

Optera Structural Solutions

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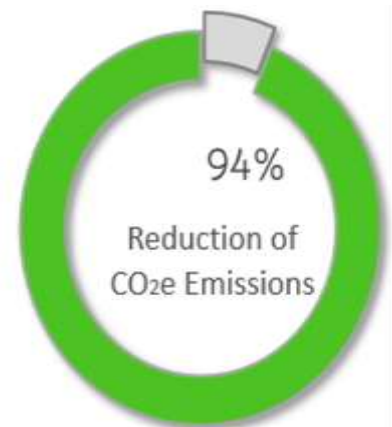
SOW OPT-20500 Agreement to install a root barrier for Brawdla

CLIENT ADDRESS:	Five St Philips, Five St Philips Place, Birmingham. B3 2PW
POLICY HOLDER:	The Guinness Partnership
POLICY HOLDER ADDRESS	The Lodge, Lavender Road, Waterloooville, PO7 8BX
CLIENT REFERENCE:	BRW 041305
OUR REFERENCE:	OPT-20500
PROJECT MANAGER:	Spencer Caizley
DATE	8th December 2025
ESTIMATED DURATION:	4 weeks

Specifications of Barrier					
Barrier Type	length	Max Root Depth from SI	Minimum depth to be achieved with barrier	Distance between tree / Vegetation and barrier	shortest distance between barrier and foundation
Copper	50m	1.7m	3.5m	11m	3m



Aerial plan indicating proposed 50m length and alignment of barrier.



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Carbon Emissions

The installation of a copper impregnated geotextile fabric is the most carbon neutral option available to the insurance repair marketplace. The average tree absorbs 21 kg of CO₂ per annum based upon a mature species. Felling trees releases carbon and replanting saplings takes many tens if not hundreds of years to offset the effect of felling the original species.

Traditional engineering solutions consume vast quantities of carbon, both in their execution with plant, spoil to landfill and the vehicle movements to and from site. In addition, the manufacture of concrete generates in the region of 72kg of CO₂ per ton and contributes 8% of all manmade carbon output in the world today.

From Optera's own investigations and research, we estimate:

- The average underpinning scheme omits 12 tons of CO₂.
- The average piled raft scheme omits 44 tons of CO₂.
- PU injection treatment omits 3 tons of CO₂.
- By contrast, a 10m root barrier omits just 1 ton of CO₂.

Not only is the root barrier installation both less disruptive and much quicker to install than traditional engineered techniques, but it offers carbon savings of between 88 and 95% and is still 67% more carbon friendly than our closest innovative competitor.

Method Statement

- Having discussed the proposal with Brawdia, we understand that all current risk vegetation has been removed and essentially our remit is to defend against T5, Oak which is designated as future risk. The tree is TPO protected and root severance application will be submitted to Havant BC.
- We will remove fence panels from the rear of the site and access through the rear, across communal grassed areas. Track mats will be used to avoid damage to any landscaping in the process.
- A site compound will be necessary to the front of the building for works vehicles and materials. We note this to be a managed car park, but assume free access for 3 parking spaces for the duration of the works.
- A trench, 450mm wide, will be formed to 3.5m in depth using a five ton excavator and the arisngs are to be placed on boards to one side of the trench.
- Typically, once the first fives metres has been dug and formed, line the trench with the copper impregnated bio barrier and backfill the trench with as dug arisings. A smaller 1.5 ton machine will be used to place the material in 150mm layers and the larger machine, with a compactor attachment will be used to compress and consolidate the trench.
- Repeat this exercise until all of the barrier has been installed.
- The trench across lawned areas, will be topped up with compacted topsoil and where we transition paths, they will be topped with clean compacted type 1 MOT stone. The paths will be reinstated with strip cut cold lay macadam on completion of the works.
- The compound will be broken down and removed from site.

Notes and Assumptions

- i. **The project Fee is valid for 60 days from the date of this report, after which we reserve the right to review the scheme and costs accordingly.**
- ii. It is assumed that the excavations will be undertaken in virgin ground with no requirement for trench support or additional protections.
- iii. No allowance has been made for the temporary disconnection or relocation of services or drainage.
- iv. No allowance has been made for replacement of any plants, trees, shrubs, etc. that may be necessarily damaged or destroyed during the installation of the root barrier, or gaining access to the work area – it is assumed that this will be dealt with by means of a direct payment by the Insurance company after assessment by the loss adjuster.
- v. Any adjustments or additional works discovered at PCM will be added as a variation to the works.
- vi. The Optera design relies on our clients information provided to us. No liability can be accepted for inaccuracies within that information which the design relies upon.

Warranty Details

All Optera whole life scheme designed barriers are issued with a 10 year company warranty, the details of which are seen below:



Warranty Note

Building Repair Warranty

Contractor	Optera Ltd.
Warranty Reference Number	xxxx
Supplier Registered Office Address	Seven Stars House, TWhale Road, Coventry, England, CV3 4LB
Supplier Company Number	07860088
Supplier Job Reference Number	xxxx
Commencement Date	xxxx
Expiry Date	xxxx
Homeowner's Name	xxxx
Location of Works	xxxx
Description of works undertaken and Warranted the "Works"	Works completed pertaining to Optera's Statement of Work. Dated xxxx

Signed for and on behalf of Optera Ltd:-

Name: Spencer Caizley

Sig: Spencer Caizley

Position: Director

Date: xxxx

Warranty

The Contractor warrants that for a period of 10 years from the date of completion of the Works detailed above, the Works undertaken and/or the materials installed shall be free from defect. In the event of a failure, proven to be due to faulty workmanship by the Contractor, or materials applied and installed by the Contractor, the Contractor will make or cause to be made, at its expense, all repairs necessary to enable performance in accordance with this warranty.

Any dispute as to whether any defect or failure is attributable to faulty or sub-standard workmanship or materials shall be referred to an arbitrator, who should be a suitably qualified and experienced Chartered Engineer, or Chartered Surveyor (i.e. a chartered civil, or structural engineer (MICE/StructE), or a chartered building surveyor (RICS)).

This warranty is specific to the location and Works as detailed above and is subject to the following qualifications and conditions:

Qualifications

The Homeowner acknowledges that the Contractor shall not be responsible for remediation of any of, or any combination of the following causes:

1. The cost of routine maintenance, overhaul or modifications, or loss or damage arising therefrom, or for which compensation or recourse is provided by legislation such as the Consumer Credit Act 1974;
2. Any willful acts or wilful omissions of the Homeowner or persons acting on their behalf;
3. Any loss of use, any consequential or economic loss of any kind or description whatsoever including, but not limited to loss, costs, damages, expenses or penalties for any reason;
4. Any damage caused by war risks, aerial bombs or nuclear radiation;
5. Any damage or defect caused by wear and tear, sunlight, normal deterioration, neglect in maintenance, any change in colour, texture, quality or distribution or ageing or superficial deterioration or staining of finishes or surface appearance or ageing process;
6. Any claims first notified outside the period of this warranty or any claims for any defects that the Homeowner should reasonably have been aware of any defects for which their Homeowner receives a discount/reduction in the cost of the Works;
7. The use of the Works for any purpose other than that for which they were originally intended and as stated in the document;
8. Any claim, loss or damage caused by or consequent upon a peril that can be insured under a Household or Commercial Buildings or Property Owners Insurance policy whether insured or not, other than in respect of subsidence, heave or landslip as a direct result of defective workmanship or materials in the Works herein warranted;
9. Placement, erection or construction of anything on or through the Works without the written permission of the contractor;
10. Any costs, losses, expenses or damages for death, bodily injury, disease, illness or injury to mental health;

11. Any deterioration of the Works or the imposition of any load greater than that for which the Works were designed in whole or in part, structural alterations, repairs, modifications to the Works during the period of the warranty unless agreed in writing by the Contractor;

12. Any claim, loss, destruction or damage caused by pollution or contamination;

13. Any claim involving cosmetic cracking or blemishes that do not affect the performance of the Works;

14. Any claim, loss, destruction or damage due to defective design;

15. Any issue caused by the materials after expiry of the manufacturer's product guarantee.

Conditions

- A. The Homeowner shall notify the Contractor in writing of any defect within 21 days of discovery and give the Contractor reasonable opportunity to inspect the alleged defect and the area affected. During such an inspection, the Contractor shall be permitted to take such notes, photographs and/or samples as he deems necessary;
- B. In the event of a failure attributable to workmanship, the Contractor's sole responsibility shall be limited to the costs of making good such repairs as necessary to enable the Works to perform as originally warranted;
- C. Any work carried out to rectify any failure or deterioration covered by this warranty shall not extend the duration of this warranty;
- D. If an alleged failure or deterioration is proven to not be the responsibility of the Contractor, then all costs associated with the investigation of such failure shall be borne by the Homeowner;
- E. This warranty does not become void or enforceable until such time as payment in full for the Works has been received by the Contractor.

Intervention Explained

Clay-shrinkage subsidence is typically related to the encroachment of tree roots into the clay soils beneath the foundations of the property.

To ameliorate tree-root induced clay-shrinkage subsidence, the first option is generally removal of the implicated tree(s). However, where the tree(s) cannot be felled, for whatever reason, the next option would be to sever the roots between the tree and the property and form a barrier to prevent reestablishment of the roots.



The barrier will be positioned between the offending tree(s) and the affected part of the building, and will be installed to a depth designed to cut the tree(s) roots between the tree and the foundations; the act of excavation severs the roots, causing any roots beneath the foundations to wither and die. This prevents the tree(s) from extracting moisture from the clay supporting the foundations, allowing the clay to rehydrate and recover their natural moisture levels. Naturally, there is a period of time required for the recovery process to take place, but repairs can typically be undertaken shortly after the installation is complete.

The root barrier material favoured by Optera is a tough, copper impregnated geotextile membrane. This is normally installed using an excavator measuring no more than 2m in width. A trench is formed with the excavator and the arisings are either disposed of off-site or are stored on-site for use as backfill material.

The barrier is typically formed in 5m sections. Once the first 5m of the trench is excavated, the leading edge is banded with a trench-sheet and the copper impregnated bio-barrier is installed, before backfilling with free-draining stone, or excavated arisings as appropriate to the site. Where 'as-dug' material is used, the backfill is placed in layers and consolidated with a compactor plate attached to the excavator. The process is then repeated until all of the designated barrier has been installed. If reinstatement works are to be undertaken by another contractor, Optera will fill the trench to the surrounding surface as a temporary measure to allow consolidation and avoid a trip-hazard until the permanent reinstatement can be completed. Any excess spoil will be cleared from site along with the plant, welfare, and protections.

How do Copper Root Barriers work?

In the UK the shrinking and swelling of clay soils, particularly when influenced by trees, is the single most common cause of foundation movement that damages domestic buildings.

Trees are known to cause clay soils to shrink by drawing water through their roots, predominantly during the Spring and Summer months. The shrinkage results in both vertical and horizontal ground movement that, when transmitted to a building's foundations, cause damage to the building's structure. The amount of shrinkage depends on the type of clay soil, the type and size of vegetation, and on weather patterns.



The moisture content of a clay soil tends to vary with depth. Closer to the surface there can be relatively large changes in soil moisture content between summer and winter as a result of evaporation from the ground surface, the drying effect of the Sun and general vegetation, including grasses. Such variations are normally confined to the upper 1m of the ground. However, where trees are growing within influencing distance of a building, then the soil moisture profiles will fluctuate much more widely through the seasons and to a much greater depth; in response, soil volume changes are amplified, and consequential building movements will be far greater.

It is quite possible that a building will coexist with nearby trees for many years without any noticeable damage, so what is the trigger for the onset of damaging levels of movement? The answer is usually a combination of the tree(s) getting bigger and developing larger leaf areas, but very often it is linked with a particularly hot, dry period of weather.

The process of clay-shrinkage subsidence is a reversible one and buildings experiencing damage in response to a period of hot, dry weather will typically see an improvement (crack widths will reduce) following a corresponding period of cooler, wetter weather when the clay is able to recover its moisture levels and swell back to its former volume.

The intention of the Bio-root barrier is to divorce the building (or more specifically the clay soils supporting the building's foundations) from the influence of the trees and thereby stop the seasonal soil moisture fluctuations, allowing the building to remain stable throughout the year.

The bio-root barrier is strong and flexible, with very high tear resistance, as well as being water-permeable, thus allowing the natural movement of water through the ground without impediment. The Copper contained within the core of the membrane also acts as a chemical repellent to the roots without constituting a hazard to plants or animals. The Copper foil securely bonded within the porous geotextile membrane, releases Copper ions into the adjacent soil by forming Copper Carbonate (verdigris); these signal adverse conditions to any roots growing towards the barrier, preventing a proliferation of roots close to the barrier. The levels of Copper generated do not constitute a burden on the eco-system or impact groundwater quality.



Outdated, impervious barriers divert rather than stop roots and may prevent the movement of groundwater causing unintended consequences. The use of Optera's permeable barrier stops roots both by forming a physical impenetrable obstacle and by acting as a chemical inhibitor to the reestablishment of roots.

The multi-layered membrane is welded together, retaining its flexible qualities, allowing it to be cut and effectively resealed to fit round buried services. The barrier material itself has a 60 year service life expectancy.

The chemical inhibitor effect prevents the proliferation of root against the barrier face, which was often a problem associated with conventional barriers, where increased moisture levels could encourage root growth.

Following installation of the root barrier, the trench may be backfilled with 20mm single sized stone, alternatively, and dependent upon site conditions, backfilling could be done with as-dug material, which would be placed and compacted with a plate-compactor mounted on the excavator arm. In specific circumstances, we may also use no-fines concrete on the structure side of the shield.

Some degree of surface settlement can be experienced following completion, where this happens, Optera will return to top-up the trench; typically this occurs within the first six months of installation.

