



# APPENDIX I

## TREE PROTECTION STRATEGY

### CLONBURRIS SHD

### DUBLIN 22

Project No.	Project name	Date	Revision
TCLO002	Clonburris SHD	11/04/22	-

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**Fig 1. Tree Protection Fencing Detail**

**Fig 2. Rola-Trac protective matting**

## 1. Introduction

This document is designed to outline the procedures which will be undertaken to effectively retain trees free from adverse construction impacts for the duration of the construction period on the site of the construction of the Clonburris SHD, Dublin 22. The document is divided into sections which begin at the pre-construction planning stage and follows on to post construction re-assessment of retained trees.

### 1.2 Key issues

Appointment of an arborist (Site Arborist) to oversee all works relevant to trees.

Scheduling of tree and construction works.

Establishment of tree protection (refer to drawings TCL001 113-118. Tree Protection Monitoring of tree protection (adherence to the Tree Protection Code of Practice). Supervision of works in the vicinity of trees.

Post construction re-assessment of retained trees.

## 2. Consulting Arborist

A Site Arborist shall be appointed prior to the commencement of site construction works and will be responsible for the setting up and monitoring of tree protection, liaising with local authority tree / planning officers and providing feedback and advice to the design construction teams on issues relevant to trees. The Site Arborist shall be retained for the duration of construction works and should be appointed to carry out a post-construction tree survey / assessment.

## 3. Scheduling of works

### 3.1 Pre-construction meetings/tree works

- An onsite meeting will be held if required, with all relevant parties; including the Developer and or his Agents, Site Arborist and Local Planning Authority
- Remedial works to trees throughout the site where indicated as necessary within the Tree Works Schedule. All works will be undertaken to BS 3998 2010 Tree Work and/or to current best practice.
- Erection of tree protection fencing as per recommendations contained within BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations. Tree protection to be erected under supervision of Site Arborist prior to main construction works being undertaken on site (refer to drawing TCL002 109-112 Tree Protection).

### **3.2 Construction period**

- The Site Arborist shall monitor tree protection.
- The Site Arborist shall specify any necessary remedial works to trees which may arise due to construction works.
- The Main Contractor shall carry out any instructions made by the Site Arborist with regard to the protection of retained trees and ensure where necessary that these instructions are followed by any sub-contractors.

### **3.3 Post construction works will consist of:**

- Re-survey of retained trees and the implementation of measures contained with the survey document.

## **4. Preservation of Trees**

### **4.1 Contractors obligations**

The Contractor shall take all precautions to ensure that any trees which are not required to be taken down under the contract shall remain undisturbed and undamaged. All works to trees and all operations adjacent to trees should be undertaken in accordance with the Code of Practice. The Contractor must appoint a qualified arboricultural contractor to undertake all tree works subject to approval by the Consulting Arborist. The Contractor shall undertake no works to trees unless instructed by the Contract Administrator. All works on or within the Construction Exclusion Zone are to be supervised by the site arborist. Five working days notice of intention to undertake works to be given.

### **4.2 Setting out: Protected Tree Zone/Construction Exclusion Zone**

The tree protection zone shall be set out in accordance with the Code of Practice (5) and as per drawings TCL002 109-112 Tree Protection. A notice 'Construction Exclusion Zone' shall be placed on tree protection fencing at regular intervals along the protective fencing. This notice shall include contact details for the Site Arborist. Strictly no access should be permitted to this zone unless instructed by the Site Arborist.

The Contractor is to maintain the protective fencing in good condition to the satisfaction of the Site Arborist for the duration of the contract. Any damage to fencing is to be reported to the Site Arborist immediately. Damaged fencing is to be repaired within 2 hours of the damage occurring. All works within the vicinity of the damaged fencing are to be suspended until the fencing is repaired.

### **4.3 Maintenance of Protected Tree Zone**

The Site Arborist should be given 5 days notice of any works within or access required to this zone. The 'Protected Tree Zone' should under no circumstances be used for storage of materials, equipment, or site debris. No fires should be lit within the "Protected Tree Zone", or equipment washed or cleaned.

## 5. Code of Practice for the preservation of trees.

The following specification is intended for the preservation of trees. These guidelines will help sustain vigour and minimise adverse growing conditions for trees set out for retention.

### 5.1 Code of Practice notifications

The Code of Practice will be brought to the attention of all site personnel including those of the Main Contractor, Sub-Contractors and Engineering Specialists associated with the project.

All operations to be in accordance with BS 5837:2012 Trees in relation to design, demolition and construction -Recommendations.

The Contractor should purchase and make available on site a copy of the above.

### 5.2 The Site Arborist:

- Supervise the installation of tree protection fencing.
- Supervise all tree works and assess on-going tree protection.
- Liaise with the relevant authorities during the project.
- Constantly monitor the project with regard to tree health to ensure that no damage is caused to the subject trees during the operational works.
- Report any negligent damage to trees which will prejudice their health.
- Monitor, where necessary, all works carried out by the Arboricultural Contractor and Main Contractor within the 'Protected Tree Zone'.

### 5.3 Arboricultural Contractor:

- Submit a full method statement containing machinery to be used, removal of wood etc to the Site Arborist.
- Carry out works to the most up to date arboricultural practices available e.g. BS 3998. Recommendations for tree work (as amended).
- Undertake work only with suitably qualified operatives in constant consultation with the Site Arborist.
- Trees identified for removal will be section felled in wooded areas so as not to damage remaining trees.

### 5.4 Main Contractor:

- Appoint a member of staff to be responsible for tree protection and this person shall be the point of contact between the Main Contractor and the Site Arborist.
- Undertake all work in accordance with this specification.
- Ensure that all personnel, operatives, sub-contractors etc. are aware of this specification and operate accordingly
- Notify the Site Arborist of any potential conflicts that may affect the health, vigour and viability of trees.

## 5.5 Access:

Access to the site and service roads shall be agreed with the Site Arborist prior to commencement of works. Where it is deemed necessary for heavy machinery access the contractor shall refer to the guidelines within BS 5837 2012 and liaise with the Site Arborist to instigate the most appropriate root protection system.

## 6. Post Construction

A post construction report on the condition of trees should be undertaken and all recommendations made within this report should be carried out to BS3998 Tree Works.

Examples of above-ground stabilizing systems

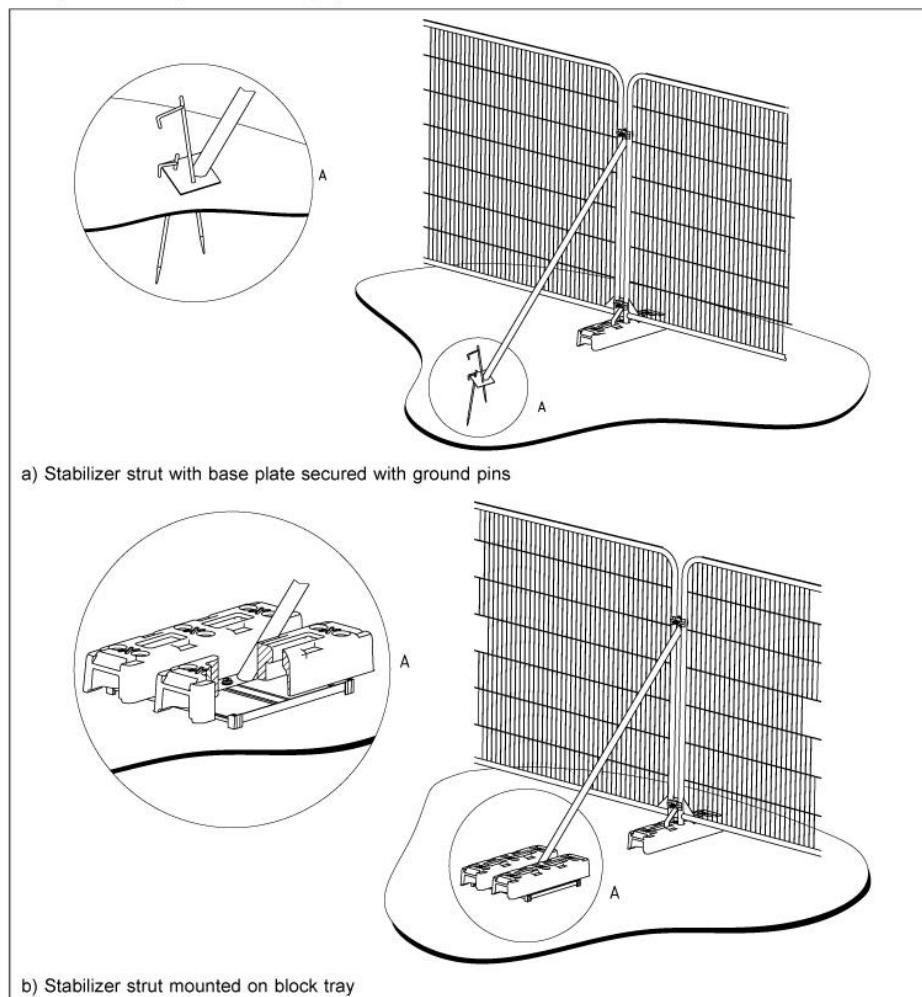


Fig 1. Tree Protection Detail (Herras type fencing or similar approved).

## 7. Arboricultural Method Statement

This section gives general guidance on methods of work to minimise damage to trees. The design team including the project arborist should be consulted at an early stage prior to the commencement of any works. This will reduce the potential for conflict between trees and works.

### 7.1 Below Ground

Wherever trees are present, precautions should be taken to minimise damage to their root systems. As the shape of the root system is unpredictable, there should be control and supervision of any works, particularly if this involves excavating through the surface 600mm, where the majority of roots develop.

### 7.2 Fine Roots

Fine roots are vulnerable to desiccation once they are exposed to the air. Larger roots have a bark layer which provides some protection against desiccation and temperature change. The greatest risk to these roots occurs when there are rapid fluctuations in air temperature around them e.g. frost and extremes of heat. It is therefore important to protect exposed roots where a trench is to be left open overnight where there is a risk of frost. In winter, before leaving the site at the end of the day, the exposed roots should be wrapped with dry sacking. This sacking must be removed before the trench is backfilled.

### 7.3 Precautions

The precautions referred to in this section are applicable to any excavations or other works occurring within the Prohibited or Precautionary Zones as illustrated in Figure 1 – ‘Tree Protection Zone’.

### 7.4 Realignment

Whenever possible works should always be diverted or re-aligned outside the Tree Protection Zones. Under no circumstances can machinery be used to excavate open trenches within the Tree Protection Zones unless under the supervision of the Project Arborist.

The appropriate method of working within Tree Protection Zones should be determined in consultation with the Project Arborist / Client and may depend on the following circumstances.

- The scope of the works (e.g. one-off repair or part of an extensive operation)
- Degree of urgency (e.g. for restoration of supplies)
- Knowledge of location of other apparatus
- Soil conditions
- Age, condition, quality and life expectancy of the tree

Where works are required for the laying or maintenance of any apparatus within the Tree Protection Zones there are various techniques available to minimise damage.

Acceptable techniques in order of preference are;

**a ) Trenchless**

Wherever possible trenchless techniques should be used. The launch and reception pits should be located outside the Prohibited or Precautionary Zones. In order to avoid damage to roots by percussive boring techniques it is recommended that the depth of run should be below 600mm. Techniques involving external lubrication of the equipment with materials other than water (e.g. oil, bentonite, etc.) must not be used when working within the Prohibited Zone. Lubricating materials other than water may be used within the Precautionary Zone following consultation and by agreement.

**b) Broken Trench - Hand-dug**

This technique combines hand dug trench sections with trenchless techniques if excavation is unavoidable. Excavation should be limited to where there is clear access around and below the roots. The trench is excavated by hand with precautions taken as for continuous trenching as in (c) below. Open sections of the trench should only be long enough to allow access for linking to the next section. The length of sections will be determined by local conditions, especially soil texture and cohesiveness, as well as the practical needs for access. In all cases the open sections should be kept as short as possible and outside of the Prohibited Zone.

**c) Continuous Trench - Hand-dug**

The use of this method must be considered only as a last resort if works are to be undertaken by agreement within the Prohibited Zone. The objective being to retain as many undamaged roots as possible.

Hand digging within the Prohibited or Precautionary zones must be undertaken with great care requiring closer supervision than normal operations.

After careful removal of the hard surface material digging must proceed with hand tools. Clumps of roots less than 25mm in diameter (including fibrous roots) should be retained in situ without damage. Throughout the excavation works great care should be taken to protect the bark around the roots.

All roots greater than 25mm diameter should be preserved and worked around. These roots must not be severed without first consulting the owner of the tree or the consulting arboriculturist. If after consultation severance is unavoidable, roots must be cut back using a sharp tool to leave the smallest wound.

## **7.5 Backfilling**

7.5.1 Backfilling should be carefully carried out to avoid direct damage to roots and excessive compaction of the soil around them. The backfill should, where possible, include the placement of an inert granular material mixed with top soil or sharp sand (not builder's sand) around the roots. This should allow the soil to be compacted for resurfacing without damage to the roots securing a local aerated zone enabling the root to survive in the longer term.

7.5.2 Backfilling outside the constructed highway limits should be carried out using the excavated soil. This should not be compacted but lightly "tamped" and usually left slightly proud of the surrounding surface to allow natural settlement. Other materials should not be incorporated into the backfill.

## 8. Additional Precautions near Trees

8.1 Movement of heavy mechanical plant (excavators etc.) must not be undertaken within the Prohibited Zone and should be avoided within the Precautionary Zone, except on existing hard surfaces, in order to prevent unnecessary compaction of the soil. This is particularly important on soils with a high proportion of clay. Spoil or material must not be stored within the Prohibited Zone and should be avoided within the Precautionary Zone.

Where it is absolutely necessary to use mechanical plant within the Precautionary Zone care should be taken to avoid impact damage to the trunk and branches. A tree must not be used as an end-stop for paving slabs or other materials nor for security chaining of mechanical plant. If the trunk or branches of a tree are damaged in any way advice should be sought from the supervising arboriculturist.

See table 1 –‘Prevention of Damage to Trees Below Ground’ below for summary details regarding causes and types of damage to trees and the implications of the damage and the necessary precautions to be taken to avoid damage.

**TABLE 1 - Prevention of Damage to Trees Below Ground**

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Trenching, mechanical digging etc.	Root severance	<ul style="list-style-type: none"> <li>The tree may fall over</li> <li>Death of the root beyond the point of damage</li> <li>Potential risk of infection of the tree</li> <li>The larger the root the greater the impact on the tree.</li> </ul>	Hand excavate only within the Precautionary Zone. Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the consulting arborist. For roots less than 25mm in diameter use a sharp tool and make a clean cut leaving as small a wound as possible.
Trenching, mechanical digging, topsoil surface removal etc.	Root bark damage	<ul style="list-style-type: none"> <li>The tree may fall over</li> <li>If the damage circles the root it will cause the death of the root beyond that point</li> <li>Potential risk of infection of the tree</li> <li>The larger the root the greater the impact on the tree.</li> </ul>	Do not use mechanical machinery to strip the topsoil within the Precautionary Zone. Hand excavate only within the Precautionary Zone. Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the consulting arborist. For roots less than 25mm use a sharp tool and make a clean cut leaving as small a wound as possible.
Vehicle movement and plant use. Material storage within the precautionary area.	Soil compaction & water saturation	Restricts or prevents passage of gaseous diffusion through soil, the roots are asphyxiated and killed affecting the whole tree.	Prevent all vehicle movement, plant use or material storage within the Precautionary Zone. Use tree root protection mats where this is not possible

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Top-soil scouring, excavation or banking up.	Alterations in soil level causing compaction or exposure of roots.	Lowering levels strips out the mass of roots over a wide area. Raising soil levels asphyxiates roots and has the same effect as soil compaction.	Avoid altering or disturbing soil levels within the Precautionary Zone.
Use of herbicides.	Poisoning of the tree via root absorption	<ul style="list-style-type: none"> <li>Death of the whole tree</li> <li>Death of individual branches</li> </ul> Damage to leaves and shoots.	The selection and application of herbicides must be undertaken by a competent person in accordance with COSHH regulations.
Spillage of oils or other materials.	Contamination of soil	Toxic and asphyxiation effects of chemicals, oils, building materials (cement, plaster, additives etc.) on the root system can kill the tree.	Never store oils, chemicals or building materials within the Precautionary Zone or within the branch spread of a tree, whichever is the greater.
Placement or replacement of underground apparatus.	Various	Death of all or part of the tree.	Effective planning and liaison with the consulting arborist, taking into consideration the position of trees, and their future growth potential and management.

## 8.2 Tree root protection mats

Protective matting such as Rola-Trac™ (image 2) should be placed over the initial work zone areas near tree root systems to mitigate any adverse effects from the presence of machinery and associated construction activity by works personnel. These also have the benefit of protecting the soil from any potential works contaminants due to works.

Image 2. Rola-Trac™ protective matting.



## 9. Above Ground

### 9.1 Damage by Pruning

Trees (including shrubs and hedges) can be damaged by inappropriate or excessive pruning. The aim of pruning should be to achieve vegetation clearances in ways which minimise the aesthetic and physical impact on retained trees and shrubs.

Reasonable care should be taken to avoid unnecessary damage to flora and fauna and to access ways.

Work should comply with BS3998. Pruning is a skilled job which should be undertaken by appropriately trained and experienced staff.

Given constraints often imposed by others it is not always possible to prune in an aesthetically pleasing way. However an effective Utility Arborist adjusts the work carried out for each plant to achieve the best possible standard, given the prevailing constraints.

- Ideally vegetation is left well balanced with natural crown shapes
- Pruning must also take into account the vegetation re-growth expected in the interval between cuts. This will vary widely between plant species and sites.
- Vegetation management: tree selection for retention and replanting at an early stage can be used to prevent the need for much more intrusive and damaging work in the future when the vegetation grows closer to the overhead line. Good practice often involves interventions over a number of cutting cycles to manage trees and shrubs so that future conflict with local infrastructure is minimised.

Where reasonably possible avoid recognised injurious practices such as:

- Topping or lopping to an arbitrary height or branch length
  - Unbalancing a tree crown by excessive one-sided pruning
  - Pollarding. Unless pollarding is the existing recognised management technique.
  - Inappropriate use of flailing.
  - Climbing damage - Care should be taken to avoid injuring thin and weak barked species by inappropriate use of rope access techniques.
  - Access damage - Vehicle access and treatment of risings should avoid injury to low branches, stems, root buttresses and feeder roots.
  - Spreading Disease - Appropriate regard should be given to avoid spreading fungal diseases.
- If the only pruning option is to severely reduce or unbalance a tree, then coppicing, or felling and replacement planting are often better options.

See table 2 – ‘Prevention of Damage to Trees Above Ground’ below for summary details regarding causes and types of damage to trees and the implications of the damage and the necessary precautions to be taken to avoid damage.

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Impact by vehicle or plant Physical attachment of signs or hoardings to the trunk Storage of materials at base of tree  Rubbing by winch or pulling cables	Bark bruising, bark removal, damage to the wood, damage to buttress roots, abrasion to trunk	Wounding with the potential for infection ultimately resulting in death of all or part of the tree.  Structural failure of the tree	Surround the trunk with protective free-standing barrier. Exclude vehicles, plant or material storage from the Precautionary Zone. Ensure sufficient clearance of cables or ropes.
Impact by vehicle or plant  Rubbing by overhead cables	Bark damage to branches, breakage and splitting of branches, abrasion to branches	Structural failure of the branch.  Wounding or loss of a branch with the potential for infection ultimately resulting in death of all or part of the branch or tree.	Exclude vehicles, plant or material storage from the Precautionary Zone. Ensure sufficient clearance of cables or ropes.  All pruning should be carried out in accordance with BS3998 (prune affected branches to give appropriate clearance from cables)
Inappropriate siting of overhead apparatus, such as CCTV, lighting fixtures and communications masts and dishes.	Inappropriate pruning, unnecessary tree removal	Severely pruning tree to acquire line of sight signal for communications dish etc.	Effective planning and liaison with arboriculturist, taking into consideration the position of trees, and their future growth potential and management.
Lack of forethought in design and location of apparatus and services entries on new developments	Complete tree removal	The tree is removed unnecessarily	Agree the location and installation of services at the design stage. Consideration should be given to the creation of dedicated service routes wherever possible.
Use of herbicides	Poisoning of the tree via absorption through bark, leaves and shoots	Death of the whole tree, death of individual branches, damage to leaves and shoots	The selection and application of herbicides must be undertaken by a competent person in accordance with COSHH regulations.

## 9.2 Chemical Damage to Trees

Chemical damage to trees adjacent to utility premises and operational land can be avoided if;

- the risk is identified when planning any work involving herbicides or other chemicals ensuring that only appropriate chemicals are used. Particular care should be exercised when considering the use of herbicides recommended for “non crop areas” as many of these also specify “do not use where there may be roots of desirable plants”,
- herbicides are applied only at the rate and in the manner recommended by the manufacturer,
- follow-up applications are not undertaken until weeds reappear on the operational land,
- alternative methods of weed control are considered.

## References

NJUG (2007) Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees.