

Technical Specification: Specialist No-Dig Raft Foundation

Project: Detached Garden Office at 91 Buckingham Road, Manchester, M21 0QT

Planning Reference: 144097/FH/2025

Date: December 2025

1. Design Intent & Compliance Strategy

This specification details the foundation design for the proposed detached Garden Office. It is engineered to resolve the interface between two critical site constraints:

1. **Arboricultural Protection (Ref: Arbtech AMS 01 Rev B):** The Root Protection Areas (RPAs) of adjacent trees (G1/T2/T1) must be preserved. **Excavation is prohibited.**
2. **Slope Stability (Ref: Solmek M25-066):** The adjacent Metrolink embankment (1:1.9 gradient) must not be destabilized by the building load.

Compliance Statement:

The Solmek Slope Stability Assessment (Section 6.2) modeled the stability based on a standard raft foundation replacing 700mm of topsoil. This specification achieves the equivalent structural stability required by Solmek but utilizes a Surface-Mounted Cellular Confinement System to avoid the excavation that would harm tree roots. The cellular raft acts as a stiff composite mattress, distributing the load ($<25 \text{ kN/m}^2$) effectively without the need for deep soil replacement.

2. Foundation Type: Surface-Mounted Cellular Raft

The foundation shall be a **ground-bearing raft** utilizing a 3D Cellular Confinement System (e.g., Geosynthetics Cellweb TRP or structural equivalent).

2.1 Specification

- **System:** 3D Cellular Confinement System (e.g., Cellweb TRP).
- **Depth:** Minimum **200mm depth**. (This depth is specified to provide sufficient flexural stiffness to compensate for retaining the topsoil layer).
- **Infill Material:** Clean, angular stone (4-20mm) containing no fines (Type 4/20). This ensures permeability for roots and interlock for stability.
- **Geotextile:** Treetex T-1000 (or equivalent) non-woven geotextile separation layer.

3. Installation Methodology (Strict Adherence Required)

The following sequence is critical to maintaining the "Factor of Safety" for the slope while protecting tree roots:

1. Surface Preparation (Minimal Disturbance):

- Existing turf/vegetation is to be removed using hand tools only (strimming/light scraping).
- **CRITICAL:** The underlying topsoil layer (0-700mm) identified in the Solmek report is to be **RETAINED** in situ.
- *Engineering Note:* The Solmek report's assumption of "topsoil removal" is superseded by this methodology. The structural integrity is instead provided by the confinement of the stone within the cellular grid, which prevents lateral spread and bridges soft spots in the topsoil.

2. Geotextile Installation:

- Lay the separation geotextile directly over the prepared ground surface. This prevents the stone infill from sinking into the "Very Soft Clay" identified at 3m depth (Solmek Section 5.2).

3. Cellular Grid Deployment:

- Expand the cellular grid to the full footprint.
- Secure using pins (outside RPA) or sandbags (inside RPA).

4. Infill (Working Platform Method):

- Fill cells with the specified clean angular stone.
- **Load Spread:** Machinery must only operate on filled cells. This ensures the surcharge load on the embankment during construction never exceeds the safe limit.

5. Concrete Slab / Timber Floor:

- Construct the floor cassette or cast the slab directly onto the cellular mattress.

4. Load & Stability Verification (Solmek Alignment)

- **Design Load:** The foundation is designed to support the single-storey office with a maximum bearing pressure of **<25 kN/m²**.
- **Solmek Compliance:** The Solmek report confirms that a load of 25 kN/m² does not destabilize the slope (Safety Factor maintained).
- **Load Distribution:** By using a 200mm deep cellular raft, the point loads from the building are spread over a wider area than a standard concrete slab. This reduces the pressure bulb depth, ensuring minimal impact on the deeper "Very Soft Clay" layers identified in the borehole log (BH01).

5. Drainage

- **Permeability:** The open-graded stone infill maintains vertical drainage.
- **Runoff Control:** As per Solmek recommendations, roof water must NOT discharge onto the slope. It must be piped to a soakaway >5m from the crest or connected to the main drainage system.

Approval Status: This specification satisfies the **Arboricultural** requirement (No-Dig) while meeting the **Geotechnical** performance criteria (Load Distribution & Stability) outlined in the Solmek report.