Lunch with MIA – Do You Know Your Flood Risk?

Maryland Insurance Administration
December 2, 2021
Common Causes of Flooding

• Stormwater runoff (pluvial flooding)
  – “Urban flooding”

• High tides/coastal storm event (hurricane, Nor’easter)
  – King tide
  – “Nuisance flooding”

• Sea level rise and land subsidence

• Riverine/flash flood (fluvial flooding)
  – Extreme precipitation

• Other:
  – Water main break
  – Sewer backup
Urban Flooding

“...the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems.”
Nuisance Flooding

“...high tide flooding that causes a public inconvenience.”
Water Main Break

Topics

• **Know Your Risk – Maps and Data**
  – FEMA Flood Insurance Rate Maps (FIRMs)
  – Sources of Information
  – Future Flood Risk

• **Reduce Your Risk – Floodplain Management/Regulations & Mitigation Actions**
  – Floodplain Management Ordinance
  – Flood damage-resistant materials
  – Flood openings, etc.
National Flood Insurance Program (NFIP)

• Created by the National Flood Insurance Act of 1968 (Hurricane Betsy, 1965)

• Administered by FEMA/DHS

• Participation is voluntary
  – Adopt and enforce regulations
  – Eligible for flood insurance

• Benefits of participation:
  – Flood insurance
  – Grants and loans
  – Disaster assistance
  – Federally-backed mortgages

• Partnership between the Federal government and the “community” (County or municipal government)
Key Components of the NFIP

- Maps and Data
- Know Your Risk
- Reduce Your Risk
- Insure Your Risk
- Flood Insurance

Floodplain Management/Regulations & Mitigation Actions
Know Your Risk – Maps and Data

- Flood Insurance Study (FIS)
- Flood Insurance Rate Map (FIRM)
  - Geographic Information System: Digital FIRM (DFIRM)
- Community Identified Flood Risk:
  - Historic high water marks
  - 2050 and 2100 SLR projections
  - Other?
Flood Insurance Rate Map (FIRM)

- Delineates flood risk based on different recurrence intervals (1% and 0.2% annual chance flood)
  - Floods don’t follow map boundaries

- National standard is the 1% annual chance flood (also known as 100-year flood, or special flood hazard area)
  - Flood insurance rating
  - Floodplain management & development review process
Common FIRM Terms

• Base Flood Elevation (BFE)
  – Depth of 1% annual chance flood

• Special Flood Hazard Area (SFHA)
  – Extent of 1% annual chance flood
# Flood Risk Zones

<table>
<thead>
<tr>
<th>Risk</th>
<th>Zone</th>
<th>Recurrence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>X (unshaded)</td>
<td>&lt;0.2%</td>
</tr>
<tr>
<td>Moderate</td>
<td>X (shaded)</td>
<td>0.2%</td>
</tr>
<tr>
<td>High (Riverine/tidal)*</td>
<td>A, AH, AO, AE</td>
<td>1.0%</td>
</tr>
<tr>
<td>High (Coastal)*</td>
<td>VE</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

*Mandatory purchase requirements for flood insurance, and regulatory requirements in high risk areas*
A Zone Riverine (Nontidal) – No BFE Shown
AE Zone Tidal
AE Zone Riverine (Nontidal)
AE Zone Riverine (Nontidal) – Floodway
VE Zone
Coastal A Zone (CAZ)

- **VE** (Wave height ≥ 3 feet)
- **AE** (Wave height 3.0–1.5 feet)
- **LiMWA** (Limit of base flooding and waves)

- **BFE** (1% annual chance stillwater elevation)
- **Properly elevated building**
- **Un elevated building constructed before community entered the NFIP**

- **Shoreline**
- **Sand beach**
- **Buildings**
- **Overland wind fetch**
- **Vegetated region**
- **Limit of SFHA**
Limit of Moderate Wave Action (LiMWA) – Benedict
Maryland’s Flood Risk Application
https://mdfloodmaps.net/map/
Flood Risk Map
FEMA Flood Map Service Center

• Access Products
  – FIRM & FIS
  – LOMCs
  – DFIRM Database
  – Historic Products
  – Flood Risk Products

• Access Tools
  – Make a FIRMette
  – National Flood Hazard Layer (NFHL) Viewer

• Live Support
  – FEMA Mapping and Insurance eXchange (FMIX)

https://msc.fema.gov/portal/home
Other Sources of Flood Risk Data

- Coast Smart Climate Ready Action Boundary (CS-CRAB)
  - [https://mdfloodmaps.net/crab/](https://mdfloodmaps.net/crab/)

- Flood Factor®
  - [https://floodfactor.com/](https://floodfactor.com/)
  - Used by realtor.com
Coast Smart Climate Ready Action Boundary (CS-CRAB)

- Story Map: [https://arcg.is/0HXmjj0](https://arcg.is/0HXmjj0)
- Mapping: [https://mdfloodmaps.net/CRAB/](https://mdfloodmaps.net/CRAB/)
Anne Arundel County - Coastal Neighborhood - Aerial Map
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Anne Arundel County - Coastal Neighborhood - Aerial Map
Flood Factor®

• [https://floodfactor.com/](https://floodfactor.com/)

• “Past floods, current risks, and future projections based on peer-reviewed research from the world’s leading flood modelers.”

• Free online tool created by the nonprofit First Street Foundation

• Used by REDFIN, realtor.com and Estately

• 1-10 scoring matrix
https://www.realtor.com/

- FEMA and Flood Factor flood risk data

Flood Risk Information

To help you make informed decisions about this property, we provide two independent flood risk assessments. Be sure to ask your agent as well about local flood risks.

**FEMA**

Within Special Flood Hazard Area and indicates high risk.

The FEMA flood risk model is based on historic flood patterns and covers a general area, not an individual property. It's also used to determine insurance and building code requirements.

Learn more about FEMA flood maps and zones and what they're used for.

**Flood Factor**

Flood risk is increasing as sea levels rise and weather patterns change.†

Flood Factor identifies the past, present, and future flood risk for a home by identifying risks from rain, rivers, tides and storm surge using advanced modeling techniques.

Take a closer look at this property’s Flood Factor and risk details.

Learn about the differences between FEMA and Flood Factor assessments

More on how to prepare and protect your home

**Flood Insurance**

Since this property is located in FEMA zone VE (est.)*, flood insurance is likely required by federally regulated or insured mortgage lenders.

Select coverage amount

$250K building and $100K in contents

**TryFlood.com**

Estimated Annual Premium

Get Quote

* Flood risk data is provided by Flood Factor*, a product of First Street Foundation®. The Flood Factor model is designed to approximate flood risk and not intended to include all possible risks of flood.
* Most probable FEMA flood zone as estimated by MassaveCert, Inc.
** This non-binding quotation is not an offer of or a contract for insurance and may be withdrawn for any reason. Price and terms associated with this quote are subject to underwriting review and may change.
Reduce Your Risk – Floodplain Management/Regulations

• Minimum NFIP requirements in the Code of Federal Regulations (CFR)
  – Title 44, Subchapter B, Parts 59-60, § 59.1 & § 60.3(a)-(e)

• State Laws, Regulations and Executive Orders
  – Annotated Code of Maryland, Environment Article
  – Code of Maryland Regulations (COMAR)
  – Climate Change and “Coast Smart” Construction Executive Order

• Community’s Floodplain Management Ordinance
  – Often based on Maryland Model Floodplain Management Ordinance
  – Higher Regulatory Standards? (ex. Freeboard)

• Building Codes/Maryland Building Performance Standards
  – International Codes (I-Codes):
    • International Building Code (IBC), International Residential Code (IRC), etc.
  – ASCE 24: Flood Resistant Design and Construction
  – ASCE 7: Minimum Design Loads for Building and Other Structures
Freeboard

Source: [FEMA Build Back Safer and Stronger Fact Sheet](https://www.fema.gov/build-back-safer-and-stronger-fact-sheet)
Elevation: Zone AE – Crisfield
Elevation: Zone VE – Calvert Co.
FEMA Elevation Certificate (EC)

1. To ensure compliance with a community’s regulations
   - Properly elevated
   - Adequate flood openings

2. Flood insurance rating
   - Proper documentation required

3. Support Letter Of Map Change (LOMC) requests
   - Usually, must be certified by a licensed professional
     - In Maryland, only a land surveyor can certify as-built information
Reduce Your Risk – Mitigation Actions

- Use flood damage-resistant materials
- Install flood openings in enclosures
- Install backflow prevention valves
- Elevate HVAC and utilities
- Anchor fuel tanks, extend vent pipe (oil)
- Anchor and vent accessory structures (ex. sheds)
- **FRED** – Floodproof, Relocate, Elevate, Demolish
- **Purchase flood insurance!**
Flood Damage-Resistant Materials

• **Acceptable:**
  – Cement board
  – Brick, tile
  – Marine grade plywood
  – Sprayed polyurethane foam insulation

• **Unacceptable:**
  – Gypsum board, greenboard
  – Carpeting
  – Oriented-strand board (OSB)
  – Fiberglass insulation

• **Fasteners and Connectors**
  – Stainless steel or hot-dip galvanized

Source: [NFIP Technical Bulletin 2, Flood Damage-Resistant Materials Requirement](https://example.com)
**Flood Openings**

- **Reduce hydrostatic pressure on walls**

- **Minimum requirements:**
  - Bottom of opening must be within 12” of grade
  - 1 square inch of net open area for every square foot of enclosed area OR use engineered openings
  - On at least two different walls
Flood Openings

Improper flood openings can result in higher flood insurance!

Source: *The American Surveyor, Taking the Mystery Out of Flood Openings, Vol. 10 No. 6*
Backflow Prevention Valve

Source: Protecting Building Utilities From Flood Damage, FEMA-348, November 1999 (has been revised)
Elevated HVAC Unit & Flood Openings – Dorchester Co.
Elevate Utilities

Non-elevated utilities results in higher flood insurance!

Source: *The American Surveyor, Taking the Mystery Out of Flood Openings, Vol. 10 No. 6*
Dry Floodproofing Utilities

Anchoring a Fuel Tank

Source: FEMA Anchor Fuel Tanks Fact Sheet, April 2008
Anchoring a Propane Tank – Outside

Anchoring an outside propane tank.

Alternative Method of Installing Anchors From One Side

Galvanized 48" Long 3/4"-Diameter Double-Head Ground Anchor With 6" Single Helix Auger

NOTE: Tank support legs vary, depending on manufacturer's design. Each leg set on concrete footing pad 3"H x 6"W x 12"L.

NOTE: Check with utility companies for locations of underground lines. Verify locations of underground lawn sprinkler lines, septic tanks, and drain field lateral lines before auguring ground anchors.
Propane Tanks – Eastern Shore
Anchoring a Heating Oil Tank – Outside

Alternative Method of Installing Anchors From One Side

Galvanized 48”-Long 3/4”-Diameter Double-Head Ground Anchor With 6” Single Helix Auger

Vent Pipe Extension to Weather Head 1’ Higher than Base Flood Elevations

Fill Tube Screw-On Tight-Fit Cap with Gasket

1-1/4”-Wide by 0.32”-Thick Stainless Steel Strap Inside Vinyl Sheath

Flood Level

Building Wall Located Adjacent to Tank

Flood Level

Ground Level

Ground Level

NOTE: Tank support legs vary, depending on manufacturer’s design. Each leg set on concrete footing pad 3”H x 6”W x 12”L.

How2005_oil illus

Heating Oil Tank

NOTE: Check with utility companies for locations of underground lines. Verify locations of underground lawn sprinkler lines, septic tanks, and drain field lateral lines before auguring ground anchors.

Anchoring an outside heating oil tank.
Accessory Structures

Source: *The American Surveyor, Taking the Mystery Out of Flood Openings, Vol. 10 No. 6*
FRED: Flood Mitigation Grants

• Usually requires a local government or non-profit to sponsor the project

• FEMA **Hazard Mitigation Assistance (HMA) Grants**
  – Hazard Mitigation Grant Program (HMGP)
  – Building Resilient Infrastructure and Communities (BRIC)
  – Flood Mitigation Assistance Grant Program (FMA)

• Maryland **Comprehensive Flood Management Grant Program (CFMGP)**

• Maryland **Community Development Block Grant Program**
Elevation Project – Hoopers Island, Dorchester Co. (During)
Elevation Project – Hoopers Island, Dorchester Co. (After)
FEMA Publications

• **Protect Your Home from Flooding: Low-Cost Projects You Can Do Yourself**

• **Mitigation for Homeowners Fact Sheet**

• **NFIP Technical Bulletins**
  – 12 bulletins that provide guidance for complying with the NFIP’s building performance requirements
    • TB 1: [Openings in Foundation Walls and Walls of Enclosures](#)
    • TB 2: [Flood Damage-Resistant Materials Requirement](#)

• **Homeowner’s Guide to Retrofitting**

• **Protecting Building Utility Systems From Flood Damage**
Protect Your Home from Flooding: Low-Cost Projects You Can Do Yourself

• OUTSIDE THE HOME
  – Protect your valuable possessions, maintain proper water runoff and drainage, anchor outdoor fuel tanks, etc.

• INSIDE THE HOME
  – Install flood vents, install a sump pump, prevent sewer backups, use flood-resistant building materials, etc.

• FLOOD PREPAREDNESS
Plan Ahead

2. Build a Kit – https://www.ready.gov/kit
   - https://www.ready.gov/floods
     – Sign up for your community’s warning system
     – Learn and practice evacuation routes
     – Build an emergency supply kit
   - Connect with your neighbors, and work together
   - FEMA Mobile App
Websites

• Maryland Department of the Environment (MDE)
  https://mde.maryland.gov/Pages/index.aspx
  – Maryland Flood Risk Application
    https://mdfloodmaps.net/map/
  – Coast Smart CRAB
    https://mdfloodmaps.net/crab/

• Federal Emergency Management Agency (FEMA)
  https://www.fema.gov/
  – National Flood Insurance Program (NFIP)
    https://www.fema.gov/national-flood-insurance-program
    https://www.floodsmart.gov/
  – FEMA Flood Map Service Center (MSC)
    https://msc.fema.gov/portal/home
Thank you!

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