2023 Dry Floodproofing Certificate for Non-Residential Structures

Overview of Updates and Changes to the Form
Agenda

- Introduction
- Background on the FEMA Floodproofing Certificate
- Changes that Relate to Floodproofing
  - New Flood Insurance Rating Methodology
  - Building Codes and Floodproofing
- Floodproofing and the NFIP
- Updates to the Floodproofing Certificate
- Summary
- Q & A
Purpose of the Dry Floodproofing Certificate

- Utilized for floodplain management requirements and flood insurance rating
- For non-residential structures and non-residential portions of mixed-use structures
- Certification by a registered professional...
  1) the elevation to which the building has been dry-floodproofed,
  2) that the building, together with utilities and sanitary facilities, is watertight to the floodproofed elevation, with walls that are substantially impermeable to the passage of water, and
  3) that the structure has been designed and constructed to be capable of resisting hydrostatic and hydrodynamic and debris impact forces, including the effects of buoyancy.

- Not a substitute for the Elevation Certificate
NFIP Flood Insurance Rating Methodology
NFIP Flood Insurance Rating Methodology

Defining a Property’s Unique Flood Risk

- The flood zone and Base Flood Elevation (BFE) are no longer used as direct rating variables.
- Elevations are considered for all properties, regardless of flood zone.

Rating Variables

- Geographic Location
- Structural Variables
- Prior Claims History
- Discounts
  - Mitigation
  - Statutory
  - Community Rating System (CRS)
Structural Variables: Building Characteristics

- Building Occupancy
- Construction Type
  - *For single-family homes: Frame, Masonry, Other*
- Foundation Type
- First Floor Height
- Ground Elevation
- Building Replacement Cost Value
  - *Considers square footage (for single-family homes)*
- Number of Floors in building
  - *Above ground, not counting basements/enclosures*
- Date of Construction
Flood Insurance Discounts

- Foundation Type – Piers/Posts/Piles
- Machinery & Equipment elevation
- Flood Openings (wet floodproofing)
- Dry Floodproofing
- Residential Basement Floodproofing Exceptions (44 CFR § 60.6(c))
- Statutory Discounts
- CRS Discounts

FEMA
Federal Emergency Management Agency
Eligibility for a Floodproofing Discount

- FEMA is expanding policy discounts, making them available to properties outside of high-risk flood areas. Discount for dry floodproofing is available:
  - In zones starting with A
  - In B, C, D, and X zones
  - Not available in V zones
    - Discount will be forfeited if mapped into V zone

- Instructions on the form refer to this availability:
  - “...a building must be dry floodproofed to one foot above the BFE to be considered for floodproofing credit. For B, C, D, or X flood zones, the building’s dry floodproofed design elevation must be at least two feet above the natural HAG to be considered for floodproofing credit.”
Residential Basement Floodproofing Exceptions (44 CFR § 60.6 c)

- **Rare cases:** Communities that have an exception for floodproofed residential basements approved by FEMA.
  - Must have language in local ordinance meeting [Technical Bulletin 10](https://www.fema.gov/floodplain-management/manage-risk/residential-buildings-basements)
- **Separate certification** for the permitting of a dry floodproofed residential basement, specifying that the design complies with the local floodplain management ordinance.
Building Codes and Dry Floodproofing Requirements

- To comply with the requirements of American Society of Civil Engineers (ASCE) 24, *Flood Resistant Design and Construction*, a building must be dry-floodproofed to at least BFE + 1 foot.
  - ASCE 24-14, Chapter 6, Floodproofing
- Not permitted in Coastal High Hazard Areas, Coastal A Zones, and other high risk flood hazard areas.
- Not permitted for residential structures.
Reasons for Changes to the Dry Floodproofing Certificate Form

- Additional flood zone and hazard information needed on the form to support flood insurance rating methodology.
  - FEMA expanded policy discounts by making them available to properties located outside of high-risk flood areas.
  - Building codes & higher standards: meet ASCE 24 standards to be eligible for a floodproofing discount.
- Previous version didn’t capture information required for floodplain management use of the form.
  - Lacked sufficient information to determine whether floodproofing was appropriate in a given area.
Floodproofing and the NFIP
Floodproofing

“Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.”

(44 CFR § 59.1)

- In the NFIP regulations, “floodproofing” refers to dry floodproofing (Technical Bulletin 3).
Wet vs. Dry Floodproofing

**Wet floodproofing**
- Flood openings allow the floodwaters to pass through
- Constructed with flood-resistant materials
- Parking garages, building access enclosures, crawlspaces, and similar unfinished spaces

**Dry floodproofing**
- Special sealants, components, equipment
- Watertight & “substantially impermeable”
- **Not** permitted for *residential* structures
- **Not** permitted for any structure in Zone V
Dry Floodproofing of Non-Residential Structures

- Non-residential structures may be dry floodproofed instead of elevated. (44 CFR 60.3(c)(3))
  - “Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community’s FIRM...
    (i) have the lowest floor (including basement) **elevated** to or above the base flood level
    or,
    (ii) together with attendant utility and sanitary facilities, **be designed** so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;”
Dry Floodproofing of Non-Residential Structures

- If dry floodproofed, a certification is required. *(44 CFR 60.3(c)(4))*
  - “...where a non-residential structure is intended to be made watertight below the base flood level,
    
    (i) a registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the applicable provisions of paragraph (c)(3)(ii) or (c)(8)(ii) of this section, and

    (ii) a record of such certificates which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained with the official designated by the community...”
A Dry Floodproofed Building

- “...is a building that has been designed and constructed to be watertight (substantially impermeable to floodwaters) below the BFE and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.”
  (instructions on the form; 44 CFR 60.3(c)(3))

- “Numerous design & planning considerations must be addressed, including... flood warning time, uses of the building, mode of entry to and exit from the building and the site in general, floodwater velocities, flood depths, debris impact potential, flood frequency, and any other state and local requirements must be addressed to ensure that dry floodproofing will be a viable floodplain management measure.”
Substantially Impermeable

- The use of materials and techniques that restrict the passage of water and seepage through pathways (joints, cracks, openings, channels) and points of entry and that limit the accumulation of water during flooding (*FEMA Technical Bulletin 3*).

- According to ASCE 24 and the U.S. Army Corps of Engineers (USACE), a structure is considered **substantially impermeable** if the **maximum accumulation of water is not more than 4 inches in a 24-hour period** without relying on devices for the removal of the water (*USACE, 1995*).
Dry Floodproofing Measures

Include but are not limited to:

- Doors and windows that are specially designed to be watertight when closed without flood shields
- Removable, or permanently installed, substantially impermeable panels to cover doors, windows, and other openings
- Backflow (non-return) valves or shutoff valves
- Seals that prevent the entrance of floodwater through joints and utility penetrations
- Sump pumps or self-priming pumps that control the level of seepage water
- Backup or emergency power for sump pumps and other seepage control measures that is protected to the flood protection level

*NFIP Technical Bulletin 3 / January 2021, Section 1.4 (pg. 5)*
Dry Floodproofing

- May be applicable to:
  - Core areas of critical facilities
  - Buildings subject to frequent, low-level flooding for a level of protection lower than the base flood elevation (BFE)
  - New non-residential construction
  - Non-residential portions of mixed-use buildings
- Floodproofing will be most successful in areas subject to relatively low-velocity flooding and shallow flood depths.

FEMA P-936 / July 2013,
Section 1.1

Images from FEMA P-2037
Resources

- Requirements for the Design and Certification of Dry Floodproofed Non-Residential and Mixed-Use Buildings (*NFIP TB-3*)
  

- Floodproofing Non-Residential Buildings (*FEMA P-936*)
  
Resources

- **Flood Mitigation Measures for Multi-Family Buildings (FEMA P-2037)**
  

- [https://www.fema.gov/multimedia-library](https://www.fema.gov/multimedia-library)
Dry Floodproofing Certification

- The design and certification of dry floodproofing measures involve **engineering evaluations and calculations**.
- Plans for a floodproofed non-residential building must be prepared by a registered engineer who must sign and seal a floodproofing certificate. *(44 CFR 60.3(c)(4))*
  - Certifying that dry floodproofing is **designed in accordance with ASCE 24**
- Local official must obtain a complete and correct “as-built” **Floodproofing Certificate** before issuing a certificate of occupancy.
FEMA Dry Floodproofing Certificate Form
Dry Floodproofing Certificate for Non-Residential Structures Form

Download the 2023 Edition: www.fema.gov/flood-insurance/find-form/underwriting
Sections of the Dry Floodproofing Certificate Form

- **Section I – FIRM Information**
  - Expanded; gathers more information
- **Section II – Dry Floodproofed Design Certification**
  - By a Registered Engineer or Architect
- **Section III – Dry Floodproofed Elevation Certification**
  - By a Registered Professional Land Surveyor, Engineer or Architect
- **Section IV – Dry Floodproofed Construction Certification**
  - By a Registered Engineer or Architect
Expanded Instructions

- Additional clarity and instructions provided on the form.
  - Specifies *dry* floodproofing.
  - Specifies “the dry floodproofing of non-residential buildings and the non-residential portions of mixed-use buildings may be permitted as an alternative to elevating” a structure to or above the BFE.
  - Provides a *detailed* listing of required documentation that must accompany the completed certificate.
  - The web addresses for guidance documents and the FEMA Flood Map Service Center (MSC) have been *updated*.

*Legend: dark green font indicates new or changed information*
Section I – FIRM Information

- Expanded section, now collects additional...
  - Property information
  - FIRM information

**Old Form**

Federal Emergency Management Agency

2023 FEMA Dry Floodproofing Certificate Update August 2023
Section I – FIRM Information

- Expanded section, now collects additional Property information...
  - Property Description and/or Tax Parcel #
  - Building Use
    - Non-Residential, Mixed Use, Addition, Accessory, etc.
  - Latitude/Longitude
    - Center of the front of the building
  - Horizontal Datum

*Legend: dark green font indicates new or changed information*
Section I – FIRM Information

- Expanded section, now collects additional FIRM information...
  - Community Name and CID (not just Number), County and State
  - FIRM Zone(s) and BFE(s)
    - Allows for multiple zones and/or elevations.
  - Source of BFE/Depth
    - FIS? FIRM? Community Determined? Other?
  - Datum

*Legend: dark green font indicates new or changed information*
Section I – FIRM Information

- Expanded section, now collects additional FIRM information...
  - **Limit of Moderate Wave Action (LiMWA)**
    - If so, Coastal A zone?
  - **Floodway**
    - If so, enter velocity
  - **Alluvial Fan**
    - If so, enter depth and velocity

*Legend: dark green font indicates new or changed information*
Limit of Moderate Wave Action (LiMWA)

Is a Limit of Moderate Wave Action (LiMWA) shown on the FIRM?  □ Yes  □ No
If Yes, is the property located in the Coastal A Zone [area between the LiMWA and Zone V boundary (or shoreline)]?  □ Yes  □ No

[Map showing different zones and areas labeled A, B, C, and the LiMWA boundary]
Floodway Velocity

Approximations of velocity may be interpolated from data in the Flood Insurance Study (FIS) Floodway Data Table, if the waterway was studied using detailed methods.

(FEMA P-936, page C-2)
### Floodway Data Table

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<th>DISTANCE (FEET)</th>
<th>WIDTH (FEET)</th>
<th>SECTION AREA (SQUARE FEET)</th>
<th>MEAN VELOCITY (FEET PER SECOND)</th>
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</tbody>
</table>

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**Is the property located in a floodway?**  [Yes]  [No]  If Yes, provide the velocity at the building location:

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**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**ADA COUNTY, ID AND INCORPORATED AREAS**

**FLOODWAY DATA**

**DRY CREEK**

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2023 FEMA Dry Floodproofing Certificate Update

**August 2023**
Why Collect This Additional FIRM Information?

- For Zone A, the NFIP regulations do not specify limits on the use of dry floodproofing based on flood depth, flood velocity, or the presence of waves; however,
- FEMA does not recommend use of dry floodproofing systems in areas where...
  - The depth of water under base flood conditions is greater than 3 feet
  - Base flood velocities exceed 5 feet per second
  - Moderate wave heights (1.5 to 3 feet) are present during base flood conditions
    - ASCE 24 restricts the use of dry floodproofing in Zone V and in Coastal A Zones, if a Limit of Moderate Wave Action (LiMWA) is delineated on flood maps.

The NFIP regulations for dry floodproofing apply only in SFHAs identified on FIRM as Zone A (A, AE, Al-30, AH, and AO). Dry floodproofing is not permitted in SFHAs identified as Zone V (V, VE, V1-30, and VO). For Zone A, the regulations do not specify limits on the use of dry floodproofing based on flood depth, flood velocity, or the presence of waves. However, FEMA does not recommend use of dry floodproofing systems in areas where:
  - The depth of water under base flood conditions is greater than 3 feet.
  - Base flood velocities exceed 5 feet per second.
  - Moderate wave heights (1.5 to 3 feet) are present during base flood conditions.
BREAK
5 minutes
**Design Certification & Elevation Certification: Now 2 Sections**

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**Floodproofing Certificate for Non-Residential Structures**

The floodproofing of nonresidential structures is a critical step in protecting against flood damage. This certificate is designed to ensure that structures are adequately protected against flood hazards. It includes sections for design certification and elevation certification, which are now two separate sections.

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**2023 FEMA Dry Floodproofing Certificate Update**

August 2023
Section II – Dry Floodproofed Design Certification

*New Section*

Completed by a Professional Engineer (PE) or architect licensed in that state, certifying the design of the dry floodproofing measures.

- Comments/Description Box
- A. Dry Floodproofed Design Elevation
- B. LAG (Natural or Finished)
- C. HAG (Natural or Finished)
Certifying Design Standards for Dry Floodproofing

- What was your approach?

- What is the target (elevation) that approach is designed to meet?
Certifying Design Standards for Dry Floodproofing

The structure, together with attendant utilities and sanitary facilities will be...

- Watertight to the dry floodproofed design elevation, with "substantially impermeable" walls
  - Less than 4 inches water accumulation in a 24-hour period without relying on devices for the removal of the water (ASCE 24)
Certifying Design Standards for Dry Floodproofing

- All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces up to the dry floodproofed design elevation.

- Flood damage-resistant materials are used for all areas where seepage is intended to collect inside the dry floodproofed areas up to at least 4 inches above the floor.
Section III – Dry Floodproofed Elevation Certification

Completed by a Registered Professional Land Surveyor (PLS), PE, or Architect licensed in that state.

- A. Dry Floodproofed elevation (as-built)
- B. LAG (natural or finished)
- C. Natural HAG
  - Because 2 feet above the natural HAG to be considered for floodproofing credit (B, C, D, X)
- Height of Floodproofing on the building above natural or finished LAG
- Signature and seal
Section III – Dry Floodproofed Elevation Certification

- Elevation datum for building elevations must be the same as that used for the BFE.
  - **Checkbox prompt for conversion factor.** If conversion used, describe in comments.

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<tr>
<th><strong>SECTION III – DRY FLOODPROOFED ELEVATION CERTIFICATION</strong></th>
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</thead>
<tbody>
<tr>
<td><em>(By a Registered Professional Land Surveyor, Engineer or Architect licensed in the State where the building is located)</em></td>
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<tr>
<td>Benchmark Utilized: [ ] Vertical Datum: [ ]</td>
</tr>
<tr>
<td>Indicate elevation datum used for the elevations provided in this section:</td>
</tr>
<tr>
<td>□ NGVD 1929 □ NAVD 1988 □ Other/Source:</td>
</tr>
<tr>
<td>Elevation datum used for building elevations must be the same as that used for the BFE. Conversion factor used? □ Yes □ No</td>
</tr>
<tr>
<td><em>Note:</em> If Yes, describe the source of the conversion factor in the Comments area of this section.</td>
</tr>
<tr>
<td>A. Dry floodproofed elevation (must be based on finished construction): [ ] feet [ ] meters</td>
</tr>
<tr>
<td>B. Lowest Adjacent Grade (LAG) next to the building: □ Natural □ Finished [ ] feet [ ] meters</td>
</tr>
<tr>
<td>C. Natural Highest Adjacent Grade (HAG) next to the building: [ ] feet [ ] meters</td>
</tr>
<tr>
<td>Height of floodproofing on the building above the natural or finished LAG is [ ] feet.</td>
</tr>
<tr>
<td><em>Note:</em> For insurance rating purposes in all eligible zones inside the SFHA, the building’s dry floodproofed design elevation must be at least one foot above the BFE to be considered for floodproofing credit. For B, C, D, or X Zones, the building’s dry floodproofed design elevation must be at least two feet above the natural HAG. If the building is not dry floodproofed to the above-mentioned standards, then the building will not be considered for floodproofing credit. See the Instructions section for information on documentation that must accompany this certificate if being submitted for flood insurance rating purposes.)</td>
</tr>
</tbody>
</table>

*Legend: dark green font indicates new or changed information*
Dry Floodproofing Discount

- The minimum NFIP requirement for dry floodproofing a structure is to the BFE.
- However...
  - To be in compliance with the requirements of ASCE 24, one foot is subtracted from the dry floodproofed elevation. Therefore, a building in the SFHA must be dry floodproofed to one foot above the BFE to be considered for floodproofing credit.
  - For B, C, D or X flood zones, the building must be dry floodproofed to at least two feet above the natural HAG to be considered for floodproofing credit.
Completed by a Professional Engineer (PE) or architect licensed in that state, who certifies the *design and construction* of the dry floodproofing measures are in accordance with ASCE 24.

- Based upon development and/or review of the design, specifications, *as-built* construction drawings, and physical inspection.
  - Finished construction

- No additional data entered in Section IV, just a signature and seal to certify.
Section IV – Dry Floodproofed Construction Certification

- Certifying that...
  - The structure, together with attendant utilities and sanitary facilities is watertight to the dry floodproofed design elevation, is **substantially impermeable** to the passage of water, and shall perform in accordance with **44 CFR 60.3(c)(3)**.
  - All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces up to the dry floodproofed design elevation.
  - The floodproofed elevation is in accordance with the design **and** any alteration(s) to the design.
  - Flood damage-resistant materials have been incorporated/used in all areas where seepage would collect inside the dry floodproofed areas up to at least 4 inches above the floor.

*Legend: dark green font indicates new or changed information*
Required Documentation

Instructions contain an expanded description of what documentation is required...

- Photographs
- Comprehensive Flood Emergency Operations Plan
- Comprehensive Inspection and Maintenance Plan
- Building Owner Acknowledgement
Photographs

- Photographs of...
  - all sides and aspects of the floodproofed building
  - all components used to provide dry floodproofing protections (shields, gates, barriers, sump pumps, backflow (non-return) valves or shutoff valves, etc.)
  - the installed barriers/shields and corresponding clear photographs of openings areas where barriers and shields are deployed without the barriers/shields installed (doors, windows, ventilation intakes, etc.)
  - penetrations through dry floodproofed envelopes (utilities, mechanical)
  - backup power source for sump pumps

*Legend: dark green font indicates new or changed information*
Photographs
Comprehensive Flood Emergency Operations Plan

For the entire structure
a. personnel, equipment, tools, and supplies needed to deploy system before flooding;
b. chain of command and assigned responsibilities for personnel;
c. personnel notification procedure and list of duty requirements;
d. decision tree for initiation: timeline, responsible parties, and triggers;
e. written description and map of the storage locations and types of dry floodproofing measures and associated tools/equipment,
f. conditions that require the deployment of active dry floodproofing measures;
g. instructions and installation order of operations;
h. instructions for connecting standby (emergency) power source;
i. contact information for the manufacturer and designer (for replacement parts and support);
j. evacuation plans for all personnel;
k. requirements for installation and deployment drills and training program (at least once a year); and
l. requirement for regular review and update of the plan procedures.

*Legend: dark green font indicates new or changed information*
Comprehensive Inspection and Maintenance Plan

For the entire structure

a. Exterior envelope of the structure, to identify possible structural and waterproofing deficiencies such as cracks, water staining, and penetrations;
b. All penetrations to the exterior of the structure;
c. Slabs and wall/slab joints, structural and drainage deficiencies;
d. Flood shields, gates, panels, doors, glazing, barriers, and other components designed to provide dry floodproofing protection, including all seals, gaskets, fasteners, hardware and tools;
e. Sump pumps (or self-priming pumps) and interior drain system;
f. Emergency power systems;
g. Testing of emergency generators, sump pumps, and other drainage measures;
h. Backflow (non-return) valves or shutoff valves;
i. Location of all flood shields, gates, panels, and other components including all hardware/materials/tools needed to seal the dry floodproofed area;
j. Contact information for the manufacturer of the shields and other components to determine the availability of replacement gaskets, seals, and other parts and to ask questions; and
k. Cadence of inspection and maintenance plan.

*Legend: dark green font indicates new or changed information*
Building Owner Acknowledgement

- Separate document or letter that verifies that the owner...
  - is aware of the criteria for when the dry floodproofing measures must be installed, and
  - knows how to install all the measures.
- Signed by the owner
- Additionally, if the measures are to be installed by a third-party, then the third-party contractor must sign that they know how to install the measures.

*Legend: dark green font indicates new or changed information*
Multiple Copies

A copy of all pages of the Floodproofing Certificate and all attachments go to the:

1) community official,
2) insurance agent/company, and
3) building owner.
Documentation Requirements for Non-Residential Floodproofing Discount

- The insurer must submit the required floodproofing documentation to FEMA to determine eligibility for a floodproofing discount.
  - Application Form
  - Completed Elevation Certificate
  - Completed Non-Residential Floodproofing Certificate
  - Photographs
  - Flood Emergency Plan
  - Inspection and Maintenance Plan

Remember: the dry floodproofing certificate is not a substitute for the elevation certificate.
The insurer must validate floodproofing documentation **annually**.

- There is a set of questions that must be answered at policy renewal and sent to FEMA for recertification.
- No official form; usually a letter from the inspector with the following required info...
  - Reinspection Date
  - Inspector Name
  - What was inspected
  - Confirmation that the Inspection & Maintenance Plan has been reviewed and updated
  - Confirmation that the Flood Emergency Plan has been reviewed and updated
  - Statement that panels, walls are still actively floodproofed
Summary

- Additional information collected on the form (in Section I) supports determination of where a dry floodproofing approach is viable, and where a building is eligible for floodproofing discount.
- Separate sections to certify the design (II), the as-built elevation (III), and confirm that the design & construction meets the performance standards (IV).
- More specifics provided (in the instructions) on the required photographs and supporting documentation.

Email your questions about the new form to nfipunderwritingmailbox@fema.dhs.gov.
Questions?
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