

Optera Structural Solutions

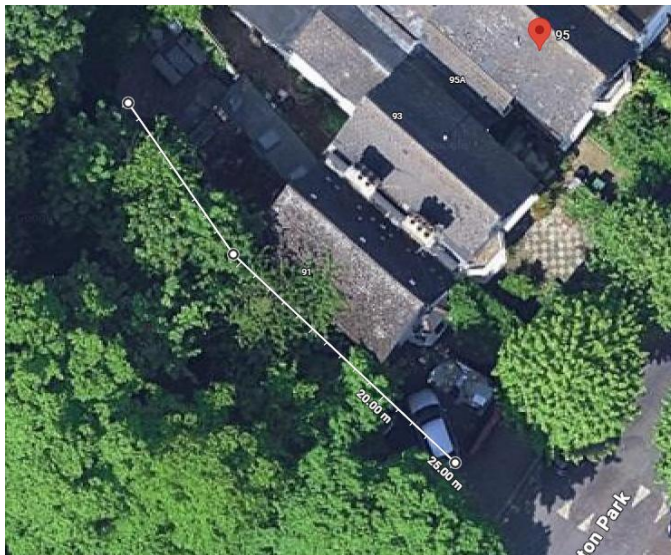
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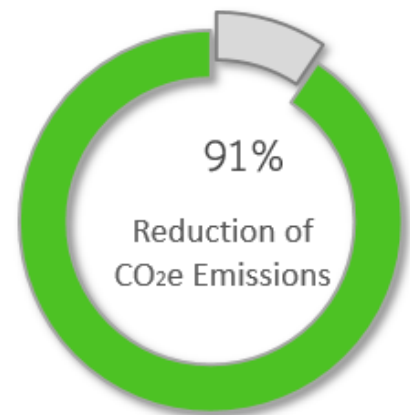
OPT-20831 V1 Agreement to install a compact root barrier for Woodgate and Clark

CLIENT NAME:	Woodgate and Clark
CLIENT ADDRESS:	86 Deansgate, Manchester. M3 2ER
POLICY HOLDER:	91 Upper Tollington Park Ltd
POLICY HOLDER ADDRESS:	91 UPPER TOLLINGTON PARK, LONDON, N4 4LP
CLIENT REFERENCE:	16549416
OUR REFERENCE:	OPT-20831
PROJECT MANAGER:	Paul Milliam
DATE	31/03/2026
ETSIMATED DURATION:	5 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	25	3.3m	4.3m	5m+	1m+



Aerial plan indicating proposed 25m length and alignment of barrier.



This scheme quotation is strictly confidential and for the sole benefit of Optera's client. The intellectual property contained within this document is Optera's alone and this document must not be passed in full or in part to another person, party, or organisation without the express written agreement of Optera, other than the Policyholder and insurance company responsible for the respective claim.

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.

Introduction

Optera have been requested to provide a quotation for a stabilization scheme to arrest subsidence movement affecting the property. We have visited the property and undertaken an external assessment. No internal inspection has been undertaken.

Woodgate and Clark have confirmed root induced clay shrinkage to be the cause of subsidence, this having been promoted by moisture extraction from nearby Council trees located in a woodland area to the left side and adjacent to the elevated railway track. A clay soil was identified below the foundation and roots were identified to a depth of 3.3m from the Acer (Sycamore) species consistent with trees of this type growing on adjacent woodland. The main drainage runs extend under and beneath the main house and are in good order. It is understood that some drainage repairs have been undertaken, including a replacement gully down the left flank. Defective drainage has been dismissed as an influence on the structural movement being investigated.

We been provided with the PGA report 6thFeb 2024 enclosing MDJ Arboricultural Report January 2024. The MDJ Arboricultural Report implicates T3, T4 & T8– T13 as being causal and suggests removal. In addition, they comment that T1, T2, T5 and T17 be reduced. We have not been advised if the reductions have been agreed but understand the Council have been unresponsive to all requests made.

Level monitoring has been undertaken and show the most significant movement to be occurring down the left flank wall. It is understood that representation has been made to the Council asking that they undertake tree felling and reductions of the implicated trees but this has been unsuccessful with no response being received. Optera have therefore been asked to provide a remedial solution to prevent ongoing subsidence to the left side of the building affected by trees identified as being causal.

Design Rational

The depth of roots at 3.3m is significant and would prompt a traditional mass concrete underpinning depth of 3.8m. Given the limited access, concrete side steps and drainage we consider this option to be undesirable and cost prohibitive. The alternate engineered underpinning scheme would be piles extending to a provisional depth of 8m slip sleeved to 4m along the entire flank wall and rear elevation and across the front. This will create difficulty with designing out differential movement between parts of the building that are piled and those on a lesser footing. You will also not prevent roots from extending between the files and into the clay bulb under the main house. The only way to avoid this is to install a full piled raft to the footprint of the building. This will be a significant undertaking and will render the property uninhabitable during the works.

The only alternative to a full piled raft is a compact root barrier. This can be installed down the left side of the property extending from the front left corner of the driveway full length to past and beyond the rear left corner. The barrier will fit between the boundary fence and flank wall of the property in order to give it maximum distance from the trees, the nearest being 5.1m from the building. The depth of roots promotes a barrier depth of 4.3m and a length of 25m. The barrier has not been design to defend against T14,15 & 16 as these have not been implicated but are of the Sycamore species. If protection was required then the barrier would need to be reconfigured to extend the full length of the garden. Similarly, T17 Plane has also not included within the current design. The barrier will need to extend through the tarmac driveway and will need to reinstated by a specialist.

Method Statement

Pre Works

- Gain Conservation permissions for installing barrier near to trees.(WHC)
- Undertake Services Search. (WHC)
- Gain parking bay suspensions. (WHC)
- Side passage to be cleared of all contents. (By others)

Barrier Works

- Set up site including compound area to be agreed with the client. This will be boarded, protected and secured with site fencing.
- Take down section of fencing and gate and required.
- Disc cut through tarmac and break through sub-base on driveway.
- Disc cut through concrete hardstanding to side passage.
- Break out sub-base.(assumed <100mm and unreinforced)
- Board and protect along the barrier line and tracked route into and out of site.
- CAT scan the barrier line and any services are to be hand dug and exposed prior to machine excavation.
- Mobilise auger rig and set up.
- Form barrier using a series of augered boreholes with a specialist auger rig to make a secant trench 25m length and 4.3m deep to side as shown on aerial plan.
- Excavated material to be tracked barrowed to skip on driveway/highway on licence.
- Insert copper cored geotextile backed fabric panels using tracked drop hammer rig. Fabric barrier panels overlap 100mm to form continuous barrier defence.
- Backfill with pea shingle, compact and fold over barrier across trench.
- Backfill remaining 200mm with MOT type 1 well compacted..

- Allow to hot lay tarmac along barrier line to level and consistent finish with existing surfaces. (By specialist).
- Relay instate concrete base and harstanding.
- Reinststate gate and fencing previously removed.
- Off hire and clear plant and equipment from site and clean down 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 other than those mentioned, and location is known.
- iv. The barrier has been designed to defend against implicated trees T3, T4, T8-T13 as detailed in the MDJ Arborist Report. It is not designed to defend against "Future Risk" and current vegetation is assumed to be maintained and managed at current levels.
- v. We have assumed services run across the proposed barrier line and these will need to be identified before works start to confirm feasibility of the barrier proposed. It is assumed these will be suitably spaced to allow barrier installation.
- vi. We have allowed enabling and reinstatement works described above.
- vii. All party wall requirement to be completed by others and in place before works start.
- viii. Pavement closure, skip licences, parking suspensions, council permissions necessary will be charged at cost plus 20%.
- ix. Exploratory site investigation to determine foundation and location of gas main. This can be undertaken by WHC at a cost of £1,400 plus VAT.



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, 1 Wheler Road, Coventry, England, CV3 4LB
Supplier Company Number	07468088
Supplier Job Reference Number	xxxx
Commencement Date	xxxx
Expiry Date	xxxx
Homeowner's Name	xxxx
Location of Works	xxxxx
Description of works undertaken and Warranted the "Works"	Works completed pertaining to Optera's Statement of Work. Dated xxxxx

Signed for and on behalf of Optera Ltd:-

Name: Spencer Caizley
Sign: Spencer Caizley
Position: Director
Date: xxxxx

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 bunded 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 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.



Appendix A

Terms and Conditions

1. Definitions

- "Client" or "Employer": the party commissioning the Works.
- "Contractor": Optera Structural Solutions ("Optera").
- "Administrator": any contract administrator appointed by or on behalf of the Client/Employer.
- "Works": the services, labour, plant and materials to be provided by Optera as set out in the quotation, estimate, or tender including any agreed variations.

2. Basis of Contract

The Works are based on information supplied by the Client/Employer or their Administrator. Optera will provide the labour, materials and plant required. If supplied information is varied, incorrect or incomplete, Optera may recover associated loss and expense and a reasonable extension of time.

3. Scope of Works

Optera will supply and install the systems and solutions described in the quotation and drawings using industry-standard methods and materials appropriate to the project (including, where applicable, root barrier systems for tree-root management).

4. Design Reliance & Client-Provided Information

In preparing any design, specification, recommendations or installation methodology, Optera may rely upon information provided by or on behalf of the Client/Employer or third parties (e.g., surveys, arboricultural reports, soil data, structural drawings, utility and drainage plans, tree species and root spread assumptions, site investigation reports).

Optera is entitled to rely on the accuracy and completeness of such information unless otherwise agreed in writing, and shall not be responsible for loss, delay, cost or performance issues arising from inaccuracies,

omissions or inconsistencies within that information. Where information proves incorrect or incomplete, Optera may suspend Works for safety/design review and recover reasonable additional costs and time.

5. Information & Documents from Others

Where drawings and other relevant information are prepared by others, they must be issued within an agreed period prior to commencement. Optera is not responsible for delays, errors or additional costs resulting from late or incomplete information.

6. Acceptance Period

Unless stated otherwise, offers or tenders remain open for acceptance for 12 weeks from the date of issue.

7. Commencement

Commencement is subject to availability of labour, plant and materials and receipt of an acceptable order.

8. Completion Period

Completion periods assume normal weekday working hours (08:00–17:00), exclude public holidays, and assume no obstructions, split visits or circumstances beyond Optera's control. Variations may affect completion unless agreed in writing.

9. Client/Employer Obligations

Provide, without charge: adequate lighting and water, electrical power for portable tools, emergency telephone access, reasonable secure storage for plant/tools/materials; maintain all relevant site/structure insurances; ensure compliance with Health & Safety, Fire Officer and Building Control requirements and any applicable local regulations.

10. Contractor Obligations

Optera will comply with applicable laws and regulations, give required notices, pay relevant fees/charges (recoverable unless allowed for in the contract), maintain required insurances, and exercise due care consistent with Health & Safety obligations for the scope of the Works.

11. Bill of Quantity Rates / Sums

Rates and sums assume the Works are available to allow continuous and efficient use of resources. Disruption beyond Optera's control may result in recoverable loss/expense and a fair extension of time.

12. Variations

All additions, omissions or alterations to the scope/specification shall be valued and confirmed in a signed Variation or Additional Works Order and will adjust the Contract Sum and programme accordingly.

13. Dayworks & Waiting/Standing Time

Where delays or waiting arise beyond Optera's control, dayworks and standing time will be charged at standard day rates, inclusive of site plant and equipment.

14. Materials & Title

Materials are offered on usual trade conditions; samples are indicative only; equivalent materials may be substituted where necessary. All unfixed and fixed materials supplied by Optera remain Optera's property until all sums due under the contract are paid in full. For defective supplier materials, Optera will use best endeavours to obtain redress from the supplier.

15. Underground Services & Hidden Obstructions

Optera will take reasonable precautions when excavating. Where the location of services is inaccurate, incomplete or omitted from information supplied by others, Optera shall not be responsible for resultant damage. Unexpected conditions discovered during installation may require method adjustments and may result in additional costs.

16. Programme & Delays

Installation schedules are estimates based on known conditions. Completion dates will be extended where delays arise from variations, design changes, strikes/lockouts, supply or subcontractor delays, adverse weather, restricted access, hidden services or other events beyond reasonable control. Optera will use best endeavours to minimise delays.

17. Loss & Expense

If the Client/Employer prevents or impedes Optera's execution of the Works or breaches these terms, Optera may adjust the price to recover resultant loss and expense.

18. Warranty & Defects Liability

Optera warrants that its installation Works will be carried out with reasonable care and skill. This warranty does not cover failure or reduced effectiveness caused by: (i) incorrect or incomplete information provided by the Client/third parties; (ii) subsequent ground disturbance; (iii) tree growth beyond anticipated parameters; or (iv) alterations to site conditions after installation.

Any defects in Optera's workmanship/materials for which Optera is liable and which are notified within 6 months of completion will be corrected, subject to receipt of all payments due.

19. Payment & Invoicing

Optera may issue stage/interim invoices and requests for payment commensurate with the value of work completed; payment is due within 7 days unless agreed otherwise in writing. A final valuation (including agreed variations) is payable by the date stated on the invoice. Invoices are deemed accepted unless disputed in writing within 14 days. All prices are subject to VAT at the rate prevailing at invoice date.

An initial payment is due prior to commencement to cover mobilisation, materials, equipment hire and/or professional services carried out prior to site works.

20. Overdue Payments

Overdue sums accrue finance charges at 1.25% per month (calculated daily) until payment is received. Reasonable costs, time and administration incurred in recovering overdue sums are fully recoverable.

21. Warranties & Guarantees – Issue Condition

All sums (including retentions and any disputed amounts) must be paid before formal warranties or guarantees are issued to the Client/Employer. Optera only issue extended warranties for root barriers for a period of 10 years from the date of completion. Any additional warranty required should be requested in writing prior to the commencement of works.

22. Limitation of Liability

To the fullest extent permitted by law, Optera's aggregate liability in connection with the Works is limited to the Contract value for those Works. Optera shall not be liable for indirect or consequential losses.

23. Termination (Determination)

Optera may terminate by written notice if: (i) the Client/Employer fails to make payments when due; or (ii) the Client/Employer becomes bankrupt, insolvent, enters administration, or liquidation. Upon termination, all Works undertaken (whether invoiced or not) and resulting loss/expense become immediately payable.

24. Dispute Resolution – Arbitration

Either party may refer disputes or differences to arbitration. The arbitrator shall be agreed between the parties or appointed under the rules of the RICS/JCT current at the relevant time. The arbitrator's decision shall be final and binding.

25. Order of Precedence (Contrary Conditions)

If there is any conflict between these Terms & Conditions and the covering letter/offer, the covering letter/offer shall prevail.

26. Acceptance

Acceptance of the quotation and/or commencement of the Works constitutes acceptance of these Terms & Conditions unless otherwise agreed in writing.