



**Department of the Environment**

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# Meeting the Venting Requirements for Compliance with the NFIP

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**State Coordinating Office**  
**National Flood Insurance Program (NFIP)**

**October 25, 2012**



# Agenda

- Overview of NFIP
- Applicable Regulations
- Openings (Flood vents)
  - Non-engineered vs. Engineered
  - Documentation requirements
- Elevation Certificate

# National Flood Insurance Program (NFIP)

- Created in 1968
- Administered by FEMA
- Three main parts
- Numerous stakeholders
- Community = Participating County or Municipality
- Voluntary



National Flood Insurance Program

## Answers to Questions About the NFIP

FEMA F-084 / March 2011



FEMA

# Three Main Parts of the NFIP

## 1. Mapping

- Flood Insurance Rate Maps (FIRMs)/  
Flood Insurance Study (FIS)

## 2. Regulations

- Based on flood zones mapped on FIRMs
- Code of Federal Regulations (44 CFR 60.3)
- Local Floodplain Management Ordinance

## 3. Insurance

- Renters, Homeowners, Business Owners

# Applicable Regulations

- Code of Federal Regulations (CFR)
- Community Ordinance
  - Based on maps (44 CFR 60.3)
  - Higher regulatory standards?  
(ex. Freeboard)

## 44 CFR 60.3(c)(5)

Require, for all new construction and substantial improvements, that fully **enclosed areas** below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding **shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.** Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

# Enclosed Areas

- Used for parking vehicles, building access or storage
- Automatically equalize hydrostatic flood forces on exterior walls
- Must either be certified, or meet or exceed the following criteria:
  - Minimum of two openings
  - Total net area not less than 1 square inch per square foot of enclosed area

## Enclosed Areas (cont.)

- Bottom of all openings no higher than one foot above grade
- May be equipped with screens, louvers, valves, or other coverings or devices provided they permit automatic entry and exit of floodwaters



# Openings

- Also referred to as venting
- Typically 8" x 16" (size of block)
- Includes accessory structures

**Washington Co.  
(September 1999)**





**Washington Co.  
(September 1999)**



# Common Issues

- Insufficient number of vents
- Openings too high, covered or closed shut
- Below-grade crawlspaces
- Lack of documentation

Can lead to  
more expensive  
flood insurance!



**Minus-rated  
policy!**





2009 / 6 / 17





2012/ 1/11

# NFIP Technical Bulletins

- Provide additional guidance (Ex. flood-resistant materials, floodproofing, etc.)

- 11 bulletins

<http://www.fema.gov/plan/prevent/floodplain/techbul.shtm>

- Requirement vs. guidance
- TB-1: Openings in Foundation Walls and Walls of Enclosures



# Technical Bulletin 1

- Updated in August 2008
- Provides guidance on non-engineered and engineered openings
- Consistent with insurance rating requirements



## Openings in Foundation Walls and Walls of Enclosures

Below Elevated Buildings in Special Flood Hazard Areas  
in accordance with the National Flood Insurance Program

Technical Bulletin 1 / August 2008

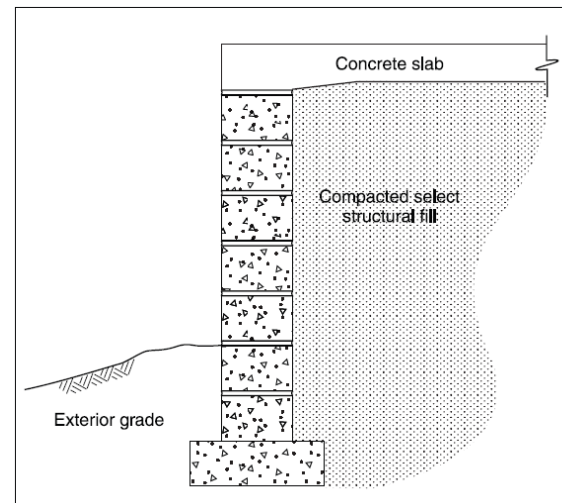


FEMA



# No Openings Required

1. Manufactured home with skirting
  - Not attached to the frame or foundation
  - Not for areas with rapid rise of floodwaters
2. Back-filled stem wall foundation

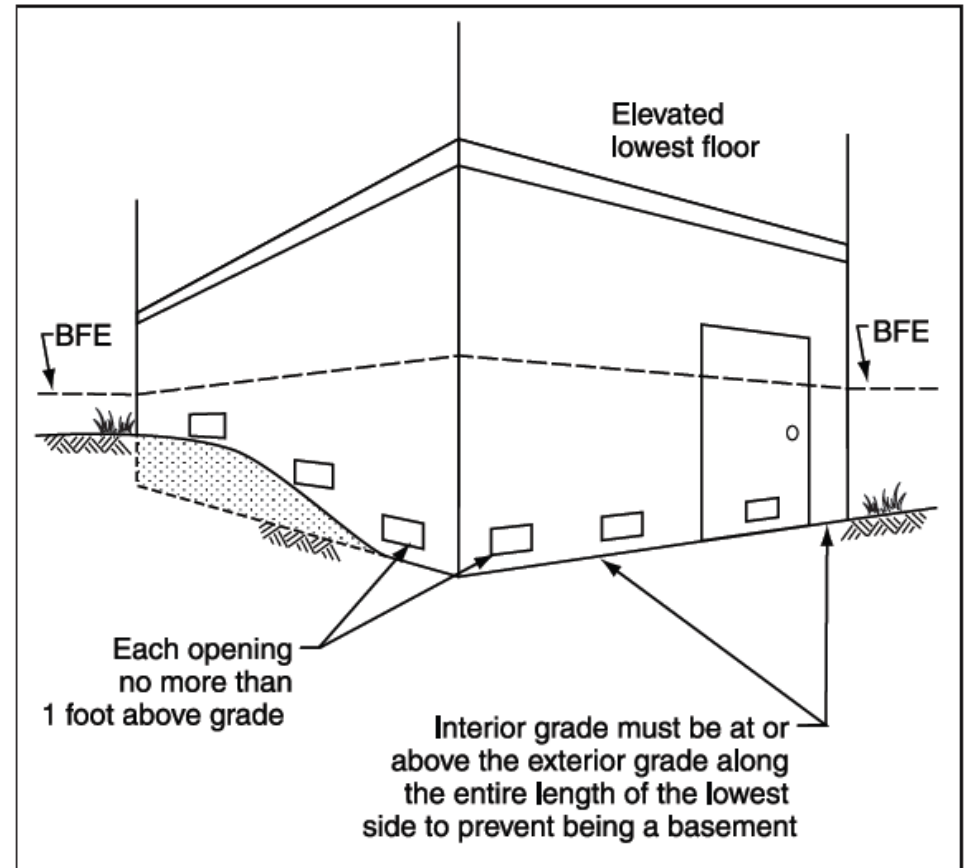


# Depth of Water 1 Foot or Less

1. Elevate floor of enclosure to or above BFE – no openings required
2. Install openings at or close to grade

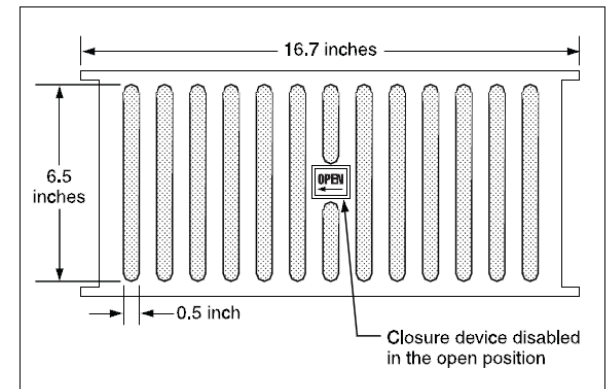
# Sloped Sites

- Sufficient open area must be below BFE



# Non-Engineered Openings

- Typical air vents
  - Must be permanently disabled in the open position
- Temperature-controlled vents
- Open blocks
- Open lattice work



**ONLY ABOUT 42 SQ. IN. OF NET OPEN AREA !**

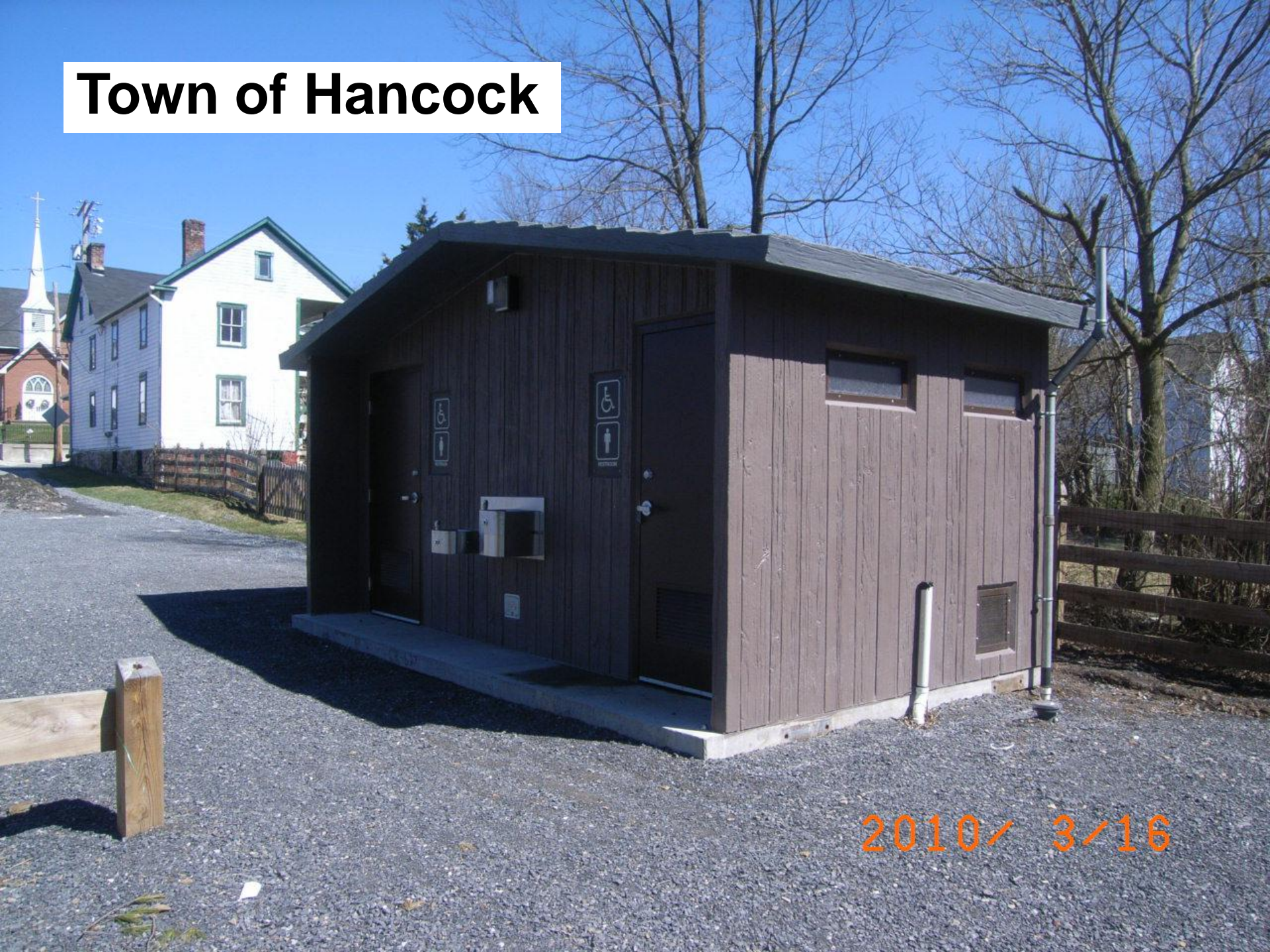
**Cecil County**



2011/10/13



# Town of Hancock



2010 / 3 / 16



# Harford County



2009 / 6 / 17



**Dorchester County**



2012 / 1 / 10



# Engineered Openings

- Must meet 44CFR 60.3(c)(5)
- Must meet ASCE 24, *Flood Resistant Design and Construction* (referenced by IBC)
- Certified by a registered professional engineer or architect
  - Attach copy of certification to EC
  - Describe in notes section of EC

# Documentation Requirements for Engineered Openings

1. ICC-ES Evaluation Report, or
2. Individual certification
  - Certified by a registered professional engineer or architect
  - Shall identify the building where openings will be installed

# **DISCLAIMER!!!**

**Maryland Department of the Environment makes no recommendations on any products.**

**The examples contained in this presentation are for instructional purposes only, and are not a comprehensive list of all available products.**

**Whatever product is chosen, the property owner, and/or owners representative, should work closely with the local community official to ensure all building requirements are met.**

# Vents Marketed as Engineered Openings

- SmartVENT

<http://www.smartvent.com/>

- Crawl Space Door Systems

<http://www.crawlspacedoors.com/>

- Cooke Vent & Cooke-Bucko Galvanized Vent

<http://www.cookesupplies.com/products.php>

# Vents Marketed as Engineered Openings (cont.)

- USA Foundation Flood Air Vents  
<http://www.usafloodairvents.com/>
- Flood Solutions  
<http://floodsolutions.com/>
- American Floodvent  
<http://americanfloodvent.com/>
- Others?

# SmartVent

- Only known engineered opening with ICC-ES Evaluation Report
- 200 square feet of flood protection



<http://www.smartvent.com/>



**Cecil County  
- exterior**



2011/10/13



**Cecil County  
- interior**



2011/10/13



# Crawl Space Door Systems

- 95 square inches of net open area



<http://www.crawlspacedoors.com/>

# Cooke Vent

- 98 square inches of net open area



<http://www.cookesupplies.com/products.php>

# Town of Secretary



2010 / 7 / 27



# Cooke-Bucko Galvanized Vent

- 98 square inches of net open area



<http://www.cookesupplies.com/products.php>

# Documentation Requirements for Engineered Openings

1. ICC-ES Evaluation Report, or
2. Individual certification
  - Certified by a registered professional engineer or architect
  - Shall identify the building where openings will be installed

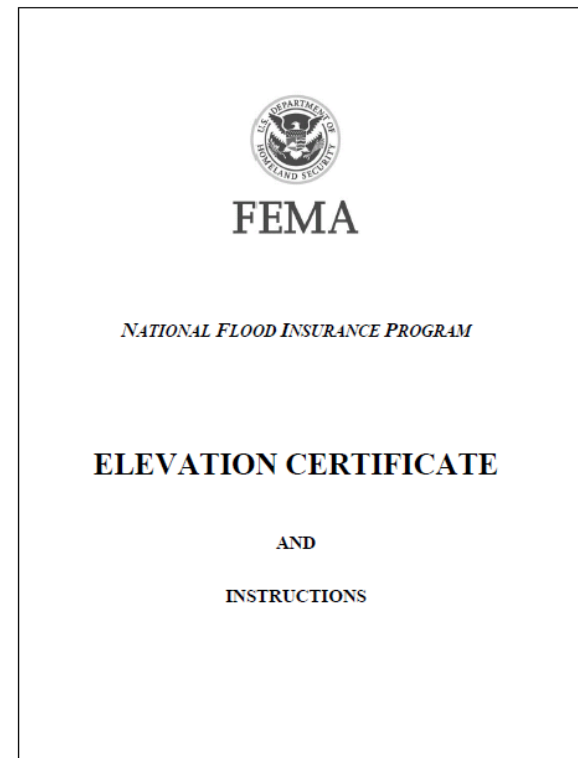
**Attach to FEMA Elevation Certificate!**

# Recommendations

- When in doubt, go with **net open area** of vent (exclude screens and louvers)
- Inside grade of crawlspace should match outside finished grade
  - **Avoid technical basements**

# FEMA Elevation Certificate

- Used by community to ensure structure built in compliance
  - Properly elevated
  - Adequate venting
- For flood insurance rating
  - **Proper documentation is very important**
- Support LOMC request



# FEMA Elevation Certificate

- Who can complete them?
  - Depends on community
  - Typically only MD licensed surveyors
- Under construction vs. finished construction

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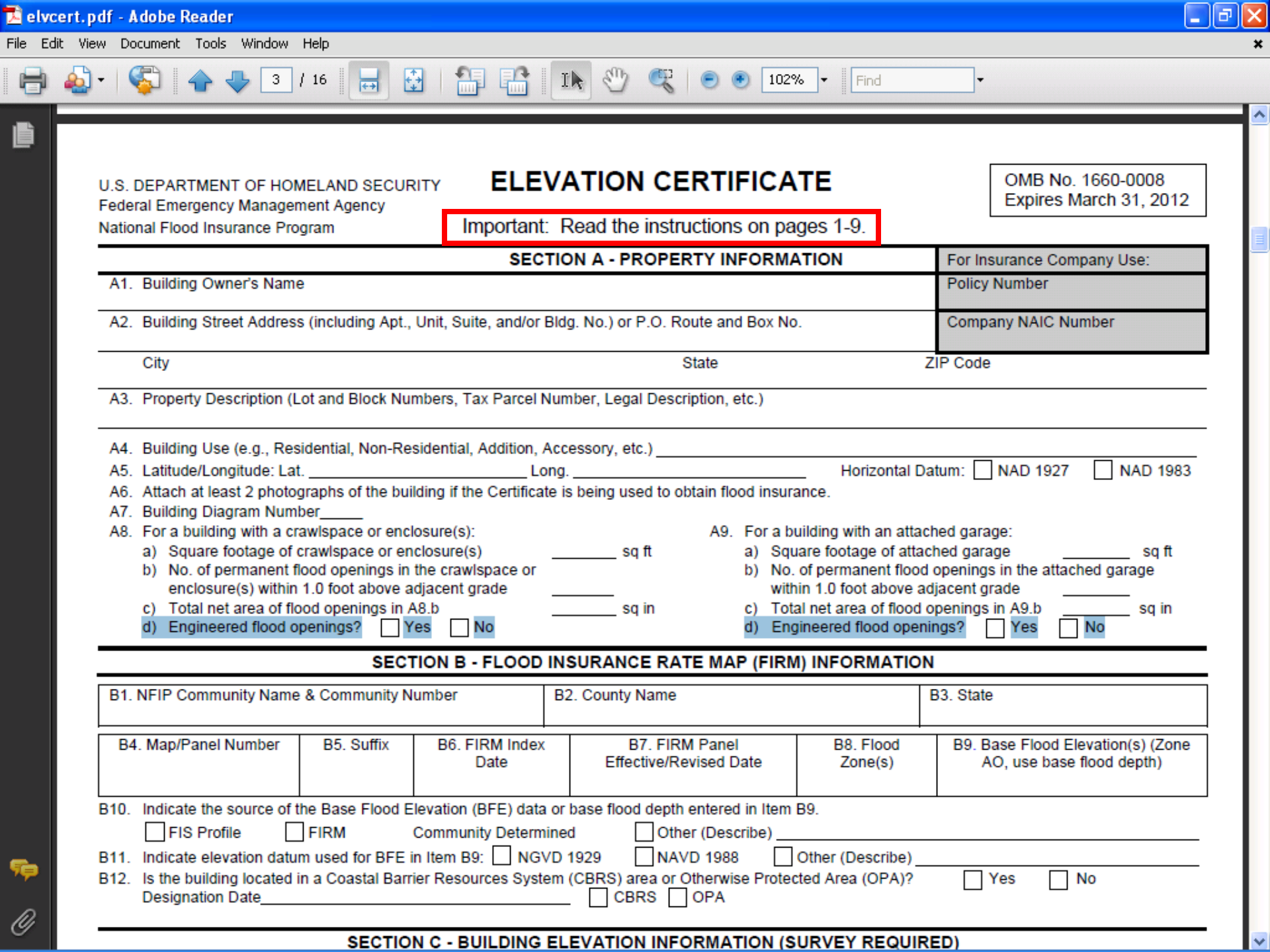
## SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

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C1. Building elevations are based on:  Construction Drawings\*  Building Under Construction\*  Finished Construction

\*A new Elevation Certificate will be required when construction of the building is complete.





U.S. DEPARTMENT OF HOMELAND SECURITY  
Federal Emergency Management Agency  
National Flood Insurance Program

# ELEVATION CERTIFICATE

OMB No. 1660-0008  
Expires March 31, 2012

**Important: Read the instructions on pages 1-9.**

## SECTION A - PROPERTY INFORMATION

A1. Building Owner's Name		For Insurance Company Use: Policy Number
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Company NAIC Number
City	State	ZIP Code
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) _____		
A5. Latitude/Longitude: Lat. _____ Long. _____		Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number _____		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) _____ sq ft		a) Square footage of attached garage _____ sq ft
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____		b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A8.b _____ sq in		c) Total net area of flood openings in A9.b _____ sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No

## SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

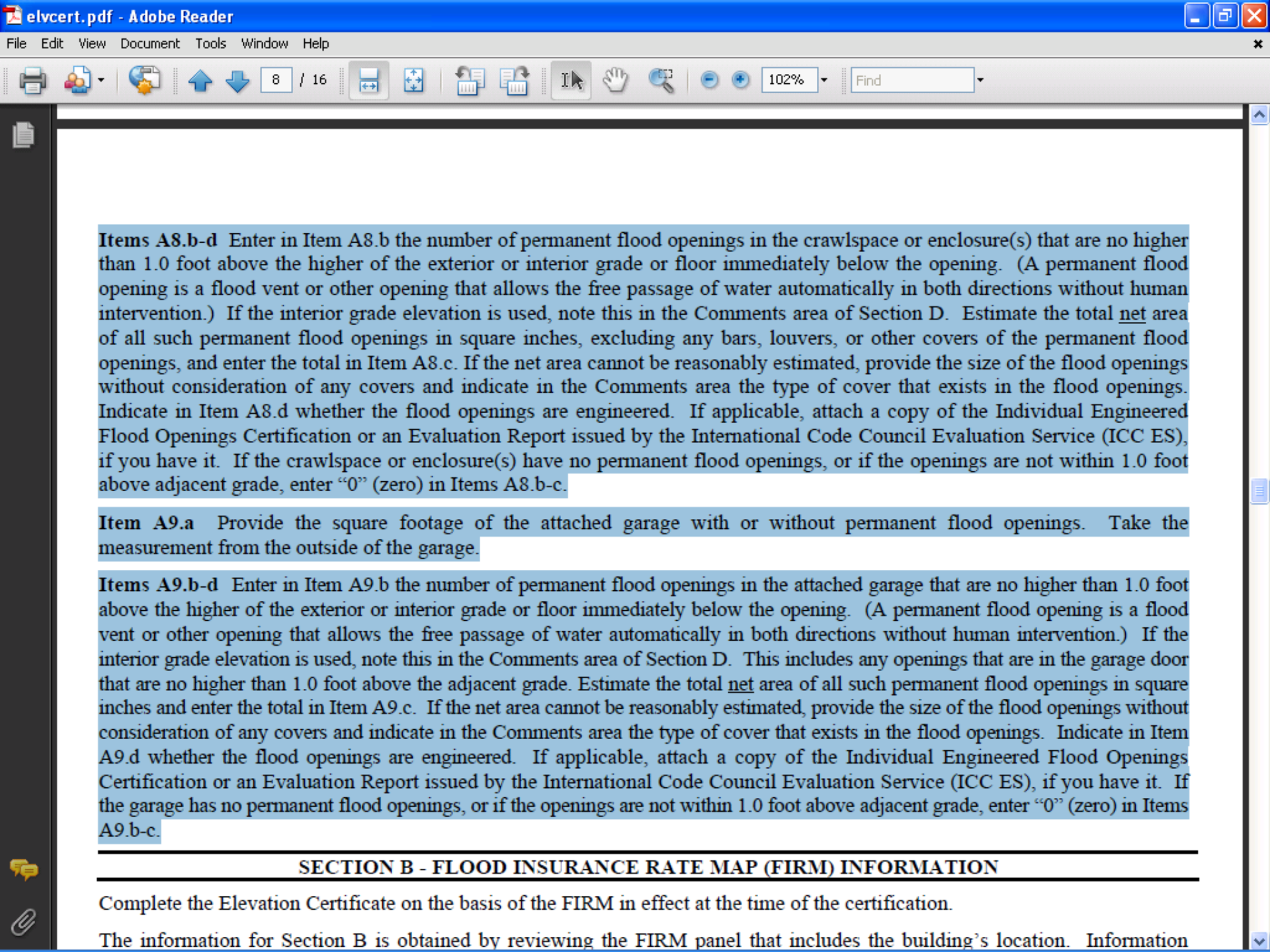
B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.  
 FIS Profile  FIRM  Community Determined  Other (Describe) \_\_\_\_\_

B11. Indicate elevation datum used for BFE in Item B9:  NGVD 1929  NAVD 1988  Other (Describe) \_\_\_\_\_

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)?  Yes  No  
 Designation Date \_\_\_\_\_  CBRS  OPA

## SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)



**Items A8.b-d** Enter in Item A8.b the number of permanent flood openings in the crawlspace or enclosure(s) that are no higher than 1.0 foot above the higher of the exterior or interior grade or floor immediately below the opening. (A permanent flood opening is a flood vent or other opening that allows the free passage of water automatically in both directions without human intervention.) If the interior grade elevation is used, note this in the Comments area of Section D. Estimate the total net area of all such permanent flood openings in square inches, excluding any bars, louvers, or other covers of the permanent flood openings, and enter the total in Item A8.c. If the net area cannot be reasonably estimated, provide the size of the flood openings without consideration of any covers and indicate in the Comments area the type of cover that exists in the flood openings. Indicate in Item A8.d whether the flood openings are engineered. If applicable, attach a copy of the Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES), if you have it. If the crawlspace or enclosure(s) have no permanent flood openings, or if the openings are not within 1.0 foot above adjacent grade, enter "0" (zero) in Items A8.b-c.

**Item A9.a** Provide the square footage of the attached garage with or without permanent flood openings. Take the measurement from the outside of the garage.

**Items A9.b-d** Enter in Item A9.b the number of permanent flood openings in the attached garage that are no higher than 1.0 foot above the higher of the exterior or interior grade or floor immediately below the opening. (A permanent flood opening is a flood vent or other opening that allows the free passage of water automatically in both directions without human intervention.) If the interior grade elevation is used, note this in the Comments area of Section D. This includes any openings that are in the garage door that are no higher than 1.0 foot above the adjacent grade. Estimate the total net area of all such permanent flood openings in square inches and enter the total in Item A9.c. If the net area cannot be reasonably estimated, provide the size of the flood openings without consideration of any covers and indicate in the Comments area the type of cover that exists in the flood openings. Indicate in Item A9.d whether the flood openings are engineered. If applicable, attach a copy of the Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES), if you have it. If the garage has no permanent flood openings, or if the openings are not within 1.0 foot above adjacent grade, enter "0" (zero) in Items A9.b-c.

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## SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

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Complete the Elevation Certificate on the basis of the FIRM in effect at the time of the certification.

The information for Section B is obtained by reviewing the FIRM panel that includes the building's location. Information

<b>IMPORTANT: In these spaces, copy the corresponding information from Section A.</b>			For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number
City	State	ZIP Code	Company NAIC Number

**SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)**

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments

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Signature \_\_\_\_\_ Date \_\_\_\_\_  Check here if attachments

**SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)**

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).

a) Top of bottom floor (including basement, crawlspace, or enclosure) is \_\_\_\_\_ feet meters above or below the HAG.

b) Top of bottom floor (including basement, crawlspace, or enclosure) is \_\_\_\_\_ feet meters above or below the LAG.

E2. For Building Diagrams 6-9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8-9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is \_\_\_\_\_ feet meters above or below the HAG.

E3. Attached garage (top of slab) is \_\_\_\_\_ feet meters above or below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is \_\_\_\_\_ feet meters above or below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance?  Yes  No  Unknown. The local official must certify this information in Section G.

**SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION**

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name \_\_\_\_\_

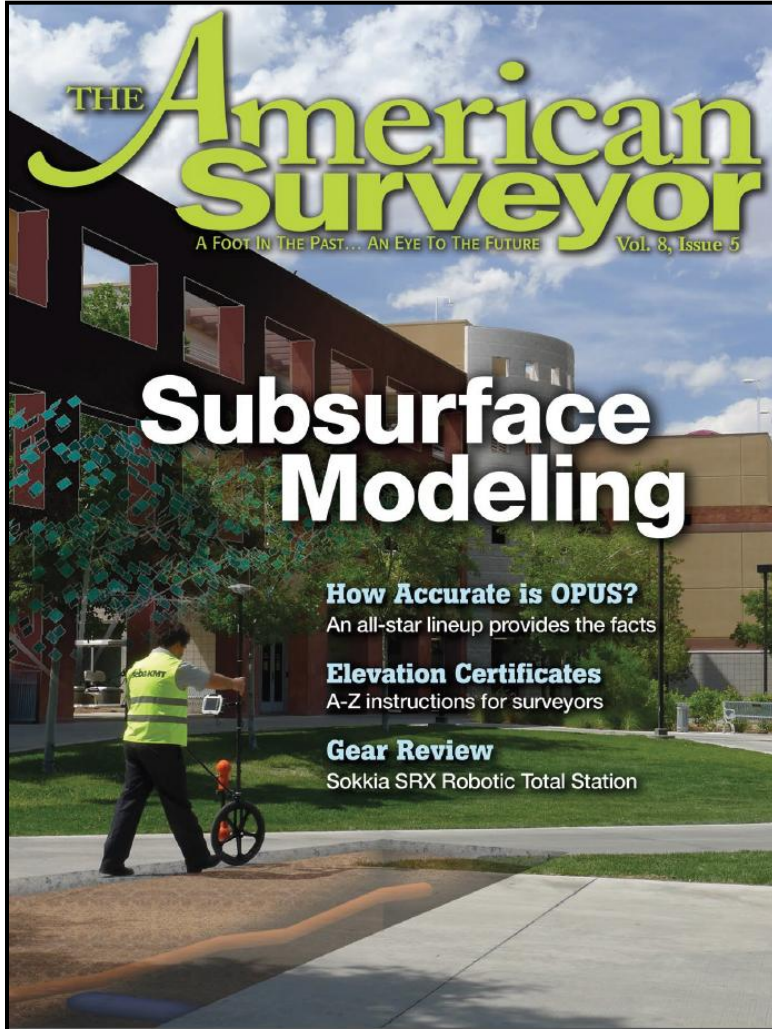
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ ZIP Code \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Comments \_\_\_\_\_

Check here if attachments





- **EC instructions**
- Two-part article in *The American Surveyor* magazine written in 2011
- Floodplain Management Bulletin (FEMA 467-1)

# FEMA Publications

- NFIP Technical Bulletins
  - TB-1: Openings in Foundation Walls and Walls of Enclosures
  - TB-11: Crawlspace Construction
- Elevation Certificate (FEMA Form 81-31)
- Floodplain Management Bulletin (FEMA 467-1)

# Phone Numbers

FEMA Publication Warehouse

1-800-480-2520

FEMA Map Information eXchange (FMIX)

1-877-FEMA-MAP (1-877-336-2627)



# Websites

- FEMA – [www.fema.gov](http://www.fema.gov)
- Maryland Department of the Environment  
[www.mde.state.md.us](http://www.mde.state.md.us)  
[www.mdfloodmaps.com](http://www.mdfloodmaps.com)
- FEMA Map Service Center  
[www.msc.fema.gov](http://www.msc.fema.gov)
- NFIP – [www.FloodSmart.gov](http://www.FloodSmart.gov)



# Questions?

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## **Maryland Department of the Environment** Water Management Administration Wetlands & Waterways Program

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