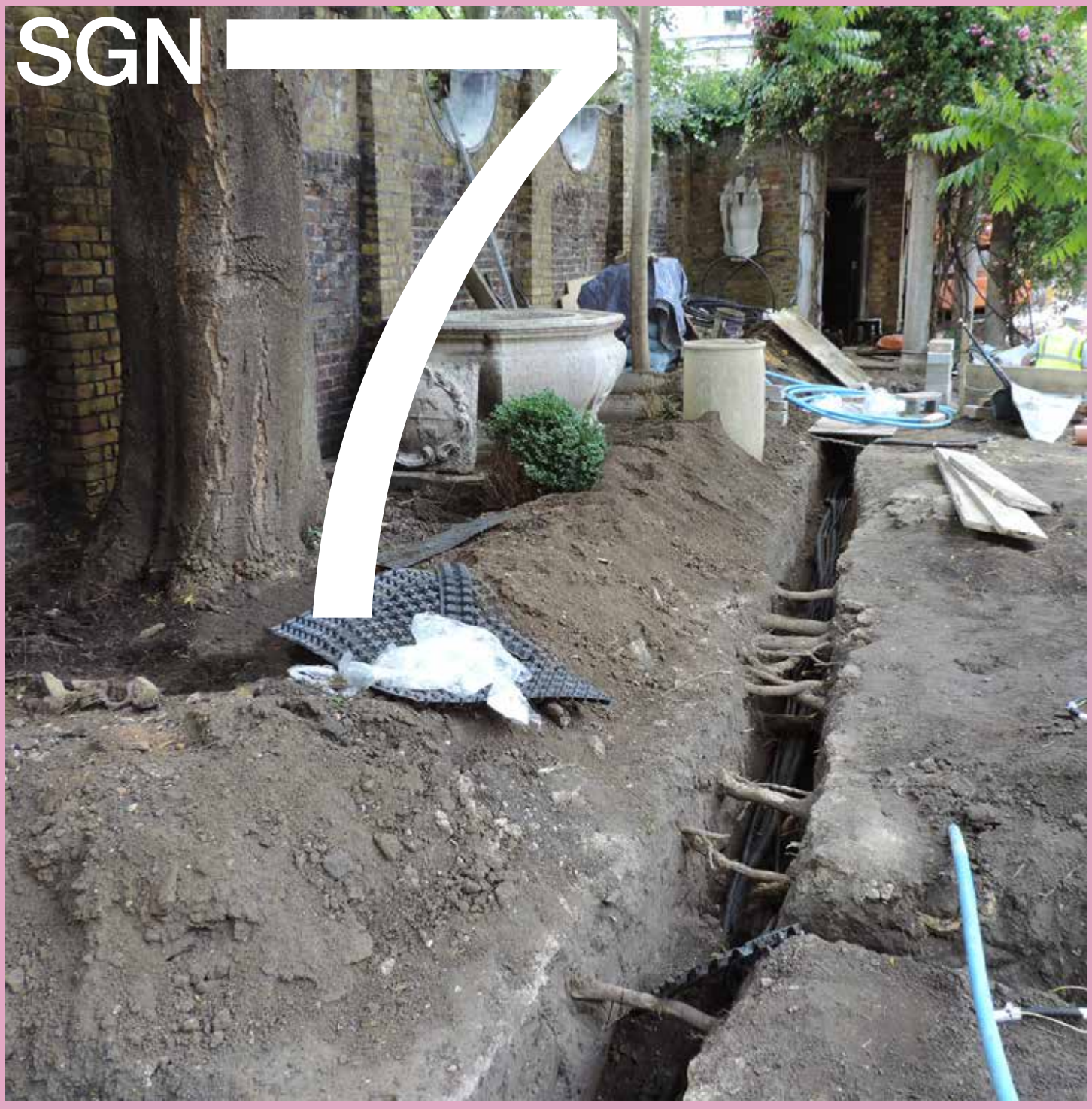
Excavation in root protection areas

SGN 7



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Summary guidance for site operatives

Excavation in root protection areas

Administration

- Unauthorised damage to protected trees is a criminal offence and could lead to enforcement action.
- Work under the normal site risk assessment procedures and comply with the wider site safety rules.
- Brief operatives entering root protection areas (RPAs) by the supervising arboriculturist before work starts.

Other relevant SGNs

- Monitor works in RPAs by the supervising arboriculturist (See *SGN 1 Monitoring tree protection*).
- Design access to avoid soil compaction (See *SGN 3 Ground protection*).
- Additional guidance on excavating to install services is provided in *SGN 11 Installing services in root protection areas*.

Important reminders

- Excavate using specialised compressed air tools or hand tools such as forks and spades, with a preference for air tools. **Note:** Do not mechanically excavate.
- If using hand tools, avoid accidental bark damage by using a fork to loosen the soil to help locate any substantial roots.
- Use a smaller tool such as a trowel to clear the soil away from roots without damaging the bark.
- Remove soil/material from the excavation without disturbing the adjacent rooting environment.
- Retain flexible clumps of smaller fibrous roots if they can be displaced temporarily or permanently beyond the excavation without damage.

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Summary guidance for site operatives

Excavation in root protection areas

- Cut exposed roots to be removed cleanly 10–20cm behind the final face of the excavation.
- Protect roots temporarily exposed, but to be retained, from direct sunlight, drying out, and extremes of temperature, by appropriate covering such as dampened hessian sacking and/or boards over the hole.
- If necessary, individual roots and clumps of less than 2.5cm width will be cut cleanly without consulting the supervising arboriculturist.
- Retain individual roots and clumps greater than 2.5cm in width where possible and only cut if agreed with the supervising arboriculturist.
- When back-filling, place an inert granular material mixed with top soil or sharp sand around retained roots greater than 2.5cm in width before light compaction.

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Explanatory notes and examples

Excavation in root protection areas

Purpose

SGN 7 describes the principles that will be applied to authorised excavation in RPAs, based on the recommendations in *BS 5837 (7.2)*, and the guidance in *NJUG (4.1)*.

General principles and clarifications

Excavation can adversely affect retained trees through direct damage to roots and destructively disturbing the rooting environment. However, some trees can tolerate limited amounts of excavation if the work is carried out carefully and the disturbance is kept to a minimum. The amount of disturbance that an individual tree can tolerate depends on factors such as tree species, health, age, and the growing conditions. These are all matters that will be assessed by an experienced and qualified arboriculturist.

Unless otherwise agreed by the supervising arboriculturist, all excavation will be carried out using hand tools, and the preferred method will be by compressed air soil displacement. If the compressed air option is not available, hand digging will be acceptable. Whatever the method of digging, the priority will be to remove soil without damaging the bark and wood of significant woody roots. If individual roots or clumps are discovered, those less than 2.5cm width can be cut cleanly without consultation with the supervising arboriculturist. Individual roots and clumps greater than 2.5cm width will be retained where possible and only cut after agreement by the supervising arboriculturist.

All soil removal must be done with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller fibrous roots should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If hand digging, a fork should be used to loosen the soil and help locate any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs 10–20cm behind the final face of the excavation. Roots temporarily exposed, but to be retained, will be protected from direct sunlight, drying out and extremes of temperature by appropriate covering such as dampened hessian sacking.

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Explanatory notes and examples

Excavation in root protection areas

SGN 7-01
Conventional trench installation of services damages tree roots and is not permitted in RPAs.

SGN 7-02
All excavation in RPAs should be with hand-held tools. Where possible, there will be a preference to use air tools because they are very effective at exposing roots and services with minimal damage.

SGN 7-03
Air tools are particularly useful where roots are very dense.

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Explanatory notes and examples

Excavation in root protection areas

SGN 7-04
Conventional hand tools such as spades and forks should be used where surfacing is so hard and compacted that it is not possible to use air tools.

SGN 7-05
These cobbles and the sub-surface were so compacted that hand tools had to be used to loosen and then remove the material around the roots before replacing with a more favourable rooting medium.

SGN 7-06
Individual roots and clumps greater than 2.5cm in width should be retained undamaged, unless cutting is authorised by the supervision arboriculturist.

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Explanatory notes and examples

Excavation in root protection areas

SGN 7-07
Once roots have been located with a fork, a smaller tool such as a trowel should be used to clear soil from around the root to avoid damaging bark and wood.

SGN 7-08
Exposed roots to be retained should be protected from light, drying out, and extremes of temperature, by covering with hessian sacking and/or boards until they can be covered back with soil.

SGN 7-09
Where roots to be retained will be exposed for longer than a few hours and there is a risk of drying out, the hessian covering should be kept damp by watering.

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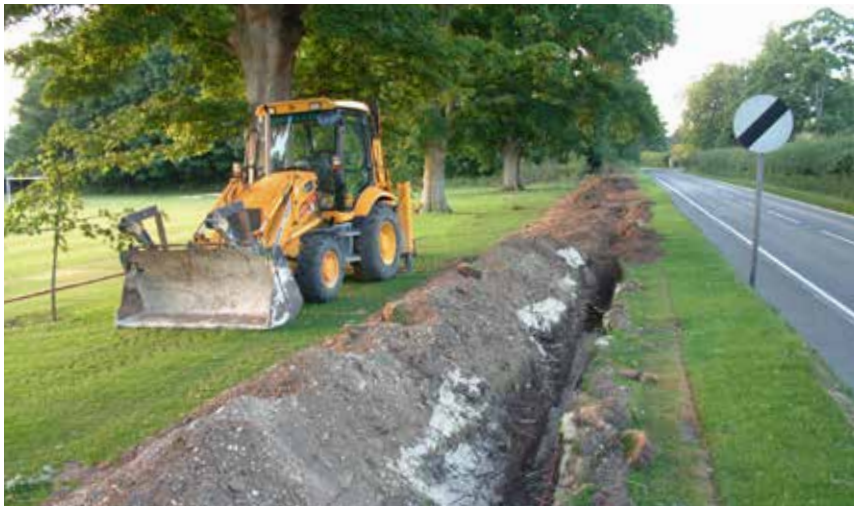
Explanatory notes and examples

Excavation in root protection areas

SGN 7-10
Where roots have to be removed, they should be cut cleanly beyond the face of the excavation with secateurs or a saw.

SGN 7-11
Where large amounts of soil are excavated to expose roots, it should be temporarily stored on heavy duty plywood boards, or similar, to prevent ground compaction to the RPA beneath.



SGN 7-12
Excavation by machines is not permitted in RPAs.

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Technical references

Excavation in root protection areas

Due to copyright restrictions, the relevant British Standard clauses are summarised, not quoted, as follows:

1. ***BS 5837 (2012) Trees in relation to design, demolition and construction – Recommendations:*** Clause 7.2 (Avoiding physical damage to the roots during demolition or construction) recommends:

    - 7.2.1 Other than for piling, existing ground levels in RPAs should not be disturbed. However, limited manual excavation might be acceptable if it is done carefully, using hand-held tools and preferably by compressed air soil displacement, subject to justification.

    - 7.2.2 Exposed roots should be protected to prevent desiccation and temperature changes, and the excavation backfilled as soon as possible after the protection has been removed.

    - 7.2.3 Individual roots and clumps of less than 25mm width can be pruned without further consultation, if necessary, making a clean cut. Roots and clumps greater than 25mm in width should only be cut if agreed by the supervising arboriculturist.

    - 7.2.4 Backfill around retained roots should be with topsoil or uncompacted sharp sand, or other loose inert granular fill.

2. ***National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – Issue 2: Section 4.1 (How to avoid damage to trees – Below ground) advises:***

    - "4.1.3 Realignment: Whenever possible apparatus should always be diverted or re-aligned outside the Prohibited or Precautionary Zones. Under no circumstances can machinery be used to excavate open trenches within the Prohibited Zone. Where works are required for the laying or maintenance of any apparatus within the Prohibited or Precautionary Zones there are various techniques available to minimise damage.

Technical references

Excavation in root protection areas

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."