Actions for Flood Resilient Homes:
Dry Floodproofing

What is dry floodproofing?

Dry floodproofing describes a range of strategies to seal the exterior of a building from flood waters.

Who should use dry floodproofing?

Dry floodproofing is only viable for buildings that are structurally sound in areas with low-velocity, relatively shallow flooding (below 3 feet). It is most appropriate for slab-on-grade buildings with concrete or solid masonry walls. Due to risk of structural failure from excessive flood forces, dry floodproofing is not advised for homes with basements or homes comprising weaker construction materials (e.g., wood frame with siding).

Note that dry floodproofing residential structures will not reduce flood insurance premiums.

(Left) *Example of exterior application of asphalt membrane (courtesy of https://staydrywaterproofing.com/)* (Right) *An interior application of a fiber-reinforced polymer wrap, image provided by FEMA P-312, Homeowner's Guide to Retrofitting 3rd Edition (2014)*

✓ **Before flood action** | ✗ During flood action | ✗ After flood action

What are dry floodproofing methods?

- **Temporary installation of waterproof membranes:** Heavy plastic sheeting or a waterproof membrane along a wall's exterior can be effective in preventing water from entering the home.
- **Use of sealants:** Waterproof sealants can be applied to building walls, structural joints, and openings for utility lines. Cement and asphalt-based coatings are effective, but can drastically change the appearance of the home and may be susceptible to puncturing. Clear coatings (e.g. epoxies or polyurethanes) can be applied to exterior walls without changing appearance but tend to be less effective.

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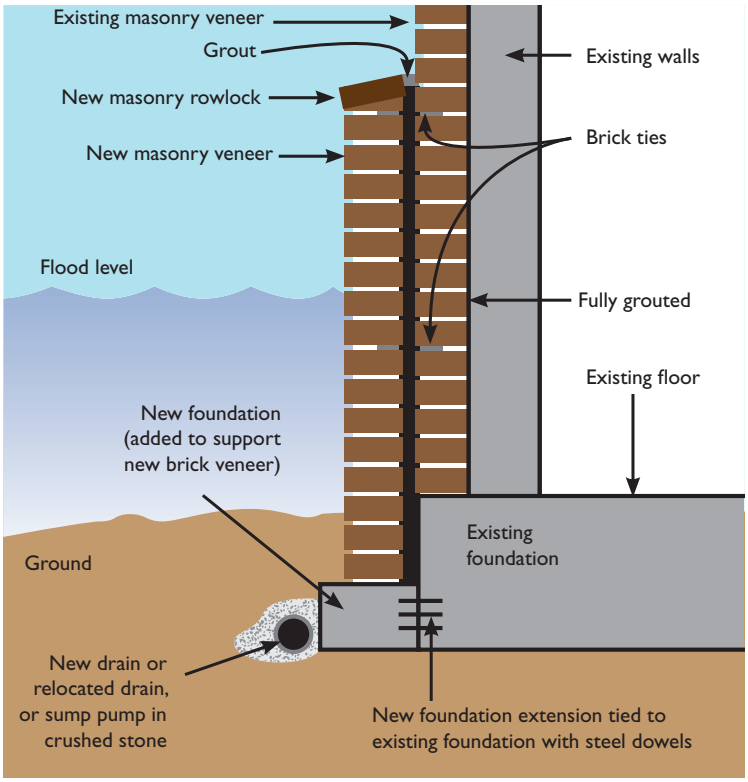

(Above) *"A way to seal an existing brick-faced wall is to add an additional layer of brick with a seal in between. Please note that weep holes (drainage) and wick drains are moved up to prevent moisture from getting inside the walls." Images and descriptions provided by FEMA P-312, Homeowner's Guide to Retrofitting 3rd Edition (2014)*

COST: VARIES[1]
✗ Reduces exposure
✓ Reduces vulnerability

For more information on flood resilience, contact the Engineering Department at 952-826-0371.

[1]The cost of dry floodproofing varies depending on the building size, depth of required protection, types of material used, and number of openings. Examples of general cost estimates can be found in FEMA publications: *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding* and *Engineering Principles and Practices of Retrofitting Floodprone Residential Structures.*

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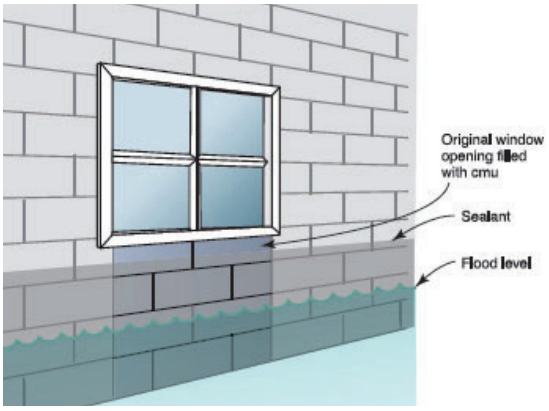
Other considerations

- The Federal Emergency Management Agency recommends that dry floodproofing should be designed by licensed professionals. Failure to anticipate hydrostatic forces (force due to the pressure of a fluid at rest) may result in extensive damage.
- Placement of flood shields or waterproof membranes is not feasible during flash floods or when warning times are short.
- Ongoing maintenance is required.
- Flood shields and sealants may not be aesthetically pleasing.
- Dry floodproofing does not mitigate the potential impact of high-velocity flood flow, wave action, erosion, or debris.

What are dry floodproofing methods? *(continued)*

- **Addressing closures**: Openings in the walls need to be either temporarily or permanently sealed shut. For example, low window openings at ground level can either have a pre-sized closure fitted over their surface or a low wall constructed around the opening. Similarly, all or part of a low window could be replaced with brick or glass block.
- **Using flood shields:** Temporary watertight shields can be placed over windows or doors in anticipation of flooding. Most residential shields can be stored in the home and installed when needed by bolting them into place or securing them in permanently installed brackets or tracks.
- **Addressing interior drainage**: A good interior drainage system to collect leaking water (e.g., a sump pump with an emergency power source) is an important component of a dry floodproofing system. Sanitary backflow prevention is also recommended.



(Above) *Metal shields installed with bolts or permanently installed tracks; image courtesy of www.psfloodbarriers.com/wp-content/uploads/sites/4/2016/09/Flood-Plank-21.jpg*

(Left) *Low window raised and original opening filled with brick; image provided by FEMA P-312, Homeowner's Guide to Retrofitting 3rd Edition (2014)*

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