western extents adjacent to Coldharbour Road. Land adjacent to Coldharbour Road is undergoing significant regeneration, with multiple commercial and residential developments taking place within close proximity to the site. Although the loss of trees associated with the development at Ellenor Hospice will have an initial impact upon the character of the road, the proposed landscaping strategy will aim to significantly improve the site's overall position in the landscape. This will further improve in the future as the mitigation planting matures.
- 3.27 The proposed landscaping scheme involves construction of a new footpath within the root protection areas of retained trees in G6 and G7. Due to the condition and amenity value of these trees, engineered solutions have been provided to minimise the impact of construction works, therefore allowing their retention and continued contribution to the site.
- 3.28 With exception of minor rooting area incursions, the proposals have largely respected the rooting area of retained trees. Provided the exclusion zones and methodologies described in the arboricultural method statement and tree protection plan are followed, trees proposed for retention should not be adversely affected by the construction works.
- 3.29 Based on the above assessment, trees recommended for retention in this report can be protected during the construction period and successfully integrated into the site post development.

4. Arboricultural Method Statement

General Requirements

- 4.1 The arboricultural method statement and tree protection plan shall remain on site for the duration of demolition, construction and landscaping works and be available to site operatives at all times. All operatives at the site shall be briefed about tree related factors as part of their site induction.
- 4.2 Any variation from the methodology described in this method statement shall be discussed with the supervising arboriculturist and agreed with the local authority arboricultural officer.

Phasing of works

- 4.3 To ensure trees are protected throughout the development, the proposed development shall occur in the following order:

Table 1: Phasing of works

Works Order	Operation	Notes
1	Initial tree works	The tree works contractor shall undertake the tree removals and access facilitation pruning specified in the arboricultural impact assessment. Completion of these works will be required to enable the installation of tree protection barriers.
2	Installation of tree protection barriers	Tree protection fencing shall be installed in the locations shown on the tree protection plan and to the specification described in this method statement.

Works Order	Operation	Notes
3	Pre-commencement meeting	The project arboriculturist shall attend a site meeting with the site manager. The local authority arboricultural officer shall be notified so they may also attend. The above pre-start arboricultural works shall be signed off by the project arboriculturist during the meeting. The meeting shall occur before any plant activity, ground works or demolition/construction activities begin.
4	Demolition phase	The tree protection barriers shall be maintained, and the construction exclusion zones observed throughout the demolition phase. Outbuildings shall be removed sensitively from the root protection areas of G2 as described in this method statement.
5	Construction phase	The tree protection barriers shall be maintained, and the construction exclusion zones observed throughout the construction phase.
6	Installation of engineered surface within the rooting area of G6 and G7.	The proposed footpath within the rooting area of retained trees in G6 and G7 shall utilise an engineered solution installed above the existing ground level. Installation shall take place as a final phase of development, just prior to the soft landscaping phase

Works Order	Operation	Notes
7	Soft landscaping phase	The tree protection barriers shall be dismantled when external construction and hard landscape operations have been completed and plant machinery or excess construction materials have been removed from site. Soft landscape operations shall occur sensitively as described in this method statement.

Initial Tree Works

- 4.4 The tree removals and access facilitation pruning specified in the arboricultural impact assessment shall be carried out as the first stage of development. Any requirements for access facilitation pruning which have not been anticipated on the date of this report shall be discussed at the pre-commencement meeting with the project arboriculturist and be communicated to the local authority arboricultural officer.
- 4.5 Tree stumps and vegetation located within the root protection areas of retained trees shall be cleared with controlled hand tools (e.g. stump grinder/brush cutter). Plant machinery shall not be used to scrape vegetation, 'grub out' stumps within root protection areas, or access the site until the tree protection barriers have been installed.
- 4.6 If bonfires are lit to dispose of arisings from the vegetation or tree clearance works, an assessment of wind direction and strength shall be made to ensure flames cannot extend within 5m of any part of a retained tree. No bonfires shall be lit within a root protection area.
- 4.7 Trees should be checked for protected species before works are undertaken. It is against the law to disturb bats or their roosts under the Conservation of Habitat and Species Regulations. Nesting birds are protected by the Wildlife and Countryside Act. If protected species are discovered, Natural England should be contacted for advice.
- 4.8 The tree works contractors should carry out all tree works to BS3998: 2010 '*Tree works – recommendations*' as modified by research that is more recent. They should also carry relevant, adequate and up to date insurance.
- 4.9 It is suggested that an Arboricultural Association approved contractor carry out all tree works. Approved contractors are expected to work to industry best standards. The Arboricultural Association website (www.trees.org.uk) contains contact details and information on engaging a suitable contractor.

Tree Protection Barriers

- 4.10 The root protection areas of retained trees must be left free from disturbance, and protected from contamination or compaction during the proposed works. Protection shall comprise of tree protection fencing.
- 4.11 Tree protection fencing shall be installed in the locations shown on the tree protection plan. The specification for tree protection fencing shall be heavy gauge, 2m tall galvanized tube and welded mesh panels, secured to standard scaffold pole uprights and cross-members with wire ties. The uprights shall be driven into the ground until secure (minimum of 0.6m) and supported by scaffold support bars that are clamped to further scaffold uprights (refer to Appendix 7). Any variation from this specification for tree protection fencing shall be discussed with the project arboriculturist and agreed in writing with the local authority arboricultural officer.
- 4.12 Signs shall be affixed to the fencing as shown in Appendix 8 to explain its purpose. The signs shall be affixed at a reasonable size and frequency to ensure they are easily visible to operatives at the site.
- 4.13 The tree protection fencing shall be installed before any plant activity, ground works or construction activities commence at the site. They shall be maintained in situ until the soft landscaping phase of development when all other construction activities in the vicinity have been completed, and excess construction materials and plant machinery have been removed from site. Any damage that occurs to the tree protection barriers during the construction period must be rectified immediately, prior to other construction activities recommencing in the vicinity.
- 4.14 The areas protected by tree protection fencing (highlighted yellow on the tree protection plan) or temporary ground protection shall be referred to as the construction exclusion zones. The following restrictions shall apply within the construction exclusion zones:
- No vehicular access shall be permitted unless on adequate temporary ground protection measures that have been agreed with the project arboriculturist.
 - Regular pedestrian access shall be restricted unless on suitable ground protection measures agreed with the project arboriculturist.
 - No storage of construction materials shall occur.
 - No storage of building spoil or construction debris (including short-term temporary stockpiling) shall occur.
 - No harmful chemicals shall be stored or handled.
 - No fires shall be permitted.
 - No mechanical excavation including regrading of levels shall occur.
 - There shall be no change in ground level unless undertaken under the supervision of the project arboriculturist.
 - No construction activities including installation of new permanent hard standing shall be undertaken unless otherwise specified in this method statement.

Storage and Handling of Harmful Chemicals

- 4.15 Provision must be taken to prevent the storage and handling of harmful chemicals within the root protection areas of retained trees. Harmful chemicals include fuels, oils, bitumen, builder's sand (which has a high salt content) and cement. Provision shall also be made to prevent the storage and handling of harmful chemicals in areas proposed for further planting if the existing soil is intended to be retained.
- 4.16 Cement mixing shall always occur outside the construction exclusion zones. If cement mixing is to occur close to the construction exclusion zones, or there is the potential for cement washings to leech into a root protection area, adequate, bunded ground protection measures must be used. This could comprise impermeable plastic sheeting under wooden boards (to prevent tears) surrounded by a raised lip.
- 4.17 All other chemicals that are harmful to trees must be stowed in suitable containers and stored away from the construction exclusion zones unless adequate, bunded ground protection measures are implemented to prevent spillages leeching into root protection areas.

Contractor Facilities

- 4.18 A suitable location for site cabins, contractor parking and site facilities for operatives shall be agreed with the project arboriculturist during the pre-commencement meeting. These facilities must be located outside the root protection areas of all retained trees unless on adequate ground protection measures that have been signed off with the project arboriculturist (potentially including existing hard standing). Provision must be taken to prevent exhaust fumes or hot air from generators or kitchen facilities from damaging foliage within the crowns of retained trees.

Demolition of Existing Structures Adjacent to Tree Group G2

- 4.19 Demolition of the above ground parts of the structures adjacent to G2 must occur carefully to avoid accidental contact with the trees. Where possible the building shall be dismantled by hand, however, if plant machinery is used, a banksman must always be present to spot overhanging branches that are not visible to the machine operator. The machine must be of a reasonable size so it can be controlled safely in proximity to the trees, and must always be operated from outside the construction exclusion zones. Debris from the demolition works must also be stockpiled outside the construction exclusion zones.

Constructing New Hard Standing within Root Protection Areas

- 4.20 Within the root protection areas of retained trees in G6 and G7, the new surface shall be constructed to the basic specification described in the arboricultural impact assessment. The detailed specification (including levels) shall be provided by an engineer but must be signed off by the project arboriculturist before implementation to ensure compliance with arboricultural requirements.

- 4.21 Prior to construction of the surface, the existing ground vegetation (e.g. grass sward or up to 50mm of leaf litter) shall be removed using controlled hand tools such as a spade or turf cutter. The underlying soil must be fully retained and protected. Plant machinery may not be used to scrape vegetation unless under the supervision of the project arboriculturist and tree stumps should be removed from root protection areas carefully using a stump grinder. If obvious surface tree roots are present or if the soil is known to be shallow, then use of plant machinery will not be appropriate.
- 4.22 The surface shall be installed by a process of 'rolling out' the cellular confinement system. This means that as one section of the cellular confinement system is installed, it will provide ground protection and create access for plant machinery to allow the next section to be installed (a tracked excavator and dumper truck are usually required to install a cellular confinement system). Vehicular access onto exposed ground within the root protection areas of retained trees shall be prohibited at all times unless adequate temporary ground protection measures are agreed with the project arboriculturist.
- 4.23 If access is required onto a cellular confinement system before the wearing course installed, a temporary surface (such as thick plywood or metal boards depending on the load needing support) shall be installed above a geotextile membrane to prevent soil and other building debris blocking the airspaces in the cellular confinement system, which could otherwise reduce the porosity of the completed surface.
- 4.24 When the cellular confinement system has been filled with clean angular stone, this should not be compacted to the point it compacts the underlying soil. Four passes with a smooth roller (max weight 1000kg without vibration) or several passes by a tracked excavator should be sufficient. Checks should be made before laying the wearing course to ensure the infill is fully consolidated.
- 4.25 The finished level of the no-dig surface will be higher than the surrounding un-surfaced ground. To mitigate this, clean-screened topsoil may be banked around the edge of the surface. It is recommended that no less than a gradient of 1:3 is created as increasing the ground level within a root protection area can disrupt root function. It is also necessary to avoid banking soil around the buttresses or buttress roots of retained trees.

Services

- 4.26 The routing of new services for the development is not available on the date of this report. These must be signed off by the project arboriculturist before implementation. Wherever possible, the services must completely avoid the root protection areas of retained trees. Where this is not feasible, the arboriculturist shall provide an arboricultural method statement (to be signed off by the local authority arboricultural officer before implementation) detailing any sympathetic methodologies that are required to minimise damage to tree roots (as described in NJUG4 '*Guidelines for the planning, installation and maintenance of utilities in proximity to trees*' and BS5837: 2012).

Installing New Permanent Fencing within Root Protection Areas

- 4.27 Installation of permanent fencing within root protection areas will require access into the construction exclusion zones. Only pedestrian access will be permitted into the construction exclusion zones and scaffold board pathways shall be used in wet conditions. Ideally these works shall occur during the soft landscaping phase of development when it is safe to dismantle the tree protection fencing.

- 4.28 The fencing specification is to be confirmed on the date of this report. Within root protection areas a fencing type that requires only postholes (no trenching) shall be used. The level of the fences must follow existing ground levels as there should be no re-grading of levels within root protection areas.
- 4.29 The postholes shall be hand excavated with care taken to avoid damaging or severing roots with a diameter greater than 25mm. Ideally the postholes shall be pre-dug to ensure significant roots can be avoided. The postholes shall be sleeved with impermeable sheeting before any concrete is added to prevent alkaline burn to retained roots. Cement mixing shall occur outside the construction exclusion zones.

Soft Landscaping within Root Protection Areas

- 4.30 Soft landscaping within the root protection areas of retained trees shall occur as the final phase of development, when all other construction activities in the vicinity have been completed and it is safe to dismantle the tree protection barriers. The detailed specification for soft landscaping is to be confirmed but will potentially include turfing and tree/shrub planting within root protection areas.
- 4.31 All planting stock, topsoil and other soft landscaping materials shall be stockpiled outside the root protection areas of retained trees. When the tree protection barriers have been dismantled, the extents of the root protection areas shall be made clear to operatives at the site by other means (e.g. ground marker paint or similar). The standard restrictions to works within the construction exclusion zones will still apply during the soft landscaping phase of development.
- 4.32 Where new turf or grass seed is to be laid within the root protection areas of retained trees, topsoil will likely need to be imported. The existing soil may be lightly tilled by hand but use of rotavators or plant machinery will be prohibited. A maximum increase of 100mm of topsoil may be introduced to a root protection area to avoid suffocating existing root growth. Care must be taken to prevent soil being piled against tree buttresses or buttress roots.
- 4.33 When soil or other materials are transported across a root protection area in wet conditions, scaffold board pathways must be used to prevent compaction of the rooting medium. It should be noted that even pedestrian traffic can compact the soil in wet conditions.
- 4.34 All planting pits within root protection areas shall be individually hand excavated (no trench planting). Care must be taken to avoid severing or damaging roots with a diameter greater than 25mm.

Pre-commencement Arboricultural Consultancy Input

- 4.35 Prior to the commencement of works, arboricultural input will be required for the following aspects of development:
- 1) The construction management plan.
 - 2) The routing of new services.
 - 3) Final levels based on the detailed design.
 - 4) The detailed specification for new engineered surfacing to be utilised for footpath within the rooting area of G6 and G7.
 - 5) The detailed specification for the vegetated serpentine wall.

- 4.36 This arboricultural method statement and tree protection plan shall be updated to accommodate these aspects of the project and the revised information submitted to the local authority tree officer for approval.

Pre-commencement Meeting

- 4.37 A pre-commencement meeting shall be held between the contractors and the project arboriculturist. The local authority arboricultural officer shall be given reasonable notice of the pre-commencement meeting so they may also attend. The purpose of the pre-commencement meeting shall be:
- To clarify the tree protection methodology with the site manager.
 - To discuss the chronology and phasing of the project with the site manager.
 - To discuss with the site manager, sympathetic working methodologies and specialist construction measures in relation to trees.
 - To sign off that the pre-commencement tree works have been completed as specified in the arboricultural impact assessment, and to discuss any requirements for any further pruning which had not been anticipated prior to the meeting.
 - To sign off that the tree protection fencing and ground protection have been installed in the correct locations and to the agreed specification. To agree revised locations subject to the phasing of the development.
 - To agree with the local authority arboricultural officer the type and timings of arboricultural monitoring necessary.
- 4.38 Following this meeting, if the local authority arboricultural officer has not been able to attend, an email outlining the actions discussed will be sent to the tree officer for approval. If necessary, a revised tree protection plan and method statement will be issued for approval.

Arboricultural Supervision

- 4.39 The project arboriculturist shall supervise:
- The installation of engineered surfacing within the rooting area of retained trees within G6 and G7.

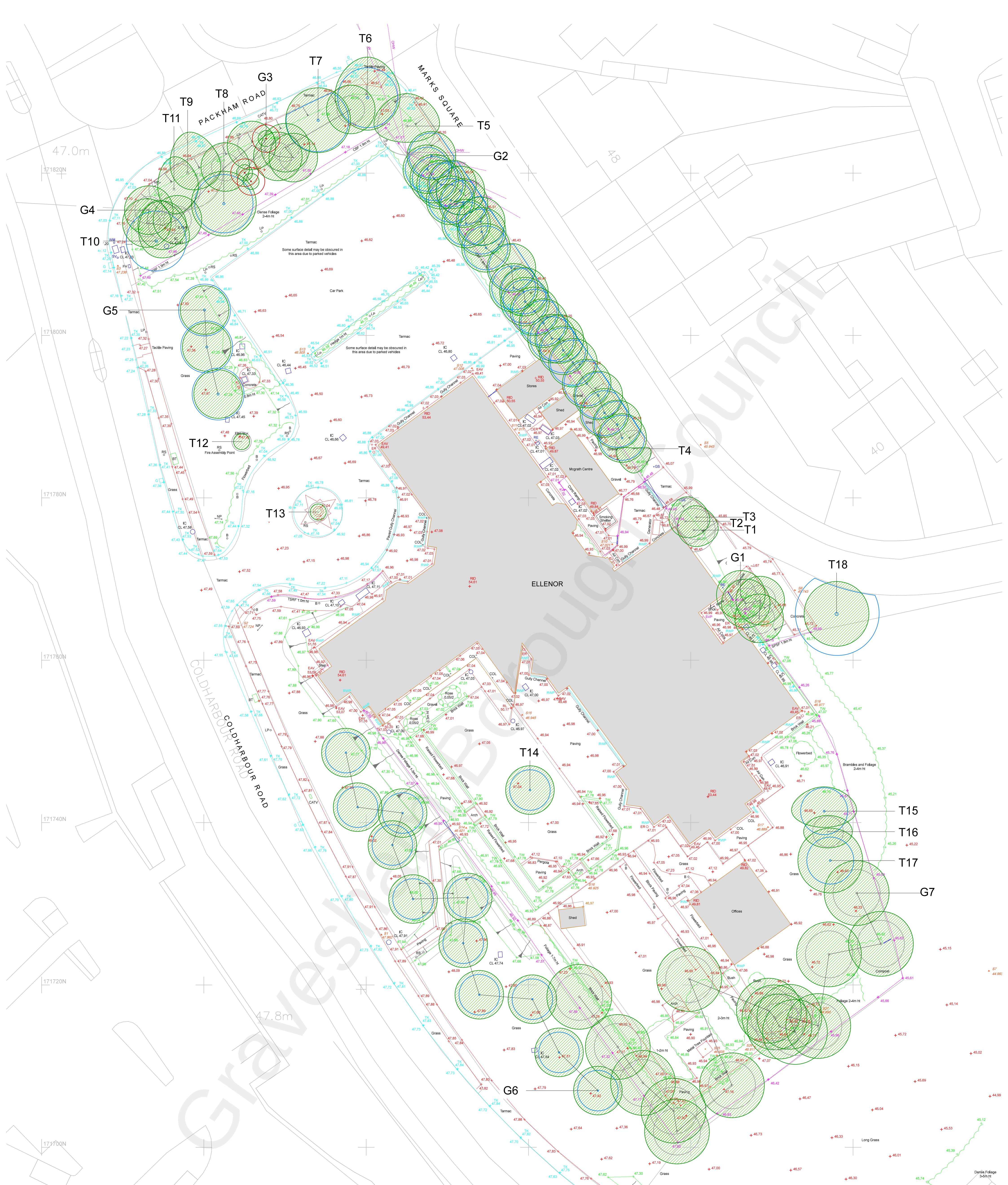
Arboricultural Monitoring

- 4.40 The site manager shall provide a monthly update to the project arboriculturist including photographic evidence that the tree protection barriers are intact and that the construction exclusion zones have been observed.
- 4.41 In addition to the above, a system and programme of onsite monitoring by the appointed arboricultural consultant shall be agreed with the Local Authority Arboricultural Officer. The form and frequency of site monitoring shall be agreed at the pre-commencement meeting.

Process if an Unforeseen Issue Relating to Trees Arises

- 4.42 If significant root growth is disturbed during construction activities that are not within the scope of this report, the work shall cease until the project arboriculturist has been consulted. Roots greater than 25mm in diameter or dense/matted fibrous roots shall be considered significant root growth. It should be remembered that whilst root protection areas are part of industry best practice, tree root growth is influenced by a number of factors and may not conform to expected ideals.
- 4.43 If at any time during the construction process, damage is inadvertently caused to a tree, the project arboriculturist shall be notified to assess the likely implications and to prescribe potential remedial measures to be implemented. Damage can be in the form of chemical or fuel spillage, mechanical damage to either the above ground parts of the tree or the roots, fire or any other unforeseen circumstance.
- 4.44 The supervising arboriculturist shall be appointed by the contractor. It will be necessary for the arboriculturist to report to the local planning authority on the outcome of the site visits as well as any unforeseen tree related issues

Appendix 1
Tree Constraints Plan



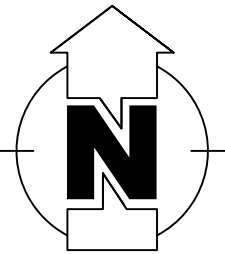
Drawing no: 5037/19/A	Rev: -	Sheet number: 1 of 1
Client and site:		
Ellenor House Coldharbour Road, Gravesend, Kent. DA11 7HQ.		
Drawing title: Tree Constraints Plan		
Date drawn: 04/02/2019		
Scale: 1:200 at A1		
Drawn by: LW	Checked by: PD	

- Key:**
- RPA of category B tree*
 - RPA of category C tree*
 - RPA of category U tree*
 - Tree canopy

*** Tree categorised in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.**

Tree Survey Schedule contained within the arboricultural report contains further information for each tree.

This drawing should be viewed in colour.



Appendix 2
Tree Survey Schedule

Survey date: Thursday 24th January 2019

Tree Survey Schedule

Site: Ellenor Hospice, Coldharbour Road, Gravesend, Kent. DA11 7HQ.



Surveyor: Luke White (*FdSc Arboriculture M.Arbor.A*)

Tree ref.	Species	Height (m)	Stem diameter (mm)	Branch spread (m)	Crown clearance (m)	Age class	Physiological condition	Structural condition	Comments and Preliminary Management Recommendations	Category grading	Root Protection Area (m ²)	Root Protection Radius (m)
G1	sliver birch. (<i>Betulus pendula</i>)	8. AV	160 AV	N: 3 E: 3 S: 3 W: 3	Crown: 2 AV Branch: 2 AV	Early mature	Good	Fair	Single stem specimens with upright growth habits due to dense spacing. Provides vegetative screening. Remove to facilitate development.	C1+2	11.6	1.9
T1	sliver birch. (<i>Betulus pendula</i>)	9	205	N: 3 E: 3 S: 2 W: 2	Crown: 3 AV Branch: 3 AV	Early mature	Good	Fair	Single stem specimens with upright growth habits due to dense spacing. Provides vegetative screening. Remove to facilitate development.	C1+2	19.0	2.5
T2	sliver birch. (<i>Betulus pendula</i>)	9	215	N: 3 E: 3 S: 2 W: 2	Crown: 3 AV Branch: 3 AV	Early mature	Good	Fair	Single stem specimens with upright growth habits due to dense spacing. Provides vegetative screening. Remove to facilitate development.	C1+2	20.9	2.6
T3	field maple (<i>Acer campestre</i>)	7	210	N: 3 E: 3 S: 3 W: 1	Crown: 0 AV Branch: 0 AV	Early mature	Good	Fair	Single stem specimen with low spreading crown structure. Crown suppressed due to proximity with T1 and T2. Remove to facilitate development.	C1+2	20.0	2.5
T4	field maple (<i>Acer campestre</i>)	5	180	N: 0 E: 2 S: 3 W: 2	Crown: 1 AV Branch: 1 AV	Early mature	Good	Fair	Single stem specimen with poor crown form due to light suppression resulting from proximity of T2. Remove to facilitate development.	C2	14.7	2.2
G2	silver birch. Field maple. European lime	12	225 AV	N: 3 E: 3 S: 3 W: 3	Crown: 2 West Branch: 2 AV	Early mature	Good	Good	Linear group of trees located on site boundary. Remove five individuals from group to facilitate development. Lift the western crowns of remaining trees to provide 3m height clearance over new storage structure.	B2	22.9	2.7

Survey date: Thursday 24th January 2019

Tree Survey Schedule

Site: Ellenor House, Coldharbour Road, Gravesend, Kent. DA11 7HQ.



Surveyor: Luke White (*FdSc Arboriculture M.Arbor.A*)

Tree ref.	Species	Height (m)	Stem diameter (mm)	Branch spread (m)	Crown clearance (m)	Age class	Physiological condition	Structural condition	Comments and Preliminary Management Recommendations	Category grading	Root Protection Area (m ²)	Root Protection Radius (m)
T5	Norway maple (<i>Acer platanoides</i>)	6	280	N: 4 E: 4 S: 4 W: 4	Crown: 2 AV Branch: 1.5 AV	Early mature	Good	Good	Single stem specimen with poor crown form due to suppression resulting from proximity to G2. Visible from the public realm. Retain and protect throughout development.	C1+2	35.5	3.4
T6	European ash (<i>Fraxinus excelsior</i>)	10	310	N: 5 E: 4 S: 4 W: 4	Crown: 4 AV Branch: 3 AV	Mature	Fair	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Retain and protect throughout development.	B1+2	43.5	3.7
T7	common lime (<i>Tilia x europaea</i>)	10	300	N: 4 E: 4 S: 4 W: 4	Crown: 1 South Branch: 3 AV	Early mature	Good	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Retain and protect throughout development.	B1+2	40.8	3.6
T8	common lime (<i>Tilia x europaea</i>)	8	300	N: 4 E: 4 S: 4 W: 4	Crown: 1 South Branch: 3 AV	Early mature	Good	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Retain and protect throughout development.	B1+2	40.8	3.6
G3	common alder (<i>Alnus glutinosa</i>)	6	125	N: 1 E: 1 S: 1 W: 1	Crown: 0 AV Branch: 0 AV	Semi mature	Poor	Poor	Group of poorly formed specimens with extensive folia dieback. Retain and protect throughout development.	U	7.1	1.5
G4	sliver birch. (<i>Betulus pendula</i>)	10	140 AV	N: 3 E: 3 S: 3 W: 3	Crown: 3 AV Branch: 3 AV	Early mature	Fair	Fair	Group of single stem specimens with typical growth habits for the species. Visible from the public realm. Retain and protect throughout development.	C1+2	8.9	1.7

Survey date: Thursday 24th January 2019

Tree Survey Schedule

Site: Ellenor House, Coldharbour Road, Gravesend, Kent. DA11 7HQ.



Surveyor: Luke White (*FdSc Arboriculture M.Arbor.A*)

Tree ref.	Species	Height (m)	Stem diameter (mm)	Branch spread (m)	Crown clearance (m)	Age class	Physiological condition	Structural condition	Comments and Preliminary Management Recommendations	Category grading	Root Protection Area (m ²)	Root Protection Radius (m)
T9	Norway maple (<i>Acer platanoides</i>)	10	305	N: 5 E: 4 S: 2 W: 2	Crown: 2 AV Branch: 2 AV	Mature	Good	Fair	Poor stem form due to historic failure of dominant leader. Visible from the public realm. Retain and protect throughout development.	C1+2	42.1	3.7
T10	Norway maple (<i>Acer platanoides</i>)	10	310	N: 5 E: 3 S: 5 W: 4	Crown: 2 AV Branch: 3 AV	Mature	Good	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Retain and protect throughout development.	B1+2	43.5	3.7
T11	European ash (<i>Fraxinus excelsior</i>)	10	250	N: 4 E: 3 S: 3 W: 2	Crown: 3 North Branch: 3 AV	Early mature	Fair	Good	Single stem specimen with typical growth habit for species. Folia dieback present but no visual evidence of cause. Visible from public realm. Retain and protect throughout development.	C1	28.3	3.0
G5	field maple (<i>Acer campestre</i>)	7	270 AV	N: 3 E: 3 S: 3 W: 3	Crown: 1 AV Branch: 1 AV	Mature	Good	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Remove group to facilitate development.	B1+2	33.0	3.2
T12	Nordman fir. (<i>Abies nordmanniana</i>)	6	100	N: 1 E: 1 S: 1 W: 1	Crown: 0 AV Branch: 0 AV	Semi mature	Good	Good	Single stem specimen with well formed crown structure. No visible evidence of defect. Visible from the public realm. Remove to facilitate development.	C1	4.5	1.2
T13	maple. (<i>Acer spp</i>)	2	100	N: 1 E: 1 S: 1 W: 1	Crown: 0.5 AV Branch: 0.5 AV	Young	Good	Good	Single stem specimen with compact crown structure. Located in roundabout. Retain and protect throughout development.	C1	4.5	1.2

Survey date: Thursday 24th January 2019

Tree Survey Schedule

Site: Ellenor House, Coldharbour Road, Gravesend, Kent. DA11 7HQ.



Surveyor: Luke White (*FdSc Arboriculture M.Arbor.A*)

Tree ref.	Species	Height (m)	Stem diameter (mm)	Branch spread (m)	Crown clearance (m)	Age class	Physiological condition	Structural condition	Comments and Preliminary Management Recommendations	Category grading	Root Protection Area (m ²)	Root Protection Radius (m)
G6	Norway maple Japanese cherry	6. AV	205 AV	N: 3 E: 3 S: 3 W: 3	Crown: 2 AV Branch: 2 AV	Early mature. – Mature	Fair	Good	Linear group located within amenity grass area. Single stem specimens with typical crown structures. Visible from the public realm. Remove seven individuals from within group to facilitate development.	B1+2	19.0	2.5
T14	Tibetan cherry (<i>Prunus serrula</i>)	11	200	N: 3 E: 3 S: 3 W: 3	Crown: 4 AV Branch: 2 AV	Mature	Good	Fair	Single stem specimen with fastigate growth habit. Ideally suited for its location within a formal garden. Retain and protect throughout development.	B1+2	18.1	2.4
G7	Lawson cypress Atlas cedar. silver birch. Tibetan cherry. Willow spp	12. AV	240 AV	N: 4 E: 4 S: 4 W: 4	Crown: 1 AV Branch: 1 AV	Mature	Fair	Fair	Dense group of predominantly poorly formed specimens. Provides screening from adjacent land. Remove 15 individuals from within group to facilitate development.	C1+2	26.1	2.9
T15	silver birch (<i>Betula pendula</i>).	8	240	N: 3 E: 4 S: 2 W: 4	Crown: 2 AV Branch: 1 West	Mature	Good	Fair	Crown formed of two co-dominant stems arising from main stem at 1m. Crown suppressed on south side due to proximity of T16. Remove to facilitate development.	B1+2	26.1	2.9
T16	field maple (<i>Acer campestre</i>)	7	155 MS	N: 2 E: 3 S: 2 W: 3	Crown: 0.5 AV Branch: 0.5 AV	Early mature	Good	Fair	Poor crown structure formed of numerous co-dominant leaders arising at 0.5m. Remove to facilitate development.	C1	10.9	1.9
T17	European ash (<i>Fraxinus excelsior</i>)	7	240	N: 4 E: 4 S: 4 W: 4	Crown: 0.5 AV Branch: 0.5 AV	Mature	Good	Good	Single stem specimen with well balanced crown structure. No visible evidence of defect. Visible from the public realm. Remove to facilitate development.	B1+2	26.1	2.9

Survey date: Thursday 24th January 2019

Tree Survey Schedule

Site: Ellenor House, Coldharbour Road, Gravesend, Kent. DA11 7HQ.



Surveyor: Luke White (*FdSc Arboriculture M.Arbor.A*)

Tree ref.	Species	Height (m)	Stem diameter (mm)	Branch spread (m)	Crown clearance (m)	Age class	Physiological condition	Structural condition	Comments and Preliminary Management Recommendations	Category grading	Root Protection Area (m ²)	Root Protection Radius (m)
T18. PA	Norway maple (<i>Acer platanoides</i>)	10	400	N: 4 E: 4 S: 4 W: 4	Crown: 2 AV Branch: 1 AV	Mature	Good	Fair	Single stem specimen with well balanced crown structure. No visible evidence of defect. Crown overhanging public footpath. Visible from the public realm. Retain and protect throughout development.	B1+2	72.5	4.8

Appendix 3
Tree Retention Plan

Appendix 4
Root Protection Area Incursion Plan



Various hard and soft landscaping activities are proposed within the rooting area of retained trees in G6 and G7 and individual tree T14. To allow retention of trees trees, new surfacing shall utilise an above ground, engineered solution and soft landscaping activities shall be undertaken sympathetically as per the arboricultural method statement.

Extension of existing car park will encroach rooting areas of 6 trees within G2 by up to 5% their total root mass. Resultant impacts are considered minor and the use of an engineered solution is deemed unnecessary.

Cycle store encroaches the rooting area of a single tree within G2 by 4% its total root mass. Level of encroachment is deemed minimal.

New services building will encroach the rooting area of 11 trees within G2 by up to 13% their total root mass. Excavations will be required in order to tie the new foundation slab in to existing ground levels. Associated root impacts are deemed minor and therefore tree removal and/or the use of engineered solutions is not necessary.

New generator will be installed on a reinforced concrete raft to allow retention of adjacent tree within G2.

Drawing no: 5037/19/C	Rev: -	Sheet number: 1 of 1
Client and site:		
Ellenor House Coldharbour Road, Gravesend, Kent. DA11 7HQ.		
Drawing title: Root Protection Area Incursion Plan		
Date drawn: 04/11/2021		
Scale: 1:250 at A1		
Drawn by: LW	Checked by: PD	

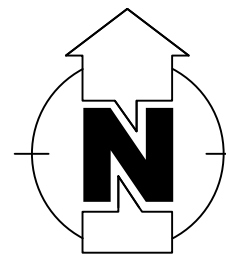
Key:

- Root protection area of category B tree* to be retained
- Root protection area of category C tree* to be retained
- Root protection area of category U tree* to be retained
- Canopy of tree to be retained
- Root protection area incursion

* Tree categorised in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.

Tree Survey Schedule contained within the arboricultural report contains further information for each tree.

This drawing should be viewed in colour.



Appendix 5
Tree Protection Plan



New footpath installed above the existing ground level using an engineered, cellular confinement solution as stipulated within the arboricultural method statement. Installation shall occur as a final phase of development during the soft landscaping phase.

Drawing no: 5037/19/DRev: -Sheet number: 1 of 1

Client and site:

Ellenor House
Coldharbour Road, Gravesend, Kent. DA11 7HQ.

Drawing title: Tree Protection Plan

Date drawn: 04/11/2021

Scale: 1:250 at A1

Drawn by: LWChecked by: PD

Key:

Root protection area of tree to be retained

Canopy of tree to be retained

Tree protection fencing

Construction exclusion zone

New engineered surface

Tree Protection Fencing Specification

Key

1

Standard scaffold poles

2

Heavy gauge 2 m tall galvanized tube and welded mesh infill panels

3

Uprights 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

Tree Protection Warning Sign

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

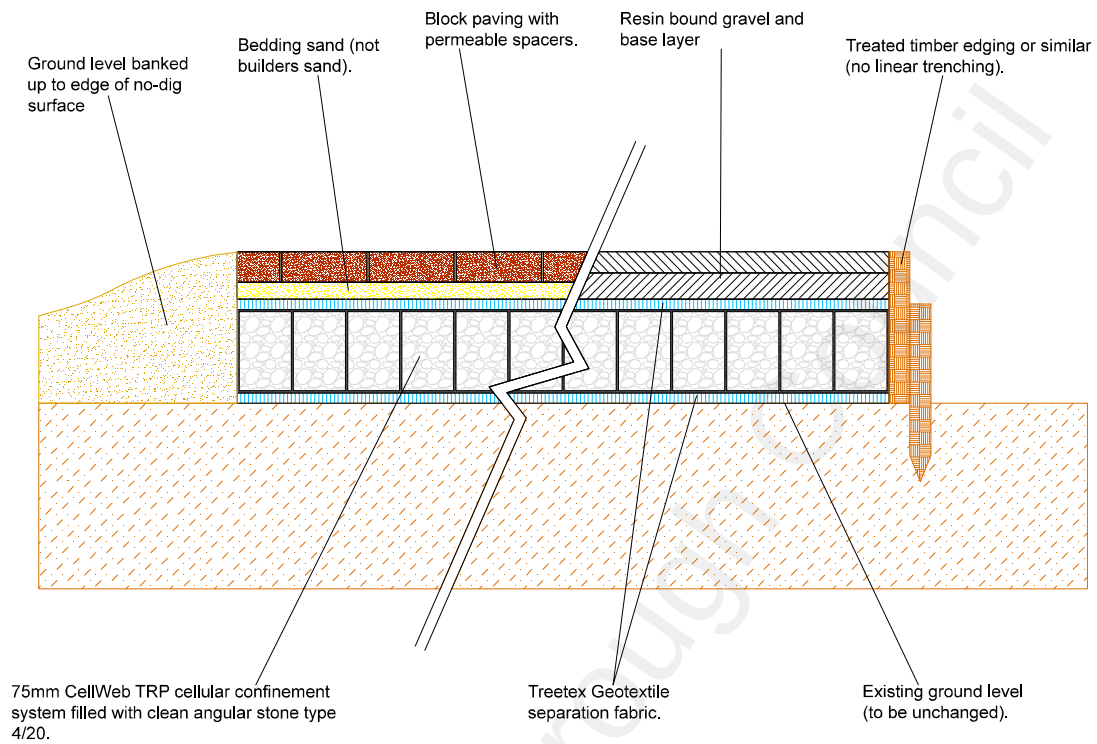
TREE PROTECTION AREA
KEEP OUT !

(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

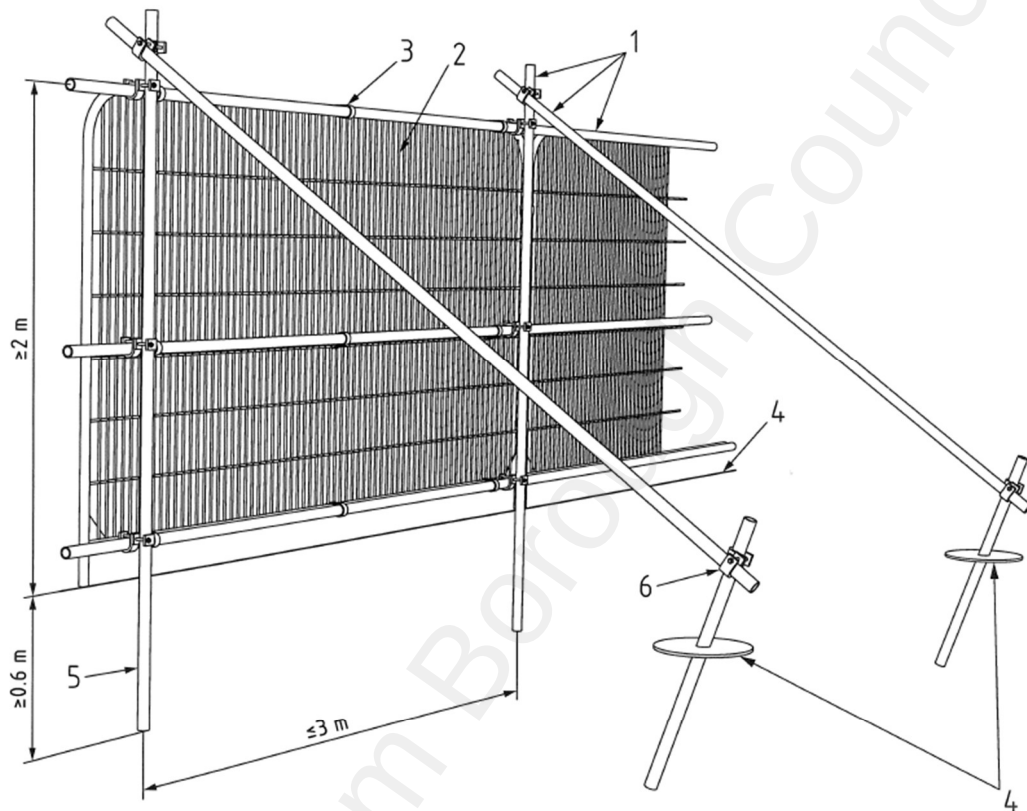


Appendix 6: Example No-dig Surface Specification



Appendix 7

Tree Protection Fencing Specification



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

Appendix 8

Example Protective Fencing Sign



Phlorum Limited

Head Office & Registered Office:

Unit 12
Hunns Mere Way
Woodingdean
Brighton
East Sussex
BN2 6AH
T: 01273 307 167

Northern Office:

Ground Floor
Adamson House
Towers Business Park
Wilmslow Road
Didsbury
Manchester
M20 2YY
T: 0161 955 4250

Western Office:

One Caspian Point
Pierhead Street
Cardiff Bay
Cardiff
CF10 4DQ
T: 029 2092 0820