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BS5837 Arboriculture impact Report

Client: Ling Tan

Site location: Clarence Gardens, London NW1 3LH

Date: 25-10-24

Prepared by Liam McGough FdSc Arb M ArborA Arb AC

Contents

1.0 Introduction

1.1 Scope & Brief

A survey was carried out at the request of Ling Tan

to assess the Arboricultural implications of the proposed installation of art intilation and mixed media constructions/Structures at the in close proximity to a large tree, to create pathways that lead to the structures and allow for them to be accessed and used with the lowest possible impact on the tree and its surrounding root protection area. **Clarence Gardens, London NW1 3LH. To advise on Protection of the Tree and its roots as well as advise conditions of work and best practice to ensure trees protection. Notes on recommended tree work if any and the safe pruning of roots where granted construction meets Root protection areas if necessary.**

The safety level of the tree based on its current status was also observed and recorded.

The purpose was to identify trees in proximity of the work that may be affected by the installation. To advise on best practice and to make best use of the space while minimising impact on and within the trees RPA. The following is a description in the own words of the creator of the project to give a fuller understanding. "The aim of this project is to give a 'voice' to the Story Tree in Clarence Gardens, so
that residents can have conversations with it, and with each other. Building on residents' individual stories, and using AI to model its personality, character and history. Genetically identical to the other nearby Plane Trees, they all appear different because of each one's unique location and micro-climate within the Gardens. Follow the underground biological and technological networks that connect them all, and talk out loud to the Story Tree's roots – it will tell you about its life and relationship to the broader environment.
Walking up to the Story Tree, visitors will notice a series of undulations ("Mounds") that look as if the Tree's roots are pushing up above the ground. Part natural, part artificial, these undulations are meant to seem slightly uncanny, some covered with natural grass, but articulated as if made by humans. The tree's root network is manifested through strips of natural pathways that invite visitors to interact with the mounds up close.
If they go close to one of the undulations and ask a question, the Tree will answer out loud. Like an archaeological layer that becomes part of the London Plane Tree's story, the side of each structure will be embossed with a custom made infographic that shows the invisible system behind the project (both natural and technological

systems intertwined), enabling visitors to understand the hidden technology, ecological and community engagement that went into creating the work.

Using a methodology that we have already established in previous work with technology and trees, we will work with local residents, in particular those whose residences look directly on to the square, to create a many-layered 'empathy map' of the Tree that reflects many people's different perspectives and stories about the Tree. This map, in combination with context and real-time data about the Tree, will be fed through an artificial intelligence interface and voice synthesis to create a 'voice' that responds to human's voices, and triggers the interactive light patterns.

We hope that the project would encourage people to develop deeper relationships to Clarence Gardens, its natural residents and to each other by creating a space for discussion and deliberation that embraces not just people but non-humans as well. The artwork will be on display for 5+ years in the public realm. So fabrication techniques and materials need to be carefully considered that can withstand the test of time and are waterproof.

The artwork is situated in a public park that is surrounded by public housings, care needs to be considered in terms of noise and light pollution.

The park is also prone to anti-social behaviour at night, while we cannot stop vandalism, care needs to be given to make sure the electronics housed within the structure are safe and secured.

The installation surrounds a 200+ year old London Plane Tree. Care have to be given to the installation around the tree, with the advice of an arborist. (provided by the commissioner)."

Subsequent works if any are recommended to alleviate any issues identified regarding root damage, and from a health and safety perspective as the area under the tree canopy will be used more if development of the talking tree installation is permitted.

Any Trees requiring works are categorised as high, medium or low priority based on the methodology stated in **section 3.7**

The data recorded included, species (common name), height, DBH, crown spread in each direction, age, condition and distance of main stem from the property foundations. Detailed explanations of these criteria are in the methodology section of this report (**section 3**).

The data is recorded in the Tree Survey Schedule section (**section 4**) of this report and includes comments identifying any damage to property foundations, faults and hazards with respect to crown form, condition, storm damage and disease. A recommended

action was given for each tree. No bore hole and DNA testing has been carried out for this report.

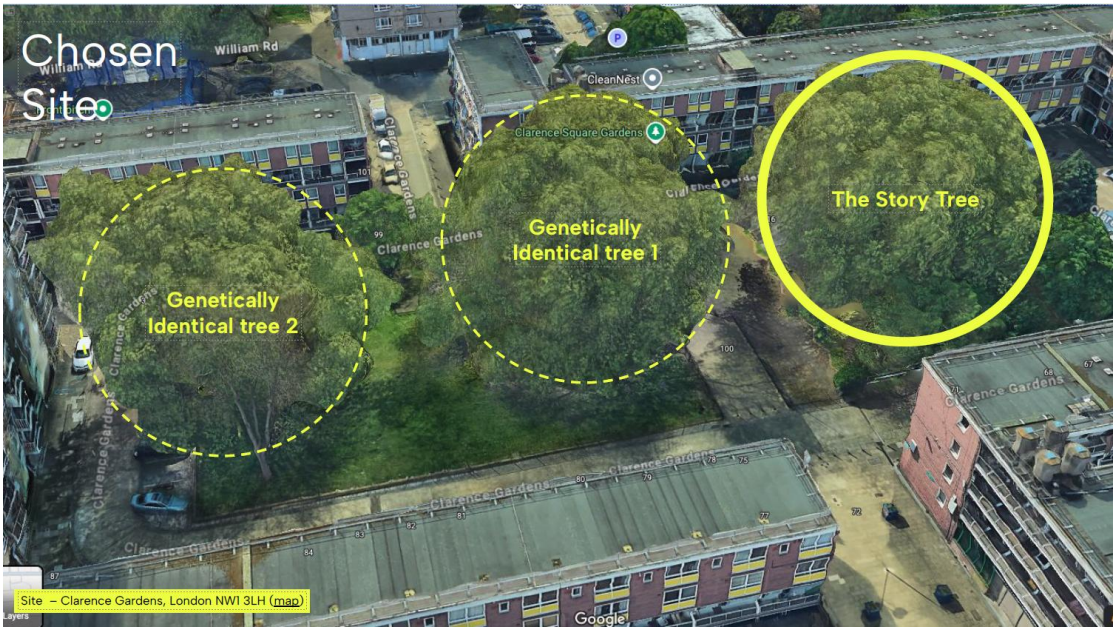
All works if any recommended should be carried out in accordance with BS 3998:2012 Tree Work - recommendations.

Individual trees are plotted on separate site plans and accompany each respective tree survey schedule (**section 4**), tree location plan in (**Appendix**).

1.2 Limitations

All observations were from ground level without detailed inspection and were not inspected from underground excavation or from an aerial perspective.
As trees are living organisms their health and condition can change rapidly. Extreme climate issues such as drought and flooding can affect soil shrinkage and overall tree health.
All statements made about the trees were based on the status of the trees at the time of inspection.
No bore hole testing or PICUS testing has been carried out at this site. All observations have been made using only visual indicators.

1.3 Site Location



Clarence Gardens, London NW1 3LH

2.0 Statutory Protection

2.1 Tree Protection

A variety of statutory restrictions apply to felling, pruning or damaging of trees with preservation orders (TPO) or within conservation areas (Department for communities and local government, 2014). With exceptions of these restrictions available.

Any trees that require arboricultural works should be checked for any restrictions prior to works commencing.

Applications should be made for trees restricted with a TPO and a six week notification made for works in a conservation area.

Where works are deemed exempt, a submission of a 5 day notification of works should be made in accordance with section 198 (6)(a) of the Town and Country Planning Act 1990.

Aditional information including boundary zones for tree protection is included in the appendix

2.2 Wildlife Protection

As part of the survey tree was inspected from ground level with the use of binoculars for signs of wildlife habitation, in particular birds and bats.

All bats and their roosts are protected by law (The Wildlife and countryside Act 1981 & conservation of Habitats as Species regulations 2010).

Penalties and prosecution for causing damage to bat's or roosts is up to £5,000 per bat and a prison sentence, plus confiscation of vehicles plant and machinery involved.

In the UK all wild birds and their nests are protected by law (The wildlife and Country side Act 1981 & The Countryside Act 2000).

The presence of Bats/roosts or birds nesting will be noted within the survey, where possible all works should be carried out to avoid the bird nesting season.

Prior to any tree works, a visual inspection should be carried out by a qualified person to ensure that there is no loss of protected wildlife habitat.

3.0 Methodology

The individual trees were assessed using Claus Mattheck's methods as stated in his guide to visual tree assessment, with a copy of the updated version at hand for instant reference.
The following data was collected for each tree;

- Species (common name)
- Height
- Age
- DBH
- Crown spread in each direction
- Condition
- Comments
- Action
- Priority

Each tree was given a sequential identification number and were plotted on the accompanying map.

3.1 Height

The height was measured using a clinometer and is expressed in metres (to the nearest metre)

3.2 Age

The age of each tree is expressed using the following terms:

- Y Young
- SM Semi-mature
- EM Early-mature
- M Mature
- OM Over-mature

3.3 DBH

The diameter of the trees' main stems was measured at breast height and is expressed in centimetres.

3.4 Condition

The overall condition of the trees was assessed with regards to its vigour, stem condition, and crown form, and is expressed using the following terms:

- P (Poor)
- F (Fair)
- G (Good)
- D (DEAD)

3.5 Distance from property

This measurement is expressed in metres and was used to evaluate current risk and future risk of subsidence or damage to property from roots.

3.6 Comments

Any signs of subsidence, hazards, defects or signs of disease observed were recorded.

3.7 Action

An action was recommended for each tree to alleviate any hazards/defects identified in the comments section of the data collected.

3.8 Priority

The priority for each action required was based on individual tree locations (e.g. near roads, footpaths or buildings) and the severity of the hazards identified in the comments section.

Recommended actions should be undertaken within the following time restraints from the date of the report;

High (H) - as soon as possible within a 3 month limitation.

Medium (M) – within 12 months.

Low (L) – if desirable and/or as part of a long term management plan.

A prioritised work schedule is located in the appendix section of this report along with all accompanying maps, and any supporting photographs.

4.0 Tree Survey Schedule

Tree No.	Species	DBH Cm/m	Height	Age	Crown spread N/S/E/W	Condition	Distance from property	Comments	Action	R.P.A
T1	London plane	150cm	17m	M	6,7.9,9	Good	15m	Mature tree good form no signs of ill health, very large single stem on communal garden area	deadwood	18m

4.1 Site description

I carried out an accompanied site visit on 25/10/24 . The weather on the day was clear. Site is neat and tidy and free from ground cover.

4.2 Soil assessment

Heavy clay with loamy sand and silt.

5.0 Data Analysis

5.1 Conclusion

The proposed installation of five undulating mounds, designed to resemble natural tree roots, has been carefully planned in accordance with BS 5837:2012 – Trees in Relation to Design, Demolition, and Construction to ensure minimal impact on the Root Protection Areas (RPAs) of the existing London plane trees. The use of staggered cobble pathways will allow for controlled pedestrian movement while maintaining ground permeability, preventing soil compaction within the RPAs.

The materials chosen—charred wood, stained steel, living turf, and daisies—will blend sympathetically with the existing environment, ensuring the installation complements rather than disrupts the trees' natural setting. Ground screws will be utilized to secure the structures, eliminating the need for invasive excavation that could disturb tree roots. Furthermore, the cement used for the cobbles will be carefully placed on a compacted MOT1 and sand base, preventing any lime leaching into the soil and safeguarding the trees' health.

Strict adherence to the installation protocols outlined in the plan will be maintained throughout, ensuring that both plant machinery and workers operate in a manner that prioritizes tree health. Protective measures will be implemented to prevent soil compaction, mechanical damage, or contamination within the RPAs.

With these carefully considered measures in place, the project has been designed with the well-being of the trees at its absolute forefront, and as such, it is expected to have little to no negative impact on their health or stability. We are in full agreement that the plan should proceed exactly as proposed, ensuring both the protection of these important trees and the successful integration of the artistic landscape feature.

The electric needed to power the art installations has been positioned in such a way that it follows the pathways and has minimal to no extra ground disruption to the cobble set pathways.

6.0 Arboricultural method statement

6.1 Generally

Any excavation carried out in the permitted area of the RPA will be done so in the presence and under the supervision of a qualified Arborist. Development can harm trees if not carried out carefully. Tree's crowns and trunks can be damaged by machinery or scorched by fire or chemicals. Trees roots can be asphyxiated and die if the rooting zone becomes compacted and the soil structure damaged. This can happen very easily, particularly on clay soils, even with the passage of light vehicles. Tree roots can be damaged by raising or lowering the ground level. In some cases it can take several years for the damage to become apparent. This report details how the development will take place whilst ensuring that the trees shown for retention can be protected, and for the protection of the soil in the areas for new planting.

The contractors installation schedule and methos statement is included here.

Installation Period 17th-23rd March (subject to weather conditions)

Crew will wear hi vis and steel toe cap boots

Access needed to site during installation period

Monday 17th March - Delivery of Materials and Marking out

Vehicles on Site - 1 Luton Flatbed tipper, 1 Landrover

Close off park area affected with hazard tape and stands.

Mark out and sign off positioning of mounds and network of cobble sett with chalk line.

Dig trenches for 5 mounds [100-120mm deep 3m long x 300mm wide plus 2 outlying channels]– taking care to avoid tree roots, confirm positioning of ground screws and channel.

Paint the individual cobb setts, set out to dry.

Tuesday 18th March - Installation of mounds

Vehicles on Site - 1 Luton Flatbed tipper, 1 Landrover

Fill trench with sub-base and compact

Lay out channel, secure to ground with ground screws in the agreed position

Attach Wooden element to channel

Bolt Metal element to wood and attached to channel.

Insert cabling and speaker, secure laser cut panel.

Fill trench with toil soil and compact.

Fill metal element with toil soil

Repeat with each of the mounds.

Wednesday - Landscaping [cobble sett]

Vehicles on Site - 1 Landrover

Cut turf along marked out lines

Dig trench to a depth of 120mm taking care not to disturb tree roots

Fill with sub-base and compact.

Cement in individual cobble sett at intervals along trench

Fill rest of trench with sharp sand, compact leaving 60mm for toil soil

Fill trench with top soil.

Thursday - Landscaping [seeding/plugging] painting lines

Vehicles on Site - 1 Landrover

Compact and top up topsoil in trenches, scatter seed and plant daisy plugs in the mounds.

Secure area to be painted with additional hazard tape and signage

Paint lines for pavement.

Friday - Snagging and handover

Vehicles on Site - 1 Landrover

Hazard tape taken down and all materials to be removed on completion of installation and signing off.

6.1.1 Fires: Fires on site should be avoided if possible. If unavoidable, they should be situated far enough so that there is no risk of damage to the trees, taking into consideration the wind direction.

6.1.2 Site and fuel storage, cement mixing and washing points: All site storage areas, cement mixing and washing points for equipment and vehicles and fuel storage areas should be outside root protection areas unless otherwise agreed with the Local Planning Authority. No discharge of potential contaminants should occur within 10m of a retained tree stem or where there is a risk of run off into Root Protection Areas.

6.1.3 Temporary buildings for site use: Site cabins, trailers and other temporary buildings can sometimes be used in root protection area if consent is agreed by the local planning authority. However on this occasion this won't be necessary. This can be very useful if there is a robust existing hard surfacing in place. The method for installing the buildings, and assessment of whether ground protection is needed is to be agreed with the Arboriculturist and specified prior to installation.

6.1.4 Protection of tree canopies: Piling rigs and cranes are often used close to trees. Work must be carefully planned so that there is sufficient room to avoid hitting the canopy during transportation or operation. Arboricultural supervision may be required, however it is the responsibility of the contractor to assess and plan the work. Any access facilitation pruning required is detailed in the tree surgery schedule.

7.0 Arboricultural impact assessment

1 .1 The BS5837 gives a Root Protection Area [RPA] for each retained tree by reference to Section 4.6 in the BS5837 2012. The RPA is an estimation of the area of the root system that would need to be retained to sustain the condition of the tree if all the other roots outside it were to be severed. The RPA represents a smaller proportion, (on average only a third), of a tree's root system and consequently whilst the RPA is particularly important to ensure that there are no adverse effects upon stability, if an encroachment does not reduce the overall assimilative function of the root system significantly it is unlikely to cause harm. However, as with any factor relating to trees each individual situation must be justified in site-specific terms.

1 .2 The RPA is usually described as a circle with a radius of the prescribed distance within which no unspecified activity should occur, though the shape and position of the RPA can be modified by an arboriculturist to meet individual site conditions according to the probable distribution of the tree roots. Intrusion into the RPA can take place only where the ground is adequately protected in accordance with the requirements of Section 6.2.3 of BS5837 or where work is carried out to an agreed design and working method.

1 .3 Liam McGough Tree services uses a tabular method to derive RPA radii in metres.

1 .4 Accordingly I have drawn in the RPA panel at Appendix as a reference only

8.0 Glossary of Terms & Definitions

Amenity- the pleasantness or attractiveness of a place.

Asymmetrical crown- unbalanced, one-sided.

Cavity- hole within a stem/branch of a tree, caused by decay or damage.

Crotch/fork/ union - region formed by a junction of two branches, or stem and branch.
Crown- overall branch and foliage cover.

Deadwood- dead branches within the crown of a tree. <30mm diameter classified as minor deadwood, >30mm major deadwood.
Dieback- ends of branches with no leaf coverage, sign of decline.

Early-mature- a tree that has not reached maturity but is deemed to be 2/3 the way through its life expectancy.

Epicormic- shoot growth from dormant or adventitious buds on main stems or branches.

Fastigiate- Upright crown form.

Good form- good crown shape and size expectant of specific species characteristics.

Over–mature- a tree that has exceeded its life expectancy.

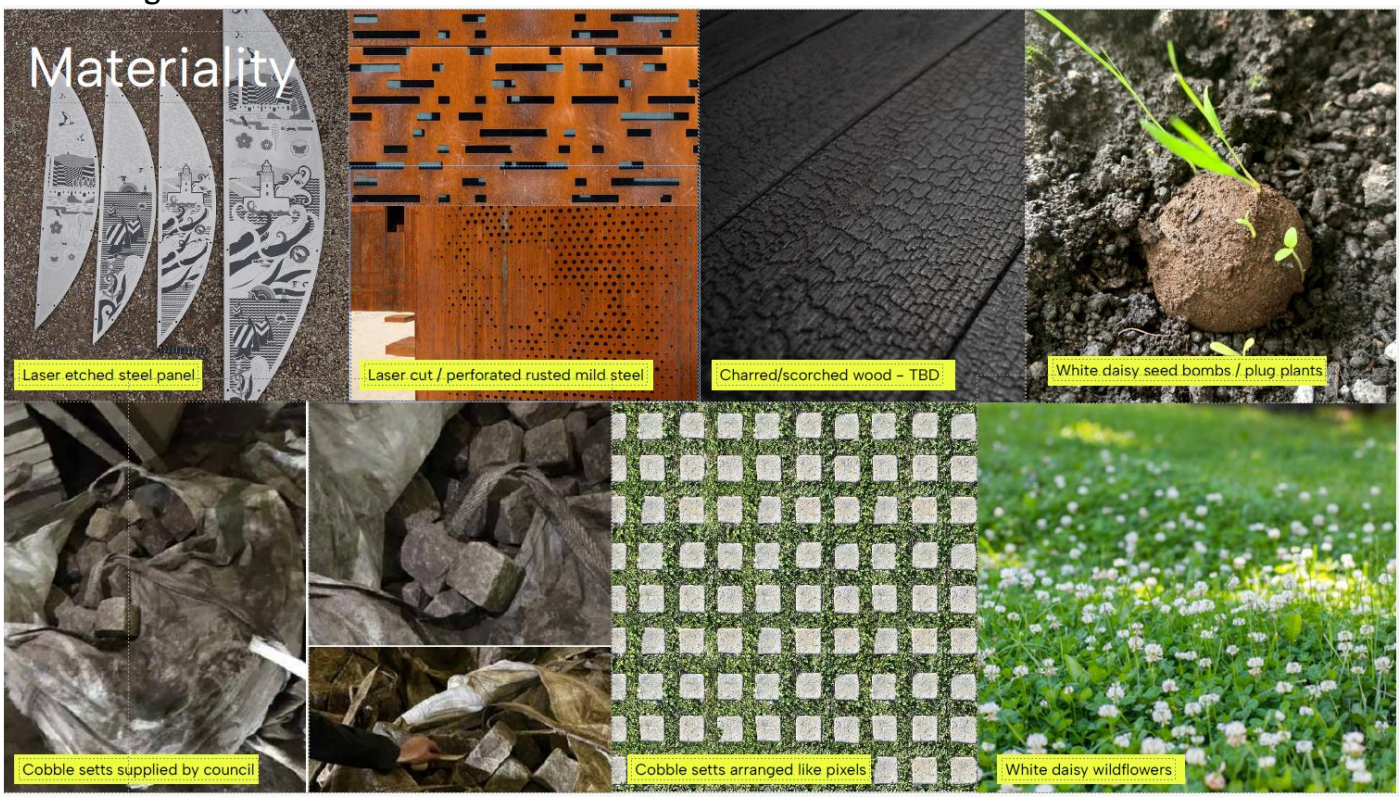
Mature- a tree that has reached the final third of its life stage.

Stem- above ground structure that supports the branches of a tree.

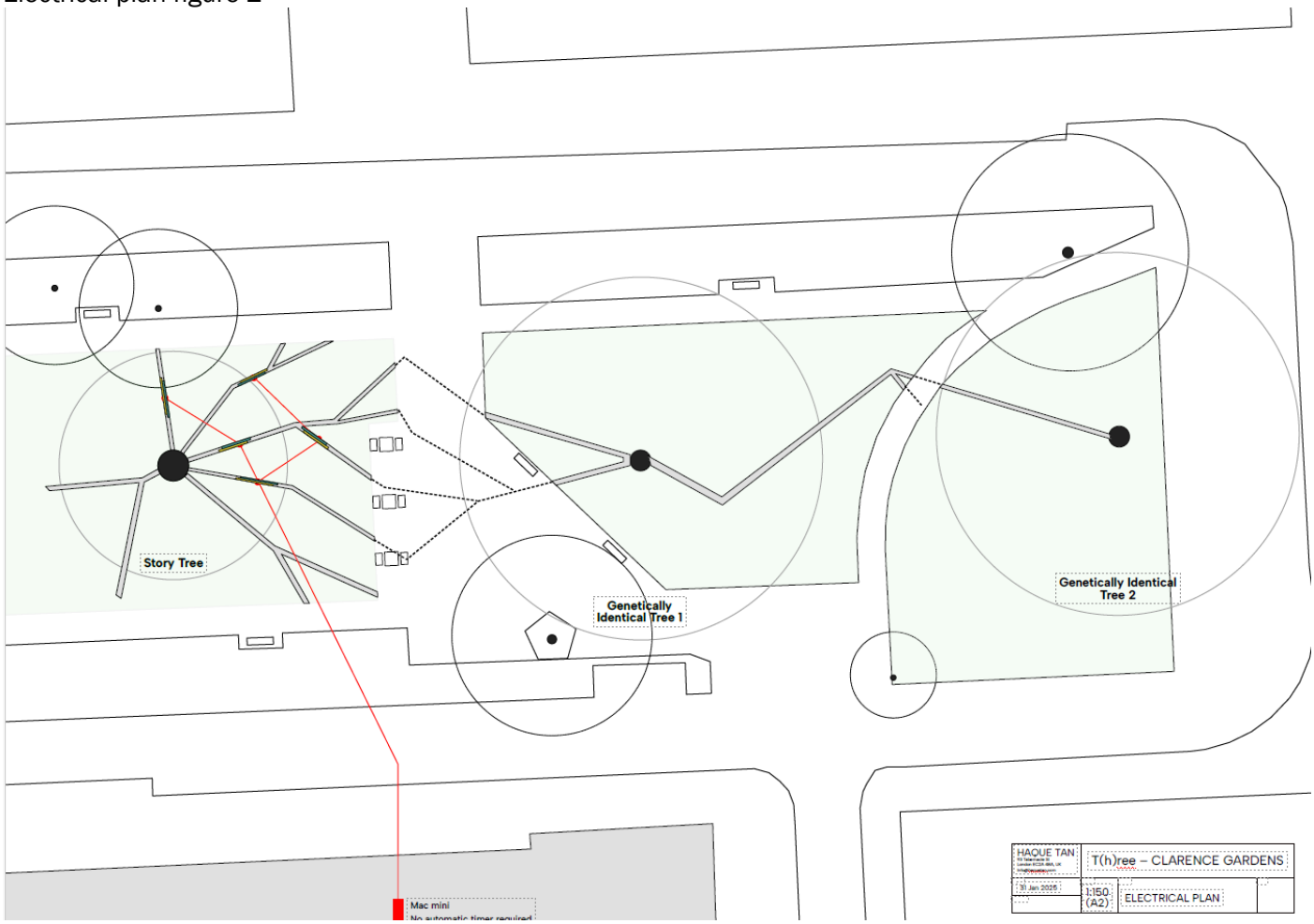
Vigour- physical strength and health of a tree

Appendix

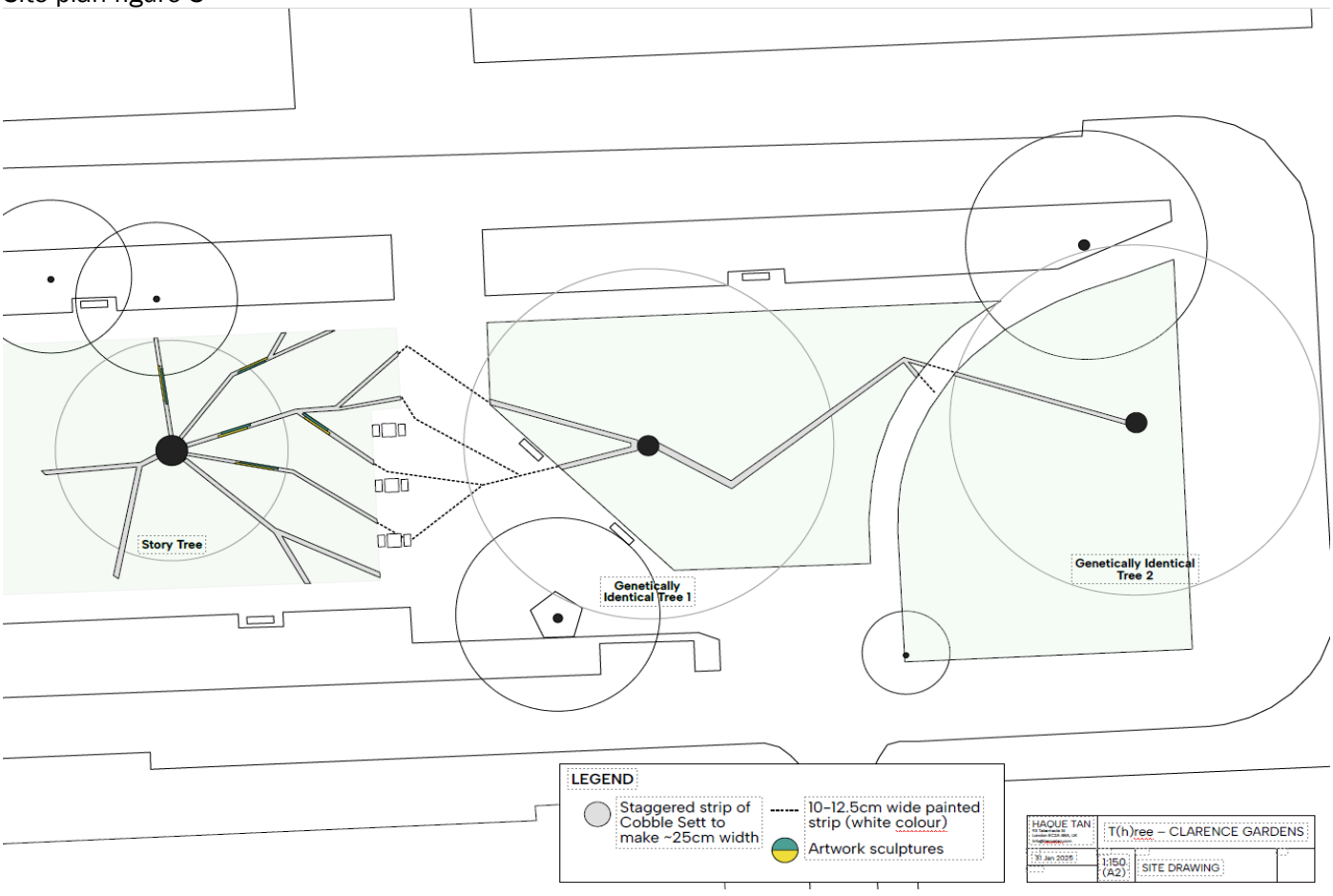
Aesthetic figure 1



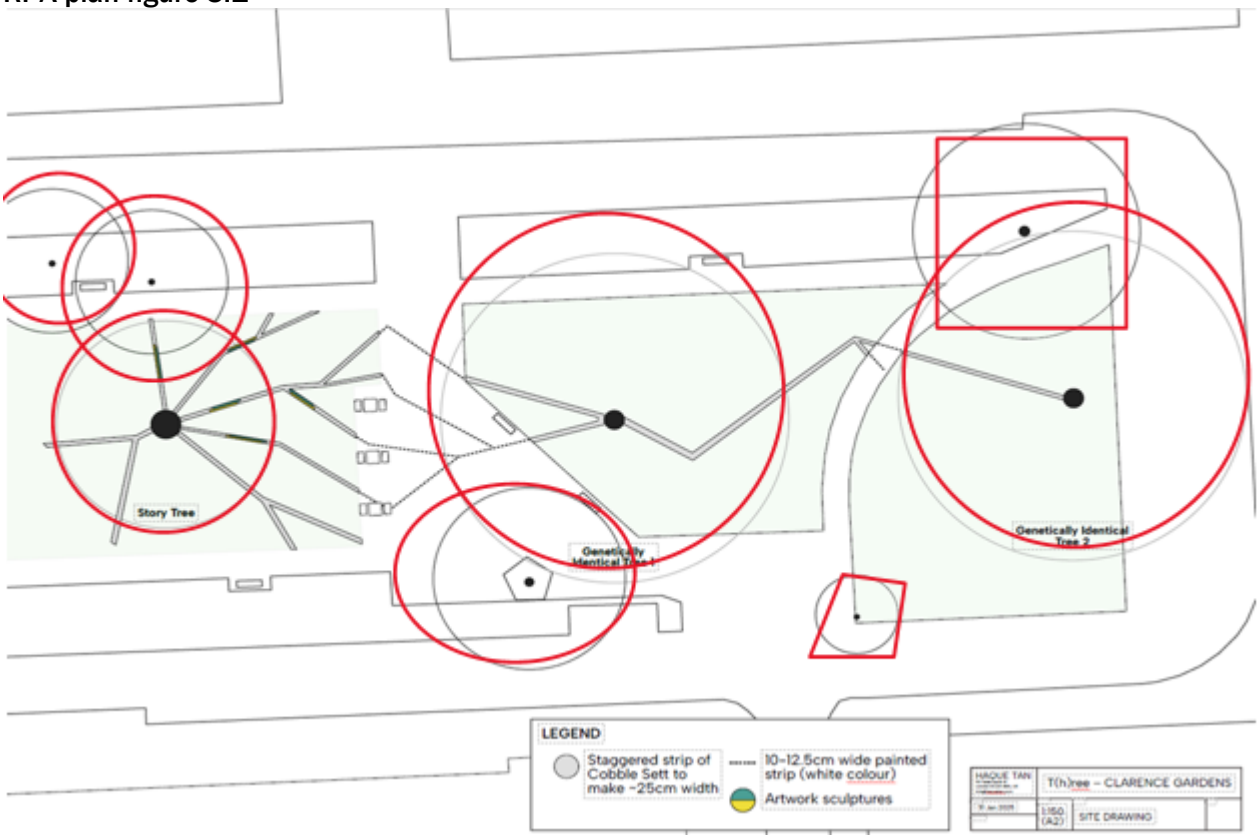
Electrical plan figure 2



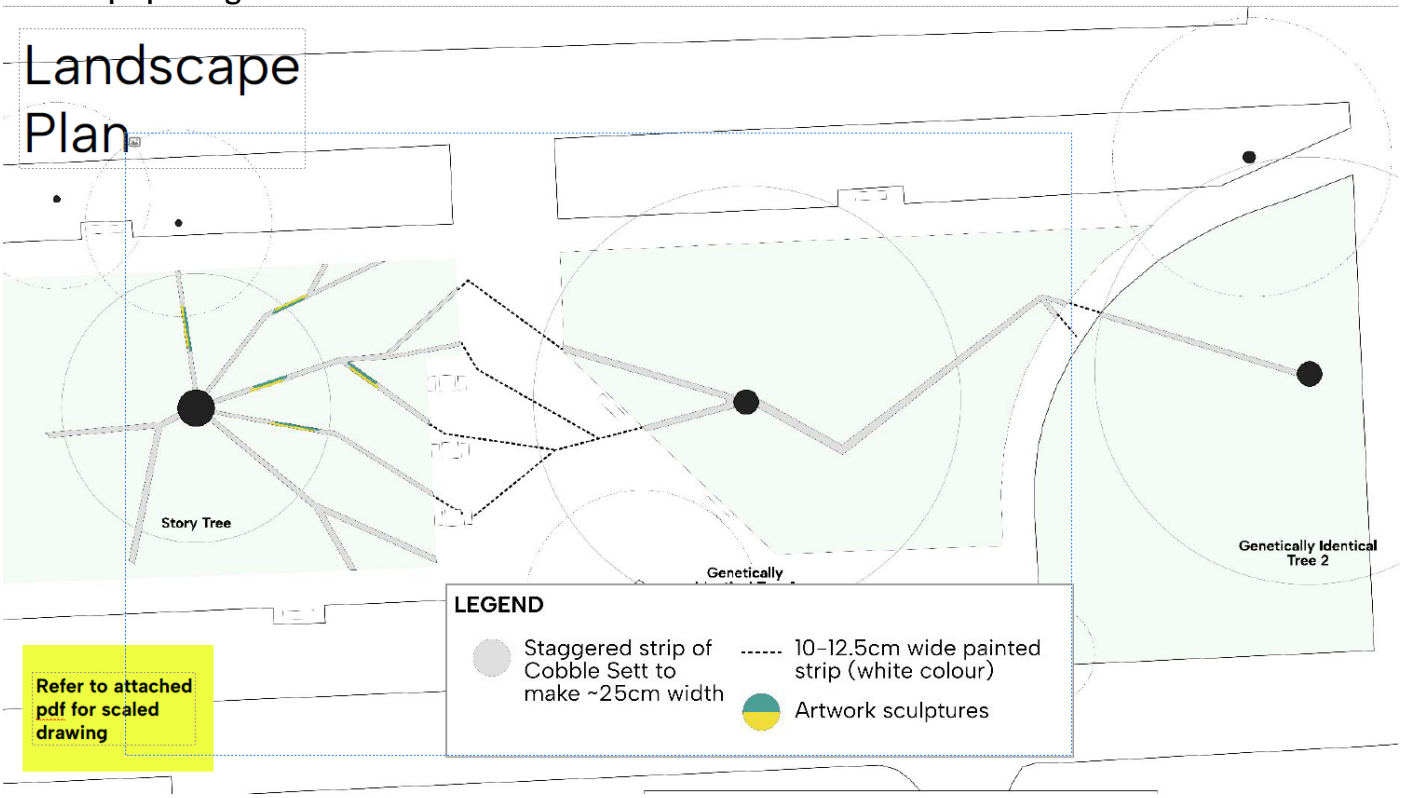
Site plan figure 3



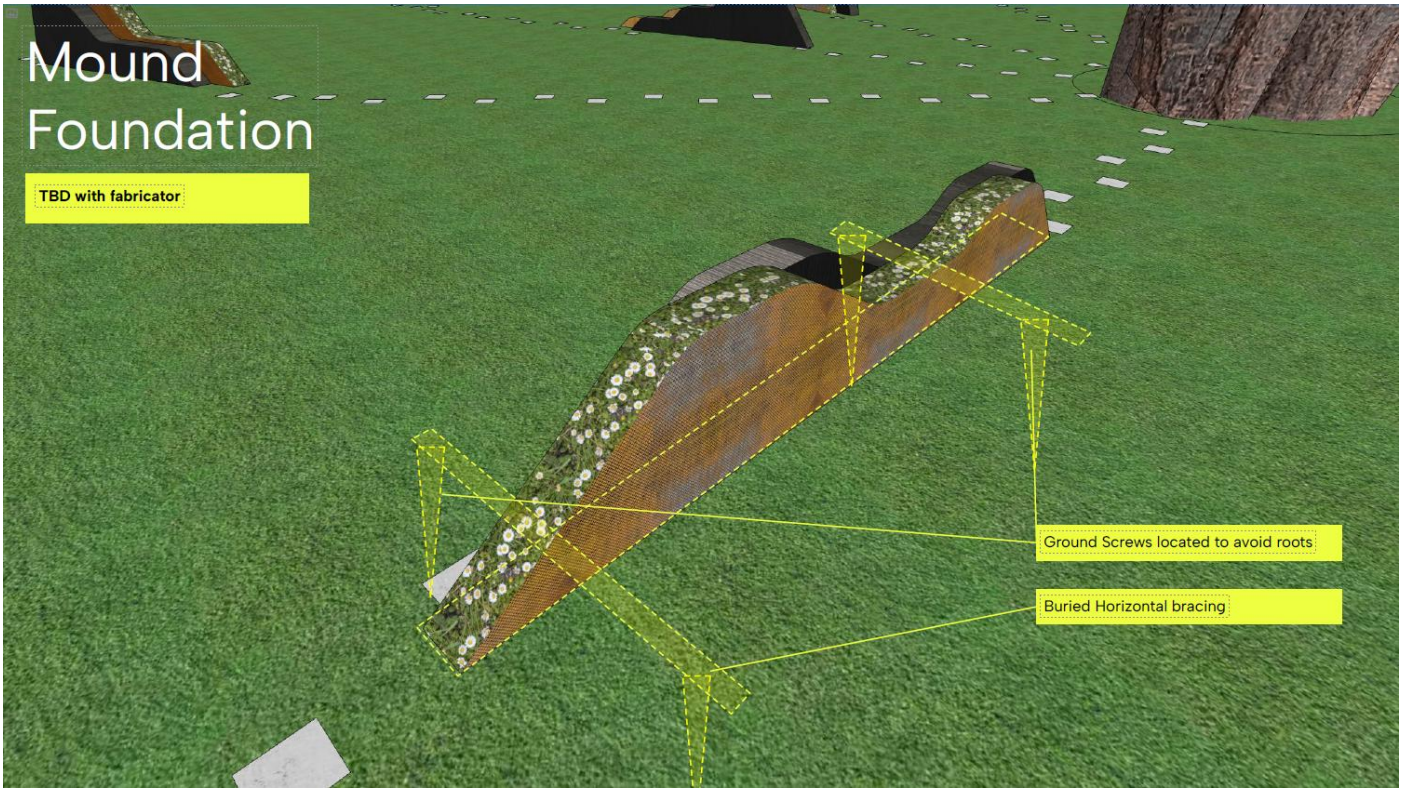
RPA plan figure 3.1



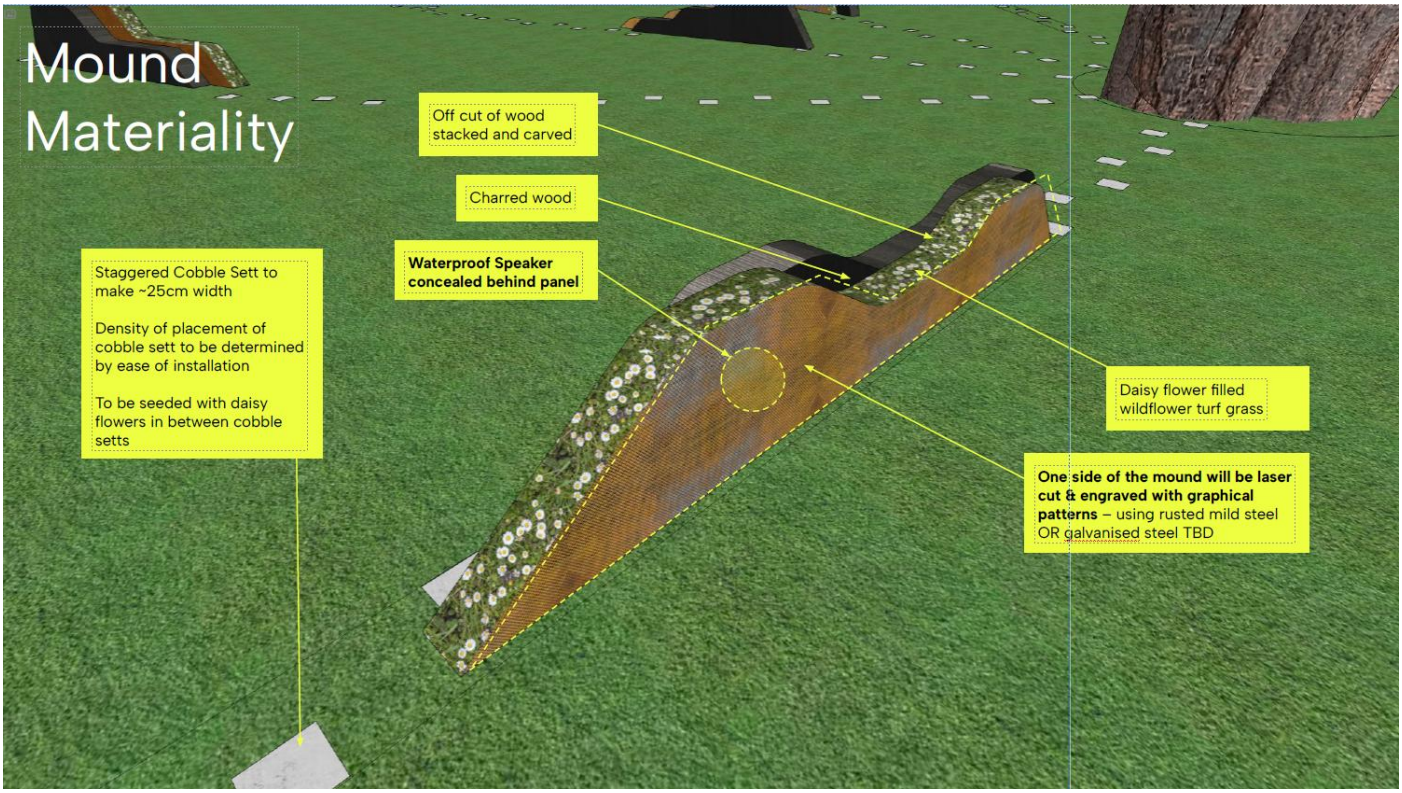
Landscape plan figure 4



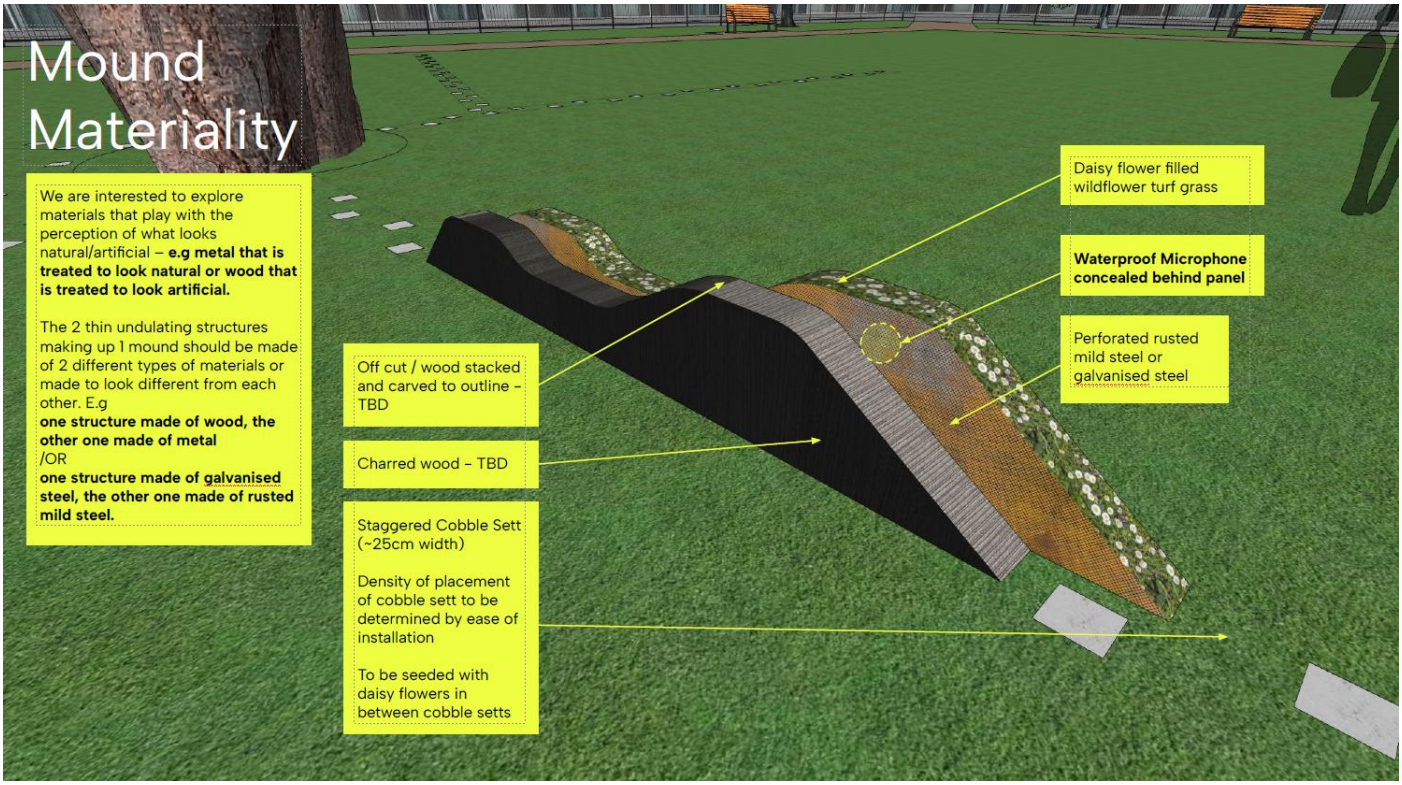
ground screws plan figure 5



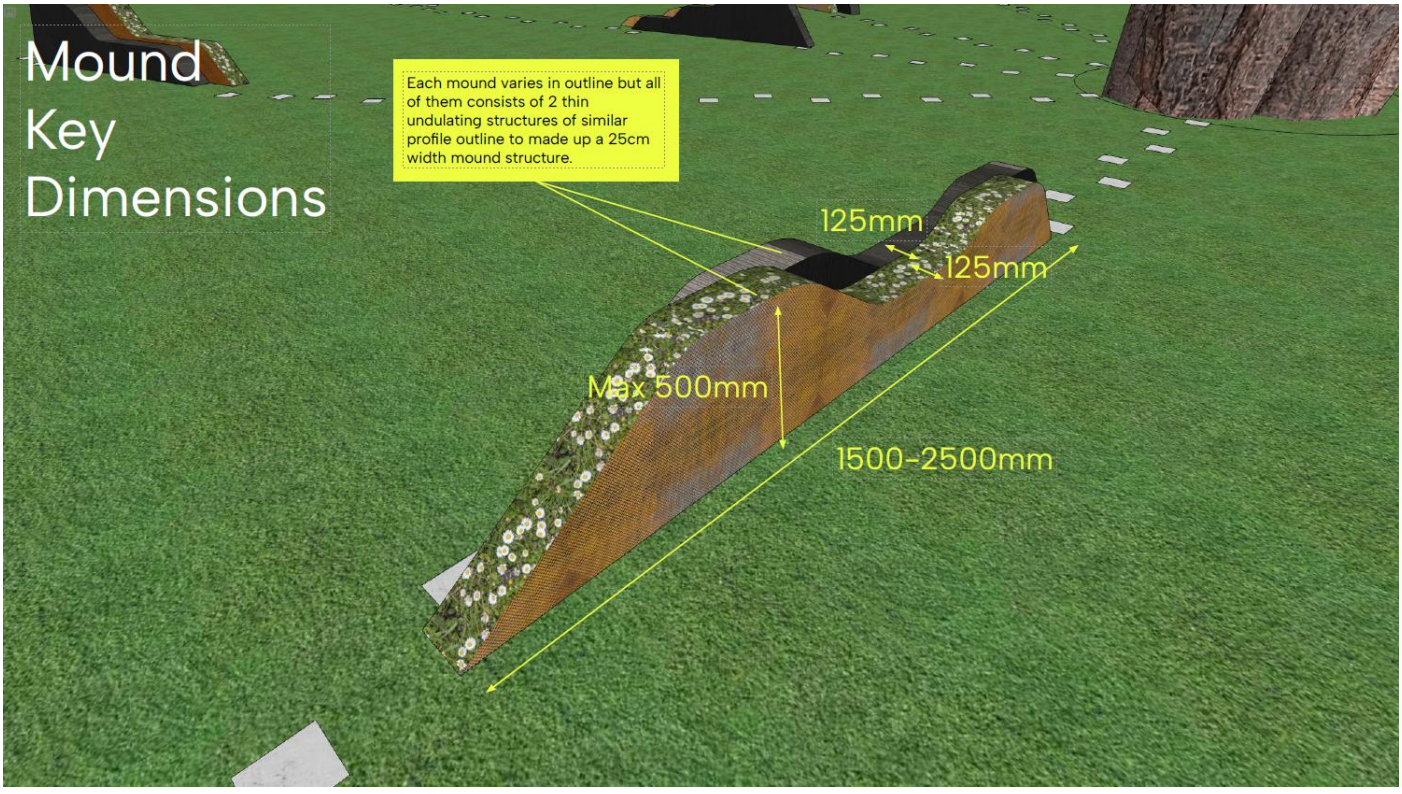
Materials used for proposed mound figure 6



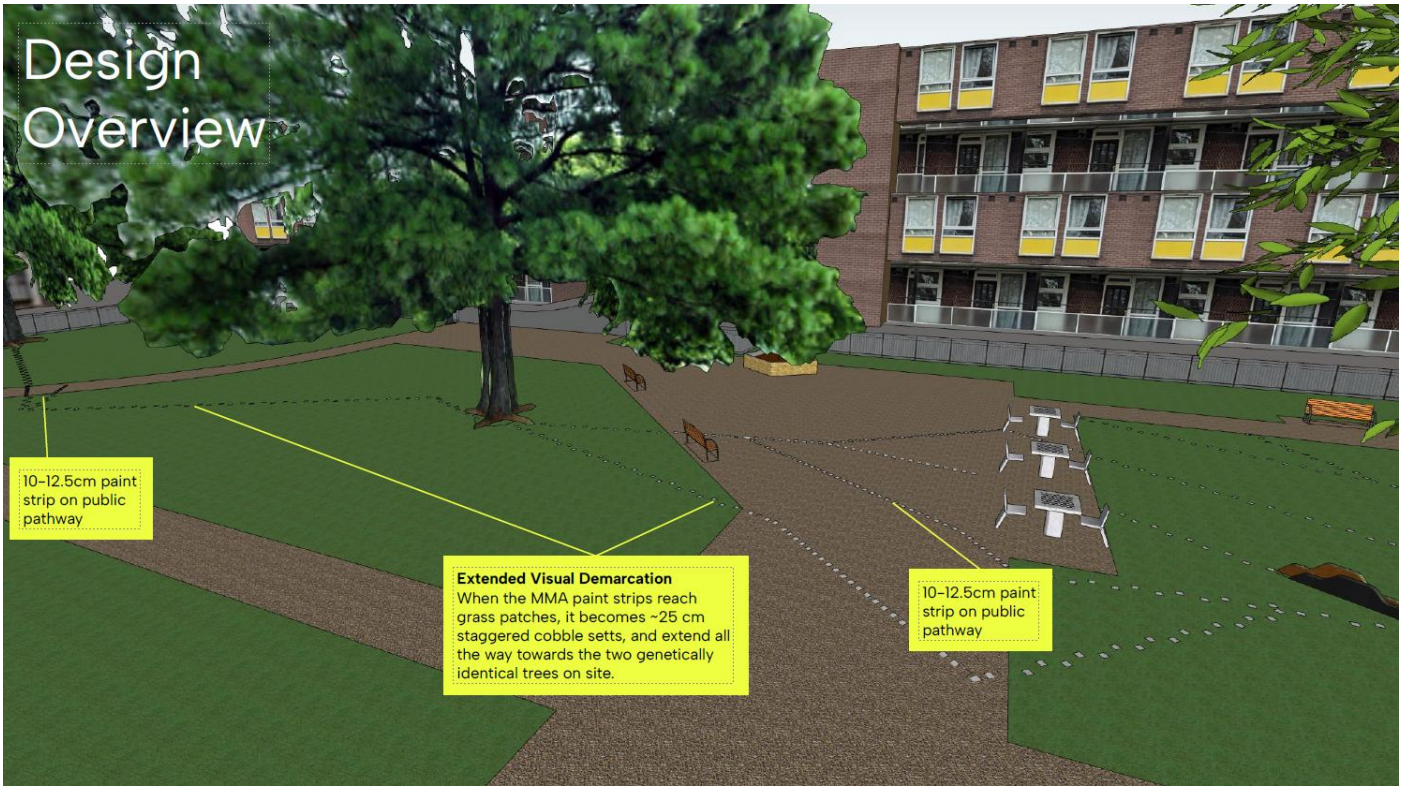
Materials used for proposed mound figure 7



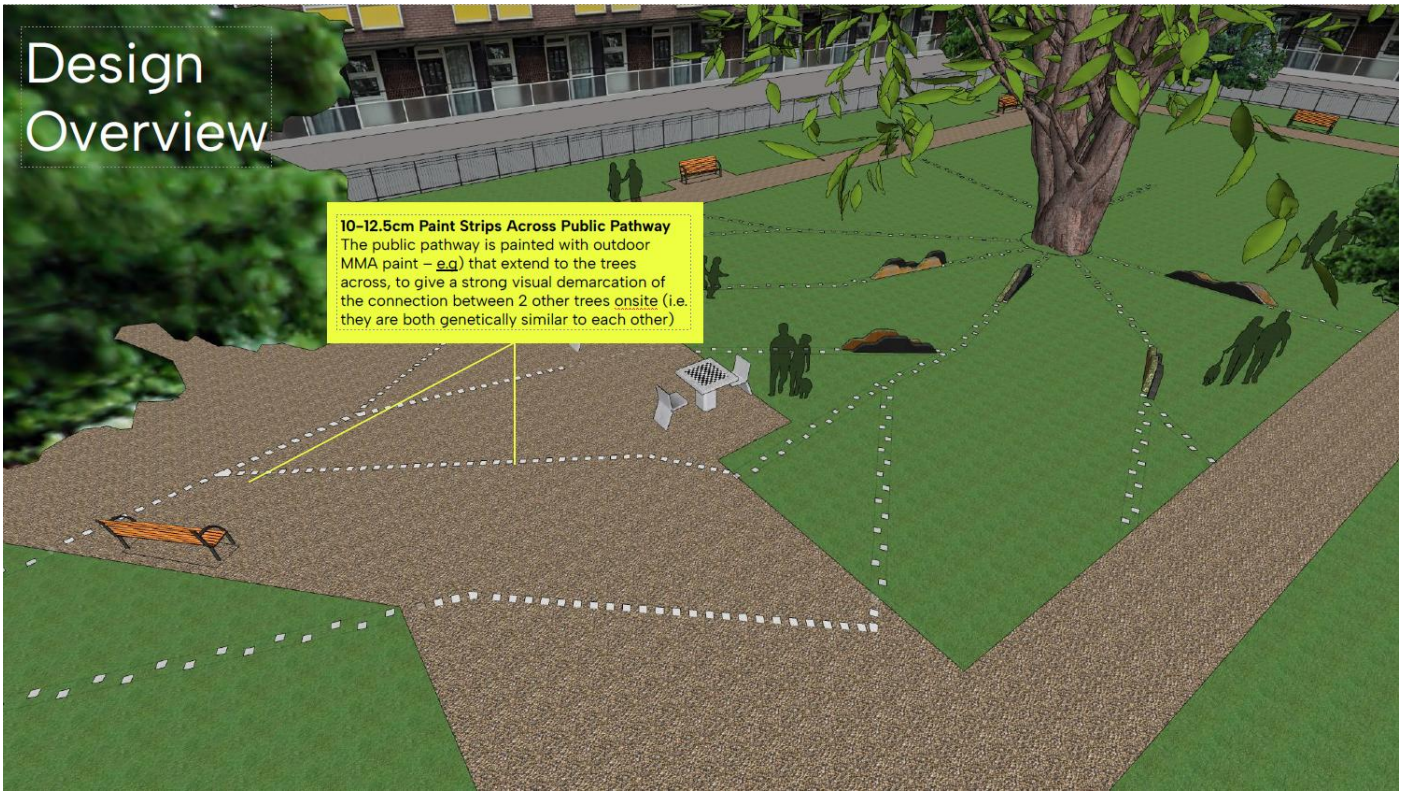
Mound proposed dimentions figure 8



Pathways leading to other trees figure 9



Design overview figure 10

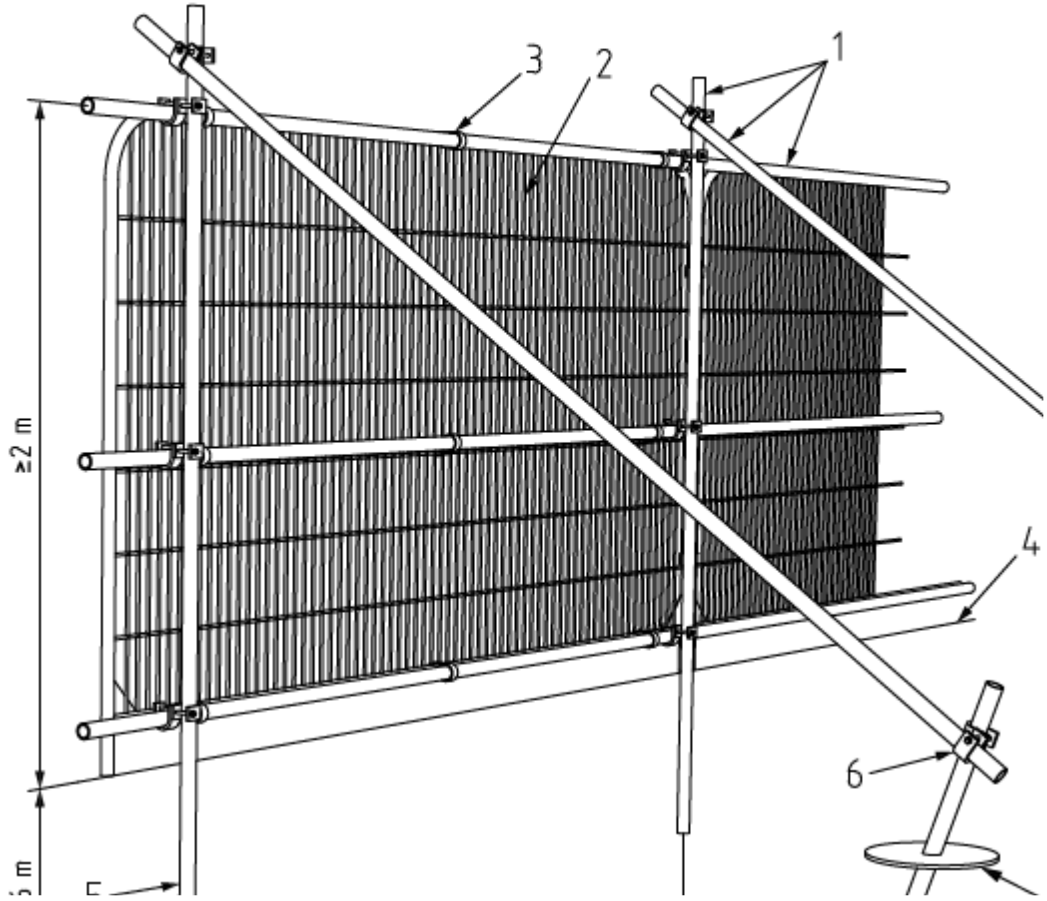


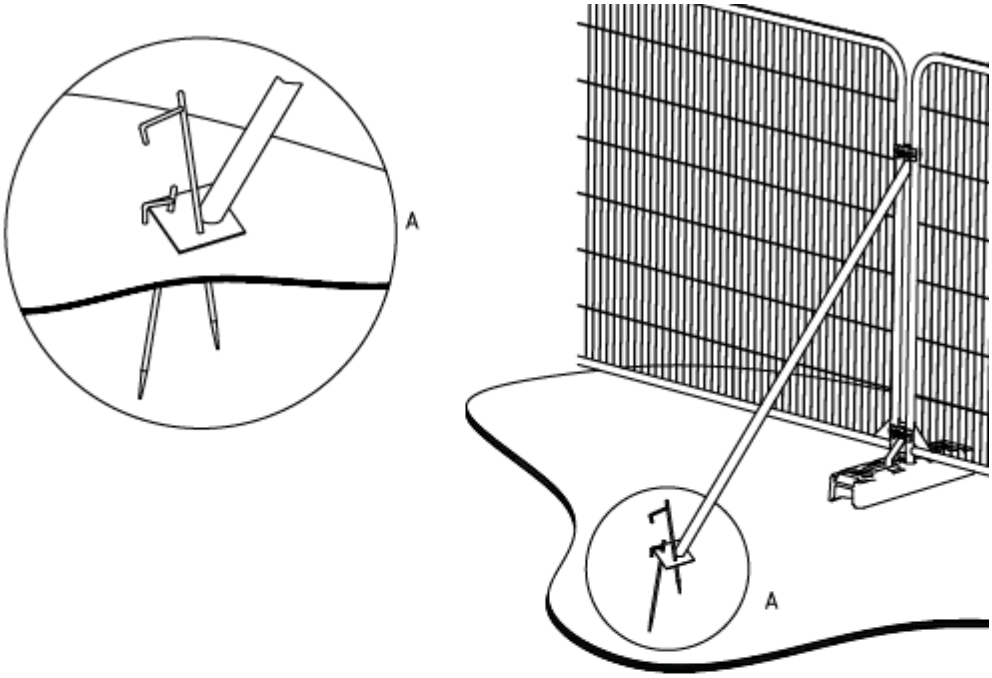
Design overview figure 11

Design overview figure 12

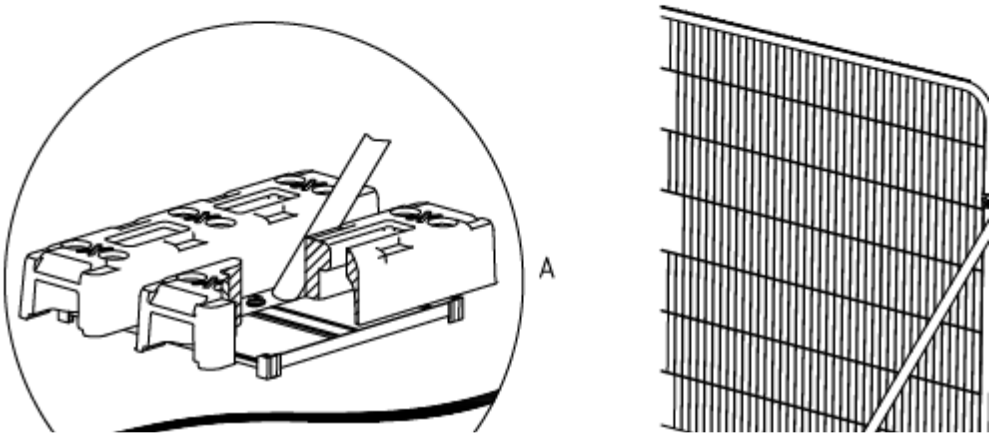
Photo of actual tree and site figure 13

re 2 **Default specification for protective barrier**





Stabilizer strut with base plate secured with ground pins



Link for appropriate ground protection although many exist www.geosyn.co.uk

(normative)

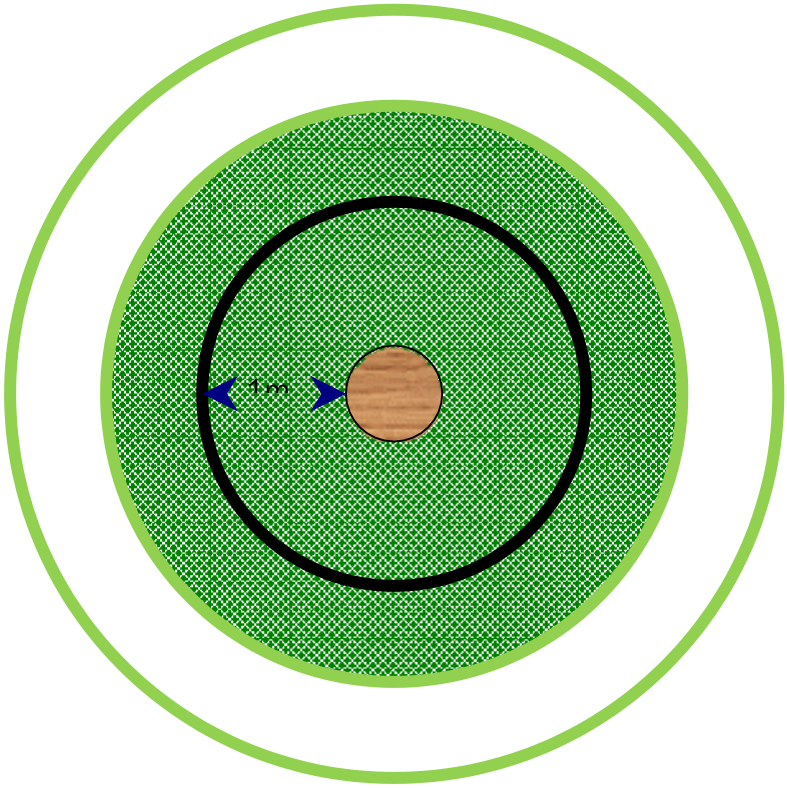
Root protection area

The RPAs given in Table D.1 should be used for single stem trees and the equivalent resultant combined stem diameter for multi-stemmed trees.

Single stem diameter mm	Radius of nominal circle m	RPA m^2	Single stem diameter mm	Radius of nominal circle m	RPA m^2
75	0.90	3	675	8.10	206
100	1.20	5	700	8.40	222
125	1.50	7	725	8.70	238
150	1.80	10	750	9.00	255
175	2.10	14	775	9.30	272
200	2.40	18	800	9.60	290
225	2.70	23	825	9.90	308
250	3.00	28	850	10.20	327
275	3.30	34	875	10.50	346
300	3.60	41	900	10.80	366
325	3.90	48	925	11.10	387
350	4.20	55	950	11.40	408
375	4.50	64	975	11.70	430
400	4.80	72	1 000	12.00	452
425	5.10	81	1 025	12.30	475
450	5.40	92	1 050	12.60	499
475	5.70	102	1 075	12.90	519
500	6.00	113	1 100	13.20	547
525	6.30	124	1 125	13.50	573
550	6.60	137	1 150	13.80	598
575	6.90	150	1 175	14.10	625
600	7.20	163	1 200	14.40	652
625	7.50	177	1 225	14.70	679
650	7.80	191	1 250+	15.00	707

Table D.1 **Root protection areas**

*NOTE These figures are derived from the calculations described in **4.6**.*



TREE PROTECTION ZONE

Key to Diagram

Trunk of Tree

Spread of canopy or branches

PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.

PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plantshould be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.

PERMITTED ZONE – outside of precautionary zone. Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

DAMAGE TO TREES

Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil and often grow out further than the tree's height. The majority of these roots are very fine; even close to a tree few will be thicker thana pencil. Most street tree roots grow under the footway but may also extend under the carriageway. If roots are damaged the tree may suffer irreversible harm and eventually die.

PROTECTING ROOTS - DO'S and DON'TS

There are three designated zones around a tree each of which has its own criteria for working practices.

THE PROHIBITED ZONE

Don't *excavate within this zone.*

Don't *use any form of mechanical plant within this zone*

Don't *store materials, plant or equipment within this zone.*

Don't *move plant or vehicles within this zone.*

Don't *lean materials against, or chain plant to, the trunk.*

Do *contact the local authority tree officer or owner of the tree if excavation within this zone is unavoidable.*

Do *protect any exposed roots uncovered within this zone with dry sacking.*

Do *backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.*

Do *notify the local authority tree officer or the tree's owner of any damage.*

THE PRECAUTIONARY ZONE

Don't *excavate with machinery. Where excavation is unavoidable within this zone excavate only by hand or use trenchless techniques.*

Don't *cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.*

Don't *repeatedly move / use heavy mechanical plant except on hard standing.*

Don't *store spoil or building material, including chemicals and fuels, within this zone.*

Do *prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cutand leave as small a wound as possible.*

Do *backfill the trench with an inert granular material and top soil mix. Compact the backfill with care aroundthe retained roots. On non highway sites backfill only with excavated soil.*

Do *protect any exposed roots with dry sacking ensuring this is removed before backfilling.*

Do *notify the local authority tree officer or the tree's owner of any damage.*

THE PERMITTED ZONE

Don't *cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.*

Do *use caution if it is absolutely necessary to operate mechanical plant within this zone.*

Do *prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cutand leave as small a wound as possible.*

Do *protect any exposed roots with dry sacking ensuring this is removed before backfilling.*

Do *notify the local authority tree officer or the tree's owner of any damage.*

Ground Protection:

The position of the barrier may be shown within the RPA at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the RPA should be protected with

ground protection.

For pedestrian movements within the RPA the installation of ground protection in the form of a single

thickness of scaffold boards on top of a compressible layer laid onto a geotextile, or supported by scaffold,

For wheeled or tracked construction traffic movements within the RPA the ground protection should

be designed by an engineer to accommodate the likely loading and may involve the use of proprietary

systems or reinforced concrete slabs

This report has been carried out and compiled by

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