

Building Flood Mitigation Measures: Water Exclusion Strategy

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Rev 1

Reference **C2975**

Date **27.01.2025**

Revision	Status	Description	Date	Issued	Checked
-	Final v1	Issued for Approval	16.05.24	RH	RH
1	Final v2	Updated to include Timetable and adopted measures	03.07.25	RH	RH

1 BUILDING MATERIAL MITIGATIONS

1.1 The national government produced guidance for improving the flood resilience of building in the Communities and Local Government (CLG) 2007 'Improving the Flood Performance of New Buildings' publication. This publication provides recommendations on how to protect buildings in the case of a flood event, and propose two scenarios based on maximum expected flooded depths, and provides an explanation between flood resistance and resilient measures, these are summarised below:

- ⇒ **Water exclusion strategy** is when the emphasis is placed on minimising water entry whilst maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (not more than 0.3m). According to the definitions adopted in this Guidance, this strategy can be considered as a resistance measure, but it is part of the aim to achieve overall building resilience
- ⇒ **Water entry strategy** is when the emphasis is placed on allowing water into the building, facilitating draining and consequent drying. Standard masonry buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or more. This strategy is therefore favoured when high flood water depths are involved (greater than 0.6m) by utilising resilient materials, and construction methods.
- ⇒ **Flood resistant measures** are incorporated where it is considered feasible to prevent floodwater entering the building and take the form of flood barriers. Many flood resistant products/barriers are only suitable to typical maximum height being 0.68m, before the risk of structural damage is incurred. As this is a historic structure with limited scope for structural reinforcement.
- ⇒ **Flood resilient measures** are incorporated where it is accepted that, in severe flood events, water may enter parts of the building so it is necessary to ensure the building will remain useable after the floodwater has receded and the area has been cleaned. Therefore, materials should be incorporated that retain their structural integrity and have good drying and cleaning properties or are waterproof, and services and sockets etc. are located as high as practical to minimise flood damage.

1.2 Given the primary risk is related to surface water flooding, most likely from an exceedance event or failure of onsite drainage, it is considered that some of key principles of the **Water Exclusion Strategy** as detailed in 'Improving the Flood Performance of New Buildings' and BS 85500:2015-Flood resistant and resilient construction.

1.3 The following report details the Flood Resilient elements that will be adopted into the dwelling construction design and detailing. These measures are considered **sufficient** to robustly protect the proposed dwellings from the risk of flooding.

1.4 This report should be read in conjunction with the CGS FRA (refer C2975) to understand the full context and flood risk to the building.

TIMETABLE FOR IMPLEMENTATION

1.5 **All** of the items listed in this report will be constructed and installed during the construction phase of the project. All items **WILL** be installed and functioning prior to occupation. This includes:

- Type A and B tanking systems (Quadproof Ultra to outside of RC walls/ floor and waterproof concrete)
- Ground bearing ground (waterproof) floor slab
- Cavity masonry throughout
- 'Approved' Surface water drainage systems discharging to the ditch to the east
- 'Approved' External ground levels and landscaping

2 RECOMMENDED BUILDING DESIGN AND MATERIALS

FOUNDATION DESIGN

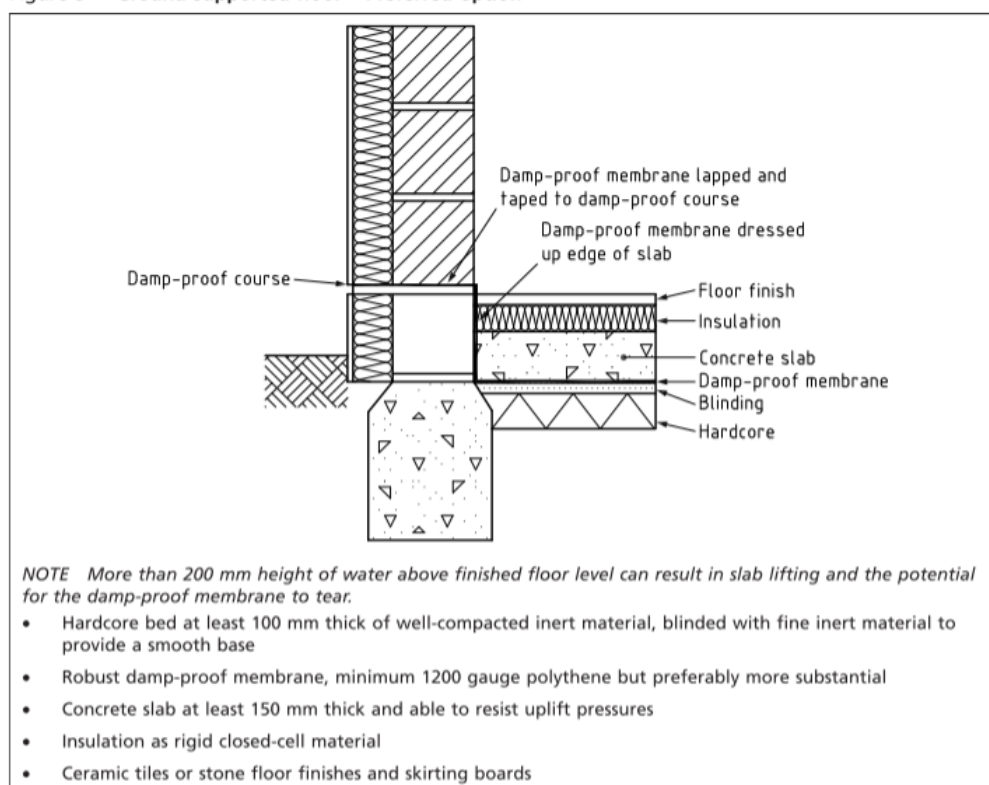
Sealed Foundations

- 1.6 **Material:** **Waterproof concrete** (integral with waterproof admixtures).
- 1.7 **Design:** The foundations will include an **integral tanking system (Quadproof Ultra)** as part of the reinforced concrete slabs. **Quadproof Ultra Membrane** is a pre-applied fully bonded waterproofing gas barrier membrane combined with a heavy-duty virgin polypropylene geotextile providing a fully concrete bonded system in basement and below ground structures.

Rising Walls and Damp-Proof Courses

- 1.8 **Material:** Quadproof Ultra to outside of RC walls/ floor and waterproof concrete will be used throughout to block water rising through capillary action.
- 1.9 **Design:** Damp-proof membrane will extend up the internal wall by at least 150 mm above the external ground level.
- 1.10 The proposed slab on ground floor detail in principle is provided below from BS 85500:2015.

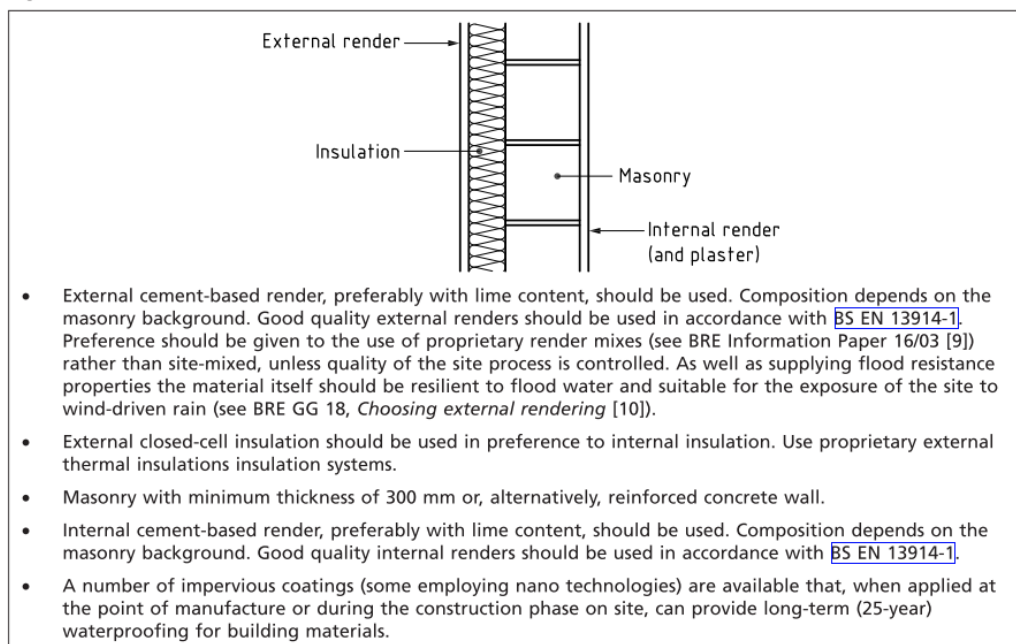
Figure 5 Ground-supported floor – Preferred option



WALL CONSTRUCTION

- 1.11 **Material:** Construct cavity walls will be constructed with **thermalite blocks (or similar)** for the inner leaf and waterproof bricks for the external leaf. A **DPC (Damp-Proof Course)** in the cavity and install of **cavity trays** will be included.
- 1.12 **Design:** **Stainless-steel wall ties** with drips to prevent water bridging the cavity and integrate a **drainage membrane** inside the cavity to direct water to external weep holes.
- 1.13 An example of the proposed Solid External Wall detail is provided below for reference.

Figure 7 Solid external walls



FLOOR DESIGN

Impermeable Floors

- 1.14 **Material:** The floor construction will be ground bearing slab, with **waterproof concrete** for an impermeable finish.
- 1.15 **Design:** There will be **integrated drainage layers** below the concrete slab to manage water and prevent seepage into the interior.

Raised Thresholds

- 1.16 **Material:** **Precast concrete threshold blocks** or durable **UPVC threshold kits** will be adopted at dwelling thresholds.
- 1.17 **Design:** Thresholds at all external doors are raised by 150 mm above the external ground level to prevent water ingress. External ground levels have been designed to be graded away from building thresholds, directing runoff around the building and into surface drainage systems (such as channels and gullies).

DRAINAGE AND LANDSCAPING

- 1.18 **Design:** refer to PJC Landscape General Arrangement Plan reference PJC.1277.001 Rev C for the surface drainage measures and ground levels that will be constructed to direct overland runoff around the building.

MAINTENANCE AND MONITORING

- 1.19 **Material:** Ensure routine inspections include checking **sealants**, **membranes**, and drainage systems. Use **infrared cameras** to detect water penetration.
- 1.20 **Design:** Maintain an **inspection plan** for early detection of system failures.

INTEGRATED SUDS (SUSTAINABLE DRAINAGE SYSTEMS)

- 1.21 **All site runoff should be tied back into the surface water drainage system. Refer to the proposed SUDS Drainage Scheme.**
- 1.22 These measures provide a comprehensive, resilient approach to water exclusion, combining structural design, material selection, and drainage techniques tailored to various flood scenarios.