Document Control Sheet

Project Name: **11a Parkhill Road, London**

Report Ref: **190705-1.1-11aPRL-AMS-LL**

Report Title: **Arboricultural Method Statement**

	Name	Position	Date
Prepared by:	Lisa Lee	Arboricultural Consultant	28/05/2019
Surveyed by:	Luke Fay	Managing Director/Senior Arboricultural Consultant	24/05/2019
Reviewed by:	Luke Fay	Managing Director/Senior Arboricultural Consultant	28/05/2019

Revision	Date	Description	Prepared by
0.1	28/05/2019	For Internal Review	LL
0.2	28/05/2019	Review	LF
1.0	28/05/2019	Issue	LL
1.1	05/07/2019	Revision and re-issue	LF

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1 Key Contact Details

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2 Background

2.1 On behalf of Fieldwork Architects, Treework Environmental Practice has been instructed to prepare an Arboricultural Method Statement (AMS), to discharge Condition 4 of Planning Permission 2018/3365/P.

2.2 **Planning Context**

Planning Permission has been granted subject to several conditions; condition 4 relates directly to a copper beech tree located within the adjacent property.

The description of the Outline Planning Permission is as follows:

'4. Prior to the commencement of any works on site, details demonstrating how the copper beech tree on a neighbouring site shall be protected during construction work including details of an impermeable membrane to be installed over the driveway of the application site shall be submitted to and approved by the Council in writing. Such details shall follow guidelines and standards set out in BS5837:2012 "Trees in relation to design demolition and construction". All trees on the site, or parts of trees growing from adjoining sites, unless shown on the permitted drawings as being removed, shall be retained and protected from damage in accordance with the approved protection details.

Reason: To ensure that the development will not have an adverse effect on existing trees and in order to maintain the character and amenity of the area in accordance with the requirements of policies A2 and A3 of the London Borough of Camden Local Plan 2017.'

2.3 The AMS follows best practice guidelines in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations* and practical solutions, based on sound arboricultural knowledge and experience of the author.

2.4 The following documents have been provided to and reviewed by Treework Environmental Practice:

Document Title	Document/Drawing number	Originator
Topographical Survey	180831	Fieldwork Architects
Basement Impact Assessment	11a Parkhill Road – Basement Impact Assessment	Fieldwork Architects / LBH Wembley Engineering
Proposed Plan	18001-A-1200-Proposed GA-Basement_Ground Floor Plan.pdf	Fieldwork Architects
Design and Access Statement	11a Parkhill Road – Design and Access Statement	Fieldwork Architects
Final Decision Notice	2018.3365.P	Fieldwork Architects / London Borough of Camden
Tree Protection Plan	190528-1.2-11aPRL-TPP-MM	Treework Environmental Practice

2.5 The Tree Survey, which informs the Root Protection Areas (RPAs), Construction Exclusion Zones (CEZs) and the position of tree protection fencing and other prescribed technical construction measures, was undertaken by Treework Environmental Practice 24 May 2019.

2.6 This method statement contains provisions for the protection of T1, a mature copper beech tree located outside of the site boundary, where the root protection area encroaches within the site and T2, a mature cherry located within the site.

2.7 This AMS has been produced to fulfil the requirements of planning Condition 4 of Outline Planning Permission 2018/3365/P. It provides a set of task tables with detailed methodology, which are to be complied with at all times. Any proposed works within Construction Exclusion Zones (CEZs) that are not covered within this AMS are to be 'agreed' with the Local Planning Authority and/or the Arboricultural Consultant, and appropriate additional methodology provided. **Failure to adhere to the provisions of this document could result in breach of condition.**

> *'4. Prior to the commencement of any works on site, details demonstrating how the cooper beech tree on a neighbouring site shall be protected during construction work including details of an impermeable membrane to be installed over the driveway of the application site shall be submitted to and approved by the Council in writing. Such details shall follow guidelines and standards set out in BS5837:2012 "Trees in relation to design demolition and construction". All trees on the site, or parts of trees growing from adjoining sites, unless shown on the permitted drawings as being removed, shall be retained and protected from damage in accordance with the approved protection details.*

Reason: To ensure that the development will not have an adverse effect on existing trees and in order to maintain the character and amenity of the area in accordance with the requirements of policies A2 and A3 of the London Borough of Camden Local Plan 2017.'

2.8 The Document should be read along with the following appendices:

- Appendix A: Tree Protection Plan
- Appendix B: Tree Schedule
- Appendix C: Tree Protection Specifications
- Appendix D: Example Site Monitoring Form
- Appendix E: Forming joints with TERRAM geotextiles

3 General Tree Welfare

3.1 When working near trees, it is important to be aware that the majority of tree roots are normally located in the top 600 mm of soil and can spread out horizontally to a distance at least equal to the height of the tree.

3.2 The distance from the tree in which damage is likely to occur is calculated by the Root Protection Area (RPA), which represents the minimum area around a tree deemed to contain sufficient roots and soil volume to keep the tree viable. RPAs should be treated as a precautionary area within which activities such as ground compaction, excavation, the storing of materials, ground stripping, raising of levels and building are likely to cause damage to trees and therefore should not take place. Usually, barriers are erected around the RPA to physically exclude such activities. The area within these barriers is known as the Construction Exclusion Zone (CEZ). Unavoidable activity within the CEZ must be carefully executed, and must be guided by this detailed method statement.

3.3 Damage can sometimes be avoided, or at least minimised, by suitable technical measures which can be devised with consultation with an Arboricultural Consultant. The protection measures and technical construction measures, applicable to this site, are included within this document.

3.4 Tree protection fencing/site hoarding will be installed as set out within the Tree Protection Plan at Appendix A. Due to the close proximity of the adjacent tree and size of the site to work, it is necessary to work with the RPA of tree T1. Therefore it will not be possible to create a Construction Exclusion Zone (CEZ) to protect the RPA of T1. However, the Ground Protection measures detailed in this report will prevent any possible leeching of materials into the RPA of T1 and any compaction from the installation of a skip to collect the spoil from the excavations.

4 General Precautions

4.1 In general, the following procedures will also be followed.

- No materials that are likely to have an adverse effect on tree health will be stored or discharged within unprotected areas of the RPA.

- Where storage of such materials is upslope of the trees, barriers will be put in place at ground level to minimise the risk of spillages leaching down-slope and contaminating the Root Protection Area of a tree. Such materials include:
    - Fuel and oil
    - Bitumen
    - Cement
    - Sand

- Fires on sites should be avoided if possible. Where they are unavoidable, they should not be lit in a position where heat could affect foliage or branches. The potential size of a fire and the wind direction should be taken into account when determining its location in relation to trees, and it should be attended at all times until safe enough to leave.

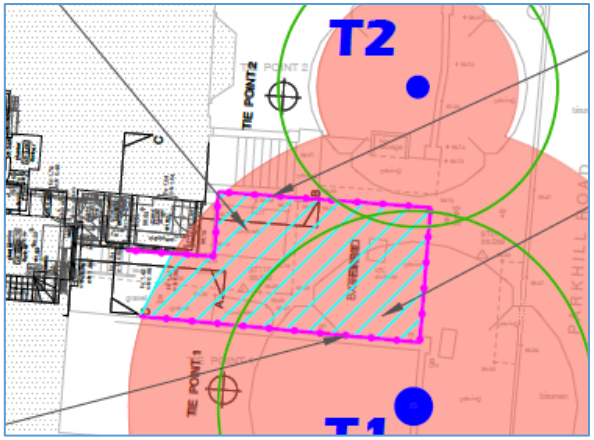
- Concrete will not be mixed or transported over unprotected ground within the RPA of T1.

- Any incidents involving potential damage to retained trees will be recorded on site using a monitoring form similar to that shown in Appendix D and a copy made available to the Local Authority Tree Officer.

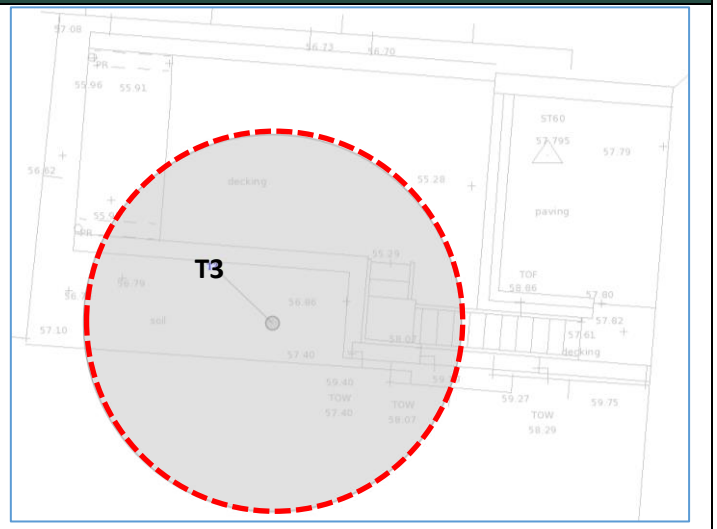
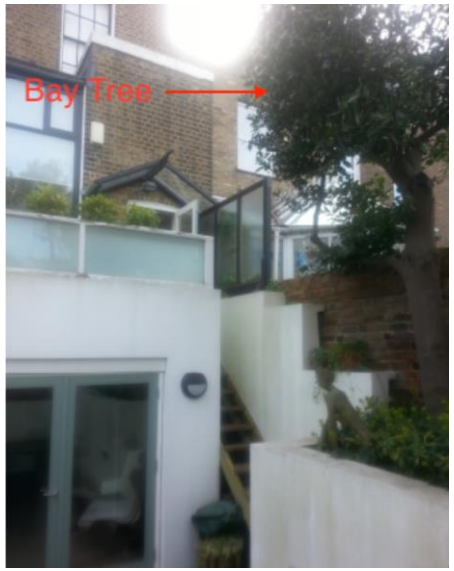
5 Tables of Tasks and Detailed Method

5.1 The tables below provide detailed method on each task and how they are to be undertaken, along with methods for other tasks which may be required to complete the works. Any deviation from the methods set out in the tables below will be discussed and agreed with the Arboricultural Consultant and/or the Local Authority before being implemented. This method statement should be reviewed at the beginning of each phase to ensure that its recommendations are still feasible and applicable.

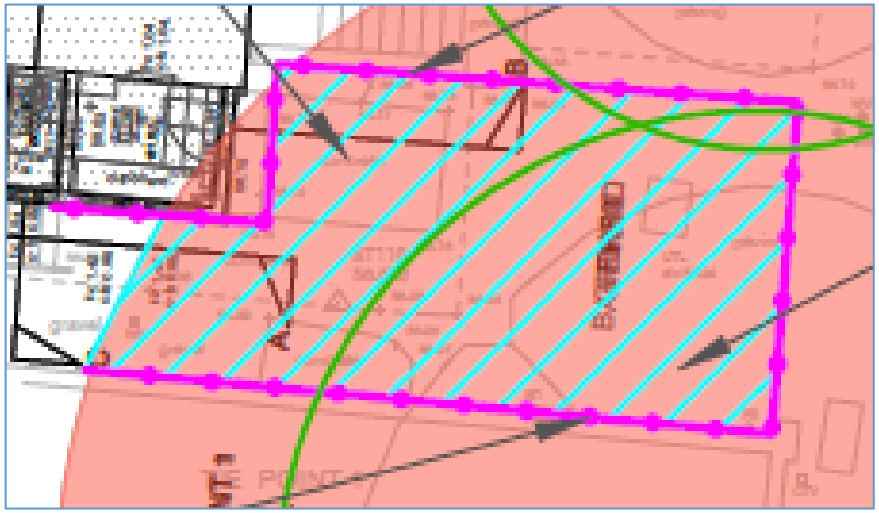
Task 1: Securing the Site – Installation of Site Hoarding/Tree Protection Fencing and Access Gates

Method and Action Required	*Reference Drawing*
1) The alignment of the site hoarding will be set out and installed prior to the commencement of works on the site. 2) Site hoarding will form the tree protection fencing located as shown on the TPP and in the sample opposite. 3) The site hoarding serving as tree protection fencing will be constructed in accordance with performance criteria required by BS5837:2012 guidelines and will form the Construction Exclusion Zone (CEZ) for the duration of the works, except where otherwise specified in this document. 4) A tree protection information sign will be secured to every other hoarding panel at eye level, facing into the site. This will aid identification of the CEZ and inform site operatives of its importance. 5) Site hoarding serving as tree protection fencing will remain in place and be kept in good condition until all works are complete, unless otherwise agreed with the Arboricultural Consultant.	 ***Sample of Tree Protection Plan***  ***Example of tree protection fencing sign***

Task 2: Tree Pruning and Removal

Method and Action Required	*Appendix Reference*
1) The tree work requirements are set out in the Tree Schedule (Appendix B). Tree **(T3)** is shown for removal, illustrated by a dashed crown outline on the Tree Protection Plan to identify their location. Parts of crowns to be pruned are shown as partial dashed outlines. 2) All tree works will be undertaken by suitably qualified Tree Surgeons and the work will be undertaken in accordance with BS3998:2010. 3) Wherever possible, all required tree pruning work will be undertaken without significantly reducing the landscape value or viability of the tree. 4) All tree work will be undertaken before any other operations on site. This will include: ○ Tree and stump removal ○ Other facilitation pruning ○ All other pruning 5) Where stumps are to be removed, and the tree is within 15 m of a tree to be retained, the stump will be ground out using a mechanical stump grinder. If outside of this area, then the stump can either be ground out or grubbed out using an excavator. 6) Any variation to the tree surgery works will be agreed with the Arboricultural Consultant before being implemented. 7) All arisings will be removed from site, except where identified for reuse.	 

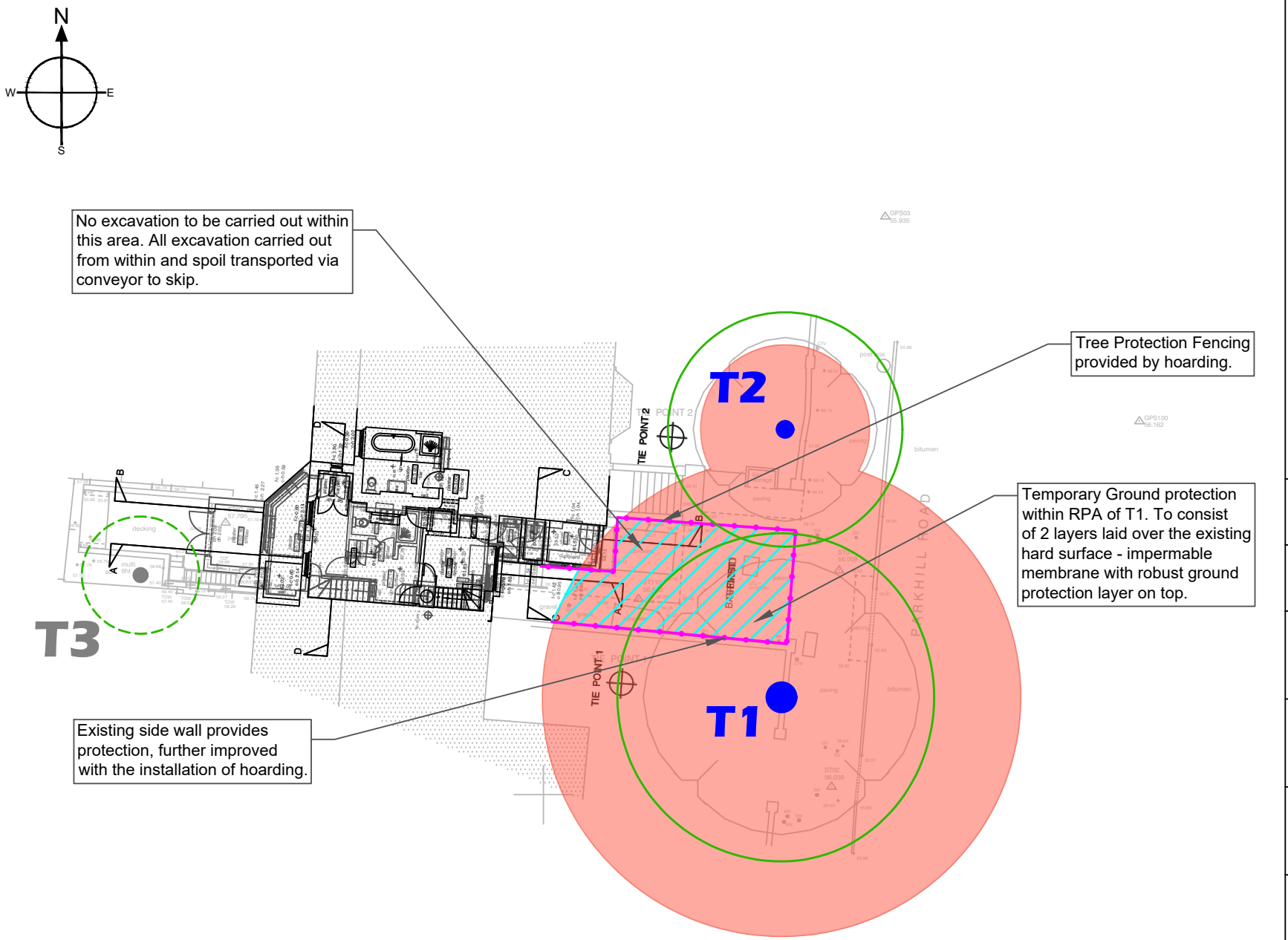
Task 3: Installation of Temporary Ground Protection within the RPA of T1.

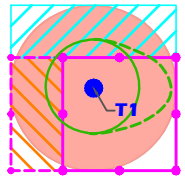
Method and Action Required	*Reference Drawings*
8) The temporary ground protection will be installed prior to the commencement of works on the site. 9) Two layers of ground protection will be laid over the existing hard surface. 10) They will be laid out within the whole area shown with blue hatching on the TPP and in the sample opposite. 11) An impermeable membrane is to be installed over the existing surface. This will be completely impermeable and installed correctly as per the manufacturers specifications to ensure no ingress of toxic materials through to the tree roots. 12) An example of an impermeable membrane is Terram Rootguard™ plus – impermeable solution. This is constructed of high density polyethylene (HDPE) and will ensure that no liquid or material seep through into the RPA. It is chemically inert and is resistant to biodegradation, ensuring that it will stay intact throughout the construction phase. 13) The sections of membrane can be joined by either overlapping, sewing, stapling or bonding. See 'Forming joints with TERRAM geotextiles at Appendix E. 14) A heavy duty rigid temporary surface will be laid over the membrane, to both protect the membrane from damage and prevent compaction of the ground below.	 ***Sample of Tree Protection Plan***  ***Terram Rootguard™ plus***

Method and Action Required	*Reference Drawings*
15) The rigid ground protection layer will comprise heavy duty steel ground protection plates or other similar material that meets the same performance criteria. It will not break or move under the load of a skip lorry or movement of the skip. 16) The rigid ground protection layer will be able to be connected and held in place without penetrating the membrane beneath. 17) The ground protection layers will remain in place and kept in good condition until all works are complete, unless otherwise agreed with the Arboricultural Consultant. *Note: Root Protection Area located under the existing footpath, crossover and road will be provided protection by the existing tarmac and pavement hard surfaces.*	 ***Example of metal ground protection sheets***  ***Example of 4-way connector***

Appendix A

Tree Protection Plan





T1 Tree or Group Reference Number	Tree Protection Fencing
Tree Stem Position A Category Tree	Initial Tree Protection Fencing
Tree Stem Position B Category Tree	Ground Protection
Tree Stem Position C Category Tree	Special Engineering /Supervised Excavations
Tree Stem Position U Category Tree	Construction Exclusion Zone
Tree Crown	Pruning/Tree Removal
Root Protection Area	Site Boundary

Date: July 2019

Scale: 1:250 @ A4

Project Name: 11a Parkhill Road, London

Drawing Title: Tree Protection Plan

Drawing Number: 190705-1.4-11aPRL-TPP-MM

Treework Environmental Practice

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Appendix B

Tree Schedule

11a Parkhill Road, London
Tree Survey BS5837-2012

Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T1	1	*Fagus sylvatica f. purpurea* Purple Beech	15.0	1	85	N 7.0 E 6.5 S 7.0 W 7.0	2.0	1.6	Mature	Fair	Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Bark exudation. Decay / structural defect in crown limb / limbs - Open cavity / cavities. Deadwood - Minor. Decay / structural defect - Suspected. Excavation within root zone - Suspected. Grafted specimen. Root environment - Restricted. Structural impact - Suspected.	326.9	10.2	20-40	B	1
T2	1	*Cerasus avium* Wild Cherry	13.0	1	30	N 5.0 E 5.0 S 5.0 W 5.0	2.0		Mature	Fair	Access to inspect base - Restricted / obscured. Crown reduction - Historic. Deadwood - Minor. Structural impact - Evident / observed.	40.7	3.6	20-40	B	1
T3	1	*Laurus nobilis* Bay/Bay Laurel/Poets Laurel	6.0	1	18	N 2.5 E 2.5 S 2.5 W 2.5	2.0	1.6	Mature	Fair	**Fell - Ground level.** Fell to enable safe construction of the basement.	14.7	2.2	20-40	C	1

Tree Schedule Key

Treework Environmental Practice

Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland), H (Hedge) or S (Shrub) to indicate the type of feature.
Tree Count	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single trees.
Species	Scientific name followed by common name (where available).
Height (m)	Tree height to the nearest metre, either measured with a device or estimated. Tree height for group records refers to the estimated average height of trees within the group (unrepresentative trees may be excluded from this estimate).
Stem Count	Number of stems. Stem count indicates whether the tree is single-stemmed or multi-stemmed and informs the RPA calculation.
Stem Diameter (cm)	Stem diameter, measured at 1.5m above ground level in accordance with Annex C of BS5837:2012. Diameters of multi-stemmed trees are presented as a combined stem diameter calculated in accordance with the formulae in Section 4.6.1 of BS5837:2012. Stem diameter for group records refers to the estimated average stem diameter of trees within the group (unrepresentative trees may be excluded from this estimate).
Crown Radius (m)	Distance from stem position to crown periphery in either the four cardinal or four ordinal directions, estimated to the nearest half metre. Crown spreads for group records refer to the estimated average spreads of trees within the group (unrepresentative trees may be excluded from this estimate).
Crown Clearance Height (m)	Distance between the ground and the lowest point of the crown periphery, estimated to the nearest half metre.
Lowest Branch Height (m)	Height of the lowest branch, the removal of which is considered likely to have a significant negative effect on the tree in terms of physiology or in terms of the size of wound created.
Life Stage	Young, Semi-mature, Early Mature, Mature, Late Mature, Ancient or Veteran.
Physiological Condition	Good, Fair, Poor, Dead.
Observations	General description of the tree or tree group, including basic features and morphology, structural and physiological condition, growing conditions and surroundings.
Recommendations	Management recommendations for tree works to address immediate unacceptable risks, or to facilitate development proposals.
RPA (m^2)	Minimum area around a tree deemed to contain sufficient roots and rooting soil volume to maintain the tree's viability, in which the protection of roots and soil structure is treated as a priority. Calculated from the stem diameter according to the formulae in BS5837:2012. RPA for group records is based on the estimated average stem diameter of trees within the group (unrepresentative trees may be excluded from this estimate).
RPR (m)	Radius of the RPA, in metres, when this is plotted as a circle around the tree stem.
Remaining Contribution (years)	Estimated number of years for which the tree will continue to make a positive contribution to the site, banded as < 10, 10-20, 20-40, 40 +.
Retention Category	Quality and value category (**A**, **B**, **C** or **U**) as defined in Table 1 of BS5837: 2012 (reproduced below), where **A** = high quality and value; **B** = moderate quality and value; **C** = low quality and value and **U** = tree identified for removal due to poor condition regardless of development proposals.
Retention Sub-category	One or more sub-categories (1-3) as defined in Table 1 of BS5837: 2012 (reproduced below), assigned for Categories **A**, **B** or **C** where 1 = arboricultural qualities, 2 = landscape qualities and 3 = conservation and cultural value.

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix C

Tree Protection Specifications

Technical Measures to Prevent Tree Damage

Tree Pruning

Tree pruning will be carried out where the design and/or planned site operations encroach into the crowns of trees and where these encroachments can be accommodated through facilitation pruning without significantly reducing the landscape value and/or viability of the tree.

Tree pruning operations will:

- be specified by the arboricultural consultant
- be in accordance with current best practice
- be carried out by a suitably experienced and qualified arborist

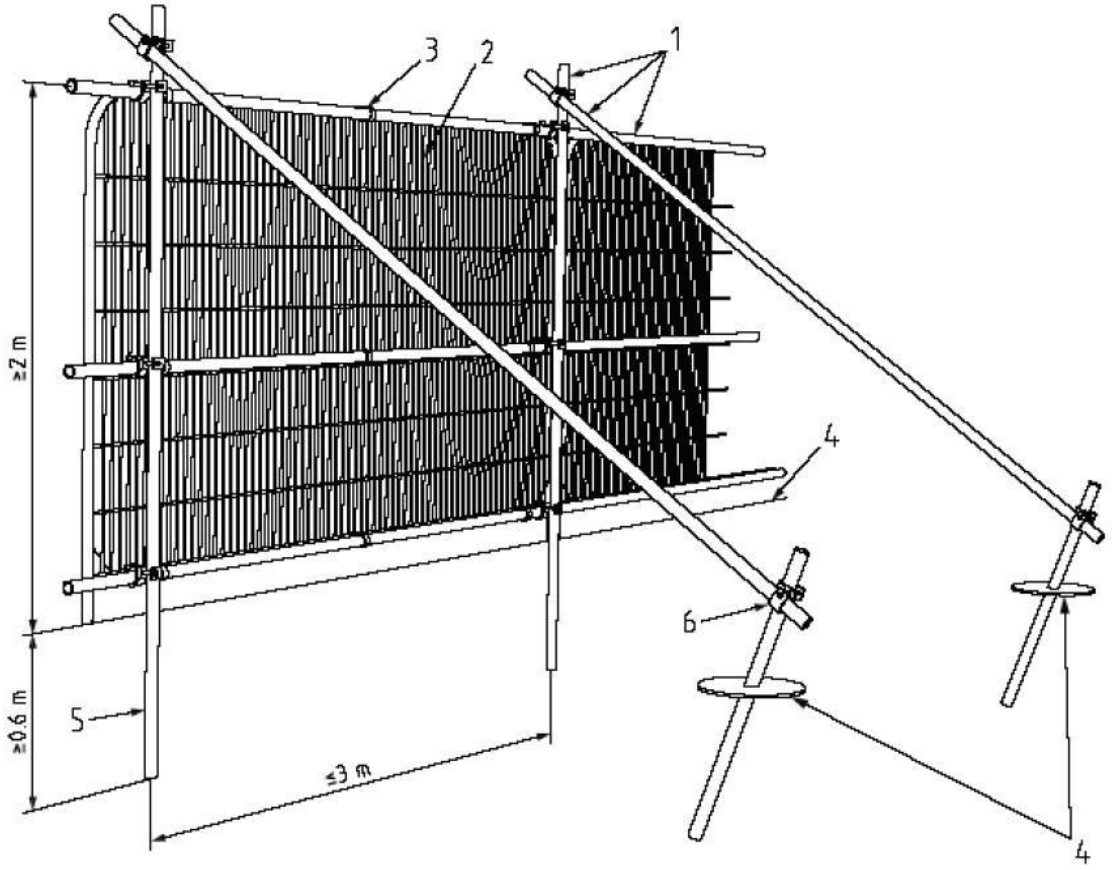
Tree Protection Fencing

Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection for trees. The performance requirement for fencing will be determined by the type of activity that will take place in the area around the CEZ.

Typically the performance requirement for the Tree Protection Fencing will be:

- Tree Protection Fencing will be installed prior to commencement of activity on the site.
- Tree Protection Fencing will only be removed once all works associated with the development have been completed.
- The Tree Protection Fencing will be installed and removed without causing damage to retained trees.
- Installation, removal and, where required, replacement of Tree Protection Fencing will be supervised and signed off by the Arboricultural Consultant.
- The Tree Protection Fencing will be stable and robust (typical construction method, in accordance with BS5837: 2012, see below).
- The area between the Tree Protection Fencing and the tree will be a Construction Exclusion Zone (CEZ)
- Fence panels will be made of mesh (e.g.: Heras fencing) or, if solid, will have 30cm windows cut into enough panels to enable conditions within the CEZ to be viewed.
- The CEZ will be clearly identified (see Construction Exclusion Zone sign example below)

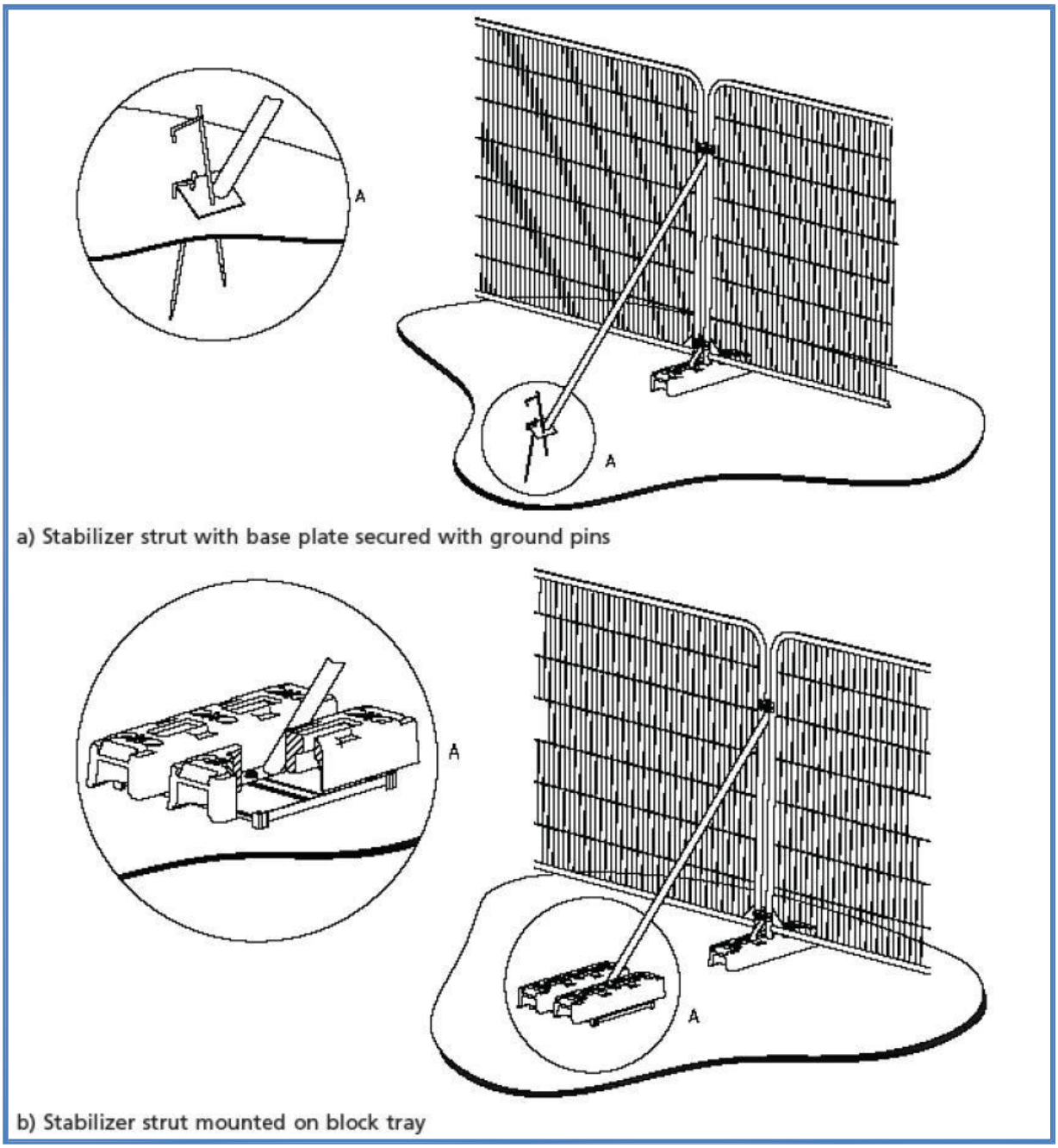
Example Tree Protection Fencing Sign



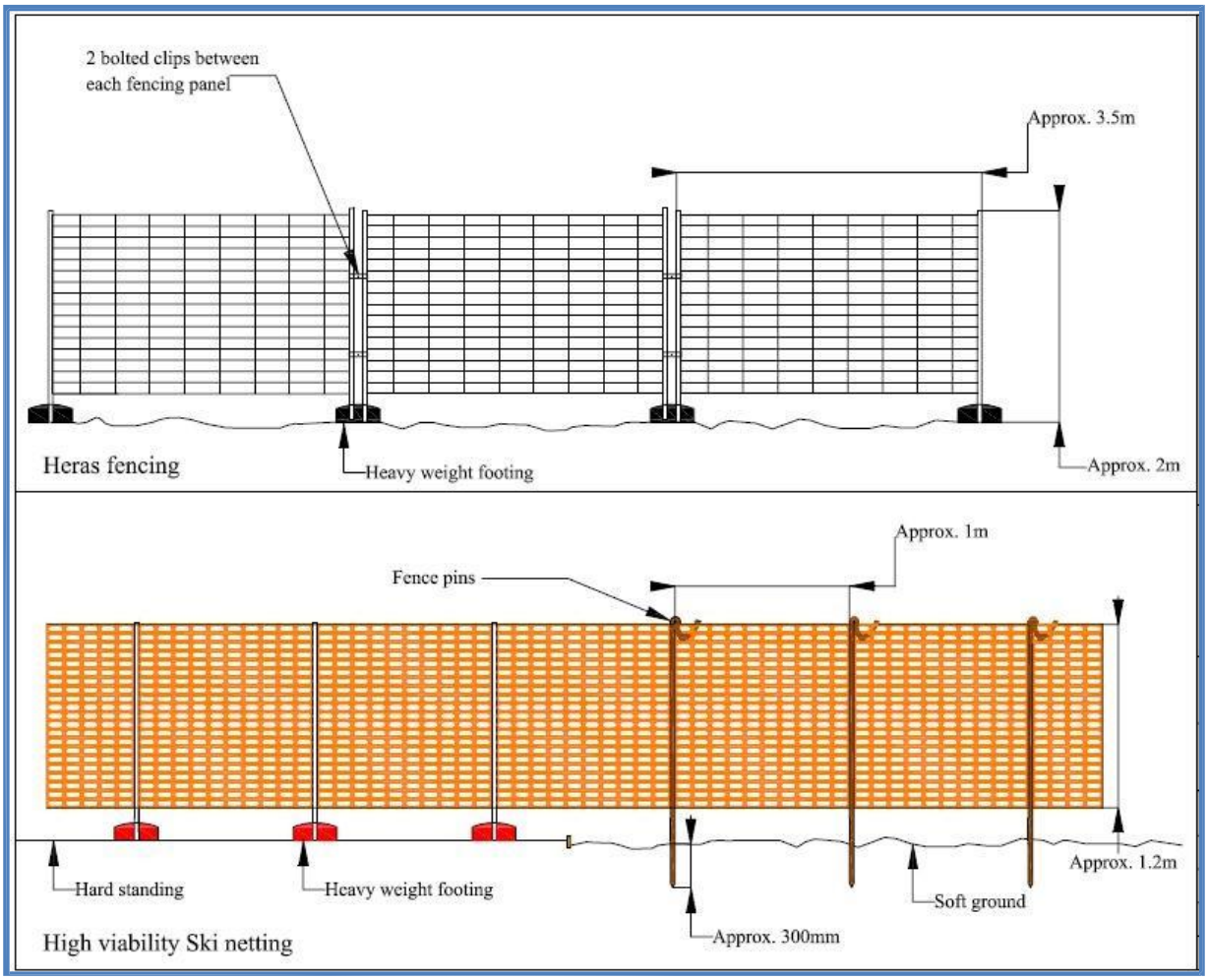
Key

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

BS5837: 2012 - Figure 2 – Tree Protective Barrier



BS5837: 2012 - Figure 3 – Examples of Above Ground Stabilisation Systems



Examples of specification fencing that may be appropriate for areas of low-intensity activity

No-dig Construction and Special Engineering Measures

No-dig construction methods and special engineering measures will be employed to enable the construction of roads and other built features within the RPAs of trees without damaging tree roots. Installation of built features using no-dig and special engineering measures will meet the following performance criteria:

- Ensure that tree roots are not damaged.
  - *For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING.*
- Ensure that soil is not compacted.
- Ensure that no spilled toxic materials seep into the soil.
- Ensure that sufficient rain water reaches tree roots.
- Ensure that gaseous exchange can take place within the soil around tree roots.
- All operations will be supervised and signed off by the Arboricultural Consultant.

Appendix D

Example Monitoring Form

Treework Environmental Practice

Site Inspection Report
Completion of Arboricultural Operations – Monitoring Form

Site Name:			
Site Address:			
Client Name:		**Instructed By:**	
Site Manager:			
Arboricultural Operation Checked By:		**Date:** **Approved / Not Approved**	
Operation Completed / Additional Works Required: **Number of Photographs Supplied:**			
Completed By (Contractor Name):		**Contractor / Subcontractor**	
Copied to LPA	**Yes / No**	**Contact Name:**	
Copied to Client	**Yes / No**	**Contact Name:**	
Copied to Site Manager	**Yes / No**	**Contact Name:**	

Operation Completed / Additional Works Required (Continued):

Appendix E

Forming joints with TERRAM geotextiles

TERRAM
Geosynthetics you can trust

Forming joints with TERRAM geotextiles

Fiberweb Maldon
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F: +44 (0)1621 874299

Introduction

Jointing TERRAM geotextiles can be achieved by overlapping, sewing, stapling or bonding.

Overlapping adjacent or subsequent rolls is the most-frequently-used method. However, there are situations when a more-substantial seam is required on the grounds of economy (reducing overlap waste), providing a degree of tensile strength continuity, or where the textile could move if a simple overlap was used. Sewing is generally the most satisfactory method in these cases.

Overlapping

For sub-base/subgrade separation, the overlap width can vary between 300mm and 1000mm depending upon subgrade strength, profile, and the stress anticipated at the overlap. 300mm is generally adequate for a firm, level subgrade but 1000mm may be necessary on a soft, uneven subgrade (see Fig 1).

Fig 1

Overlaps should be formed so that sub-base is spread over, not against, the leading edge of the top textile. Care must be taken to avoid undue stress of the overlap if displacement is to be avoided.

If high-strength grades are to be placed as filters beneath large rock e.g. coastal and river defences, then the overlap should have a minimum width equal to the diameter of the rock.

Sewn joints

Sewn joints can be formed with edges face to face - *prayer* seam (Fig 2) or with a lapped J seam (Fig 3), each with either a single or double stitch line depending upon the strength required. Polyester or aramid sewing thread can be used.

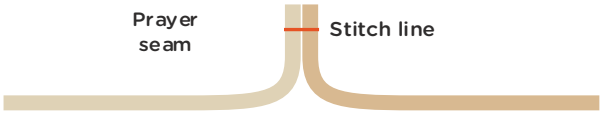

Fig 2

The single-seam prayer joint is satisfactory for most Terram geotextile grades since it produces a strength equivalent to about 75% of the textile's strength.

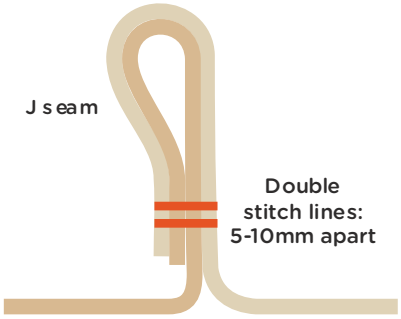

Fig 3

Stitch lines should be parallel to the edge, with the outer line at the selvedge inside edge and the stitch frequency per inch of the outer line maximised for optimum results.

It is advisable to use the sewn joints where sand is the trafficked surface above the textile otherwise it is possible for the sand to migrate through a simple overlap. Ensure that the seam *stand up* faces down.

Portable hand-operated battery-powered stitching machines are generally used with Metric 9 polyester thread, providing a double-thread-feed chain, single stitch generally set to provide 16 stitches per 100mm. Metric 25 polyester thread can be used with lightweight textiles e.g. Terram 1500 and below.

Aramid thread (around 420 tex) is used to form high-strength sewn joints. These should ideally be sample and tested for performance. It is also worth noting that factory-produced seams, using more robust sewing equipment and under more ideal processing conditions, are likely to produce more superior results than on-site sewing.

Portable, electrically-powered, sewing machines (mains/battery) are obtainable from:

J & B Sewing Machine Co Ltd. Curlew Close, Queensway Meadows, Newport NP19 4SY
Tel:- +44 (0)1633 281555 Fax:- +44 (0)1633 281666
www.jbsewing.com

The sewing operation requires a short training period (2 hours) to master the technique and familiarise with the machine and a period of practice (1 day) to perfect the method. One operator plus two labourers are normally required.

Once set up the sewing machine operation can provide acceptable installation rates. However, construction site conditions can cause problems: a broken thread can lead to unthreading problems, dampness can cause the thread or needle to break, bobbins need to be covered to keep the yarn clean and dry (a plastic bag will suffice).
It is essential to keep machines in good order and close liaison with the sewing machine manufacturer's representative is recommended.

Stapled joints

Terram geotextiles can be joined by stapling, preferably using a lapped seam and an industrial stapling device. Seam strengths are likely to be much lower than those achievable by sewing.

A suitable stapler is obtainable from Rosenheim, Lancaster Fields Gateway, Crewe CW1 6FF
Tel: 01270 585959

Bonded joints

Joints can be bonded using adhesives, but this is not generally recommended for site-formed joints as the textile needs to be clean and dry, and joints formed on a a firm base. However, a good seam strength can be achieved using a hot-melt adhesive to form a simple 100mm wide overlap under controlled conditions.
The hot-melt adhesive should be applied in accordance with the manufacturer's instructions. Pressure must be applied to the joint in order to force the glue into the textile. Pressure may be applied by standing on the joint.

Hot-melt adhesives and applicator guns are obtainable from The Adhesive Company (AHS), Unit 2a, Hargreaves Road, Groundwell Industrial Estate, Swindon, SN25 5AZ Tel: 01793 721112

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