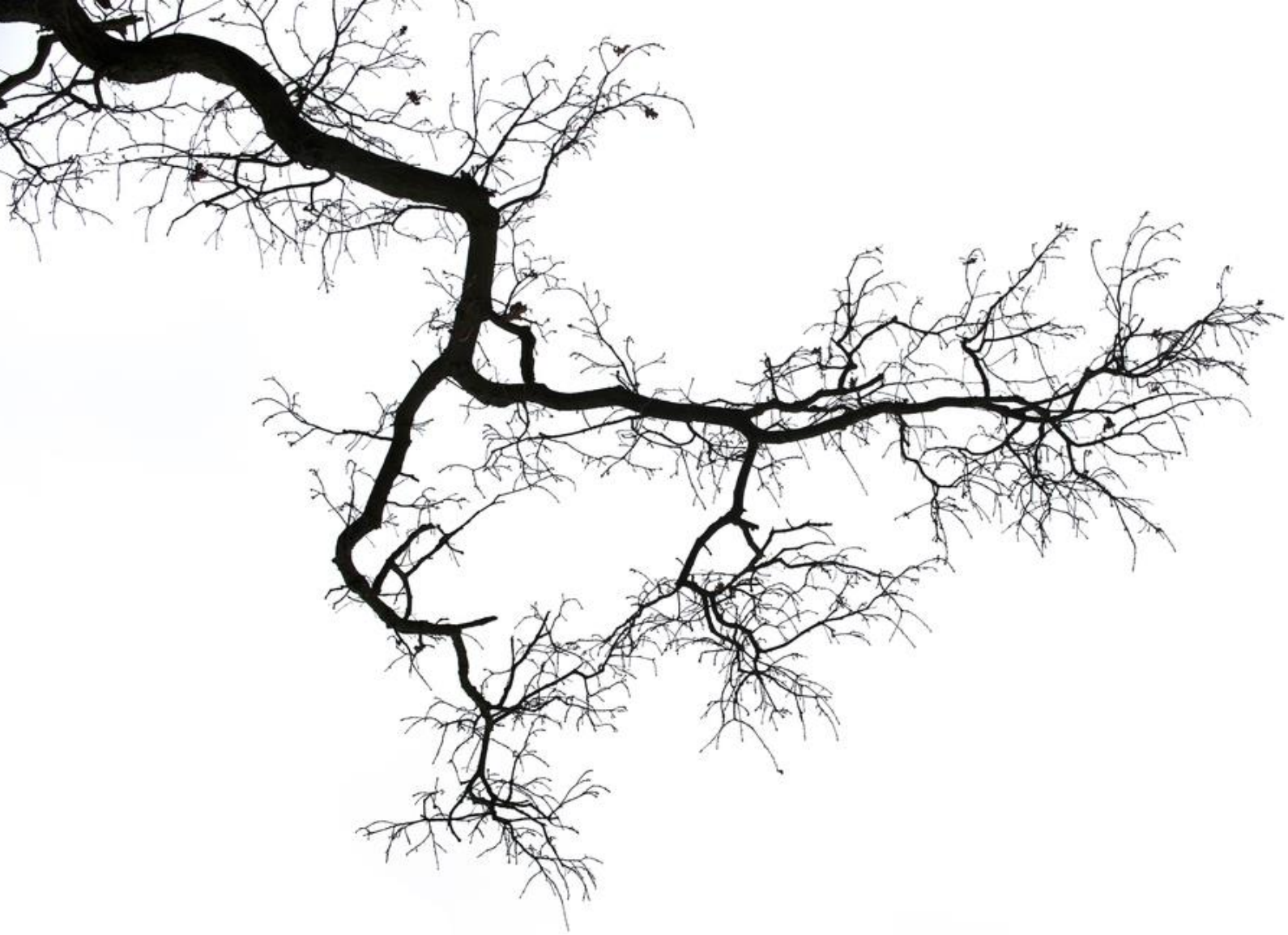


URBAN GREEN

Arboricultural Report

Aldi Stores Ltd

High Street
Royston
S71 4RF

November 2014

Report Summary

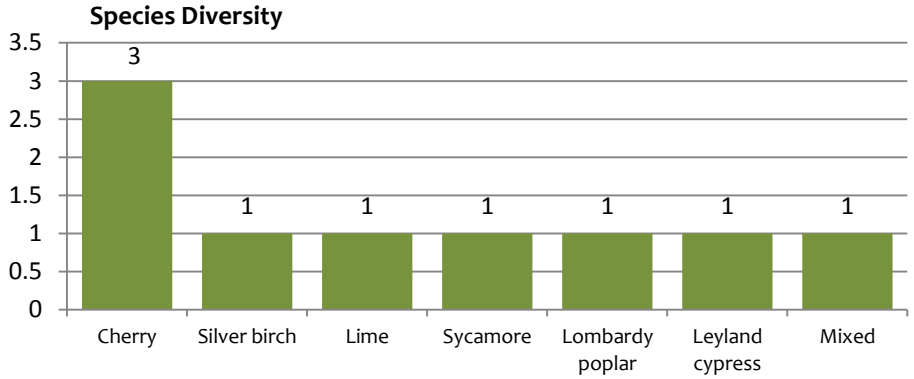
Site Location: High Street, Royston, S71 4RF

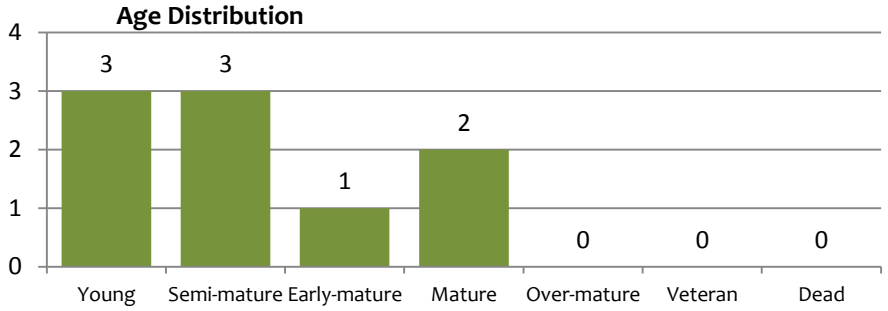


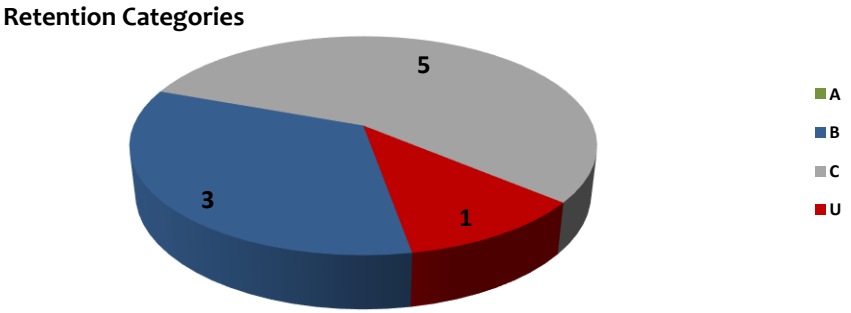
Extent of the survey



Site location







Summary

- It is proposed to construct a food store with associated parking and landscaped areas.
- A survey was conducted to BS5837. The condition of all trees on site was assessed and a Retention Category was allocated. Tree positions and Root Protection Areas are plotted on a Tree Constraints Plan.
- An Arboricultural Impact Assessment and Method Statement have also been included.
- We recommend that this report and the constraints plan are used within the design process to help achieve a proposal with minimal impact.
- Where possible category A and B trees should be retained and works within their Root Protection Area should be undertaken in a sympathetic manner. General advice is included within this report as to how this may be achieved.
- The majority of trees are located adjacent to the site boundary so there is a significant window for development with little impact on trees.
- So long as tree protection measures are enforced there is no reason to expect any significant arboricultural impact since the retained trees are situated away from the proposed development.

These points are further discussed in sections 4 and 5.

Tree Protection Status

We are informed that:

- The site is not within a conservation area.
- There is a TPO affecting a tree within the site.

See Section 3 for further details.

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1. Introduction

1.1. Instructions and references

1.1.1. All trees, regardless of their statutory status, are a material consideration in a planning application. It is therefore essential that the potential effects of any Proposed Development on existing trees are fully assessed.

1.1.2. We have been instructed by Aldi Stores Ltd to carry out an Arboricultural Survey to British Standard 5837:2012 guidelines at the site location and produce our findings in a report. We have also been instructed to provide an Arboricultural Impact Assessment to evaluate the impact on trees present and an Arboricultural Method Statement to provide detailed guidance on the protection of retained trees throughout the construction process.

1.1.3. A scaled plan has been provided with all tree positions already plotted.

1.1.4. A plan outlining the development proposals has been used to form the basis of the Arboricultural Impact Assessment in Section 4.

1.2. Scope and limitations of the report

1.2.1. The report is designed to accompany a planning application following guidance set out in BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations.

1.2.2. The Arboricultural Impact Assessment (AIA) will appraise the Proposed Development in relation to its effect on surveyed trees and any potential impact on local amenity by appraising the following:

- General construction operations.
- Soil compaction in Root Protection Areas (RPAs).
- Installation of hard services including drives and paths.
- Potential physical damage to roots, stems and aerial parts of trees.
- Removal or pruning of trees.
- Boundary Treatments.

1.2.3. The impact assessment will also appraise the effect that the retained trees may have on the development such as potential nuisance caused by excessive leaf/fruit litter, lighting levels within the proposed building and grounds and the potential damage to structures.

1.2.4. The Arboricultural Method Statement (AMS) is designed to advise on tree management and protection during the planning process.

1.2.5. All processes that have the potential to impact on trees should be considered in the wider project management of the site. This can be done by instructing an arboricultural consultant as part of the management team. This will ensure that any works that can affect trees will be monitored and supervised throughout the project.

1.2.6. The report is based upon a visual inspection. The consultant shall not be responsible for events that happen after the date of the report due to factors that were not apparent at the time, and the acceptance of this report constitutes an agreement with the guidelines and the terms listed in this report.

1.2.7. Any defects seen by a contractor or the employer that were not apparent to the consultant must be brought to the consultant's attention immediately.

1.2.8. The consultant accepts no liability in respect of the trees unless the recommendations of this report are carried out under his supervision.

1.2.9. Any physical alterations to site conditions subsequent to this report may have the potential to change/invalidate the findings and recommendations of this report.

1.2.10. Assessing the potential influence of trees upon load bearing soils, beneath existing and proposed structures resulting from water abstraction by trees or rehydration of shrinkable soils was not included in the contract brief and is therefore not considered in the report. The consultant cannot be held responsible for damage arising from such action.

1.2.11. Trees have the potential to cause indirect damage to existing and proposed structures by desiccation of the soil. Where soils are suspected to be shrinkable, they should be analysed by laboratory testing to determine the plasticity index. This will allow management decisions to be made relating to foundation depths, new planting and the effect of tree removals.

1.2.12. Potentially hazardous trees are highlighted and appropriate recommendations are made. However, this report should not be seen as a substitute for a full tree risk assessment or management plan which are specifically designed to minimise risk and liability associated with responsibility for trees.

2. Site overview

2.1. Location

2.1.1. The site is situated in a medium density residential area. The co-ordinates are 53°35'51.78"N, 1°27'33.04"W, the OS reference is SE 3589011374 and the altitude is 71m above sea level.

2.1.2. The survey was limited to the area shown in Figure 1 which is sufficient to consider the impact of the proposals.

Figure 1.



3. Tree condition and recommendations

3.1.1. The recommendations found in the Tree Data Schedule in Appendix 1 are based on assessments from a health and safety perspective and are made regardless of the Proposed Development. Section 3 discusses in further detail our findings during the site visit in relation to the health and safety of the trees, and future users of the site.

3.2. Summary of findings

3.2.1. T2 is potentially hazardous and will require removal in order to prevent possible damage due to tree or limb failure. This should be prioritised as indicated on the Tree Data Schedule.

3.2.2. G7 is potentially hazardous and requires works in order to make it safe. This should be prioritised as indicated on the Tree Data Schedule.

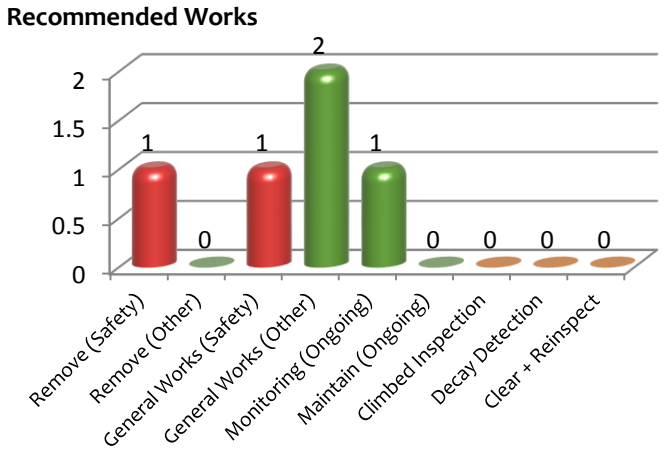
3.2.3. Trees which are in an acceptable condition at present but which require works in order to prevent future defects from developing are T1 and T6. Such work is generally less of a priority.

3.2.4. T3 is considered to be in an acceptable condition at present but has defects which require monitoring.

3.2.5. All other trees are deemed to be in an acceptable condition and no further works have been recommended.

3.3. Work priority and future management

3.3.1. The Tree Data Schedule in Appendix 1 details what works are required to individual trees in order to ensure that they are in an acceptable condition. The chart below summarises these works:



Key:

Bars coloured red indicate hazardous trees.

Bars coloured orange indicate trees which may be hazardous and require further investigation.

Bars coloured green indicate trees which are not hazardous and the work is therefore of a lower priority.

3.3.2. The following table suggests a schedule for prioritising works required to individual specimens, as outlined in the Tree Data Schedule in Appendix 1, in order to ensure that the associated risks are abated:

Priority	Definition	Tree Number
Urgent	As soon as possible	None
Very High	Within 1 Month	None
High	Within 3 Months	T1, T2, T6, G7
Moderate	Within 1 year	T3
Low	Within 3 years	None

3.3.3. Upon completion of any recommended works, the trees will be in an acceptable condition from a health and safety perspective. However, they should be regularly inspected according to the following suggested schedule:

Inspection Frequency (years)	Tree Number
0.5	None
1	T1, T3, T6, G7
1.5	None
3	T4, T5, T8, G9

3.4. Tree protection status

3.4.1. We have been informed by the planning department at Barnsley Metropolitan Borough Council that the site is not within a conservation area and there is a TPO affecting a tree within the site.

3.5. Tree protection – general advice

3.5.1. It is recommended that the local authority is consulted before any tree works are undertaken, as new TPOs may have been created since the time of enquiry, and heavy fines exist for unauthorised works to protected trees.

3.5.2. A TPO can be overridden by planning consent, where tree removal is necessary to enable the Proposed Development to proceed.

3.5.3. All works to protected trees require consent from the local authority, including pruning. However, this does not include the removal of dead wood, which is exempt. Although dead and dangerous trees are exceptions to a TPO, it is advisable to give the local authority five days' notice in writing of any intended removal.

3.5.4. It is an offence to remove more than $5m^3$ of timber in any one calendar quarter without having first obtained a felling licence from the Forestry Commission. It must be noted, however, that this excludes sites where planning permission has already been granted.

3.6. Tree works

3.6.1. All specified tree work is to be carried out in accordance with BS 3998:2010 Tree work - Recommendations by a professional and specialist arboricultural contractor, who carries the appropriate experience and insurance cover.

3.7. Wildlife

3.7.1. Prior to the commencement of any tree works, the trees should be assessed for the presence of protected species, some of which are subject to the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010. Where there is evidence that bats, birds or other protected species are present, the statutory nature conservation organization needs to be consulted prior to commencement of any tree work operations.

4. Arboricultural Impact Assessment (AIA)

4.1. Summary of the development

4.1.1. It is proposed to construct a food store with associated parking and landscaping.

4.2. Tree constraints

4.2.1. BS 5837:2012 recognises that conflicting requirements of the planning system for development means that trees are only one factor which need to be taken into consideration. Although there may be certain specimens that can pose significant constraints to development due to their importance, it is essential that inappropriate tree retention is avoided.

4.3. Summary of impact on trees

4.3.1. Trees can be adversely affected on development sites if their protection is not factored into the wider project management of onsite operations. We have transposed the tree survey plan over plans detailing current proposals in order to assess the impact on surveyed trees.

4.3.2. The table below summarises the trees that may be affected by current proposals and reasons for the impact identified.

Impact identified	Reason for impact	Trees affected			
		Category A	Category B	Category C	Notes
Tree loss	Facilitate development		T6	T2, G9 (partial loss)	Replace as part of landscape proposals and Local Authority requirements
Potential soil compaction in RPA	General construction activity		G7	T1, T3, T4, T5, G9	Temporary Protective Fencing to be installed as per the

					Tree Protection Plan in Appendix 3

4.4. Impact of tree loss

4.4.1. The majority of trees on the site are of low value and as such can be mitigated against with landscape proposals.

4.5. Impact of general construction activity

4.5.1. Tree protection fencing will need to be erected before any construction activity takes place to avoid damage to trees directly by mechanical damage or indirectly due to soil compaction in the Root Protection Areas (RPAs).

4.5.2. It is not always practical to fence off the complete RPAs, therefore special care is required in the areas not protected by temporary protective fencing, as indicated on the Tree Protection Plan in Appendix 3, to avoid soil compaction.

4.5.3. It is essential that all site personnel, including temporary contractors, are made aware of the recommendations in Section 5 and the restrictions which apply.

4.6. Changes in ground surfaces

4.6.1. The majority of tree roots are found in the upper 600mm of the soil profile. Rooting conditions become less favourable at depth due to less oxygen availability and nutrient content where organic matter decreases.

4.6.2. For good soil health, there needs to be a constant supply of air and water available to roots to allow successful plant functioning. The structure of a healthy soil has sufficient air space between the soil particles; when compaction is applied, the air spaces get squeezed out, leading to anaerobic conditions and a reduction in the soils ability to hold onto vital water and nutrients.

4.6.3. T3 will require ground surface alterations to facilitate the access road to the car park. In this area it is suggested that a no dig solution is utilised in order to avoid unnecessary root disturbance and compaction.

4.6.4. A cellular confinement system acts to “spread the load” on soft ground by distributing the load of any given traffic over a larger surface area. For further information regarding the implementation of the cellular confinement system please refer to Appendix 4.

4.6.5. The design of the cellular confinement system should be carried out in consultation with an engineer and to manufacturers' specifications which can advise on the necessary load bearing capacity of the structure and the correct installation methods. Please note that methodology used to install the cellular confinement system must avoid the use of machinery or heavy plant within the RPA.

4.6.6. Once the development is completed it is recommended that all trees are monitored to ensure the safe retention of trees on site.

4.7. Boundary Treatments

4.8. To the north of the site it is proposed to construct a brick wall that will encroach into the RPA of G7. G7 is situated on third party property and as such detrimental construction activity must not occur. In order to construct the wall it is recommended that a trial dig using an air-spade is carried out to ascertain details on the full nature of rooting activity in this area. Following the exploratory dig the data gained can inform the design of pile foundations. Alternatively a wall with discontinuous footings that bridge the RPA of G7 could be utilised.

5. Arboricultural Method Statement (AMS)

5.1. Summary of the impacts identified

5.1.1. The following impacts have been identified during the AIA and will be discharged within this AMS:

- Tree loss
- General construction activity
- Changes in ground surfaces
- Changes in ground levels
- Boundary Treatments

5.2. Development implementation phases

The arboricultural consultant may need to be involved in some or all of the following processes.

Phase of Development	Arboricultural input
Phase 1 - Site preparation	• Pre-construction tree surgery works • Access facilitation pruning • Demolition of existing structures • Installation of protective fencing and ground protection • Pre-development inspection
Phase 2 – Construction process	• Demolition of existing structures • Foundations in the RPA • Installation of services • Working in the RPA • New surfaces in the RPA

	• Hard landscaping
Phase 3 – Post-construction	• Removal of protective fencing • Soft landscaping • Signing off

5.3. Phase 1 – Site preparation

5.4. Tree surgery works

5.4.1. Tree works that are recommended in the Tree Data Schedule in Appendix 1 are of a general maintenance nature and can be carried out at any time as per recommendations.

5.4.2. Tree works required to facilitate the development will be carried out prior to the commencement of any onsite operations. This should allow sufficient space for approved construction to be carried out.

5.4.3. Any unforeseen tree works that become apparent during the construction process will require written consent from the Local Authority Tree Officer.

5.5. General construction activity

5.5.1. All operations that could affect trees on and adjacent to the site must be considered as part of the project management of the Proposed Development. It is therefore imperative that an Arboricultural Consultant is appointed as part of the design and management team to advise on pre-development issues and supervise on-site operations.

5.5.2. The Arboricultural Consultant may also have an advisory role in the preparation of site including tree surgery works and the protection of trees during demolition processes.

5.5.3. The AMS accompanies the AIA and should be read in conjunction with the Tree Protection Plan. It is essential to adhere to the recommendations within this document during on-site operations to ensure the successful retention of trees as part of the Proposed Development. Compliance with the AMS will be a requirement of all relevant contracts associated with the Proposed Development.

5.5.4. The AMS aims to provide general guidelines to onsite personnel that must be followed when working close to trees on construction sites. All site personnel should have access to this document and be made aware of any sections that may be relevant to their specific area of work.

5.5.5. The developer will inform the Local Planning Authority (LPA) within twenty four hours if the Arboricultural Consultant is replaced.

5.6. Potential damage to above ground parts of retained trees

5.6.1. Care will be taken when planning site operations to ensure that wide or tall loads or plant with booms, jibs and counterweights are able to operate without coming into contact with retained trees. Any contact has the potential to cause life limiting damage. It is therefore essential that any activities in close contact with retained trees is carried out under the supervision of a banksman to maintain sufficient clearances.

5.6.2. Any tree damage must be reported to the Arboricultural Consultant or Local Authority Tree Officer as unreported damage could lead to the structural instability.

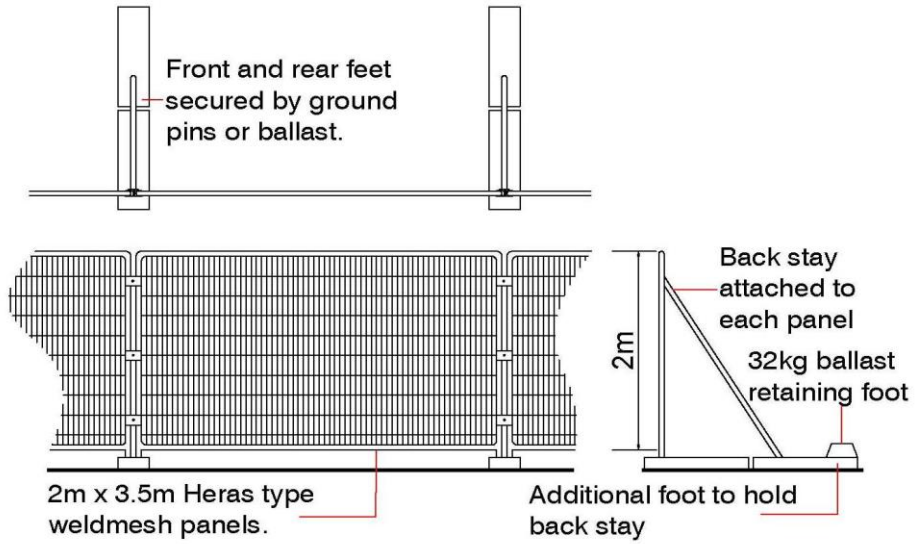
5.7. Protective fencing

5.7.1. Temporary protective fencing will need to be installed in the positions indicated on the Tree Protection Plan in Appendix 3 prior to the commencement of any construction activities on site including the delivery of materials and site facilities.

5.7.2. Any fencing that is damaged so that it is no longer able to protect retained trees must be replaced/repaired immediately with appropriate fencing.

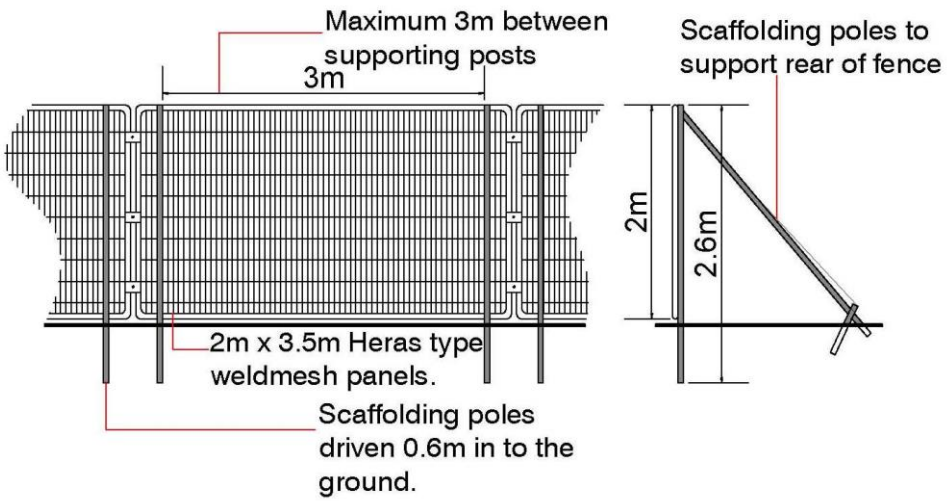
5.7.3. All RPAs will be protected by 'Heras' steadfast type fencing with back stay supports where construction activity is expected to be minimal. (Fig 2. below)

Fig 2. Temporary Protective Fencing with back stay supports



5.7.4. In areas of site where construction activity is expected in close proximity to RPAs, it will be necessary to employ the more robust 'in-ground' system following BS 5837 guidelines. (Fig 3. below)

Fig 3. Temporary Protective Fencing

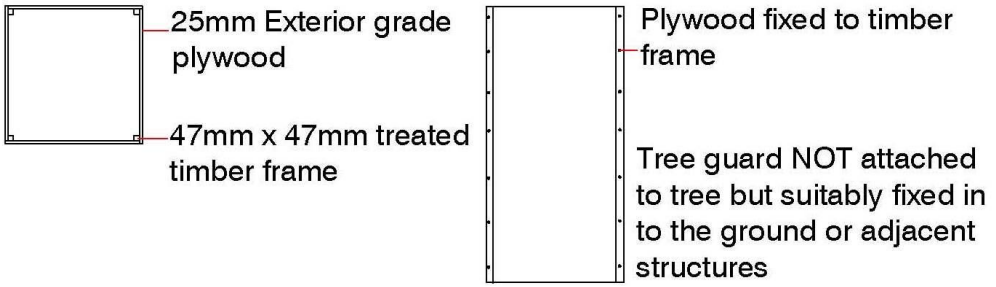


5.7.5. The 'in-ground' system involves driving vertical scaffold poles approximately 0.6m into the ground onto which are affixed horizontal scaffold poles and bracing struts. 2m high anti-climb weldmesh panels are then wired to the scaffold framework. The vertical scaffold poles should be at a maximum of 3m apart.

5.7.6. No fixing shall be made to any tree and all possible precautions shall be taken to prevent damage to the tree roots when locating uprights.

5.7.7. Where space is limited, it is sometimes necessary to construct a temporary tree guard to physically protect the main stem of the tree (Fig 4. below). This should be made by joining together 4 X 25mm Exterior Grade pieces of plywood to 47mm X 47mm treated timber posts to create a box shaped frame which is attached to the ground or adjacent structures. No fixings are to be made to the tree and suitable ground protection should be employed within the RPA of the tree (see Section 5.9).

Fig 4. Temporary Protective Fencing



5.7.8. A 600mm x 300mm warning sign reading “TREE PROTECTION AREA KEEP OUT” shall be fixed to every 10m of protective fencing. (Fig 5. below)

Fig 5. Tree Protection Sign



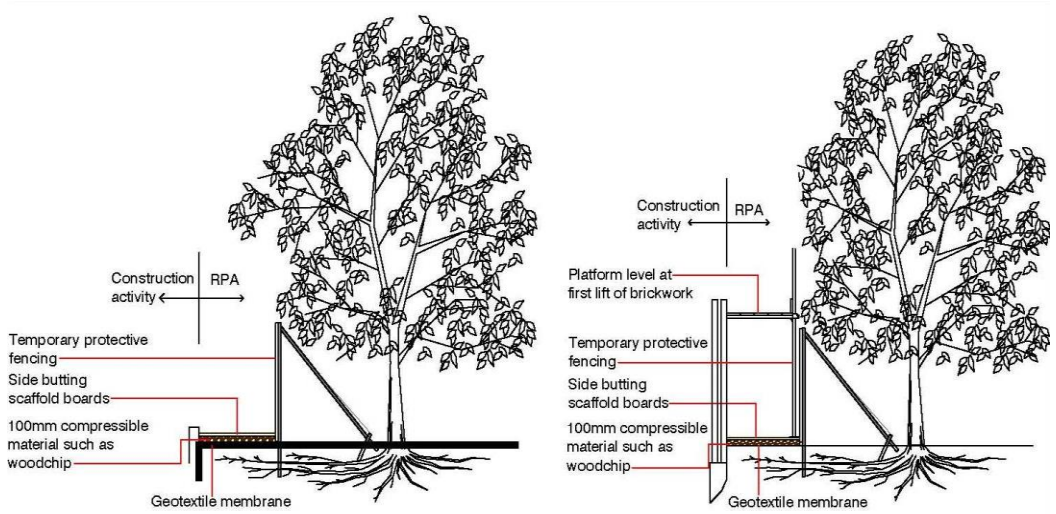
5.8. Ground protection for wheeled or tracked vehicles

5.8.1. All vehicles will use existing hard surfaces. However, it may be necessary on occasion to drive plant machinery within the RPA. To avoid compaction of the soil during construction, a minimum of 100mm compressible material, followed by temporary interconnected road plates or similar that is capable of sustaining the expected loads should be installed. This system will ensure that the weight is evenly distributed over the affected area.

5.9. Ground protection for pedestrians or light vehicles

5.9.1. The primary method of ground protection is the installation of a compressible layer (e.g. woodchip) over a geotextile fabric with side butting scaffold boards. (Fig 6. below)

Fig 6. Ground Protection in RPA



5.9.2. Ground protection measures whilst working the RPA must be capable of supporting the expected loads and avoid compaction of the soil.

5.9.3. The boarding will be left in place until the construction works are finished.

5.9.4. Scaffolding may first be erected with the uprights on spreader boards and the ground protection installed around the uprights.

5.10. Pre-development inspection

5.10.1. The site will be inspected by the appointed Arboricultural Consultant or Local Authority Tree Officer following any facilitative tree surgery works and the installation of protective fencing and ground protection measures.

5.11. Phase 2 – Construction process

5.12. Demolition and removal of surfaces in the RPA

5.12.1. During demolition, the following restrictions will apply:

- Where direct damage by falling masonry is likely, the tree should be protected by exterior grade plywood sheets constructed around the main stem.
- The main body of any mechanical excavator will operate outside the RPA.
- Masonry will be pulled away from trees where possible.
- When breaking masonry, a fine water spray will be used to minimise dust particles.
- Excessive dust particles on trees will be removed each day by spraying with water.

5.12.2. Hard surfaces should be kept in place for as long as possible during construction works in order to prevent soil compaction in the RPA.

5.12.3. During surface removal, the following restrictions will apply:

5.12.4. Only hand operated tools will be used to lift existing surfaces and sub-base. No mechanical excavators are to be used.

5.12.5. No excavation below the existing sub-base will occur.

5.12.6. Exposed roots are to be treated as in Section 5.13 below.

5.12.7. All surface removal within the RPA will be supervised by the Arboricultural Consultant or the Local Authority Tree Officer.

5.13. Excavation in the RPA

5.13.1. Any necessary excavation must be carried out using hand tools to avoid direct damage to the protective bark of tree roots. It may be possible in some instances to use specialised equipment such as high air pressure machinery to excavate the soil with minimal disturbance to roots.

5.13.2. Exposed roots will be wrapped in dry, clean Hessian sacking to prevent desiccation and to protect from rapid temperature changes. In warmer weather, the sacking should be kept moist by regular watering. Sacking should be removed before backfilling.

5.13.3. Roots less than 25mm diameter may be pruned back, preferably to a growing point. A sharp cutting tool such as bypass secateurs or a handsaw should be used to leave the smallest wound possible. Roots greater than 25mm in diameter should be retained wherever possible.

5.13.4. Root pruning should be carried out under the supervision of the Arboricultural Consultant or the Local Authority Tree Officer to ensure that only roots necessary to facilitate the development will be removed and the long-term well-being of retained trees is maintained.

5.13.5. Backfilling of any excavation should be carried out by hand to avoid direct root damage by excessive compaction and should include, where possible, the replacement of inert granular material mixed with sharp sand (not builder's sand) around retained roots.

5.14. Temporary site cabins

5.14.1. All storage facilities and deliveries will make use of existing hard surfaces to avoid unnecessary compaction within RPAs. The locations will be agreed in writing with the LPA prior to delivery and will remain in the agreed locations unless approved by the LPA.

5.14.2. If storage facilities require siting within RPAs, every effort will be made to ensure that any damage to aerial parts of retained trees is avoided and that appropriate footings are used to avoid root damage or compaction of the soil.

5.15. New structures in the RPA

5.15.1. No concrete strip foundations are to be installed within the RPA of any retained tree. Traditional strip foundations can cause an unacceptable amount of damage during the excavation process where roots are easily torn by mechanical excavators.

5.15.2. Small, light structures such as sheds and bin stores can be laid directly onto the soil surface without the need for significant excavation. A small amount of excavation may be permissible to provide a level surface, however, no roots over 25mm in diameter should be severed without the advice of an arboriculturist or Local Authority Tree Officer.

5.15.3. Traditional footings should not be used within the RPA for the construction of non-load bearing walls. It may be possible however, to construct walls in proximity to trees by bridging existing roots with lintels.

5.15.4. Where foundations are to be laid in the RPA of retained trees, root damage can be minimized by using small diameter piles located to avoid major tree roots. The proposed area for pile installation should be dug by hand to a depth of approximately 750mm in order to ascertain the position of roots present. Beams, slabs and suspended floors should be laid at or above ground level and cantilevered, as necessary, to avoid tree roots.

5.15.5. Where piling is to be installed in proximity to trees, the smallest practical pile diameter should be used as this reduces the possibility of striking major tree roots, and reduces the size of the rig required to sink the piles. The latter is particularly important where piling within the branch spread is proposed, as mini-rigs reduce the need for access facilitation pruning. Sheathed piles protect the soil and adjacent roots from the potential toxic effects of concrete.

5.15.6. Backfilling of any excavation should be carried out by hand to avoid direct root damage by excessive compaction and should include, where possible, the replacement of inert granular material mixed with sharp sand (not builder's sand) around retained roots.

5.15.7. Any pruning should be carried out under the supervision of the Arboricultural Consultant or the Local Authority Tree Officer to ensure that only branches necessary to facilitate the Proposed Development will be removed and the long-term well-being of retained trees is maintained.

5.16. Utilities

5.16.1. All services will need to be designed to avoid the RPAs of retained trees including foul and surface water drains, electricity, land drains telephone and cable services, soak-aways, lighting, gas and water.

5.16.2. The installation of underground utilities within the RPA should not be considered unless it is absolutely necessary. Trenching can cause an unacceptable amount of damage to tree roots.

5.16.3. The National Joint Utilities Group publication, NJUG10 recommends the following precautions when working in the RPA:

- No excavation should be carried out using machinery.
- When digging by hand, carefully work around roots, retaining as many as possible.
- Do not sever roots over 25mm in diameter without the consent of the Arboricultural Consultant or Local Authority Tree Officer.

- Any root pruning will be carried out using a sharp tool (eg secateurs or handsaw). Make a clean cut and leave as small a wound as possible.
- Backfill the trench with an inert granular material and topsoil mix. Compact the backfill with care around the retained roots. On non-highway sites backfill only the excavated soil.
- Do not repeatedly move or use heavy mechanical plant except on hard standing.
- Do not store spoil or building material, including chemical and fuels.
- Protect roots with dry sacking if they are to be left exposed overnight when there is a risk of frost. Sacking must be removed before backfilling.

5.17. Working in the RPA

5.17.1. Special care will need to be undertaken when working in the RPAs that are not protected by temporary fencing. The RPA is defined on the Tree Protection Plan Appendix 3 by coral hatched circles surrounding retained trees. Where necessary, temporary protective fencing will be placed in the marked positions, beyond which is a Construction Exclusion Zone (CEZ). This zone precludes all construction activity, with the sole exception of specified arboricultural works that have been agreed by all parties and under the supervision of an arboriculturist.

5.18. RPAs explained

5.18.1. The RPA is an area of ground around the base of a retained tree, which is calculated in relation to the stem diameter, where disturbance should be kept to a minimum and avoided if at all possible.

5.18.2. The majority of tree roots grow within the upper 600mm of the soil profile where most nutrients are available as the result of the decomposition of organic matter close to the surface. Rooting conditions become less favourable at depth as the soil density increases, creating anaerobic conditions.

5.18.3. It is essential that roots are protected from construction works including physical damage from excavation and changes in soil structure from compaction and changes in ground levels.

5.19. Construction Exclusion Zone (CEZ)

5.19.1. No construction activity will take place unless otherwise stated in this report or agreed in writing with the LPA prior to required works. Any required works will be carried out under the supervision of the Arboricultural Consultant or Local Authority Tree Officer

5.19.2. Any materials which have the potential to contaminate the soil, e.g. concrete mixing and diesel oil will not be discharged within 10m of the tree stem. This should take into consideration the topography of the site and slopes, to avoid materials such as concrete washings flowing towards retained trees.

5.19.3. Fires shall not be lit in a position where their flames can extend to within 5m of foliage, branches or trunk. This will depend on the size of the fire and the wind direction.

5.19.4. Notice boards, telephone cables or other services should not be attached to any part of retained trees.

5.20. Surface design

5.20.1. It is essential to maintain adequate supplies of water and oxygen for trees through the soil. New impermeable surfacing should not cover more than 20% of the RPA.

5.20.2. Design and construction specification should take account of further growth.

5.20.3. Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. They should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

5.20.4. It may be necessary to lay paving and other surfaces on a flexible base to allow movement and to facilitate relaying if distortion becomes excessive due to the activity of tree roots.

5.20.5. Edgings and associated foundations and haunchings can damage tree roots. This should be avoided within the RPA by either the use of alternative methods of edge support or by not using supports at all.

5.20.6. Where wheeled or heavy pedestrian traffic is expected in the RPAs of retained trees, it will be necessary to construct the new surface using a cellular confinement system with a permeable surface. A supplementary method statement will be included in the appendices if necessary.

5.21. Changes in ground level

5.21.1. Changes in ground level can be harmful to trees where stripping or filling of soil is carried out in the RPA. It is therefore important that no significant changes in level occur within the RPA of retained trees.

5.22. Pedestrian Paving

5.22.1. Any pedestrian paving or patios that may be installed over rooting zones, as part of a post construction landscaping scheme, should be constructed in a manner sympathetic to tree roots. Excavation should be limited to 100mm. Paving with a thickness of 50mm bedded on mortar, or sand bearing directly onto the ground, with a finished surface which is level with existing ground levels will be acceptable. No retaining kerbs should be used.

5.23. Boundary treatments

5.23.1. Where fencing is to be installed within RPAs of retained trees, post holes will be excavated by hand and kept as narrow as possible. Trial holes will be dug using a manually operated soil augur in order to position post holes to avoid major roots.

5.23.2. Exploratory post holes will be dug before committing to positions. If any roots in excess of 25mm are encountered they are to remain intact and the post hole will be relocated to avoid them. The fencing system must permit such flexibility (i.e. where fixed panel widths are used, all post holes must be excavated before committing to the final location)

5.23.3. All post holes will be excavated by hand and kept as narrow as possible (maximum diameter 300mm).

5.23.4. Any roots in excess of 10mm which are severed will be neatly pruned back with secateurs. This will encourage healing and reduce the likelihood of infection.

5.24. Soft landscaping

5.24.1. No machinery used for landscaping such as rotovators are to operate within the RPAs of retained trees.

5.24.2. All planting must be carried out carefully, by hand to avoid damage to existing roots. Mulch should be used around the base of trees, where possible, to maintain ground level and to avoid mower and strimmer damage to buttresses and surface roots.

5.25. Monitoring

5.25.1. The Arboricultural Consultant will be responsible for the monitoring of all arboricultural works and issuing a certificate of practical completion.

5.25.2. A record of site visits will be maintained for inspection on site and copies forwarded to the developer/agent and to the LPA.

5.26. Phase 3 – Post development

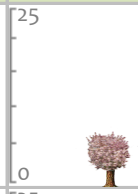
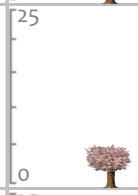
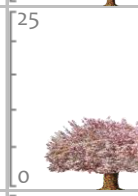
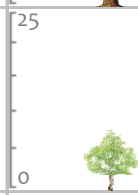
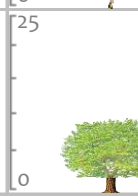
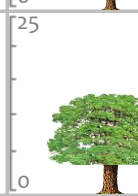
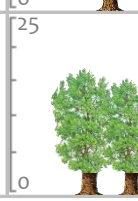
5.27. Removal of protective fencing and signing off

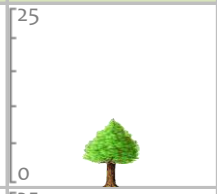
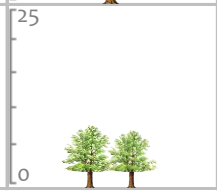
5.27.1. When the construction process is complete, the site should be inspected by the appointed arboriculturist or Local Authority Tree Officer. This must be prior to the removal of temporary protective fencing.

5.27.2. Any proposed landscaping operations by heavy machinery should be carried out before the protective fencing is removed.

Appendix 1 - Tree Data Schedule

- The following pages contain information gathered during the site survey.
- The reader should refer to Appendix 2 in order to correctly interpret the tree data.
- All images within the Tree Data Schedule are diagrammatical only. Their purpose is to indicate, at a glance, the relative dimensions of each tree. The images are computer generated based on measurements recorded for stem diameter, crown spread, crown height and overall height.

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	LB Height	LB Direction	Diameter (mm)	Crown Spread (m) N W E S	Scaled Tree Diagram (m)	Notes	Recommendations: Priority	Recommendations: Inspect Freq (yrs)	Physiological Condition / Structural Condition	Life Expectancy (yrs) / Retention Category
T1	Semi-Mature **Cherry** Prunus sp	7	2	1	E	220	N 3, W 2, E 3, S 3		1: Poor rooting conditions. 2: Fly tipping and collapsed wall around base.	Remove build up in rpa. / High	1	Fair / Fair	<10 / C
T2	Young **Cherry** Prunus sp	5	1.5	0.5	N	200	N 3, W 3, E 3, S 3		1: Major bark wound and split to lower stem.	Remove. / High	N/A	Fair / Poor	<10 / U
T3	Mature **Cherry** Prunus sp	9	2	1.5	E	480	N 6, W 3, E 7, S 6		1: Cavity and decay to main stem.	Monitor. / Moderate	1	Fair / Fair	10-20 / C
T4	Young **Silver Birch** Betula pendula	7	2	2.5	N	100	N 2, W 2, E 2, S 2			No action required. / n/a	3	Good / Good	40+ / C
T5	Semi-Mature **Lime** Tilia sp	9	1.5	2	S	280	N 4, W 4, E 4, S 4			No action required. / n/a	3	Good / Good	40+ / B
T6	Early-Mature **Sycamore** Acer pseudoplatanus	13	4	1	S	470	N 5, W 4, E 6, S 6		1: Bund built up in rpa with demolition rubble.	Remove rubble in rpa. / High	1	Good / Fair	20-40 / B
G7	Mature **Lombardy Poplar** Populus nigra 'italica'	av 17	av 3	1	S	av 500	N av 3, W 3, E 3, S 3 each		1: Significant deadwood throughout crown.	Deadwood. / High	1	Good / Fair	40+ / B

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	LB Height	LB Direction	Diameter (mm)	Crown Spread (m) N W E S	Scaled Tree Diagram (m)	Notes	Recommendations Priority	Recommendations Inspect Freq (yrs)	Physiological Condition Structural Condition	Life Expectancy (yrs) Retention Category
T8	Semi-Mature **Leyland Cypress** x Cupressocyparis leylandii	8	3	1	W	250	2 2 2 2		1: Boundary tree. 2: Previously topped at 7m. 3: Poor rooting conditions.	No action required. n/a	3	Good Fair	20-40 C
G9	Young **Mixed** Species	av 7	2	0	N	av 100	av 2.5 2.5 2.5 2.5 each		1: In raised bank on boundary. 2: Elder, sycamore, goat willow and hawthorn.	No action required. n/a	3	Good Good	20-40 C

Appendix 2 - Tree Survey Schedule Explanatory Notes

This section explains the terms used in the **Tree Data Schedule** in Appendix 1.

A2.1 General

A2.1.1 **Numbering System:** Each item of vegetation has its own unique number prefixed by a letter such that:

- **T1**=Tree 1
- **G2**=Group 2
- **H3**=Hedge 3
- **W4**=Woodland 4

A2.1.2 **Age Categories:**

- **Young** Usually less than 10 years old.
- **Semi-Mature** Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
- **Early-Mature** Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
- **Mature** Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
- **Veteran** A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
- **Over Mature** As for veteran except management is not considered worthwhile.

A2.1.3 **Species:** Common names and Latin names are given.

A2.1.4 **Height:** Measured from ground level to the top of the crown.

A2.1.5 **Crown Height:** Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

A2.1.6 **LB Height:** (Height of the lowest branch) is measured from ground level to the height at which the 1st significant branch emanates from the main stem. This information is not provided where the tree is multi-stemmed.

A2.1.7 **LB Direction:** Is the growth direction of the lowest significant branch (N, NE, E, SE, S, SW, W, NW)

A2.1.8 **Stem Diameter:** Taken at 1.5m above ground level where possible. On trees with two to five stems, the combined stem diameter is calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

For trees with more than five stems, the combined stem diameter is calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

A2.1.9 **Crown Height:** Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

A2.1.10 **Tree Diagram:** This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.

A2.1.11 **Crown Spread:** Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest half metre.

A2.1.12 **Notes:** Any relevant observations are recorded in the Notes section.

A2.1.13 **Recommendations:** Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

A2.1.14 **Priority Scale:** Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:

- **Urgent** To be carried out as soon as possible.
- **Very High** To be carried out within 1 month.
- **High** To be carried out within 3 months.
- **Moderate** To be carried out within 1 year.
- **Low** To be carried out within 3 years.

A2.1.15 **Inspection Frequency:**

- An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.

A2.1.16 **Physiological Condition:**

- **Good** Healthy and with no symptoms of significant disease.
- **Fair** Disease present or vigour is impaired.
- **Poor** Significant disease present or vigour is extremely low.
- **Very Poor** Tree is dying.

A2.1.17 **Structural Condition:**

- **Good** Having no significant structural defects.
- **Fair** Some defects observed though no high priority works are required.
- **Poor** Significant defects found. Tree requires monitoring or remedial works.
- **Very Poor** Major defects which will usually require significant remedial works or tree removal.

A2.1.18 **Life Expectancy:** The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).

A2.1.19 **Retention Category:** These are explained in detail in Table 1 on the following page.

Tree retention categorisation

The categorisation of trees is applied to guide the site owner as to the quality and value of their existing tree stock. All trees greater than 75mm in diameter at 1.5m above ground level are surveyed and allocated a ***retention category*** which takes into account amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. BS 5837:2012 recommends using a cascade chart for categorisation purposes. **Table 1** below provides an explanation of retention categories used.

Trees to be removed		Colour on Plan
Category U includes trees of very low quality that offer little or no amenity value.	Trees that are in such a condition that they should be removed as a matter of good arboricultural practice regardless of given proposals.	RED
Trees to be considered for retention		**Colour on Plan**
Category A includes trees of a high quality, usually highly visible to the wider public.	Trees that are excellent examples of their species, usually mature, with a safe useful life expectancy of at least 40 years. Category A trees are likely to enhance a development and should be retained wherever possible	GREEN
Category B includes trees of moderate quality and amenity value.	Trees that are good examples of their species but may have defects or form that downgrade them from category A. Category B trees are usually mature or younger trees with the potential to reach A category in the future. Although the retention of these trees is desirable, some losses may be acceptable.	BLUE
Category C includes trees of low quality and amenity value.	Trees that are either young with a stem diameter less than 150mm or are unlikely to make a contribution for more than 10 years. The removal of these trees should be seen as acceptable in order to allow development to proceed. It may be possible to transplant younger specimens.	GREY
NOTE: Trees that are viewed as borderline and do not fit neatly into either of the categories are given a plus or minus rating (+/-) in the tree data schedule. Therefore C+ would denote a tree being borderline C/B although C is deemed to be the most appropriate category. Similarly B- would denote a tree being borderline B/C with B seen as the most appropriate category.		

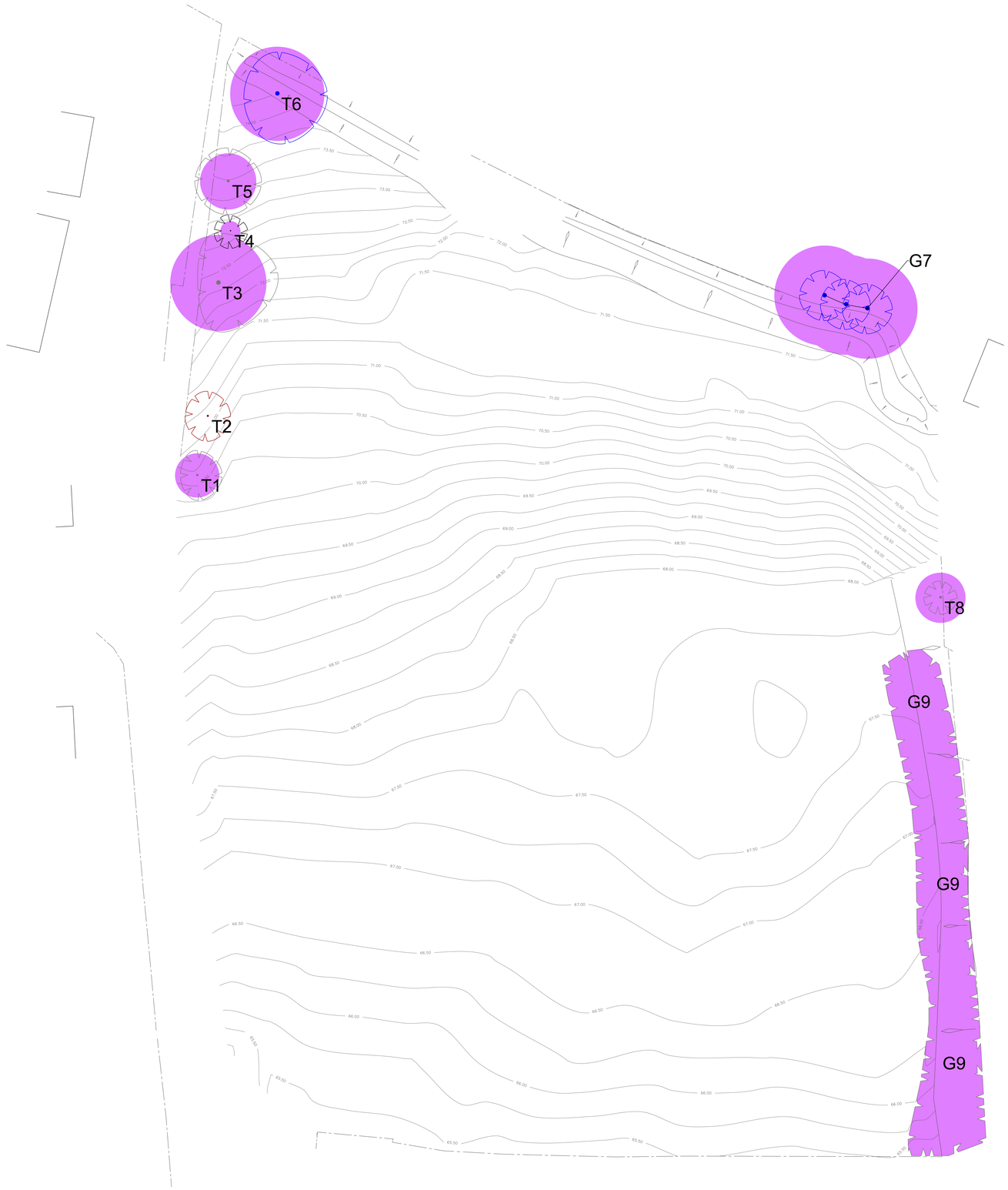
Table 1

Appendix 3 - Site Plans

The site plans referred to in the report follow this page which include the following:

- Tree Constraints Plan
- Tree Removal Plan
- Tree Protection Plan

Although included plans are usually to scale, they are only intended to indicate positions of surveyed trees and dimensions should not be taken from these drawings.



Key	
T1	Tree number 1
G2	Group number 2
H3	Hedge number 3
	Retention category A tree
	Retention category B tree
	Retention category C tree
	Retention category U tree
	Root Protection Area (RPA)

BS 5837 RETENTION CATEGORIES

Category A:
Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

Category B:
Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

Category C:
Trees of low quality and amenity. The removal of these trees should be seen as acceptable in order tp facilitate development.

Category U:
Trees whose structural condition is such that they should be removed regardless of development proposals.

URBAN GREEN
arboriculture
landscape
ecology

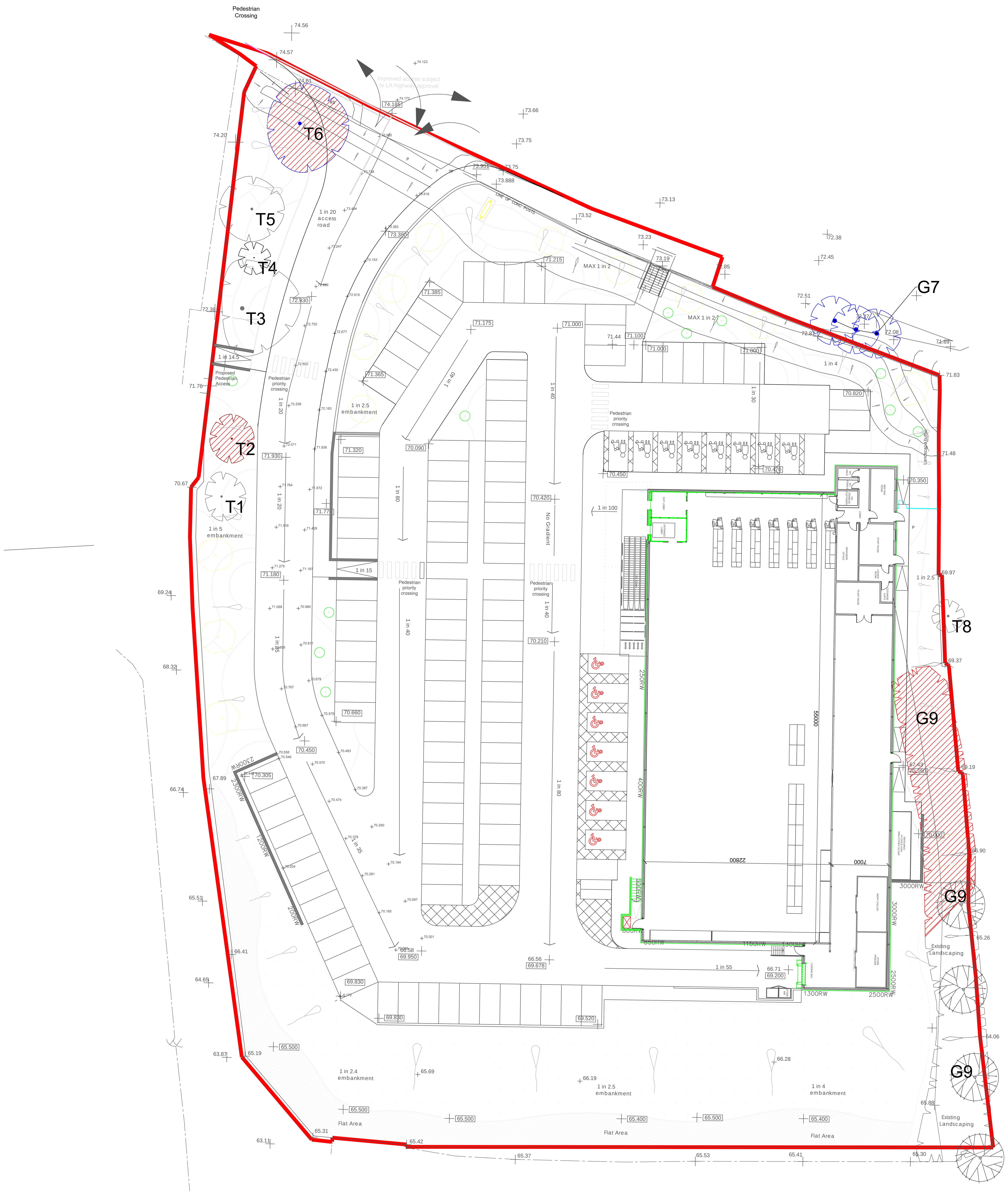
Peter House, Oxford Street, Manchester, M1 5AN
T: 0161 637 5242 E: hello@urbangreen-space.co.uk

Client
Aldi Stores Limited

Project
High Street, Royston

Description
Tree Constraints Plan

Scale	Drawn by	Date
1:200 A0	S F	07/03/14
Job number	**Drawing number**	**Revision**
10605	10605.T1	N/A



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Contractors must check all dimensions from site

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Notes:-

Key	
T1	Tree number 1
G2	Group number 2
H3	Hedge number 3
	Category A tree to be removed
	Category B tree to be removed
	Category C tree to be removed
	Category U tree to be removed
	Extents of pruning

Rev	Date	Description	Drawn	Checked
XX	XXXX	XXXXXXXXXX	XX	XX

URBAN GREEN

21 Swan Street Manchester M4 5JJ
T: 0161 312 2121 W: urbangreen-space.co.uk

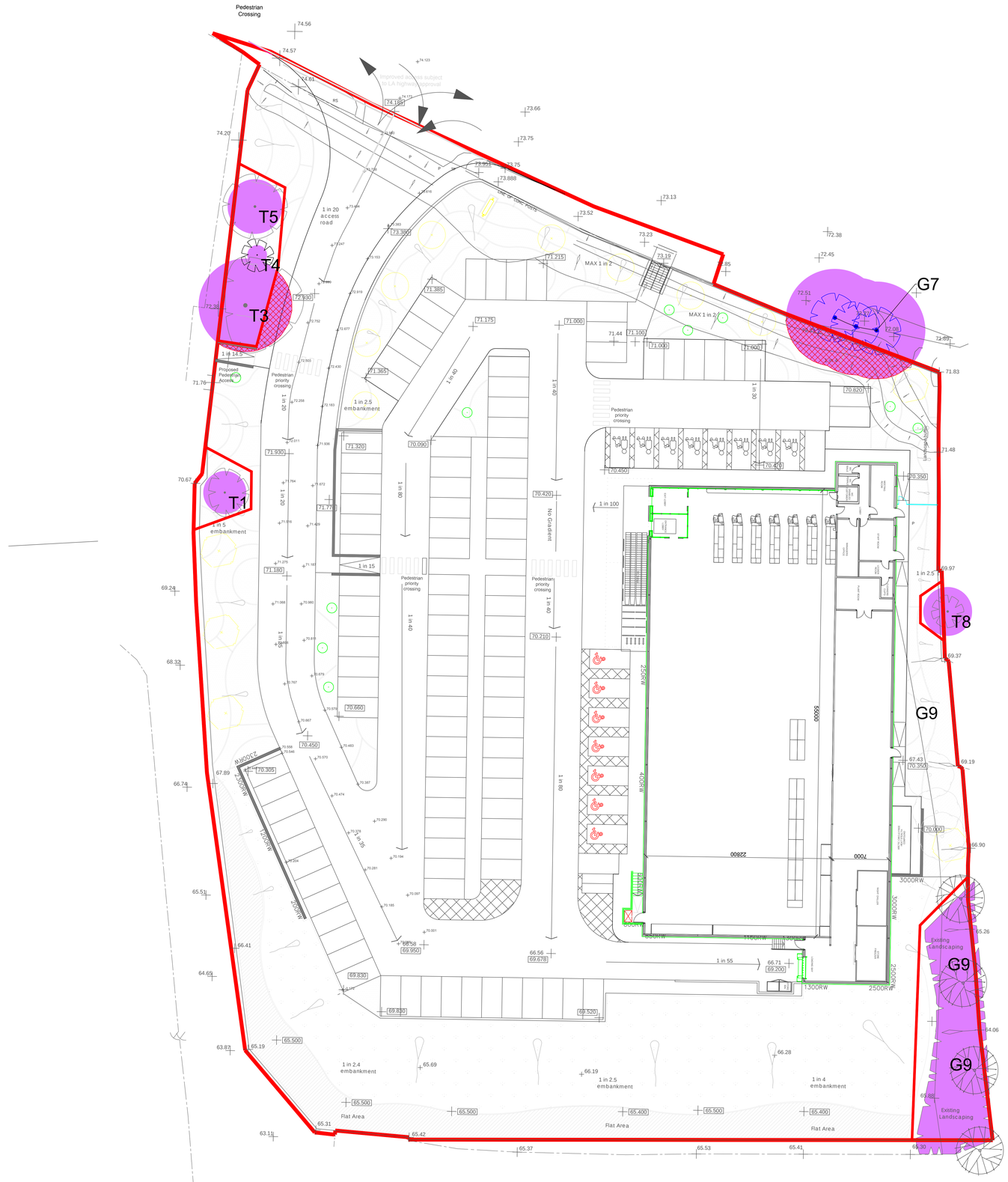
Client: Aldi Stores Ltd

Project: High Street, Royston

Title: Tree Removal Plan

Status: Planning

Project: 10605	Drawn: JC	Checked: SF
Scale @ A0: 1:200	Date: 11/11/2014	Approved: JC
Drawing No: 10605.T02		Revision: N/A



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Notes:-

Key	
T1	Tree number 1
G2	Group number 2
H3	Hedge number 3
	Category A tree
	Category B tree
	Category C tree
	Root Protection Area (RPA)
	Protective Fencing
	RPA not protected by fence. Special care required
	Construction Exclusion Zone (CEZ)

Rev	Date	Description	Drawn	Checked
XX	XXXX	XXXXXXXXXX	XX	XX

URBAN GREEN
21 Swan Street Manchester M4 5JJ
T: 0161 312 2121 W: urbangreen-space.co.uk

Client: Aldi Stores Ltd

Project: High Street, Royston

Title: Tree Constraints Plan

Status: Planning

Project:	Drawn:	Checked:
10605	JC	SF
Scale @ A0 1:200	**Date:** 11/11/2014	**Approved:** JC
Drawing No: 10605.T02		**Revision:** N/A

Appendix 4 – Method Statement for Cellular Confinement System

TERRAM®
Geosynthetics you can trust
a Fiberweb brand

GEOCELL FOR TREE ROOT PROTECTION

MIS 456 Issue 3: Feb 2012

SPECIFICATION & INSTALLATION GUIDANCE



TERRAM GEOCELL CONFINEMENT SYSTEM FOR TREE ROOT PROTECTION

Terram Geocell is a geocellular sub-base confinement system designed for the protection of tree roots where the construction of roads, car parks and access routes are required in the vicinity of trees and where Tree Preservation Orders (TPO) may be enforced. The structure confines and stabilises the sub-base stone ensuring that vehicle loads are dissipated, rutting and soil compaction is prevented and damage to tree roots is avoided. When installed as advised, Terram Geocell will also allow the continued passage and circulation of air, water and nutrients to tree roots to sustain a healthy growing environment as recommended by the following 2 documents:

- British Standard BS5837: 'Trees in Relation to Construction' (2005).
- Arboricultural Advisory and Information Service: Practice Note 1 – 'Driveways Close to Trees' (APN1)

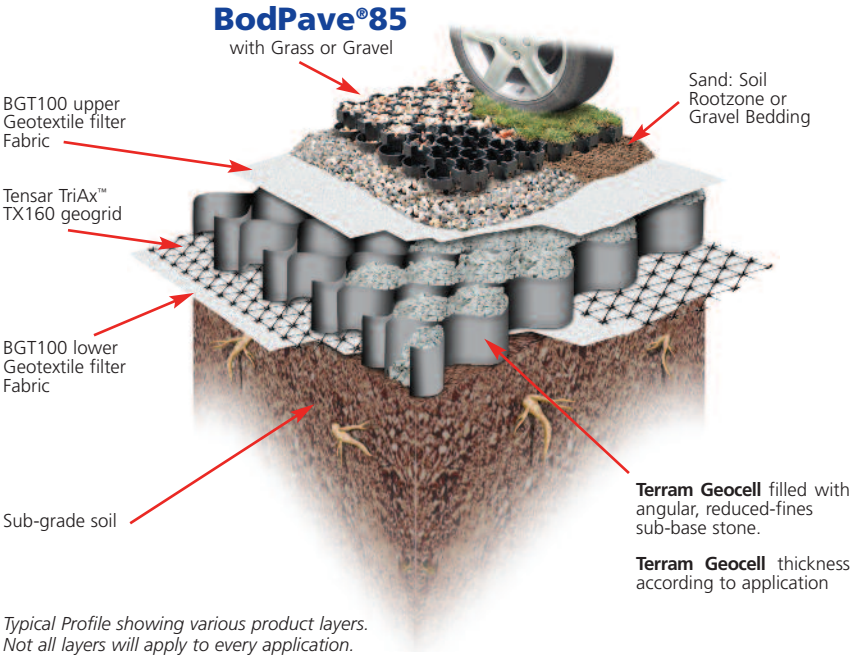
Tree Root Protection is supplied flat packed and opens to form a strong geocellular structure. It is simply pinned in place using metal fixing pins as described.

In this type of 'Reduced-Dig' or 'No-Dig' Tree Route Protection application, Terram Geocell is intended for use in conjunction with a water and gas permeable SuDS (Sustainable Drainage System) compliant pavement surface product such as BodPave®85 cellular plastic paving, Concrete Porous Block Paving or Porous Asphalt surfaces. Although Terram Geocell can be used by traffic in isolation for a very limited period when filled; it is not advised that Terram Geocell is used as the permanent surface finish for vehicle access routes. Exceptions may arise where Terram Geocell is installed as a temporary haul road for example as a site access route and may be removed and disposed of or fully re-surfaced after use. Refer to installation method details for further information.

GENERAL INSTALLATION ADVICE FOR ALL APPLICATIONS

Prior to commencing works it is advisable to seek the professional opinion and approval of the Local Planning Department and Arboriculture Officer. Specific design limitations may be determined by Tree Officers, Engineers or Planners and must be closely adhered to. All applications will vary according to the site conditions and specific tree species involved. The ground and tree roots within the tree root protection zone must be protected from compaction and damage at all stages of the construction works. Works may involve varying degrees of excavation or build-up where edge retention is required, which must avoid root damage and soil compaction. The use of mechanical equipment or even low ground pressure machinery in the tree root protection zone must be avoided and hand tools may be the only method of excavation close to the root system.

Typical Profile



Typical Profile showing various product layers. Not all layers will apply to every application.



SPECIFICATIONS

PRODUCT	PANEL SIZE	CELL DIAMETER & DEPTH	PANEL WEIGHT	MATERIAL	LOADING APPLICATION	PART No.
Geocell™ 250/100	5m x 7m	250mm x 100mm	18kg	Non-woven Polypropylene	Pedestrians	051397
Geocell™ 250/150	5m x 7m	250mm x 150mm	25kg	Non-woven Polypropylene	Cars/Light vehicles	051403
Geocell™ 220/200	6m x 3m	220mm x 200mm	20kg	Non-woven Polypropylene	HGV's	051380

PRODUCT	MATERIAL	SIZE	UNIT	PART No.
Fixing U-Pin	Steel rod	550mm long x 8mm dia	Each	082834

Fiberweb Geosynthetics Ltd
Blackwater Trading Estate • The Causeway • Maldon • Essex CM9 4GG • UK
Tel: +44 (0) 1621 874200 Fax: +44 (0) 1621 874299
e.mail: info@terram.com • www.terram.com

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GEOCELL FOR TREE ROOT PROTECTION

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INSTALLATION METHOD FOR PERMANENT ACCESS ROUTES AND CAR PARKS

1. Obtain the approval of the Local Planning Department and Arboriculture Officer that this method of construction is appropriate and acceptable for the application and to determine the limits of construction and proximity to the tree.
2. Prepare the site by carefully removing all debris and reducing surface levels to the allowable reduced dig as appropriate to the specification, whilst strictly avoiding soil compaction and tree root damage. Build-up directly on the existing surface levels may be necessary.
3. Ensure that the prepared surface is reasonably even and fill any localised depressions with sharp sand to achieve an even surface profile. Do not roll or consolidate the area.
4. Install tanalised timber edging boards or other approved edge retention to the perimeter of the construction zone as appropriate to the total layer profile thickness. Avoid damage to tree roots when placing fixing posts and pegs. Concrete kerbs are unlikely to be appropriate or allowed.
5. Install a layer of BGT100 Geotextile Fabric across the site, overlapping adjacent rolls by a minimum of 150mm. It may be necessary to lightly pin the Geotextile in place until the overlying layers are installed.
6. An optional layer of Tensar TX160 TriAx™ Geogrid may be required at this stage, possibly determined by the site soil strengths (i.e. weak CBR% strength*), the proposed application and applied load such as HGV's. In some cases the TX160 layer may also aid the reduction of the required layer thickness of Terram Geocell where an extremely limited allowable excavation or build-up has been applied. Place the Geogrid layer over the Geotextile Fabric layer and fix down using steel pins to hold flat. Overlap adjacent rolls by minimum 150mm. Avoid tree root damage and soil compaction.
7. Open out and lay the specified layer thickness of Terram Geocell (100mm/150mm/200mm deep) and pin in place between the edging boards. It may be necessary to cut the Terram Geocell to size using a sharp knife or it can be left uncut and folded up against the edgings if preferred.
8. Pin the Terram Geocell in place using Steel Fixing Pins or similar approved. The pins are generally used to maintain the cells in an open and fully expanded position whilst the cells are being filled and also to stop the structure from being pushed up by migrating aggregate during the filling process. Pin spacing will vary according to the site conditions, but will generally be required at 1m – 2m centres on flat surfaces, mainly placed around the perimeter of the area and where adjacent sections of Terram Geocell abut each other , with less in the middle of the area. Drive the pins in so that they are just touching the top of the cells but do not compress the fabric. Avoid tree root damage during the pinning process.
9. Fill the Terram Geocell, working toward the tree from the furthest point away and using the filled Terram Geocell as a platform. The cells must be filled with clean, open graded angular aggregate, normally in the particle size range of 5mm - 45mm. Not single sized or rounded aggregate. The project engineer may determine alternative fill materials such as clean 4/20 or 4/40 stone or a reduced-fines DoT Type 1X sub-base. It is not acceptable to use a standard DoT Type 1 Sub-base within the cells for tree root protection. Do not roll the surface, a light vibratory compaction plate (whacker) may be permitted to settle the stone into the cells, seek advice from the specifier or Tree Officer on this detail. Do not contaminate the filled cells with site debris, soil or mud.
10. Install the permeable pavement layer/wearing course i.e. BodPave®85, Block Paving, Porous Asphalt, on top of the Terram Geocell according to the manufacturers recommendations. Each porous pavement layer will have a specific design layer requirement; therefore for example, where a sand or sand:soil bedding layer is specified or a contaminant filtration layer is required, then a layer of BGT100 Geotextile Fabric shall be placed above the Terram Geocell prior to the pavement bedding layer being installed and finished according to manufacturers instructions. The Geotextile will stop the pavement bedding layer from migrating down into the aggregate voids within the Terram Geocell.

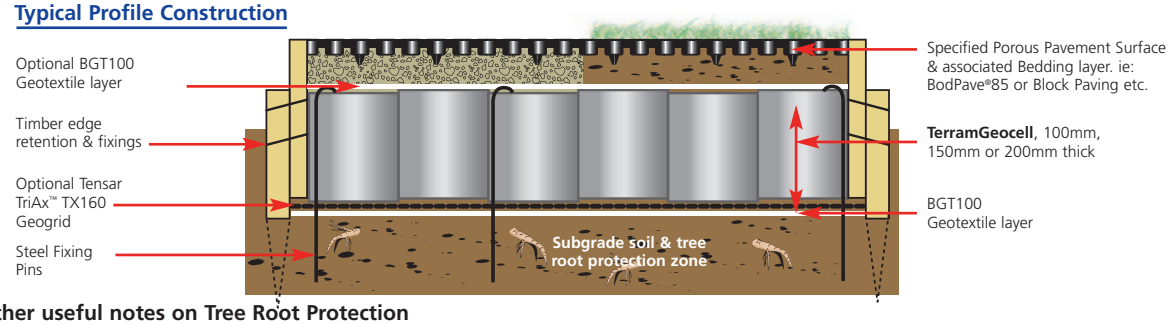
For installation recommendations for BodPave®85 cellular paving for Grass & Gravel, refer to BodPave®85 Specification and Installation Guidance Notes. For all other pavement layer products, refer to the specific manufacturers' guidance.

INSTALLATION METHOD FOR TEMPORARY ROADS AND SACRIFICIAL PAVEMENT LAYERS IN HAUL ROADS

In some applications Terram Geocell may be installed as a temporary haul road base and completely removed after use. Alternatively it may have a sacrificial stone layer placed over it which is removed and replaced with a permanent permeable pavement solution when use of the haul road is complete.

1. Obtain the approval of the Local Planning Department and Arboriculture Officer that this method of construction is appropriate and acceptable for the temporary access and to determine the limits of construction and proximity to the tree.
2. Apply all construction detail as for items 2 to 9 above for 'Permanent Access Routes'.
3. Place a layer of BGT100 Geotextile or greater strength Geotextile (i.e Terram 2000) onto the Terram Geocell surface. The geotextile grade will be determined by the specific site design criteria and degree of haul road traffic proposed. This layer will be removed and replaced later if a porous pavement surface is being installed on the Terram Geocell.
4. Place a minimum 100mm thick layer of either clean graded stone or DoT Type 1 sub-base stone onto the surface. This will be the sacrificial pavement layer to be removed later. Aggregate specification will be determined by the project manager.
5. During use of the access route, routinely check for erosion of the surface and repair with stone as required to avoid exposure of the geotextile.
6. After the haul road use is completed, remove the sacrificial layer of stone and geotextile and replace with the preferred permeable pavement layer in accordance with manufacturers recommendations. Alternatively remove the entire construction profile to return the site to its original status. is critically important to avoid contamination of the remaining layer of open-graded stone within the Terram Geocell where partial removal is carried out and at all times to avoid damage to tree roots and soil compaction during removal and disposal of the construction layers.
7. Where complete removal of Terram Geocell is required, seek the specifiers' advice on renovation and restoration of the landscaped surfaces within the tree protection zone.

Typical Profile Construction



Other useful notes on Tree Root Protection

- In most applications the total porous pavement area should not exceed 20% of the tree root protection area.
- It is advisable to seek an Engineers advice on the required Terram Geocell layer thickness related to local soil strengths and proposed traffic loadings.
- Soil compaction will severely affect the trees ability to take up water and oxygen; similarly, raising soil levels around trees will deprive roots of oxygen and cause stress and dieback.
- In most cases 80% - 90% of a trees root system are in the upper 1m of soil and the small fibrous tree roots are the most important to a trees health. The fine roots enable transport of oxygen, water and nutrient to the tree via the larger roots which also anchor the tree and provide stability. Severing only a small proportion of the fine surface root structure can severely affect the tree, causing stress, dieback and loss of stability.

* CBR% Strength = California Bearing Ratio – a measure of subgrade soil strength.

Further Reading

- British Standard: BS5837 1991 / 2005 – Trees in Relation to Construction - Recommendations.
- Arboricultural Advisory and Information Service: Practice Note 1 – 'Driveways Close to Trees' (APN1).
- 'Tree Root Systems'. (M. Dobson 1995) – Arboricultural Research Information Note 130/ARB/95.
- 'Driveways Close to Trees' (M. Dobson / D. Patch 1996). Arboricultural Practice Note 1.
- 'Guidance for Trees: Conflict or Compliment?'. (R. Nicholson 2001). Arboricultural Journal No. 25.

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