



North Carolina Society of Surveyors

Elevation Certificate Training

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North Carolina Emergency Management



What is the purpose of the Elevation Certificate?



- **Flood Insurance Policy Rating**
- Verify Regulatory compliance
- Support of applications for map revisions & amendments
- Required for CRS program

NOTES:

- Data collected on this form is for the construction & utility service to a single STRUCTURE only.
- Not the lot or other improvements.
- The Community **MUST** maintain their records in perpetuity.

Who must have an Elevation Certificate?

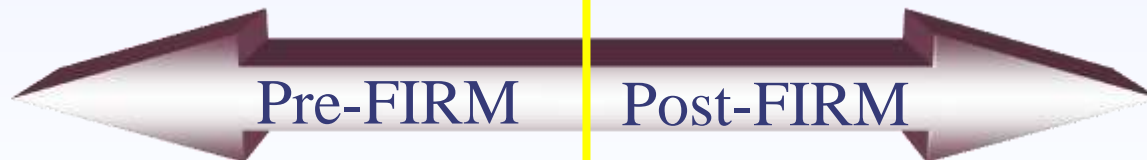


- Anyone who has applied for insurance on a building that is located in a Special Flood Hazard Area (SFHA) ;
- And the construction or substantial improvement of the building started after December 31, 1974 or on or after the date of the initial Flood Insurance Rate Map (FIRM), whichever is later.

Pre-FIRM vs. Post-FIRM

On or before 12/31/74
or before the original
FIRM date

After 12/31/74 and on or
after the original FIRM date



Federal Emergency Management Agency Community Status Book Report NORTH CAROLINA

Communities Participating in the National Flood Program

CID	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date	Tribal
370165#	ABERDEEN, TOWN OF	MOORE COUNTY	11/30/73	05/15/86	01/02/08	05/15/86	No
370131#	AHOSKIE, TOWN OF	HERTFORD COUNTY	02/22/74	05/01/87	08/03/09(M)	05/01/87	No
370001#	ALAMANCE COUNTY*	ALAMANCE COUNTY	01/03/75	12/01/81	01/02/08	12/01/81	No
370457#	ALAMANCE, VILLAGE OF	ALAMANCE COUNTY	01/03/75	08/15/90	01/02/08	12/17/87	No
370223#	ALBEMARLE, CITY OF	STANLY COUNTY	12/21/73	12/01/81	06/16/09	12/01/81	No
370398#	ALEXANDER COUNTY*	ALEXANDER COUNTY	06/09/78	02/01/91	07/07/09	02/01/91	No
370004#	ALLEGHANY COUNTY*	ALLEGHANY COUNTY	07/01/77	02/01/04	11/04/09	02/01/04	No
370404#	ALLIANCE, TOWN OF	PAMLICO COUNTY	07/14/78	08/05/85	07/02/04	08/05/85	No
370060#	ANDREWS, TOWN OF	CHEROKEE COUNTY	03/08/74	02/01/85	04/19/10	02/01/85	No
370522#	ANGIER, TOWN OF	HARNETT COUNTY		04/16/90	07/17/07	02/03/00	No
370284#	ANSON COUNTY *	ANSON COUNTY	07/15/77	06/18/90	10/16/08	06/18/90	No
370467#	APEX, TOWN OF	WAKE COUNTY		03/03/92	04/16/07	03/20/92	No
370273#	ARCHDALE, CITY OF	GUILFORD COUNTY/RANDOLPH COUNTY	03/01/74	07/16/81	03/16/09	07/16/81	No
370462#	ARCHER LODGE, TOWN OF	JOHNSTON COUNTY		12/02/05	12/02/05	05/06/14	No
370007#	ASHE COUNTY *	ASHE COUNTY	01/03/75	08/16/88	12/03/09	08/16/88	No

<http://www.fema.gov/cis/NC.pdf>



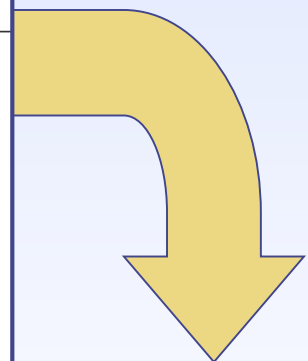
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Determine Policy Premiums

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

- 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.
- C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
- Benchmark Utilized: _____ Vertical Datum: _____
- Indicate elevation datum used for the elevations in items a) through h) below. NGVD 1929 NAVD 1988 Other/Source: _____
 Datum used for building elevations must be the same as that used for the BFE.
- Check the measurement used.
- a) Top of bottom floor (including basement, crawlspace, or enclosure floor) _____ feet meters
 - b) Top of the next higher floor _____ feet meters
 - c) Bottom of the lowest horizontal structural member (V Zones only) _____ feet meters
 - d) Attached garage (top of slab) _____ feet meters
 - e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) _____ feet meters
 - f) Lowest adjacent (finished) grade next to building (LAG) _____ feet meters
 - g) Highest adjacent (finished) grade next to building (HAG) _____ feet meters
 - h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____ feet meters



Elevation of Lowest Floor Above or Below BFE ¹	One Floor, No Basement/Encl		More than One Floor, No Basement/Encl		More than One Floor, With Basement/Encl		Manufactured (Mobile) Home ²	
	1-4 Family	Other Residential & Non-Residential	1-4 Family	Other Residential & Non-Residential	1-4 Family	Other Residential & Non-Residential	Single Family	Non-Residential
+4	.24 / .08	.20 / .08	.24 / .08	.20 / .08	.24 / .08	.20 / .08	.24 / .08	.20 / .08
+3	.24 / .08	.20 / .08	.24 / .08	.20 / .08	.24 / .08	.20 / .08	.25 / .08	.22 / .08
+2	.32 / .08	.25 / .08	.24 / .08	.20 / .08	.24 / .08	.20 / .08	.31 / .08	.25 / .08
+1	.59 / .08	.45 / .10	.38 / .08	.28 / .08	.29 / .08	.22 / .08	.73 / .09	.72 / .08
0	1.08 / .08	.97 / .20	.77 / .08	.59 / .16	.56 / .08	.50 / .16	1.67 / .09	1.62 / .08
-1 ¹	2.70 / 1.00	3.85 / 1.35	2.40 / .90	3.00 / .69	1.35 / .52	1.45 / .74	***	***
-2	***	***	***	***	***	***	***	***

Insurance Rate Comparison

Pre-/Post-FIRM ¹	Dwelling Type & # of Floors	Amount of Coverage Build/Content (in thousands)	Deductible ² Build/Content	Flood Zone	Elevation Difference of Lowest Floor and BFE (Feet)	Cost of Flood Insurance ³ (without HFIAA surcharge)
Post-	Single Family/ One Floor/ No Basement	\$200/\$80	\$1,250/\$1,250	A1-30, AE	+4	\$528
					+3	\$561
					+2	\$649
					+1	\$921
					At BFE	\$1,874
					-1	\$4,376
Post-1981	Single Family/ Without Obstruction	\$200/\$80 ⁵	\$1,250/\$1,250	V1-V30, VE	+4 or more	\$2,752
					+3	\$3,095
					+2	\$4,245
					+1	\$5,795
					At BFE	\$7,356
					-1	\$9,375
Post-1981	Single Family/ With Obstruction	\$200/\$80 ⁵	\$1,250/\$1,250	V1-V30, VE	+4 or more	\$5,114
					+3	\$5,407
					+2	\$6,088
					+1	\$7,039
					At BFE	\$8,537
					-1	\$10,714



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Option 1

Do Nothing

Your discounted rate will increase by up to 18 percent each year.



Option 2

Get an Elevation Certificate

There's no way to know exactly when having an Elevation Certificate will be beneficial, but www.FEMA.gov/cost-of-flood provides some guidance. If you get an Elevation Certificate, you can continue to pay the discounted rate if it's lower.



How to Get an Elevation Certificate

An Elevation Certificate verifies the elevation of your building. Ask if your local floodplain manager if there is one on file. If not, you can hire a licensed surveyor to provide one.



See Your Agent for Your Rate.



Knowing this, you'll know you're getting the best protection at the rate which fits your risk.



Support map amendments & revisions

The Elevation Certificate is used to revise a FEMA flood map by:

- Letter of Map Amendment (LOMA)
 - ◆ Changes the flood zone of a specific property.
- Letter of Map Revision (LOMR-F)
 - ◆ Changes the flood zone of a specific property where fill has been placed on the site.

Page 1 of 3		Date: June 03, 2015	Case No.: 15-04-4994A	LOMR-F					
 Federal Emergency Management Agency Washington, D.C. 20472									
LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)									
COMMUNITY AND MAP PANEL INFORMATION			LEGAL PROPERTY DESCRIPTION						
COMMUNITY	TOWN OF CLAYTON, JOHNSTON COUNTY, NORTH CAROLINA		Lots 6148, 6149 and 6150, Riverwood Athletic Club Alpine Valley, Phase 0E2, as shown on the Plat recorded in Plat Book 73, Page 131, in the Office of the Register of Deeds, Johnston County, North Carolina						
	COMMUNITY NO.: 370139		The portions of property are more particularly described by the following metes and bounds:						
AFFECTED MAP PANEL	NUMBER: 372017600J								
	DATE: 12/2/2005								
FLOODING SOURCE: MARKS CREEK; NEUSE RIVER			APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 35.636, -78.436 SOURCE OF LAT & LONG: GOOGLE EARTH PRO DATUM: NAD 83						
DETERMINATION									
LOT	BLOCK/SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)	
6148	--	Riverwood Athletic Club AV, Phase 0E2	433 Swanns Trail	Portion of Property	X (unshaded)	--	--	180.0 feet	
Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equalled or exceeded in any given year (base flood).									
ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)									
LEGAL PROPERTY DESCRIPTION			PORTIONS REMAIN IN THE SFHA						
DETERMINATION TABLE (CONTINUED)			STUDY UNDERWAY						
FILL RECOMMENDATION									
<p>This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the described portion(s) of the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equalled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.</p> <p>This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605.</p>									
 Luis Rodriguez, P.E., Chief Engineering Management Branch Federal Insurance and Mitigation Administration									



North Carolina Emergency Management





Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP AMENDMENT DETERMINATION DOCUMENT (OUT AS SHOWN)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF LUMBERTON, ROBESON COUNTY, NORTH CAROLINA	Lot 13, Section II-B, Cliffridge Subdivision, as described in the North Carolina General Warranty Deed, recorded in Book 1114, Pages 0031 and 0032, in the Office of the Register of Deeds, Robeson County, North Carolina
	COMMUNITY NO.: 372023	
AFFECTED MAP PANEL	NUMBER: 3720030200J	
	DATE: 1/19/2005	
FLOODING SOURCE: MEADOW BRANCH; POLE CAT BRANCH		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 34.642, -78.993 SOURCE OF LAT & LONG: GOOGLE EARTH PRO DATUM: NAD 83

DETERMINATION

LOT	BLOCK/SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS OUTSIDE OF THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)
13	-II-B	Cliffridge	1007 Furman Drive	Structure	X (unshaded)	--	--	--

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

PORTIONS REMAIN IN THE SFHA
STUDY UNDERWAY

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the structure(s) on the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). The subject property is correctly shown outside the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. If the policy has been written using an incorrect zone, it can be endorsed to correct the zone for the current policy year and one prior policy term. Please contact the insurance agent or company involved to request endorsement of the policy. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration



Adding Fill to Raise LAG?



Community's EC Review

Community Officials MUST REVIEW Elevation Certificates before accepting them to ensure:

- **Completeness**
- **Reasonableness/Accuracy**
- **Compliance**

If questions arise, please discuss with the professional for clarification or correction.

Structure will be in violation until proper Finished Construction Elevation Certificate is provided.



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Elevation Certificate Sections

Section A – Property Info

Section B – FIRM Info

Section C – Building Elevation (if BFE determined)

Section D – Survey Certification

Section E – Building Elevation (no BFE)

Section F – Property Owner Certification

Section G – Community Info



North Carolina Emergency Management



Who certifies building elevations?

Surveyor

Engineer

Architect



In order to be rated properly, the insured needs a professional like you to certify the building elevation information.

EC Form Instructions

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

OMB No. 1660-0008
Expiration Date: November 30, 2018

Instructions for Completing the Elevation Certificate

The Elevation Certificate is to be completed by a land surveyor, engineer, or architect who is authorized by law to certify elevation information when elevation information is required for Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, or AR/AO. Community officials who are authorized by law or ordinance to provide floodplain management information may also complete this form. For Zones AO and A (without BFE), a community official, a property owner, or an owner's representative may provide information on this certificate, unless the elevations are intended for use in supporting a request for a LOMA or LOMR-F. Certified elevations must be included if the purpose of completing the Elevation Certificate is to obtain a LOMA or LOMR-F.

The property owner, the owner's representative, or local official who is authorized by law to administer the community floodplain ordinance can complete Section A and Section B. The partially completed form can then be given to the land surveyor, engineer, or architect to complete Section C. The land surveyor, engineer, or architect should verify the information provided by the property owner or owner's representative to ensure that this certificate is complete.



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Sections A1 – A3

SECTION A – PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name <input type="text"/>		Policy Number: <input type="text"/>
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. <input type="text"/>		Company NAIC Number: <input type="text"/>
City <input type="text"/>	State <input type="text"/>	ZIP Code <input type="text"/>
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) <input type="text"/>		

- Complete **all** items, except “For Insurance Company Use”.
- A1. Building Owner’s(s’) Name(s)
- A2. **Building Address** - 911 address of building location.
- A3. The address is a rural route, enter the lot & block numbers, the tax parcel number, the legal description.



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Section A4 – A6

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)

A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: NAD 1927 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 _____

- A4. Building Use - residential, non-residential, an addition to an existing residential or non-residential building, an accessory building (e.g., garage), or other type of structure.
- A5: Latitude / Longitude taken at the front of the building
 - Accurate to 66'
 - NAD 1983
- A6: Photos showing at least front and rear of building
 - Split level requires side photos
 - Detail photos of vents



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Section A7

DIAGRAM 1A

All slab-on-grade single- and multiple-floor buildings (other than split-level) and high-rise buildings, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor is at or above ground level (grade) on at least 1 side.*

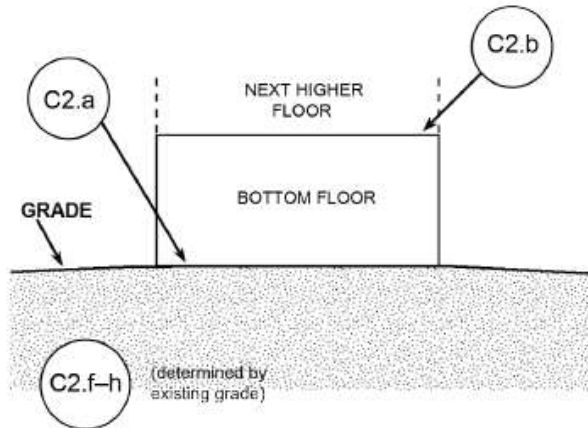


DIAGRAM 1B

All raised-slab-on-grade or slab-on-stem-wall-with-fill single- and multiple-floor buildings (other than split-level), either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor is at or above ground level (grade) on at least 1 side.*

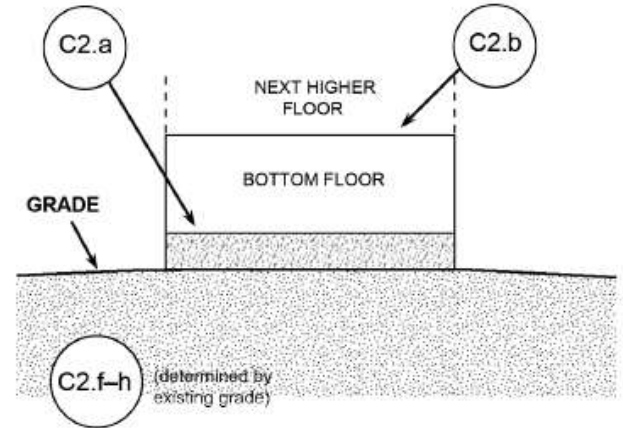


DIAGRAM 2A

All single- and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*

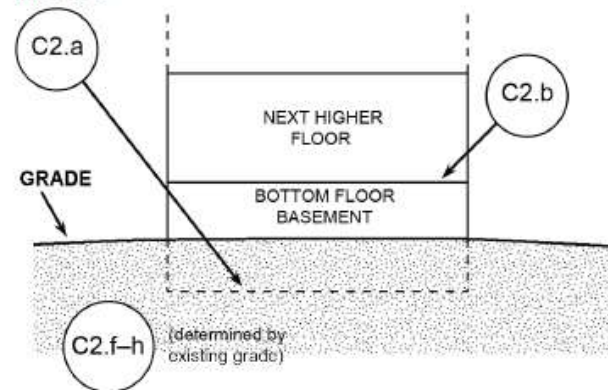
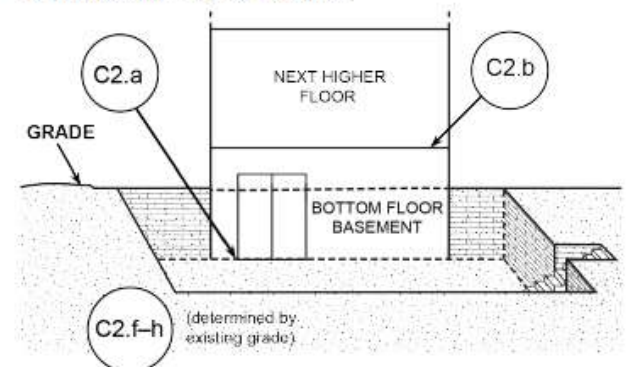


DIAGRAM 2B

All single- and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides; most of the height of the walls is below ground level on all sides; and the door and area of egress are also below ground level on all sides.*



Section A7

DIAGRAM 3

All split-level buildings that are slab-on-grade, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (excluding garage) is at or above ground level (grade) on at least 1 side.*

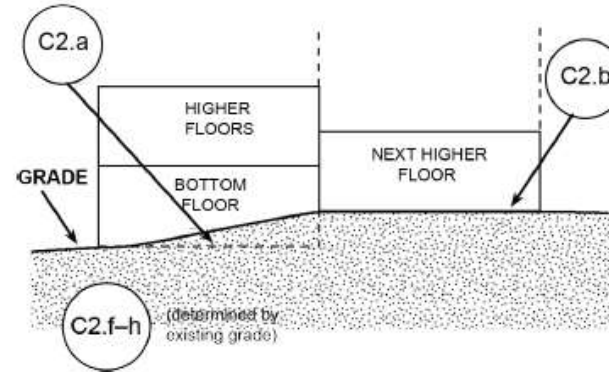


DIAGRAM 4

All split-level buildings (other than slab-on-grade), either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*

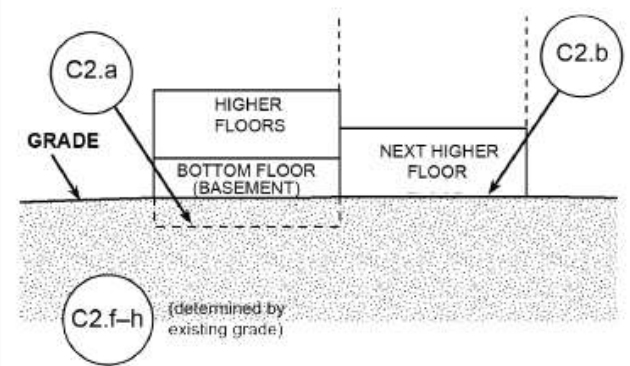


DIAGRAM 5

All buildings elevated on piers, posts, piles, columns, or parallel shear walls. No obstructions below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is open, with no obstruction to flow of floodwaters (open lattice work and/or insect screening is permissible).

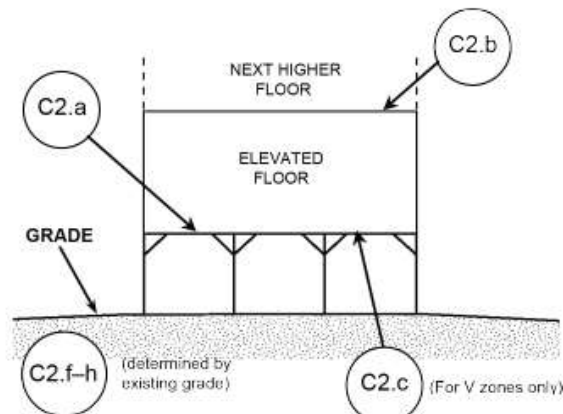
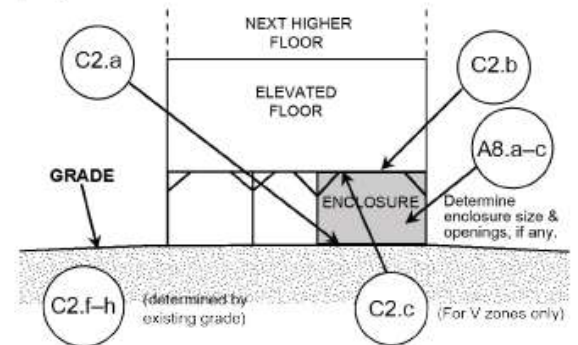


DIAGRAM 6

All buildings elevated on piers, posts, piles, columns, or parallel shear walls with full or partial enclosure below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings** present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.



Section A7

DIAGRAM 7

All buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least 1 side is at or above grade. The principal use of this building is located in the elevated floors of the building.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings** present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.

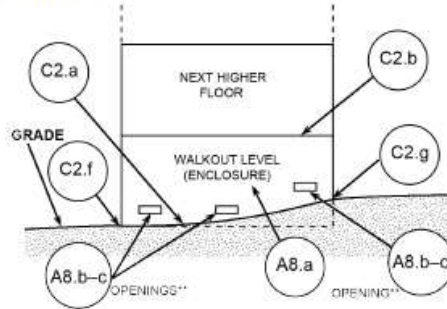


DIAGRAM 8

All buildings elevated on a crawlspace with the floor of the crawlspace at or above grade on at least 1 side, with or without an attached garage.

Distinguishing Feature – For all zones, the area below the first floor is enclosed by solid or partial perimeter walls. In all A zones, the crawlspace is with or without openings** present in the walls of the crawlspace. Indicate information about crawlspace size and openings in Section A – Property Information.

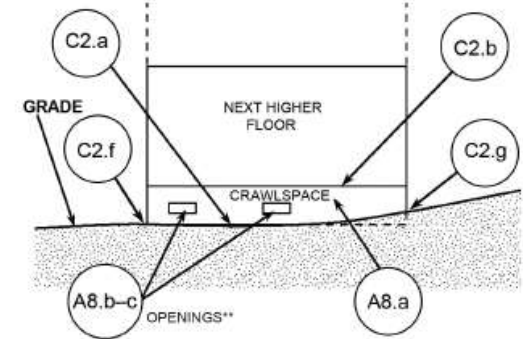
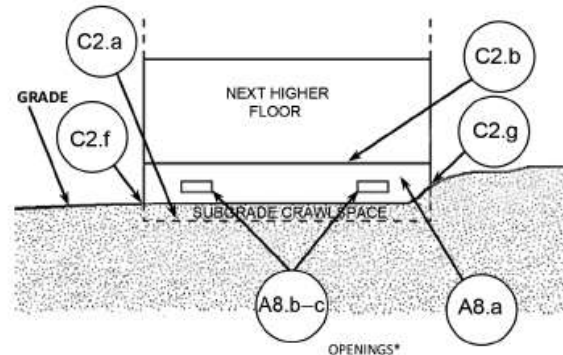


DIAGRAM 9

All buildings (other than split-level) elevated on a sub-grade crawlspace, with or without attached garage.

Distinguishing Feature – The bottom (crawlspace) floor is below ground level (grade) on all sides.* (If the distance from the crawlspace floor to the top of the next higher floor is more than 5 feet, or the crawlspace floor is more than 2 feet below the grade [LAG] on all sides, use Diagram 2A or 2B.)



Section A8 – A9

A8. For a building with a crawlspace or enclosure(s):

- a) Square footage of crawlspace or enclosure(s) sq ft
- b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade
- c) Total net area of flood openings in A8.b sq in
- d) Engineered flood openings? Yes No

A9. For a building with an attached garage:

- a) Square footage of attached garage sq ft
- b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade
- c) Total net area of flood openings in A9.b sq in
- d) Engineered flood openings? Yes No

- In Zones A & AE, fully enclosed areas below the lowest floor shall be designed to automatically equalize hydrostatic flood forces on walls by allowing for the entry & exit of floodwaters
- To meet this requirement, the openings must be:
 - certified by a registered engineer or architect, **OR**
 - meet or exceed the minimum opening requirements

Section A8c

c) Total net area of flood openings in A8.b sq in

A8.c. Calculate 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.

If the net area cannot be calculated, provide the size of the flood openings without consideration of any covers & indicate in the Comments area the type of cover that exists in the flood openings.

Section A8d

d) Engineered flood openings? Yes No

- A8.d. Engineered flood openings. 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.

FEMA Technical Bulletin 1: "Openings in Foundation Walls and Walls of Enclosures"



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Standards for Elevation on Perimeter Wall Foundations

- In Zones A & AE, fully enclosed areas below the lowest floor shall be designed to automatically equalize hydrostatic flood forces on walls by allowing for the entry & exit of floodwaters
- To meet this requirement, the openings must be:
 - certified by a registered engineer or architect,
OR
 - meet or exceed the minimum opening requirements



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Hydrostatic Openings

Permanent Opening in a Wall that Allows the Free Passage of Water in Both Directions, **AUTOMATICALLY**, without Human Intervention.

A Window, a Door, or a Garage Door is **NOT** Considered an Opening.



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Minimum Requirements for Foundation Openings

- Minimum of two openings on different sides of each enclosed area.
- The total net area of all openings must be at least one (1) square inch for each square foot of enclosed area.
- The bottom of all required openings shall be no higher than one foot above the adjacent grade at each opening.
- Openings may be equipped with screens, louvers, or other "automatic" coverings or devices, provided they permit the automatic flow of floodwaters in both directions.



North Carolina Emergency Management



FEMA Elevation Certificate

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.



North Carolina Emergency Management



R322.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
 - 2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
 - 2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, **or** the openings shall be designed and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.6.2.2 of ASCE 24.
 - 2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
 - 2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
 - 2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
 - 2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Net area?





1 foot?



This looks like 1 foot or less.

This looks like 1 foot
or less.





This is compliant



Plexiglas cover. This is a violation!!



Spray foam insulation. This is a violation!!









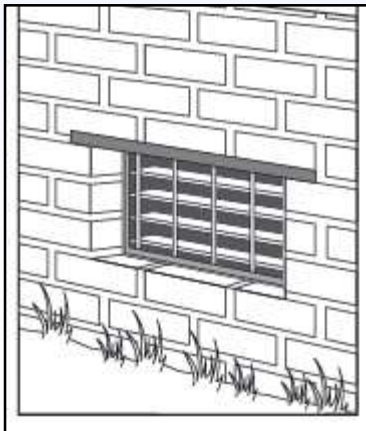
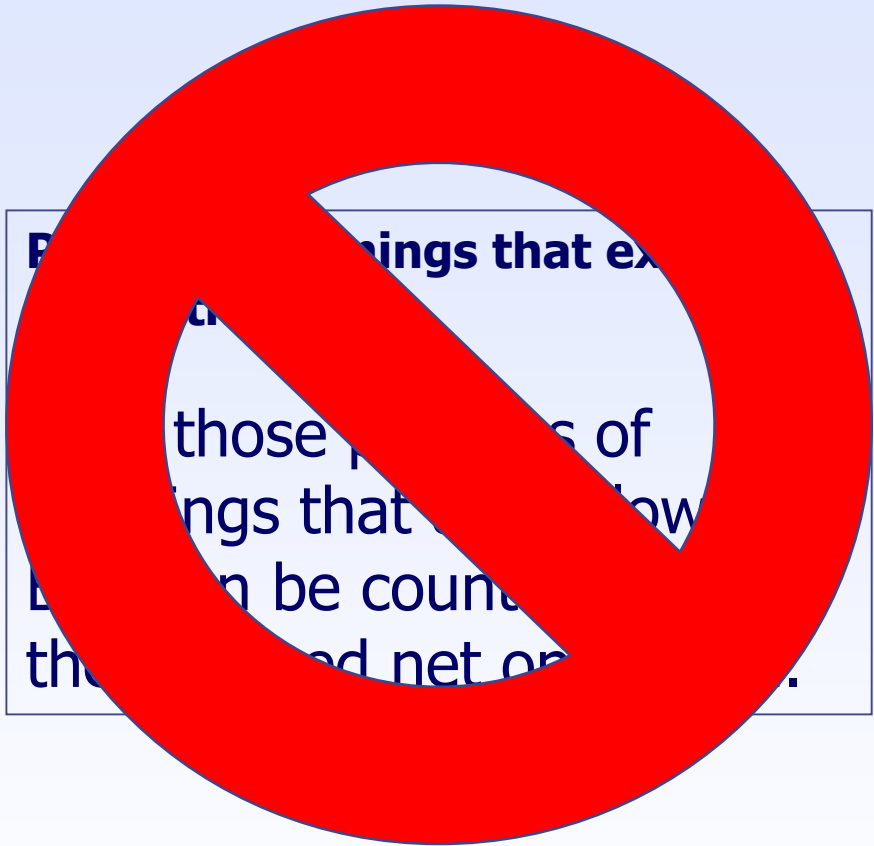
Openings in Foundation Walls and Walls of Enclosures

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

Technical Bulletin 1 / August 2008



Openings that ex
those p
ings that
n be coun
ed net or



North Carolina Emergency Management



Engineered Openings/Vents

Plastic - No Rust or Rot Crawspace Flood Vent for Homes (New Construction & Replacement)

Easy Access • Modular Use • Can Be Painted

Model Number	Opening Sizes (R/W)	Non Eng. (Sq. In.)	Eng. (Sq. In.)	Net-Free Air (Sq. Ft.)
D0816	8" X 16"	120	230	95
D1220	12" X 20"	240	425	175
D1232	12" X 32"	380	705	290
D1616	16" X 16"	255	485	200
D1624	16" X 24"	380	695	285
D1632	16" X 32"	510	955	385
D2032	20" X 32"	640	1,225	505
D2424	24" X 24"	575	1,065	455
D2436	24" X 36"	860	1,620	665



Flood Vent (No Cover)

One-piece ventplate with easy to insert vermin screen and fixed louver. Made of durable PVC/ABS plastic (no rust or rot) with a UV retardant treatment.

FEMA compliant. No cover to allow the automatic entry and exit of floodwaters.

Quick and easy to install.




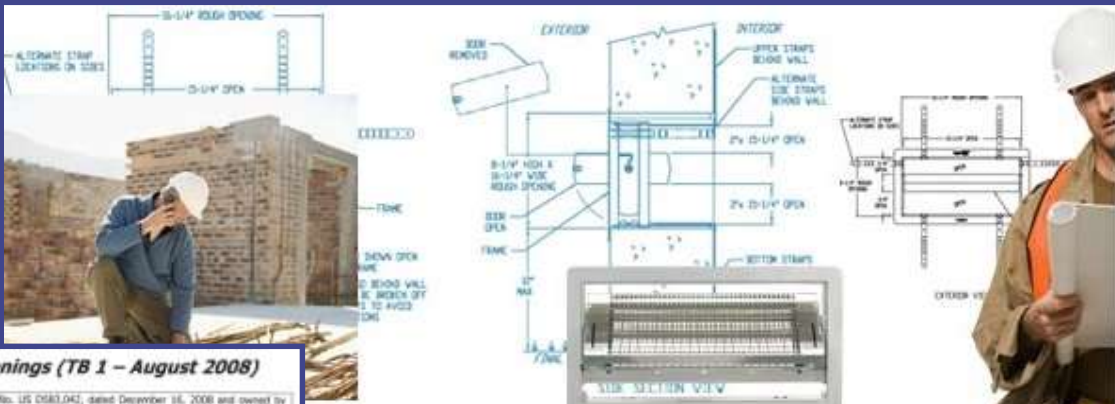
3700 Shore Drive, Virginia Beach, VA 23455
757.363.0005 • 1.800.230.9598 • www.crawlspacedoors.com



Model	Opening Size	Non-Eng. (Sq. In.)	Eng. (Sq. In.)	Net-Free Air (Sq. Ft.)
D0816	8" X 16"	120	230	95
D1220	12" X 20"	240	425	175
D1232	12" X 32"	380	705	290
D1616	16" X 16"	255	485	200
D1624	16" X 24"	380	695	285
D1632	16" X 32"	510	955	385
D2032	20" X 32"	640	1,225	505
D2424	24" X 24"	575	1,065	455
D2436	24" X 36"	860	1,620	665

Each individual opening, end air louvers, screens, or other covers, shall be...
 Signature: *Scott H. ...*
 Title: PRESIDENT, ANGE ENGINEERING P.C.
 Type of License: PROFESSIONAL ENGINEER
 License Number: 247740
 Seal: PROFESSIONAL ENGINEER, CIVIL, STATE OF NORTH CAROLINA, No. 247740, EXPIRES 12/31/2018

SMART VENT

FEMA ACCEPTED
ICC-ES EVALUATED

Flood Openings (TB 1 - August 2008)

GOOD LOUVER, Patent No. US 6,843,042, dated December 16, 2008 and owned by and issued in accordance with Federal Emergency Management Agency's National Flood Insurance Program, Technical Bulletin (TB) 1-August 2008 will allow for exterior walls by allowing for entry and exit of floodwater during floods up to...

Intersect, Net-Free Air and Engineered Opening size for each model and size of the opening in the table below. The Engineered size opening calculation was performed using the Foundation Walls for Buildings Located in Special Flood Hazard Areas in 1981 and ABC/SEI 24-05, Flood Resistance Design and Construction. I measured the net-free air for the Non-Engineered and Net-Free Air opening size for each model. Aug 2008 to determine the Engineered opening size for each model. I used the required (m); 0.033 = coefficient corresponding to a factor of safety of 5.0 (2 - 2" rectangular, long axis horizontal, short axis vertical unobstructed during design between the louvers); R = 5 R/hr worst case rate of rise and fall, and A2 = 1 R2

$0.033 [1.046] S = .4125 \text{ in}^2$
 $D0816: .95 / .4125 = 230$

Engineered (Sq. Ft.)	Non-Free Air (Sq. In.)	Engineered (Sq. In.)
120	95	230
240	175	425
380	290	705
255	200	485
380	285	705
510	385	955
640	505	1,225
575	455	1,065
860	665	1,620

Smart Vent
877-441-8368
www.smartvent.com

DETAIL DIAGRAM MODEL 1540-520 FLOOD VENT INSULATED

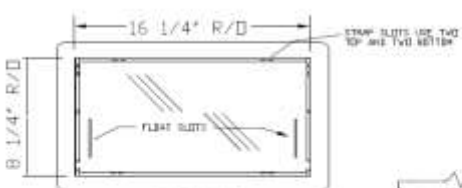


FIGURE 1 Front View

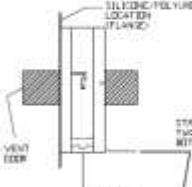


FIGURE 2 Side View





FIGURE 3 Side View



STRAP DETAIL: TEETH MUST CLICK IN TIGHT TO INSURE SECURE INSTALLATION. BRACE MUST BE PUSHED BACK.

877-441-8368
www.smartvent.com

SMART VENT Foundation Flood Vents
 1540-520 Insulated
 FLOOD VENT INSULATED
 MODEL 1540-520
 1540-520

Section A9

A9. For a building with an attached garage:

- a) Square footage of attached garage sq ft
- b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade
- c) Total net area of flood openings in A9.b sq in
- d) Engineered flood openings? Yes No

- Same as Section A8, but for garage when the garage is attached to the building.
- Use the Comments area on page 2 or attach additional comments, as needed.

Building Photographs

ELEVATION CERTIFICATE			BUILDING PHOTOGRAPHS			OMB No. 1660-0008 Expiration Date: November 30, 2018		
IMPORTANT: In these spaces, copy the corresponding information from Section A.						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		
<p>If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A8. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.</p>								
<i>Right side view of the building to be insured</i>						<i>Date the photograph was taken</i>		
Photo One								
Photo One Caption			Clear Photo One					
<i>Left side view of the building to be insured</i>						<i>Date the photograph was taken</i>		
Photo Two								
Photo Two Caption			Clear Photo Two					

(A6) An additional form for attaching photographs is provided with the new Elevation Certificate.

- 3"x3" color photographs
- Digital is acceptable
- At least two photographs showing front and rear of building
- If building is split- or multi-level, at least 2 additional photographs are needed
- Helpful to show the lowest level of the building that is above grade.



Emergency Management



Building Photographs

ELEVATION CERTIFICATE			BUILDING PHOTOGRAPHS		OMB No. 1660-0008 Expiration Date: November 30, 2018
			See Instructions for Item A8.		
IMPORTANT: In these spaces, copy the corresponding information from Section A.			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		
<p>If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A8. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.</p>					
<i>Right side view of the building to be insured</i>		Photo One	<i>Date the photograph was taken</i>		
Photo One		Clear Photo One			
<i>Left side view of the building to be insured</i>		Photo Two	<i>Date the photograph was taken</i>		
Photo Two		Clear Photo Two			

- Include the date the photograph was taken
 - ◆ Must be taken within 90 days from the date of certification
- Photographs should capture key elements such as flood openings



Emergency Management



Section B

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/Source: _____

B11. Indicate elevation datum used for BFE in Item B9: NGVD 1929 NAVD 1988 Other/Source: _____

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

Designation Date: _____ CBRS OPA



North Carolina Emergency Management



Section B1-9

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
<input type="text"/>		<input type="text"/>		<input type="text"/>	
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)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- Complete the Elevation Certificate on the basis of the **FIRM in effect at the time of the certification.**
- Additional &/or preliminary data may be provided in Comments Section.



North Carolina Emergency Management



Determining Base Flood Elevation

- Do NOT include freeboard.
- FRIS is your best source in North Carolina.
- FIRM can be used on coastal or lacustrine areas with whole-foot BFEs.
 - Confirm the stillwater elevation in the FIS, which may be up to 0.5' higher.
- AO Zones indicate DEPTH, not BFE.
- For River Profiles, read the 1% Annual-Chance or 100-Year Flood Level
- In Zone X, BFE = N/A



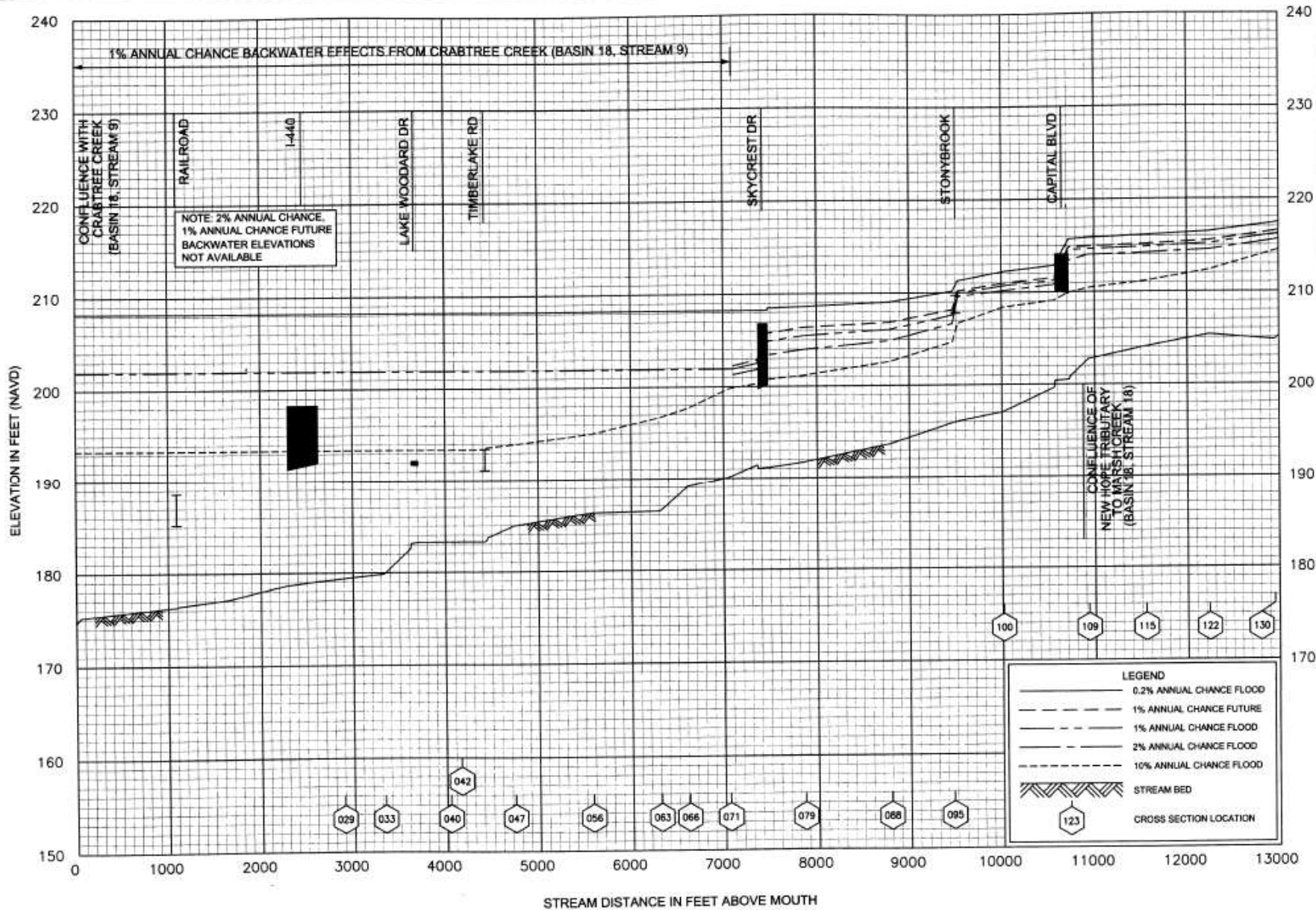
North Carolina Emergency Management



BFE in Backwater Area



FIS Profile



FLOOD PROFILES

MARSH CREEK (BASIN 18, STREAM 17)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAKE COUNTY, NC
AND INCORPORATED AREAS

FIS Profile



**250 Feet
Upstream of
XS 047**



Sections B10-B12

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/Source: _____

B11. Indicate elevation datum used for BFE in Item B9: NGVD 1929 NAVD 1988 Other/Source: _____

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

Designation Date: _____ CBRS OPA

- B10. Check the box for source of BFE data. These are listed in the order of preference. If the flooding source is riverine, the "FIS Profile" box should be selected.
- B11. Check the box for elevation datum used in Item B9. NC maps currently use NAVD 1988.
- B12. Indicate whether or not the building is located in a Coastal Barrier Resource System (CRBS) or Otherwise Protected Area (OPA). Enter the designation date & check "CBRS" or "OPA".



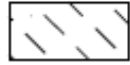
North Carolina Emergency Management



Coastal Barrier Resource System



COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS



OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

COASTAL BARRIER LEGEND

11-16-91 Otherwise Protected Area

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES – NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1991 – NOT USED IN A MANNER CONSISTENT WITH THE PURPOSE OF THE OTHERWISE PROTECTED AREAS.

Comments or concerns regarding the Coastal Barrier Resources System or Otherwise Protected Areas should be directed to the Coastal Barrier Coordinator at the U.S. Fish and Wildlife Service; (404) 679 -7106.

Federal flood insurance is prohibited in designated CBRS areas or OPAs for buildings or manufactured (mobile) homes built or substantially improved after the date of the CBRS or OPA designation. Information about CBRS areas & OPAs may be obtained on the FEMA web site at:
<http://www.fema.gov/business/nfip/cbrs/cbrs.shtm>



North Carolina Emergency Management



Coastal Barrier Resource System

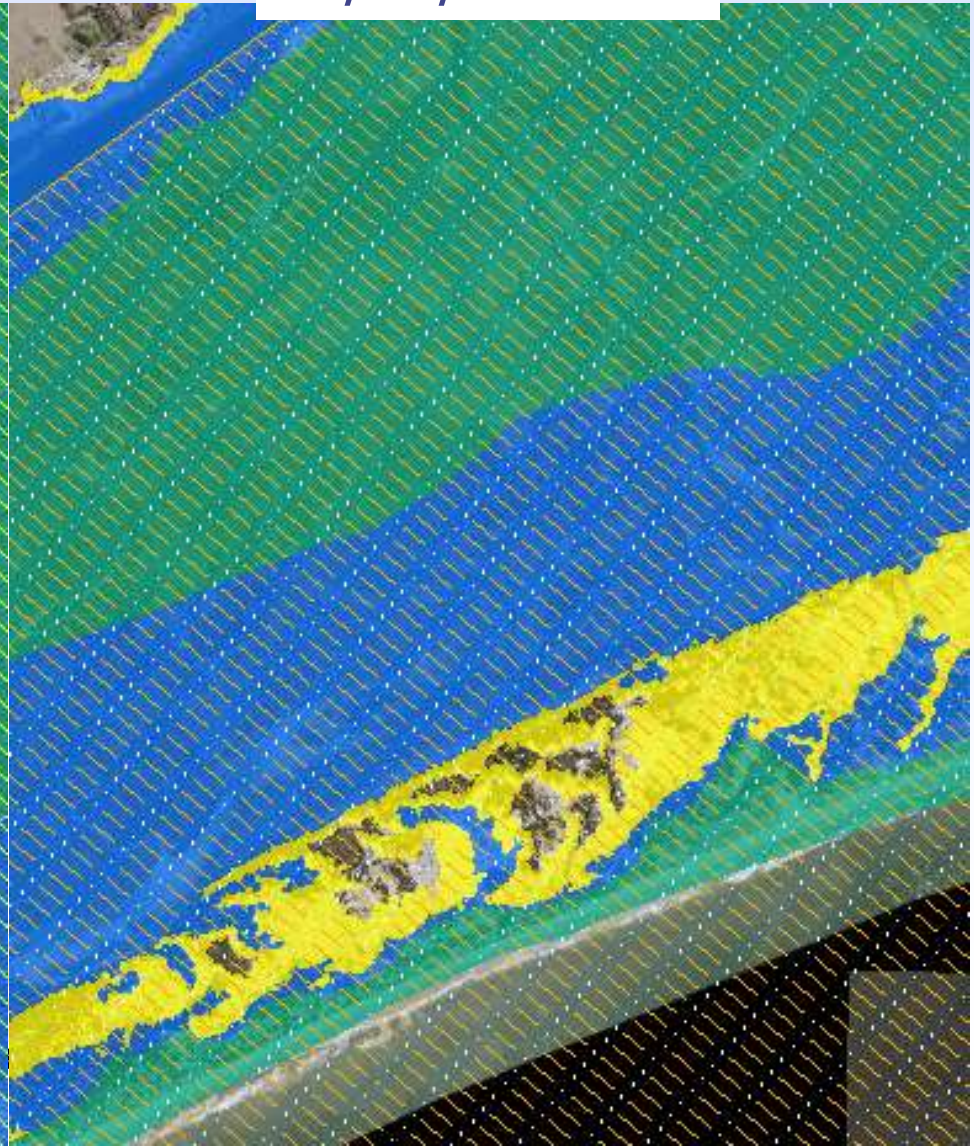
CBRS

10/01/1983



OPA

11/16/1991



Complete Two Ways

Either:

- SFHA Zone **with BFEs** Determined
 - Sections C & D

- SFHA Zone **with No BFE** Determined
 - Is rare in Eastern NC



North Carolina Emergency Management



Section C (Zone has BFE)

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.

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: _____ Vertical Datum: _____

Indicate elevation datum used for the elevations in items a) through h) below.

NGVD 1929 NAVD 1988 Other/Source: _____

Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

- | | | | |
|---|-------|-------------------------------|---------------------------------|
| a) Top of bottom floor (including basement, crawlspace, or enclosure floor) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| b) Top of the next higher floor | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| c) Bottom of the lowest horizontal structural member (V Zones only) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| d) Attached garage (top of slab) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| e) Lowest elevation of machinery or equipment servicing the building
(Describe type of equipment and location in Comments) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| f) Lowest adjacent (finished) grade next to building (LAG) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| g) Highest adjacent (finished) grade next to building (HAG) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| h) Lowest adjacent grade at lowest elevation of deck or stairs, including
structural support | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |

Section C1

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.

- Item C1. The elevations to be entered in this section are based on **construction drawings, a building under construction, or finished construction.**
- Use the Comments area of Section D as needed.
- “Finished Construction” is only when all machinery &/or equipment (furnaces, hot water heaters, heat pumps, air conditioners, elevators & their associated equipment) have been installed & the grading around the building is completed.



North Carolina Emergency Management



Section C2

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: _____ Vertical Datum: _____

Indicate elevation datum used for the elevations in items a) through h) below.

NGVD 1929 NAVD 1988 Other/Source: _____

Datum used for building elevations must be the same as that used for the BFE.

- A field survey is required for Items C2.a-h.
- Enter the Benchmark Utilized. Provide the PID or other unique identifier assigned by the maintainer of the benchmark. For GPS survey, indicate the benchmark used for the base station, the Continuously Operating Reference Stations (CORS) sites used for an On-line Positioning User Service (OPUS) solution (attach the OPUS report), or the name of the Real Time Network used.
- Note the Vertical Datum. All elevations for the certificate **must** use the same datum on which the BFE is based.



North Carolina Emergency Management



Bench Marks

BM5510 ×

North Carolina Geodetic Survey bench mark

BM5510 ⊗

National Geodetic Survey bench mark

BM5510 ⊠

Contractor bench mark (approved by NCGS)

- Identified by their NSRS Permanent Identifier (PID)
 - To access current Bench Mark elevation, description, & location information, go to:
 - NC Geodetic Survey website: www.ncgs.state.nc.us
- Or
- National Geodetic Survey website: www.ngs.noaa.gov



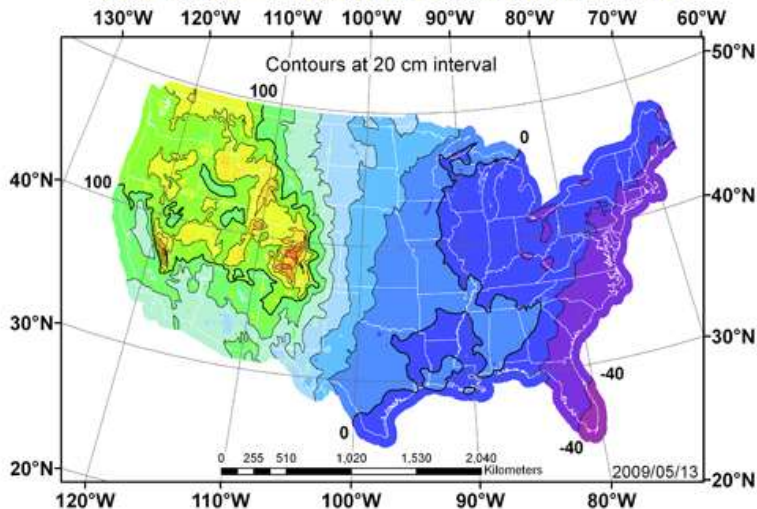
North Carolina Emergency Management



Datum Conversion

VERTCON

NAVD 88 minus NGVD 29 Datum Shift Contours



North Carolina

Orthometric Height Conversion

Orthometric height conversion is performed by calculating the [datum shift](#) based from modeled values. The resulting datum shift is displayed.

The converted orthometric height is displayed only if the height to be converted from was not left blank. ***** See input format details below *****

Latitude and Longitude within the Contiguous United States are REQUIRED:

Positions may be entered in any of the following three formats:

1. degrees, minutes and decimal seconds (including leading zeros)

Lon: (XXXX XX.XXX)	Lat: (XX XX.XXX)
Lon: 098 33 23.232 good	Lat: 45 33 23.232 good
Lon: 98 33 23.232 bad	Lat: 5 33 23.232 bad
Lon: 098 03 23.342 good	Lat: 45 03 03.232 good
Lon: 098 3 23.342 bad	Lat: 45 3 3.232 bad

2. degrees and decimal minutes (including leading zeros)

Lon: (XXXX XX.XXX)	Lat: (XX XX.XXX)
Lon: 098 23.232 good	Lat: 45 33.232 good
Lon: 98 23.232 bad	Lat: 5 23.232 bad
Lon: 098 03.342 good	Lat: 45 03.232 good
Lon: 098 3.342 bad	Lat: 45 3.232 bad

3. decimal degrees (including leading zeros)

Lon: (XXXX.XXX)	Lat: (XX.XXX)
Lon: 098.232 good	Lat: 45.232 good
Lon: 98.232 bad	Lat: 5.232 bad

Note: There MUST be one or more blanks between entry fields

Decimals can be keyed commensurate with the field's precision, but are not required

Orthometric Height to be converted FROM is OPTIONAL:

Height may be entered in either meters or U.S. survey feet:

1. meters: XXXX.XXX
2. feet : XXXX.XX FT (MUST include FT or ft for feet !)

ENTER North Latitude :.....

ENTER West Longitude :.....

ENTER Orthometric Height : -- Entry is Optional; Default units (meters) --

SELECT Vertical Datum :... NGVD 29 NAVD 88 -- of the entered height --

Section C2.a-d

		Check the measurement used.	
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
b) Top of the next higher floor	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
d) Attached garage (top of slab)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters

- Items C2.a-c. Enter the building elevations (excluding the attached garage) indicated by the selected building diagram (Item A7).
- If there is an attached garage, enter the elevation for top of attached garage slab in Item C2.d.
- If any item does not apply to the building, enter "N/A" for not applicable.

Section C2.a-d

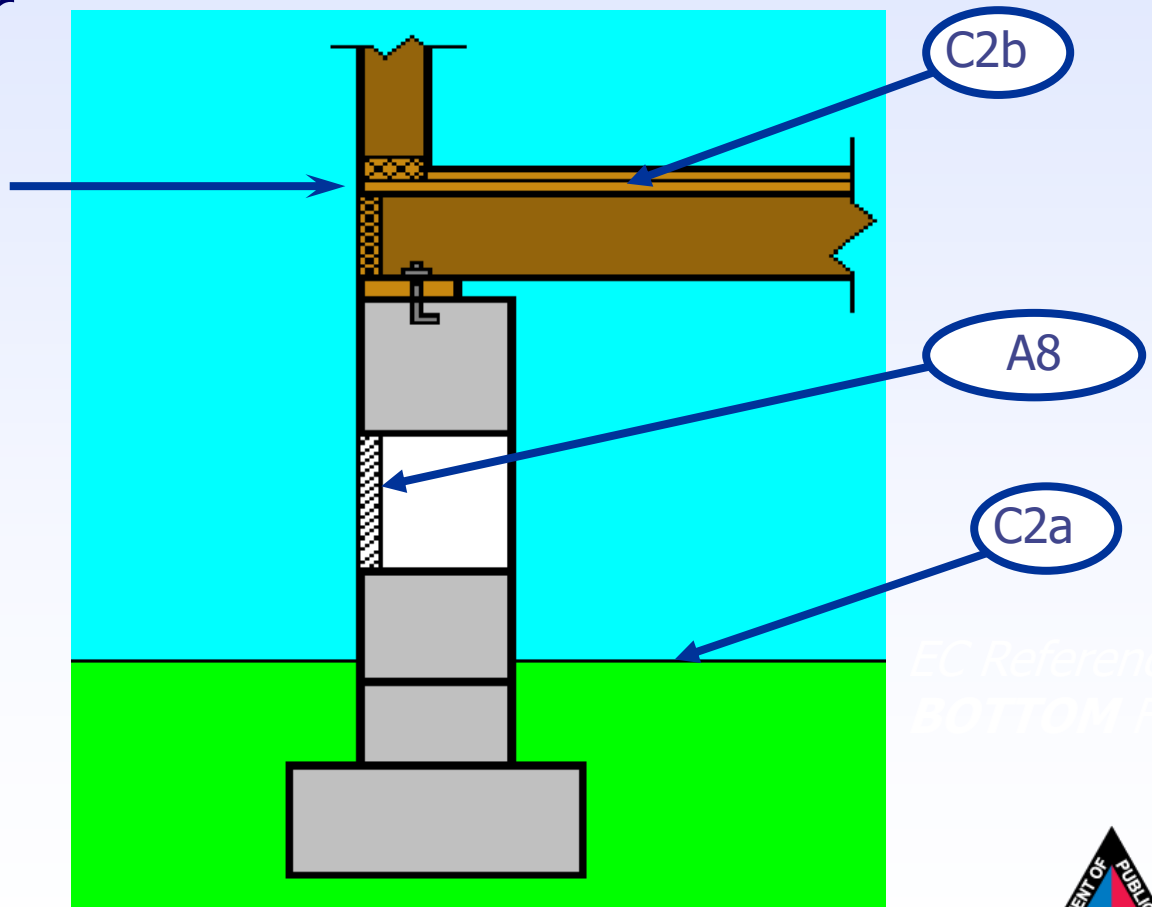
Check the measurement used.

a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
b) Top of the next higher floor	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
d) Attached garage (top of slab)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters

- For buildings in **A** zones: elevations should be measured at the **top of the floor**.
- For buildings in **V** zones: Item C2.c. Elevation c must be measured at **the bottom of the lowest horizontal structural member of the floor**.
- For buildings elevated on a crawlspace enter the elevation of the top of the crawlspace floor in Item C2.a, whether or not the crawlspace has permanent flood openings (flood vents).

Lowest Floor in ZONE A, AE, AH & A1-30

The lowest floor is measured at the top of the sub-floor, slab or grade for regulatory and flood insurance purposes



EC References to BOTTOM Floor

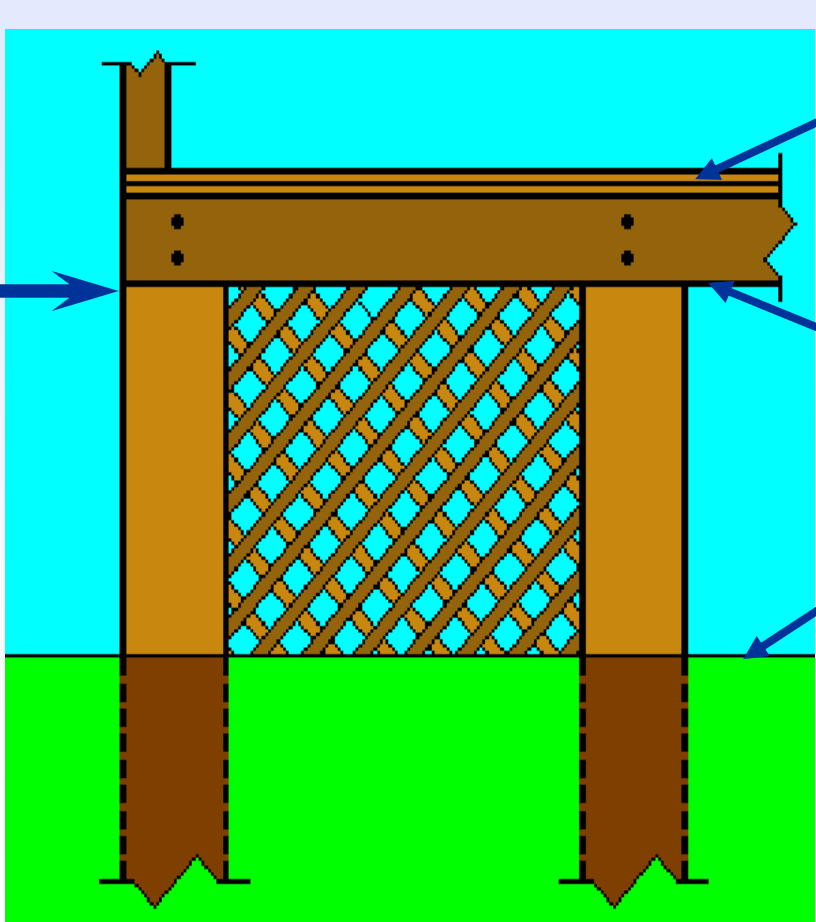


North Carolina Emergency Management



Lowest Floor in ZONE V, & VE

Bottom of the lowest horizontal structural member supporting the lowest floor



C2a

EC References to **BOTTOM** Floor

C2c

C2a*

*If solid enclosure below BFE as in Diagram 6

Section C (Zone has BFE)

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.

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: _____ Vertical Datum: _____

Indicate elevation datum used for the elevations in items a) through h) below.

NGVD 1929 NAVD 1988 Other/Source: _____

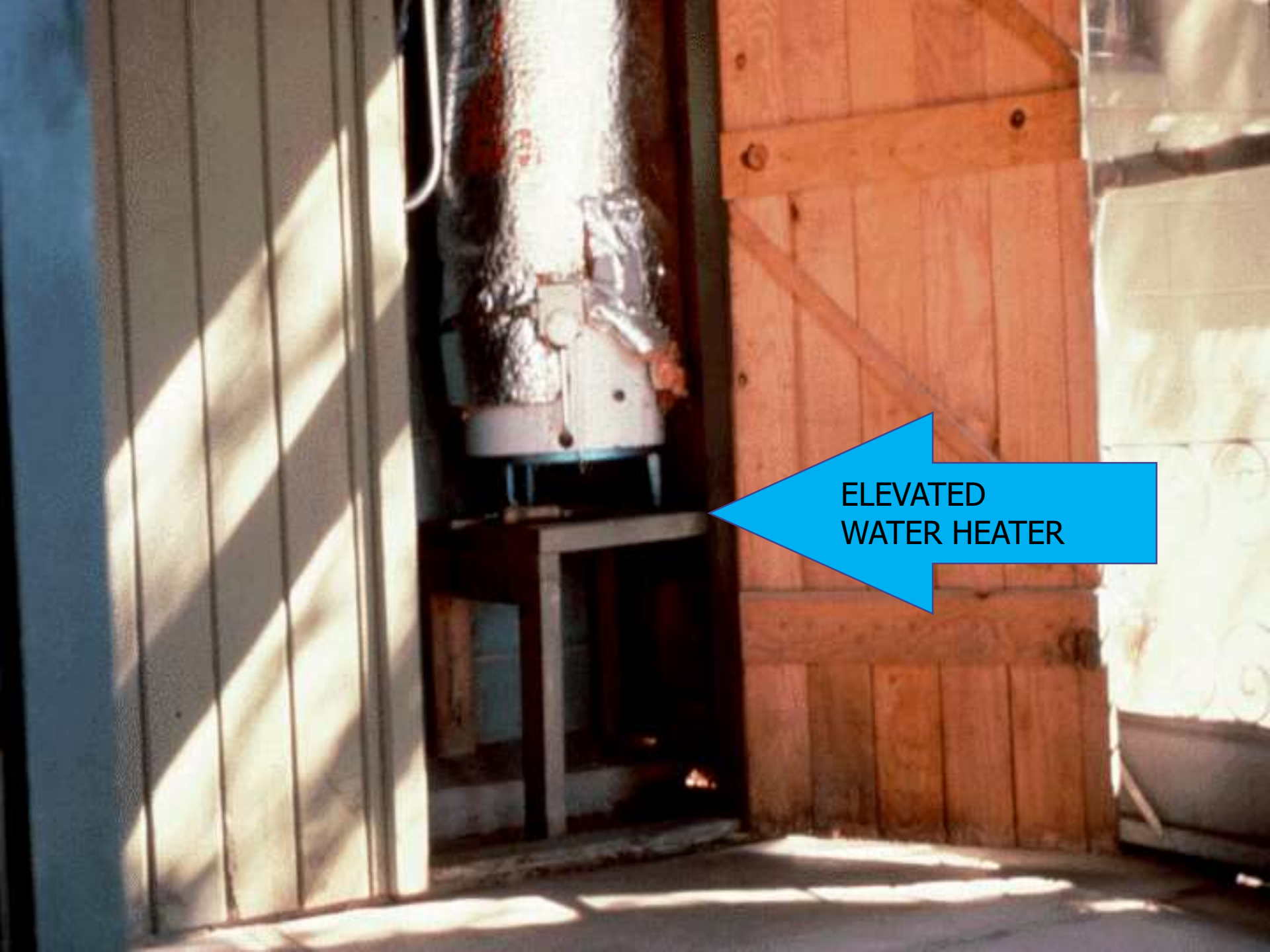
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

- | | | | |
|---|-------|-------------------------------|---------------------------------|
| a) Top of bottom floor (including basement, crawlspace, or enclosure floor) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| b) Top of the next higher floor | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| c) Bottom of the lowest horizontal structural member (V Zones only) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| d) Attached garage (top of slab) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| e) Lowest elevation of machinery or equipment servicing the building
(Describe type of equipment and location in Comments) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| f) Lowest adjacent (finished) grade next to building (LAG) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| g) Highest adjacent (finished) grade next to building (HAG) | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support | _____ | <input type="checkbox"/> feet | <input type="checkbox"/> meters |



ELEVATED
AIR CONDITIONER



ELEVATED
WATER HEATER



ELEVATED
ELECTRIC METERS

- Compliant: elevated equipment and ducts; anchored tank







North Carolina Emergency Management





North Carolina Emergency Management



Section C2.f-h

f) Lowest adjacent (finished) grade next to building (LAG)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<input type="text"/>	<input type="checkbox"/> feet	<input type="checkbox"/> meters

- Item C2.f. Enter the lowest elevation of the ground, sidewalk, or patio slab immediately next to the building.
- Item C2.g. Enter the highest elevation of the ground, sidewalk, or patio slab immediately next to the building.
- Item C2.h. Enter the lowest grade elevation at the deck support, or stairs.

These measurements must be to the nearest tenth of a foot.

Section D

Official certification required

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

Were latitude and longitude in Section A provided by a licensed land surveyor? Yes No Check here if attachments.

12/31/2006

Certifier's Name

License Number

Title

Company Name

Address

City

State

ZIP Code

Signature

Date



2009 Form:
New, lat/long verification



North Carolina Emergency Management



Section D (cont.)

Signature

Date

Telephone

Ext.

Comments (including type of equipment and location, per C2(e), if applicable)

- *Use this comment section to provide additional information, as appropriate.*
- *USE....USE.....USE*



North Carolina Emergency Management



Section E

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 1–2 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.

- *Complete this section if the building is located in Zone AO or Zone A (without BFE). Otherwise, complete Section C.*



North Carolina Emergency Management



Section F (if zone has no BFE)

(very rare in Eastern NC)

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.

Address	City	State	ZIP Code
Signature	Date	Telephone	
Comments			

Complete as indicated. This section is provided for certification of measurements taken by a property owner or property owner's representative when responding to Sections A, B, & E. The address entered in this section must be the **actual mailing address** of the property owner or property owner's representative who provided the information on the certificate.



North Carolina Emergency Management



Section G (All Zones)

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number

G5. Date Permit Issued

G6. Date Certificate of
Compliance/Occupancy Issued

- *Community officials can transfer information from a previously certified document.*



North Carolina Emergency Management



Section G (All Zones)

G7. This permit has been issued for: New Construction Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: feet meters Datum

G9. BFE or (in Zone AO) depth of flooding at the building site: feet meters Datum

G10. Community's design flood elevation: feet meters Datum

Local Official's Name Title

Community Name Telephone

Signature Date

Comments (including type of equipment and location, per C2(e), if applicable)



North Carolina Emergency Management



Photographs

BUILDING PHOTOGRAPHS

See Instructions for Item A6.

OMB No. 1660-0008

Expiration Date: November 30, 2018

ELEVATION CERTIFICATE

IMPORTANT: In these spaces, copy the corresponding information from Section A.			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	
If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken: "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." <u>When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.</u>				

**At least 2 color photographs, 3" x 3"
EC requires foundation vent photos**



North Carolina Emergency Management



Question 1

The main purpose of the Elevation Certificates is to certify a building's compliance with local floodplain regulations.

- True
 False



North Carolina Emergency Management



Answer 1

The main purpose of the Elevation Certificates is to certify a building's compliance with local floodplain regulations.

True
 False

The Elevation Certificate is mainly used by the insurance company to rate the building for flood insurance.



North Carolina Emergency Management



Question 2

The elevation data recorded in Section C must be certified by a surveyor, engineer, or architect (as allowed by state law).

- ___ True
___ False



North Carolina Emergency Management



Answer 2

The elevation data recorded in Section C must be certified by a surveyor, engineer, or architect (as allowed by state law).

True
 False

*In **NC** must be a Surveyor for a Building Under Construction or Finished Construction.*



North Carolina Emergency Management



Question 3

Before accepting an Elevation Certificate, a community official should carefully review all the data entries to ensure it was filled out correctly.

- True
 False



North Carolina Emergency Management



Answer 3

Before accepting an Elevation Certificate, a community official should carefully review all the data entries to ensure it was filled out correctly.

True
 False



North Carolina Emergency Management



Question 4

If a building does not have permanent flood openings, Items A8 and A9 should be left blank.

- ___ True
___ False

Answer 4

If a building does not have permanent flood openings, Items A8 and A9 should be left blank.

 True
 X False

The surveyor must enter N/A



North Carolina Emergency Management



Question 5

Always use the outside grade when determining the bottom of the vent is within the 1 foot.

___ *True*
___ *False*



North Carolina Emergency Management



Answer 5

Always use the outside grade when determining the bottom of the vent is within the 1 foot.

 True
 X False

Must be no more than 1.0 foot above the higher of the exterior or interior grade.



North Carolina Emergency Management



Question 6

A "0" for Item C2e indicates that there is no machinery or equipment servicing the building.

- ___ *True*
___ *False*



North Carolina Emergency Management



Answer 6

A "0" for Item C2e indicates that there is no machinery or equipment servicing the building.

True

False

The Surveyor must enter N/A

Use comments please!



North Carolina Emergency Management

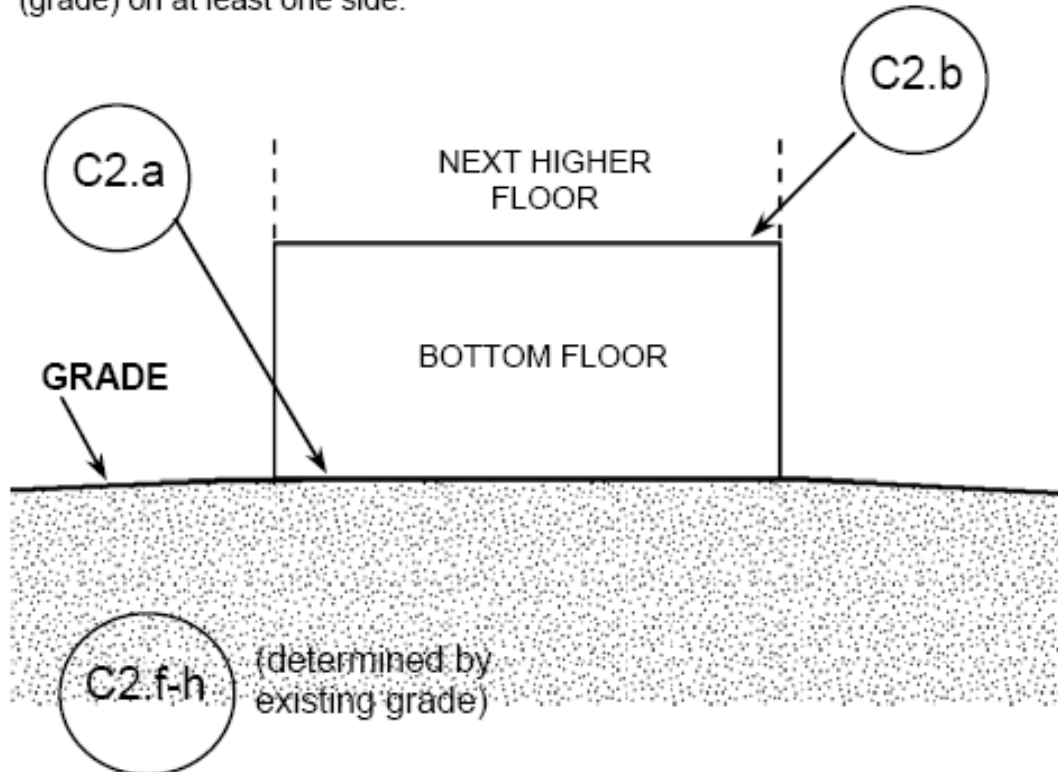


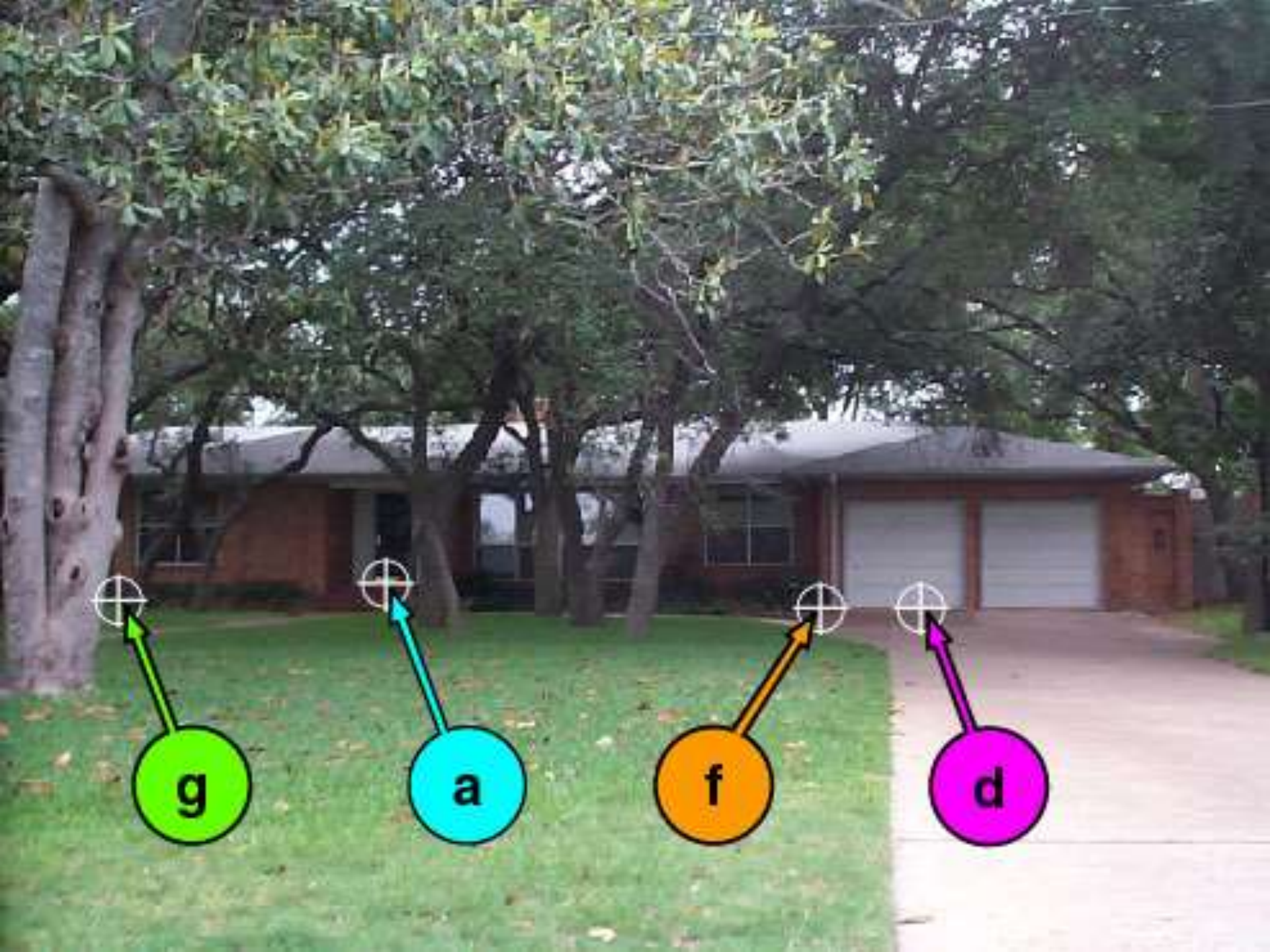
Building Diagram 1A

DIAGRAM 1A

All slab-on-grade single- and multiple-floor buildings (other than split-level) and high-rise buildings, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor is at or above ground level (grade) on at least one side.*





g



a

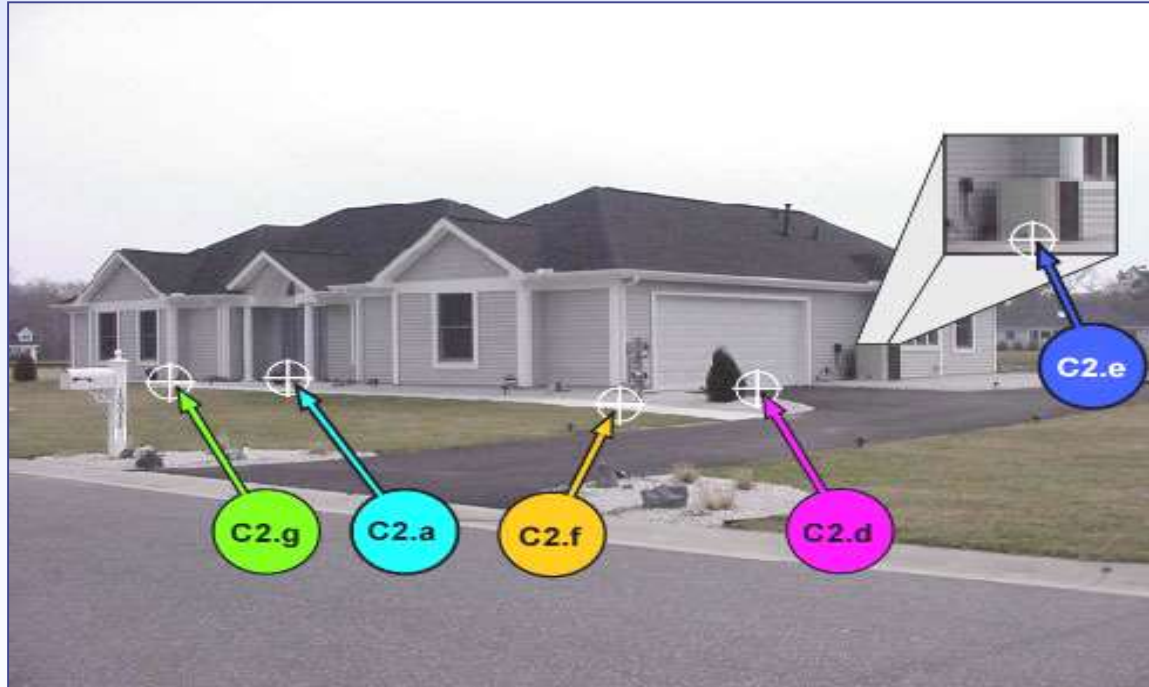


f



d

Slab-on-grade one-story building with attached garage

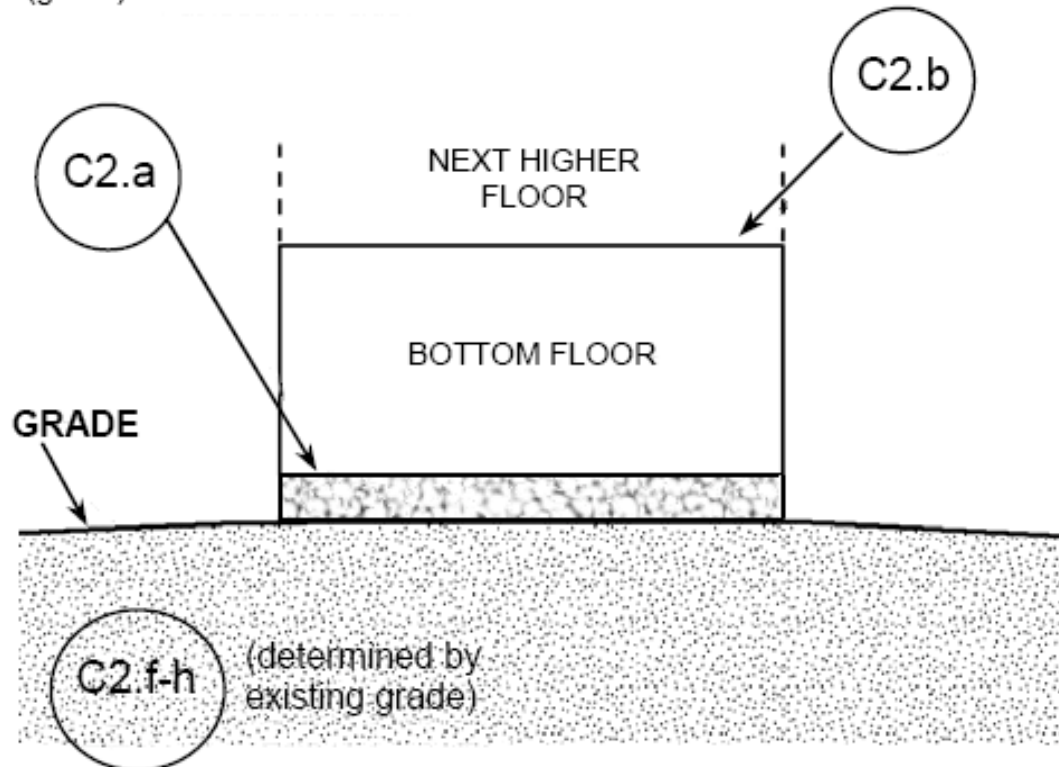


Building Diagram 1B

DIAGRAM 1B

All raised-slab-on-grade or slab-on-stem-wall-with-fill single- and multiple-floor buildings (other than split-level), either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor is at or above ground level (grade) on at least one side.*



Slab on stem wall with fill

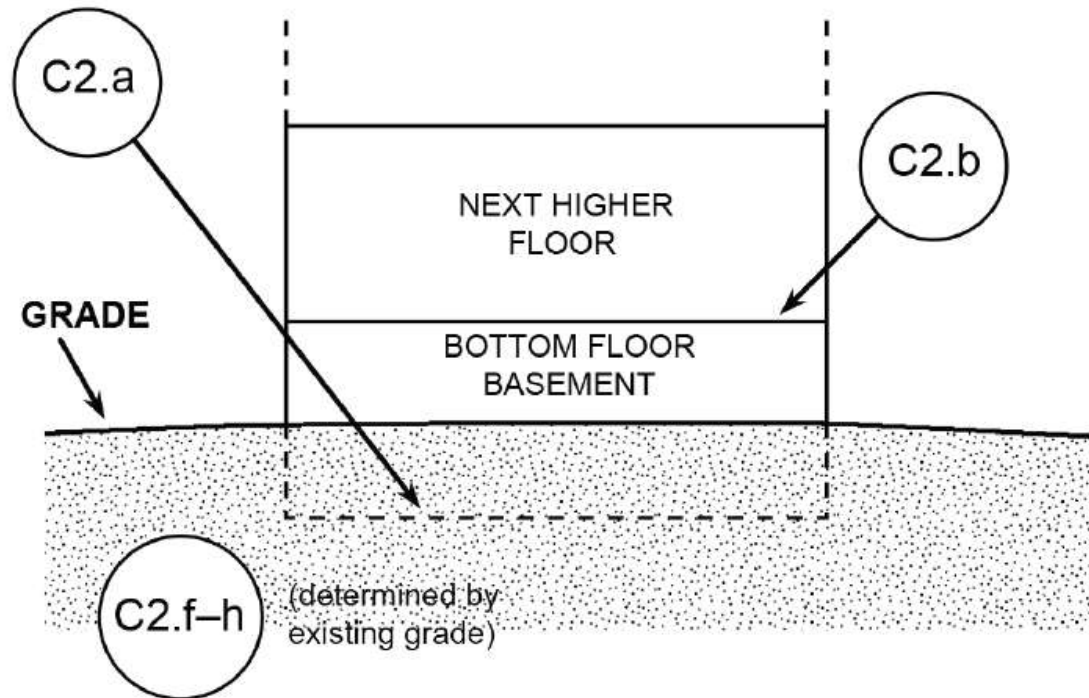


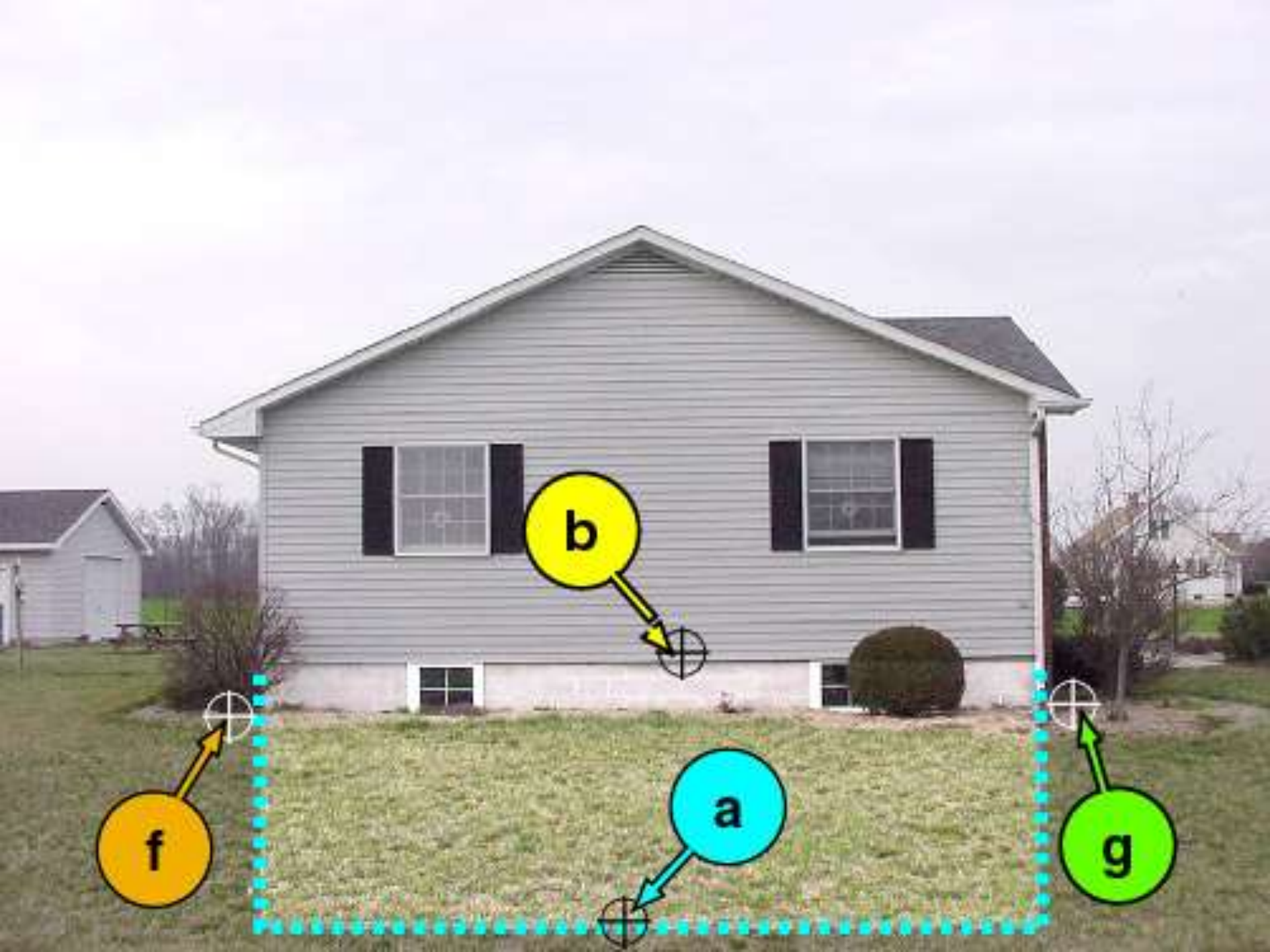
Building Diagram 2A

DIAGRAM 2A

All single- and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*





Which Diagram Do You Use?



Sloping sites

Buildings on solid perimeter foundation walls that are set into a sloping site present another special situation with respect to installation of openings. Careful attention must be paid to the following:

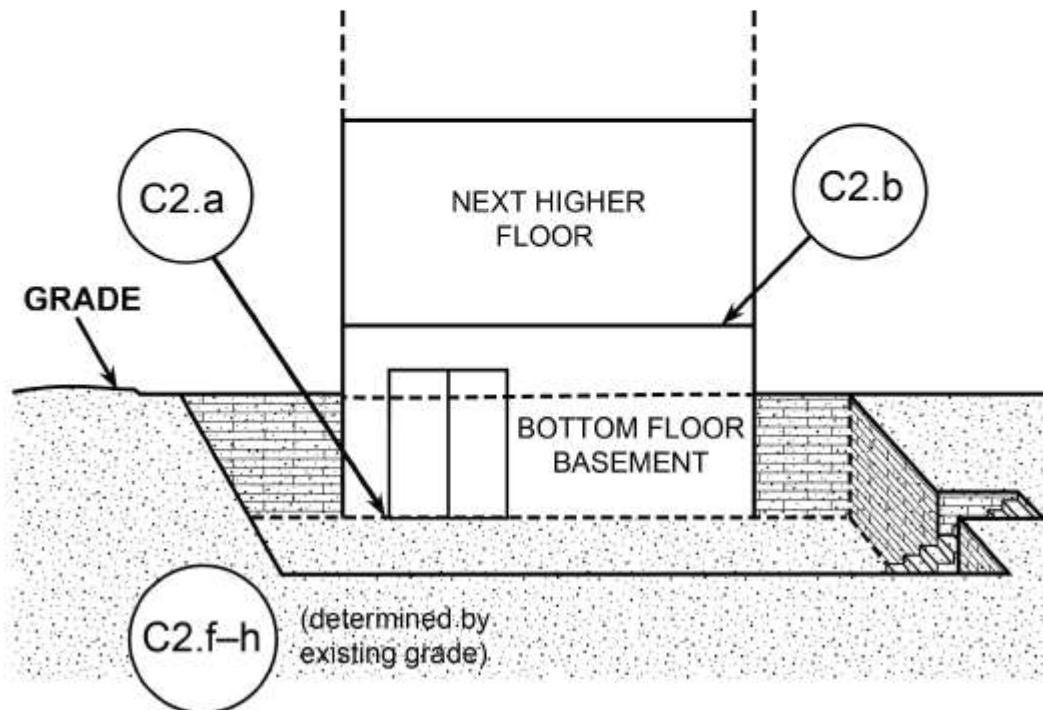
The interior floor along the lower side of a building that is set into a sloping site must be at or above the exterior grade across the entire length of that side of the building, otherwise the enclosure becomes a basement.

Building Diagram 2B

DIAGRAM 2B

All single-and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage).

Distinguishing feature - The bottom floor (basement or under ground garage) is below ground level (grade) on all sides; most of the height of the walls are below ground level on all sides and the door and area of egress is also below ground level on all sides.*





North Carolina Emergency Management

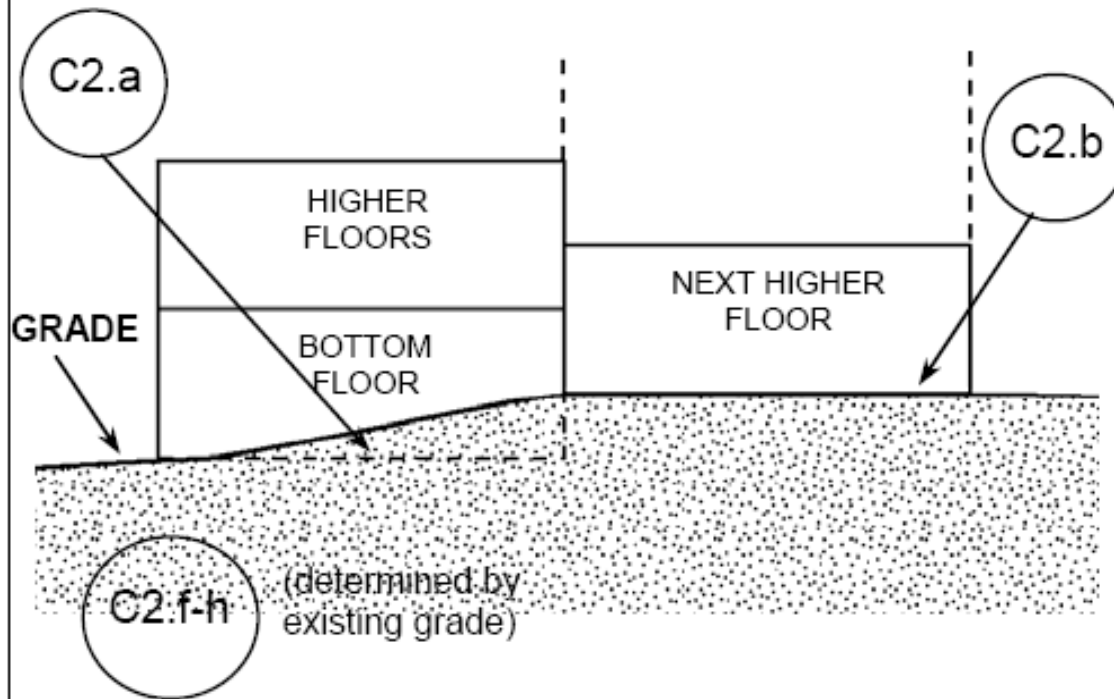


Building Diagram 3

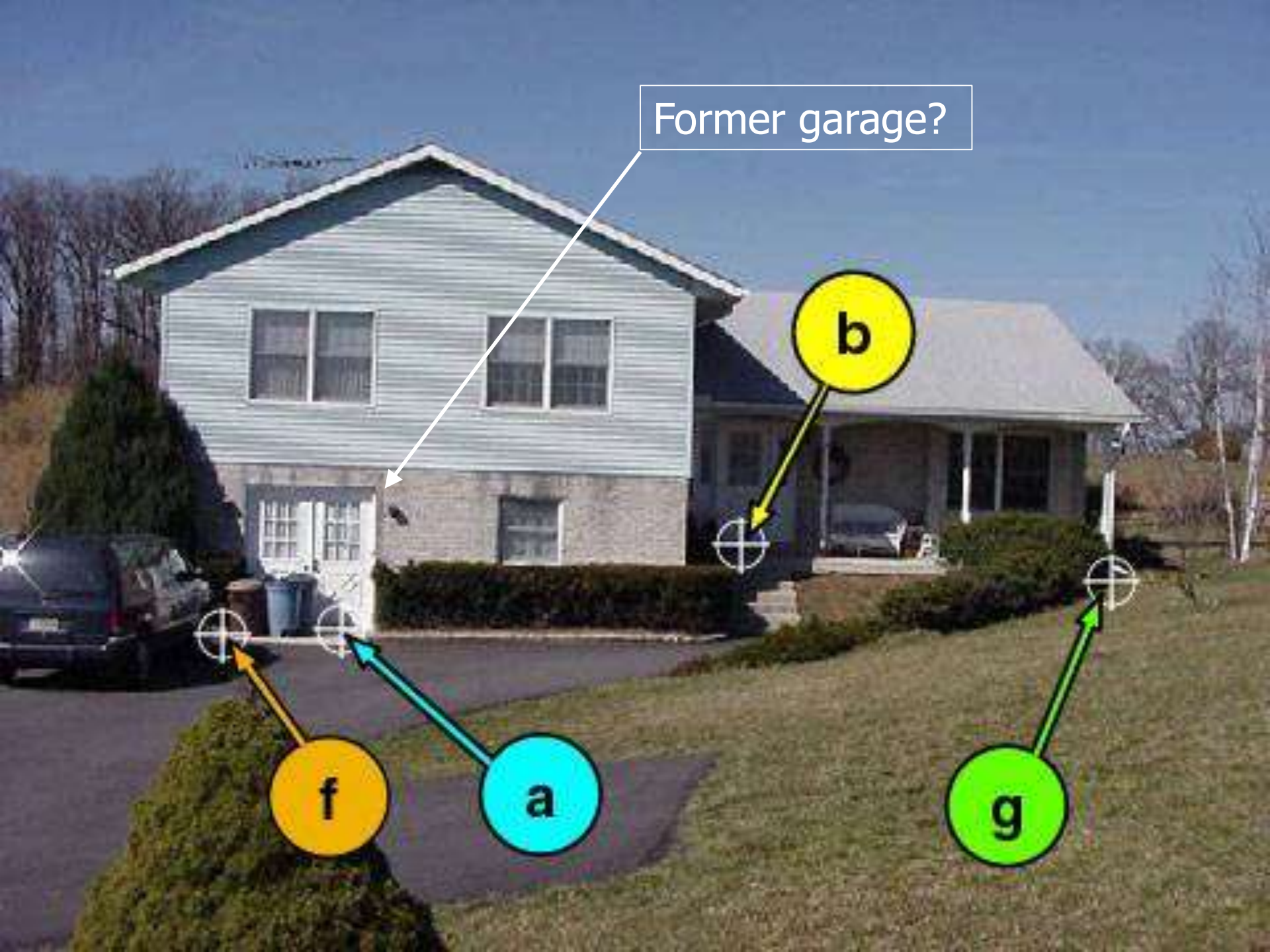
DIAGRAM 3

All split-level buildings that are slab-on-grade, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (excluding garage) is at or above ground level (grade) on at least one side.*



Former garage?



b

f

a

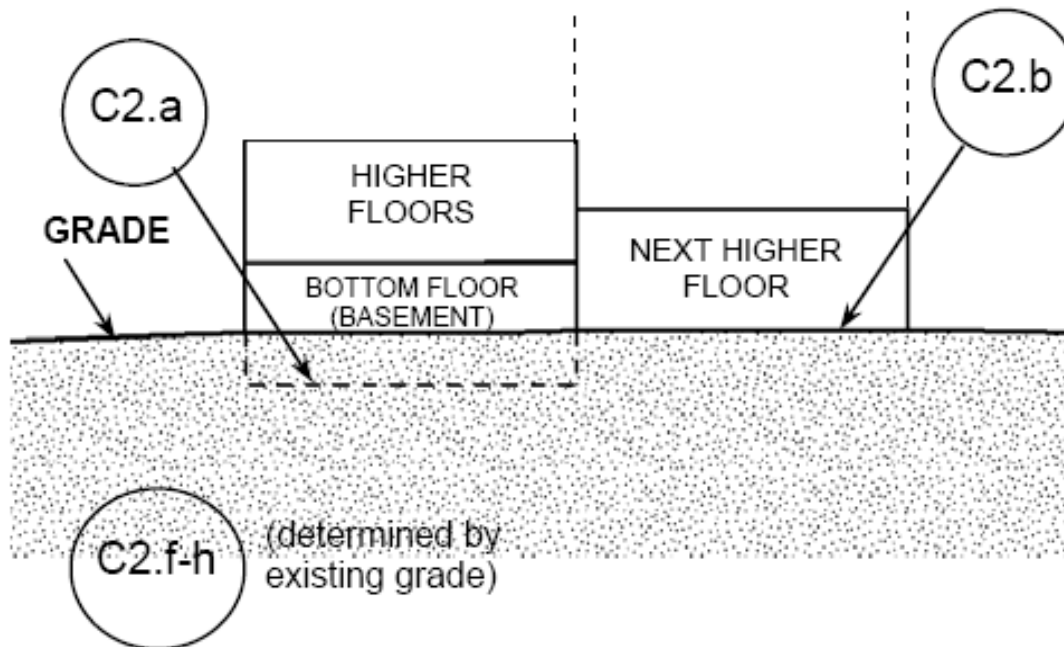
g

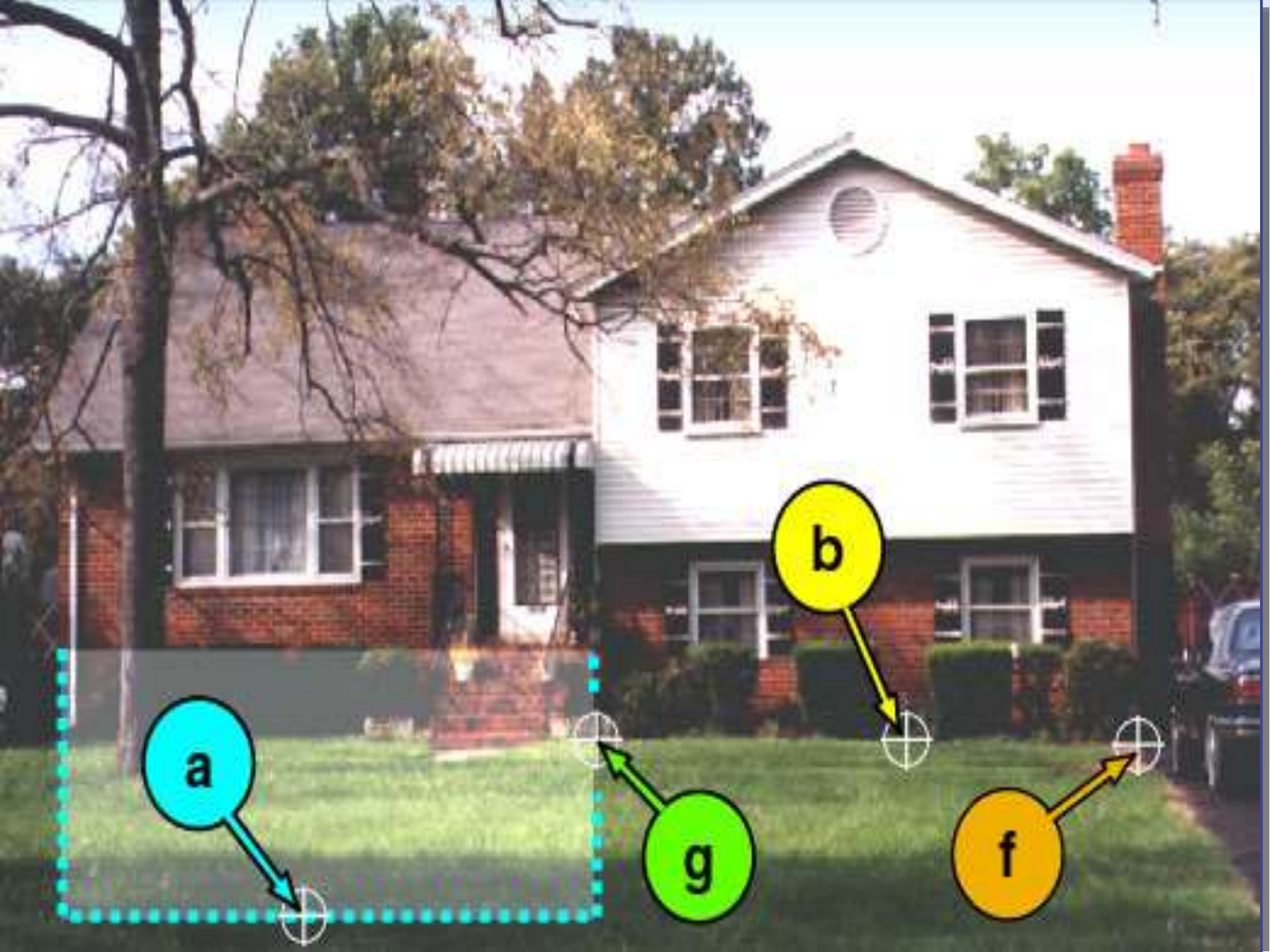
Building Diagram 4

DIAGRAM 4

All split-level buildings (other than slab-on-grade), either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*





a

b

f

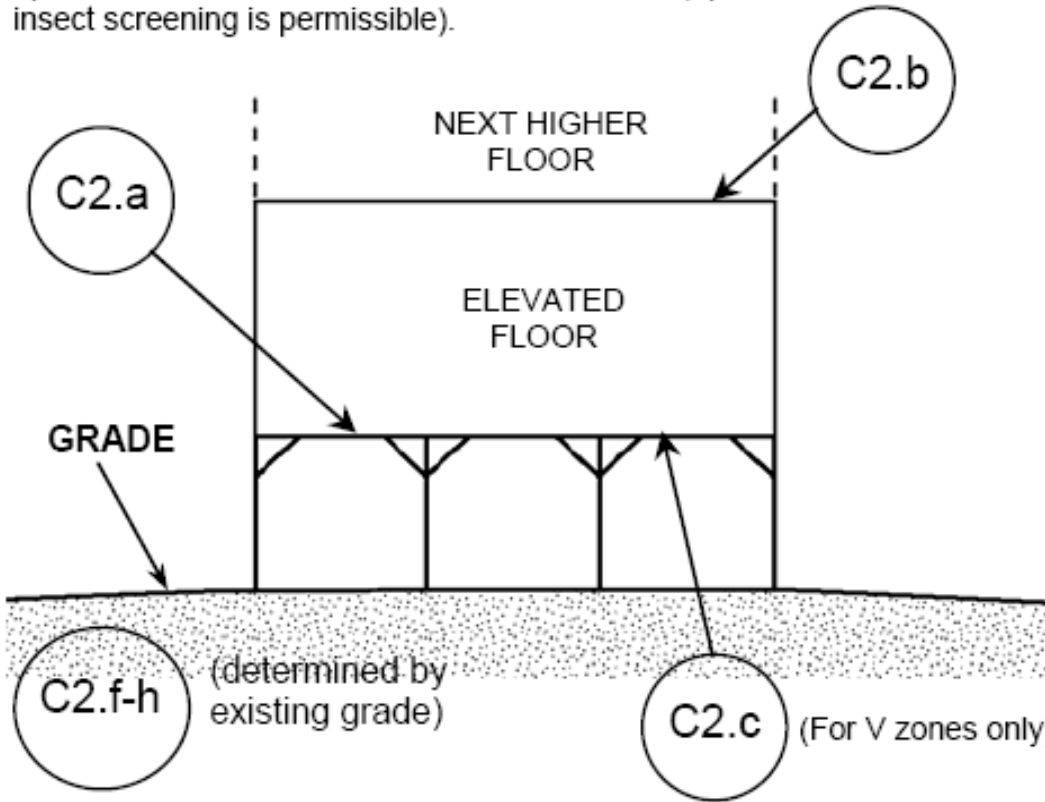
g

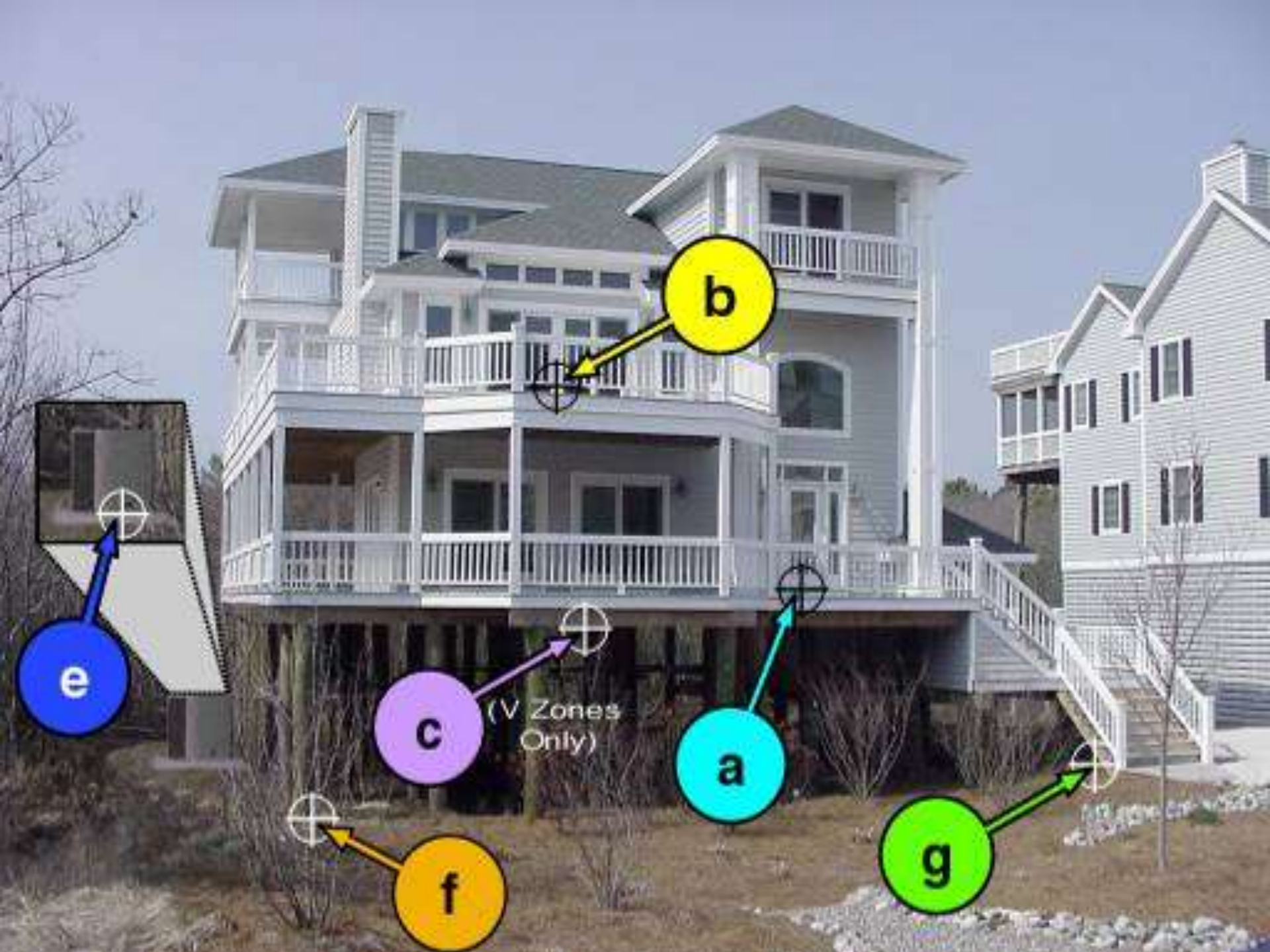
Building Diagram 5

DIAGRAM 5

All buildings elevated on piers, posts, piles, columns, or parallel shear walls. No obstructions below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is open, with no obstruction to flow of flood waters (open lattice work and/or insect screening is permissible).





b

e

c

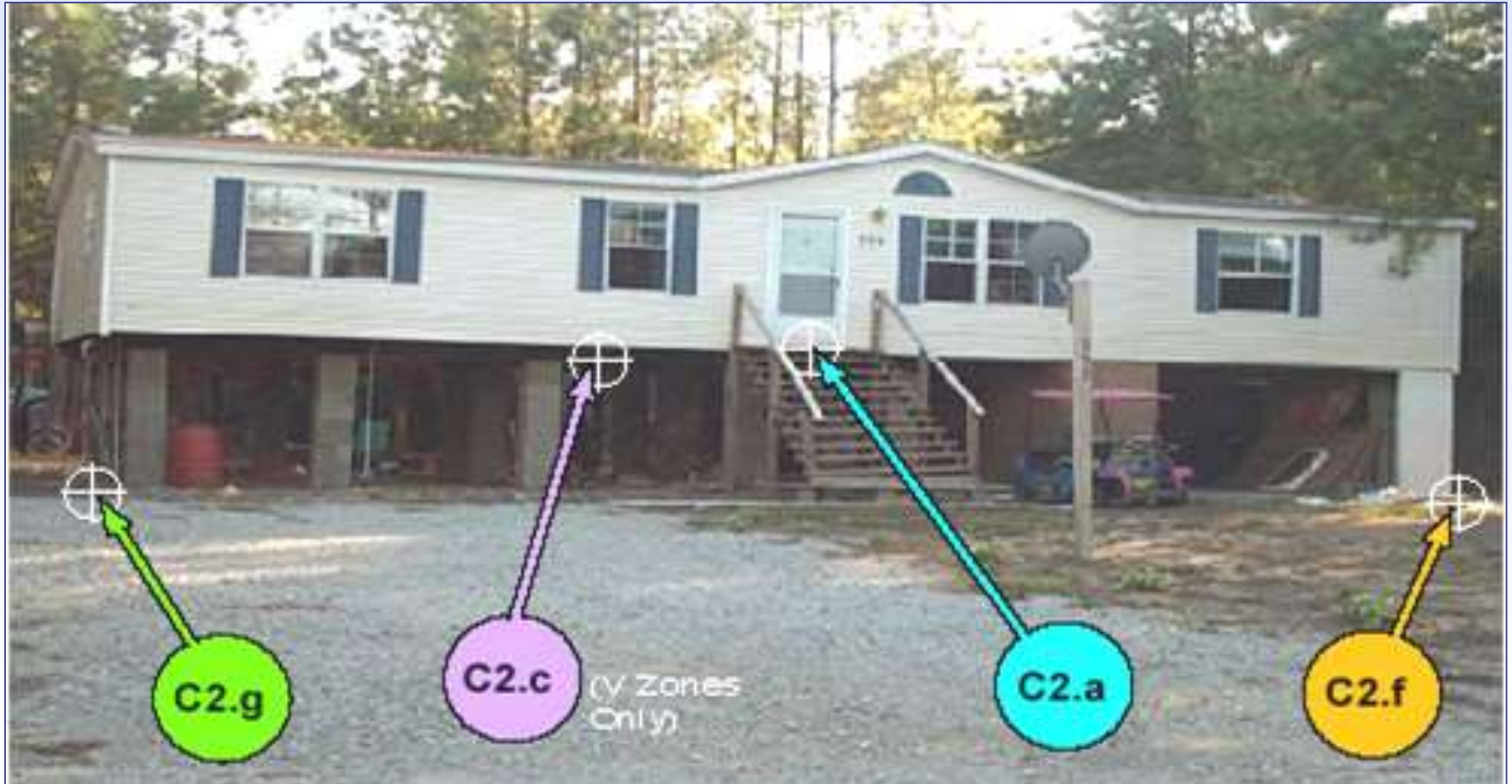
(V Zones Only)

a

g

f

Manufactured home elevated on pier foundation



Which Diagram is it?

Diagram 5 - Hanging Floor

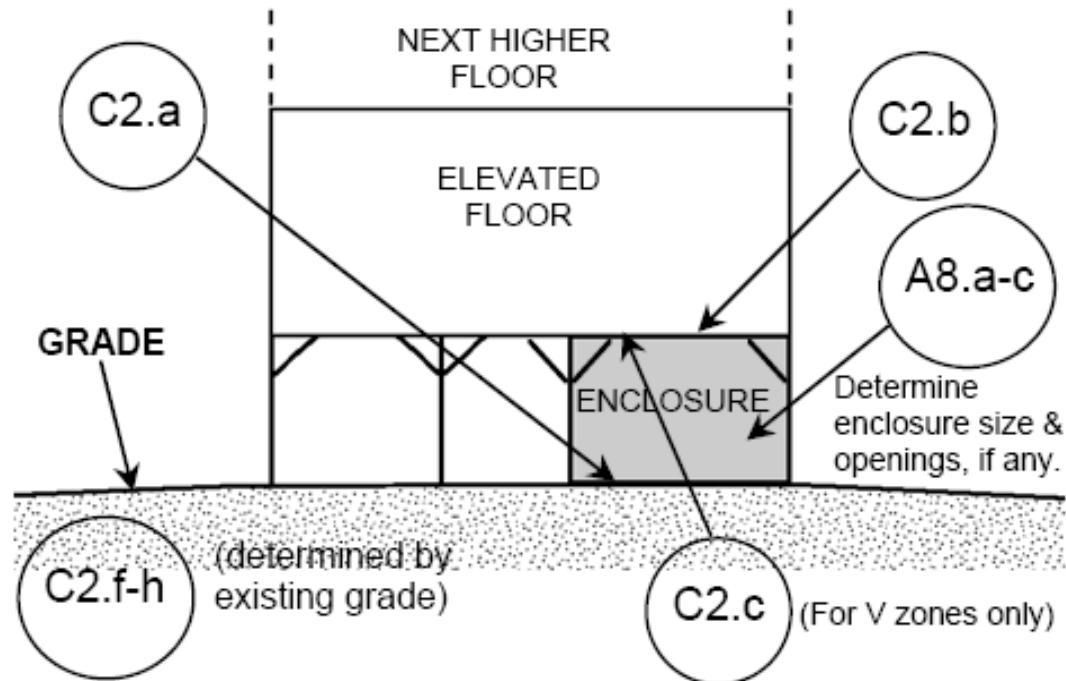


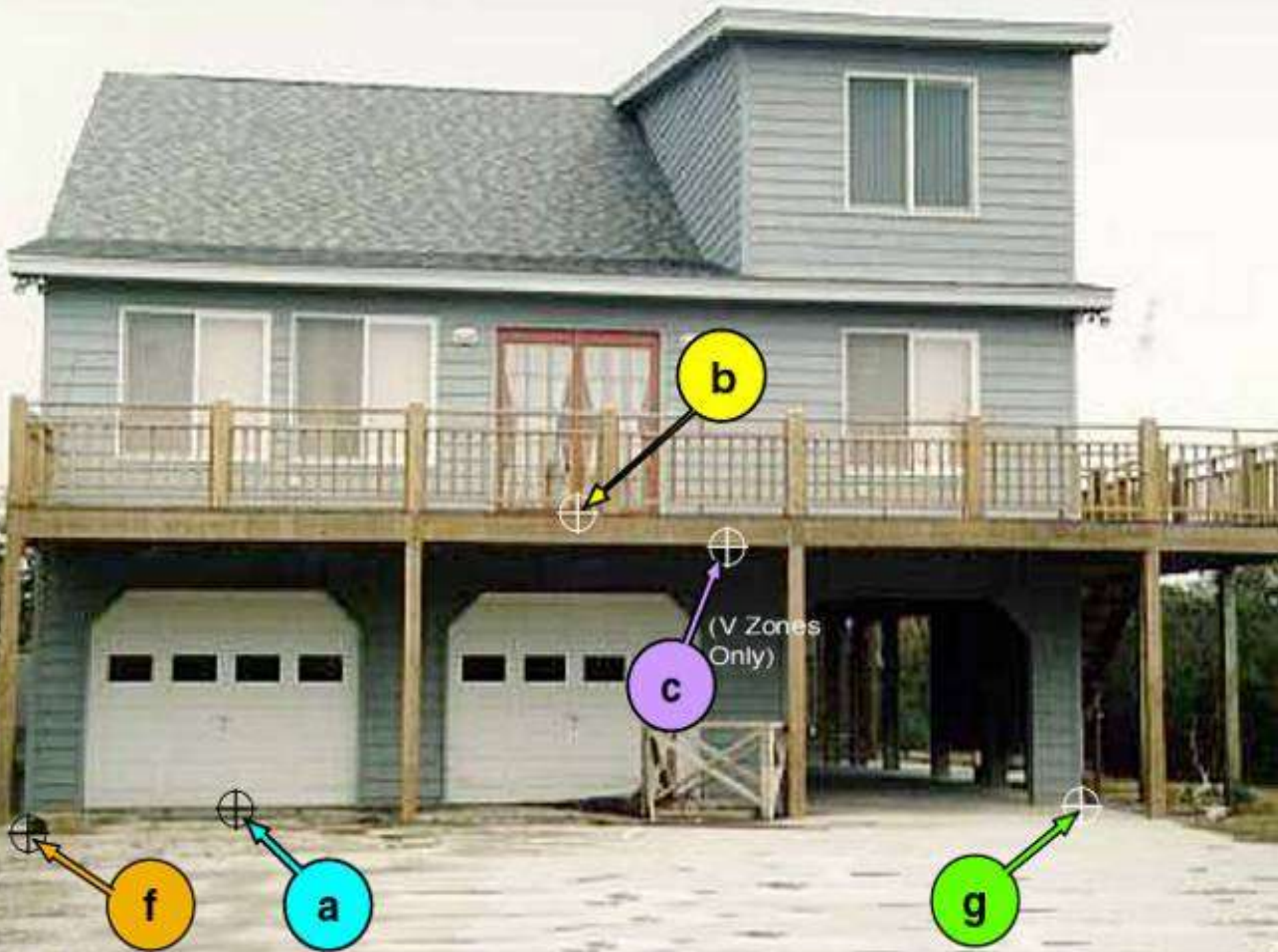
Building Diagram 6

DIAGRAM 6

All buildings elevated on piers, posts, piles, columns, or parallel shear walls with full or partial enclosure below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings** present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.



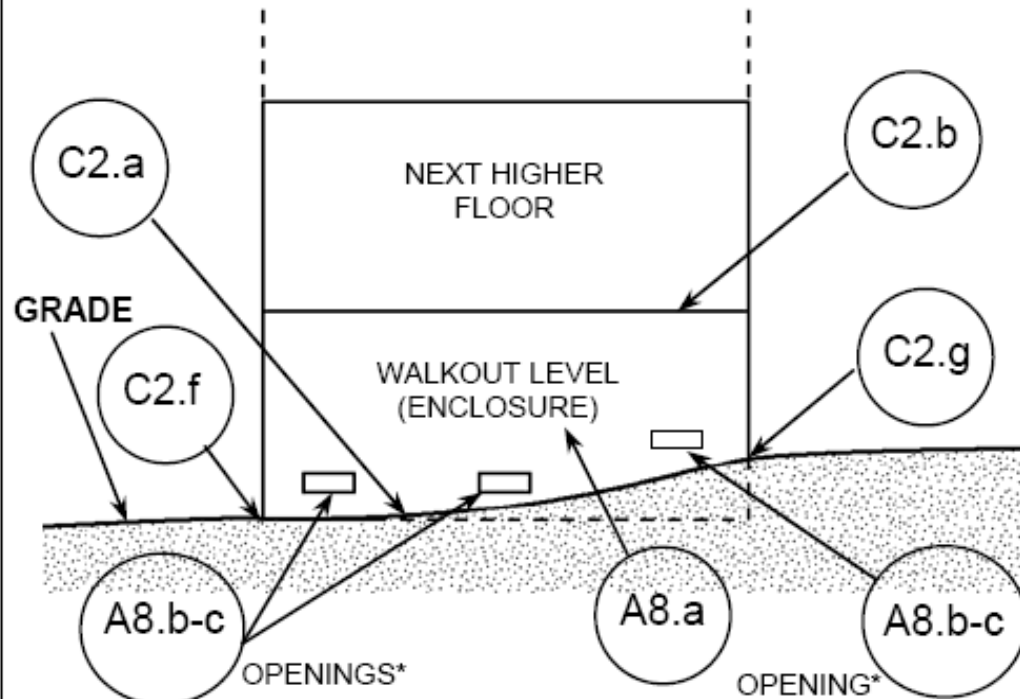


Building Diagram 7

DIAGRAM 7

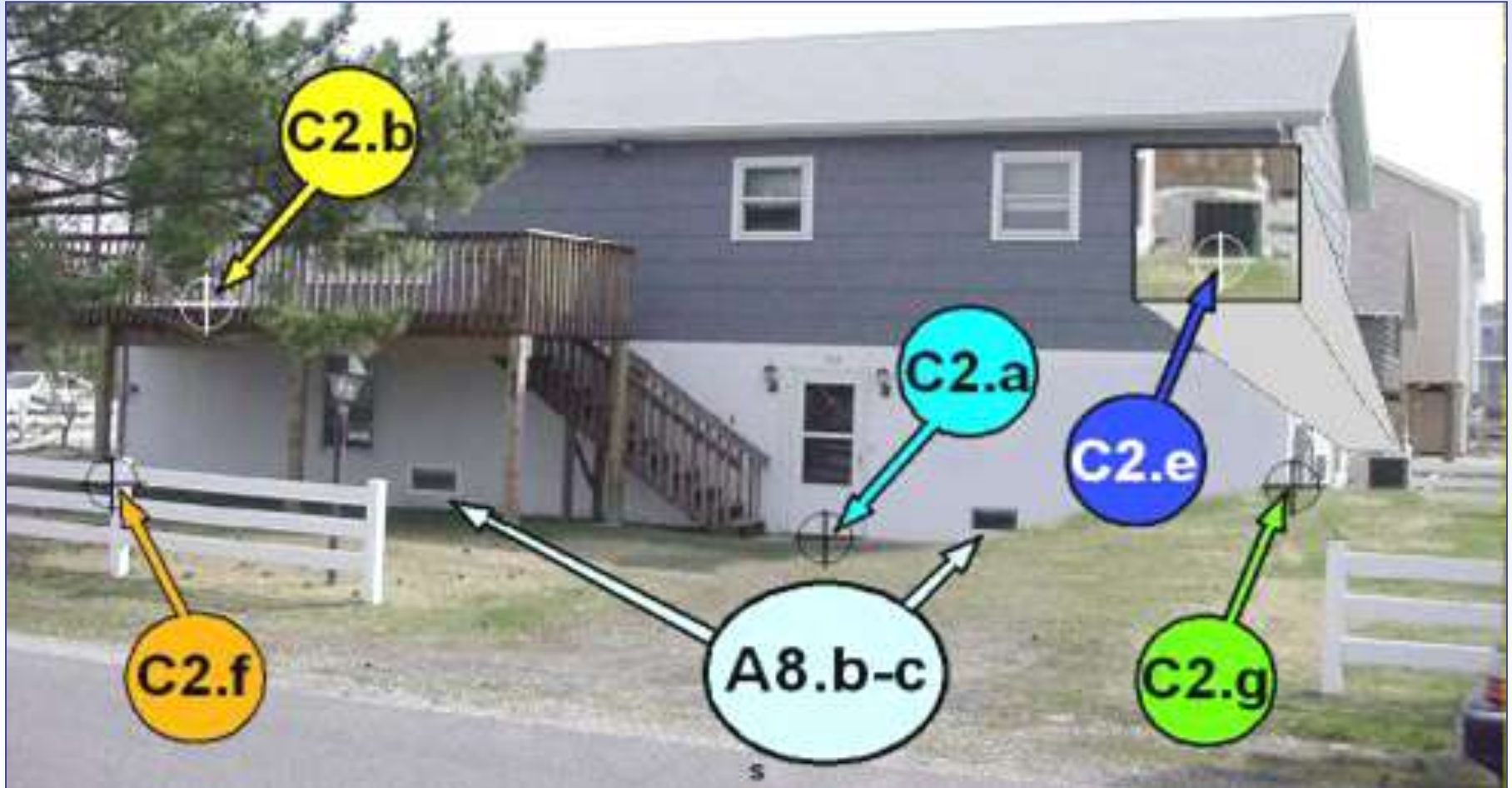
All buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least one side is at or above grade. The principal use of this building is located in the elevated floors of the building.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings* present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.



Building elevated on full-story foundation walls

Fully enclosed area below the elevated floor



Building elevated on full-story foundation walls

Fully enclosed area below the elevated floor

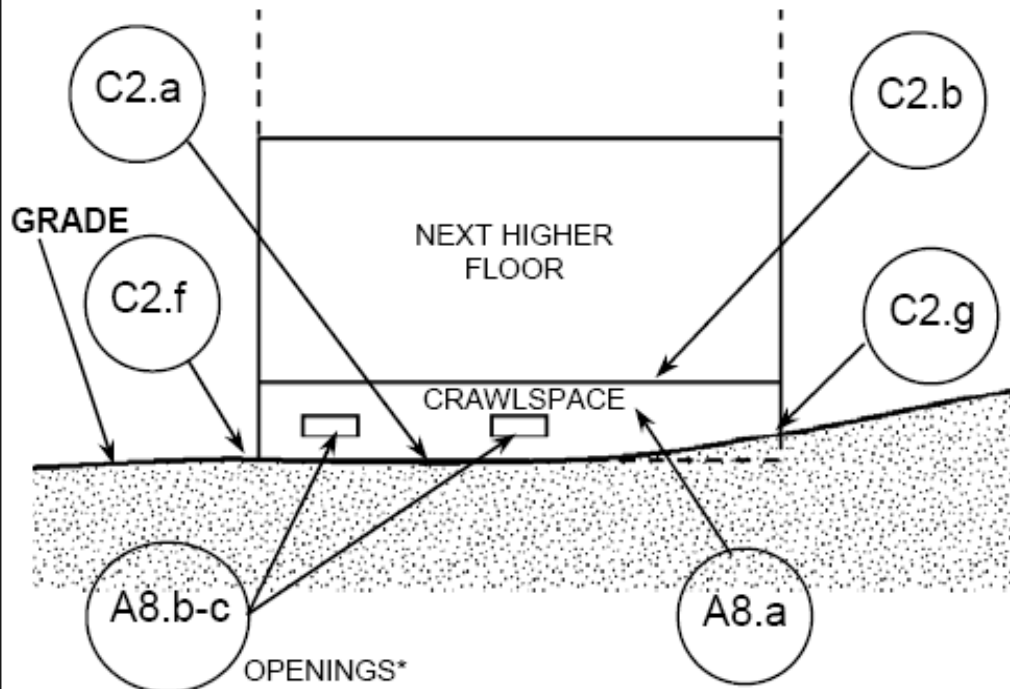


Building Diagram 8

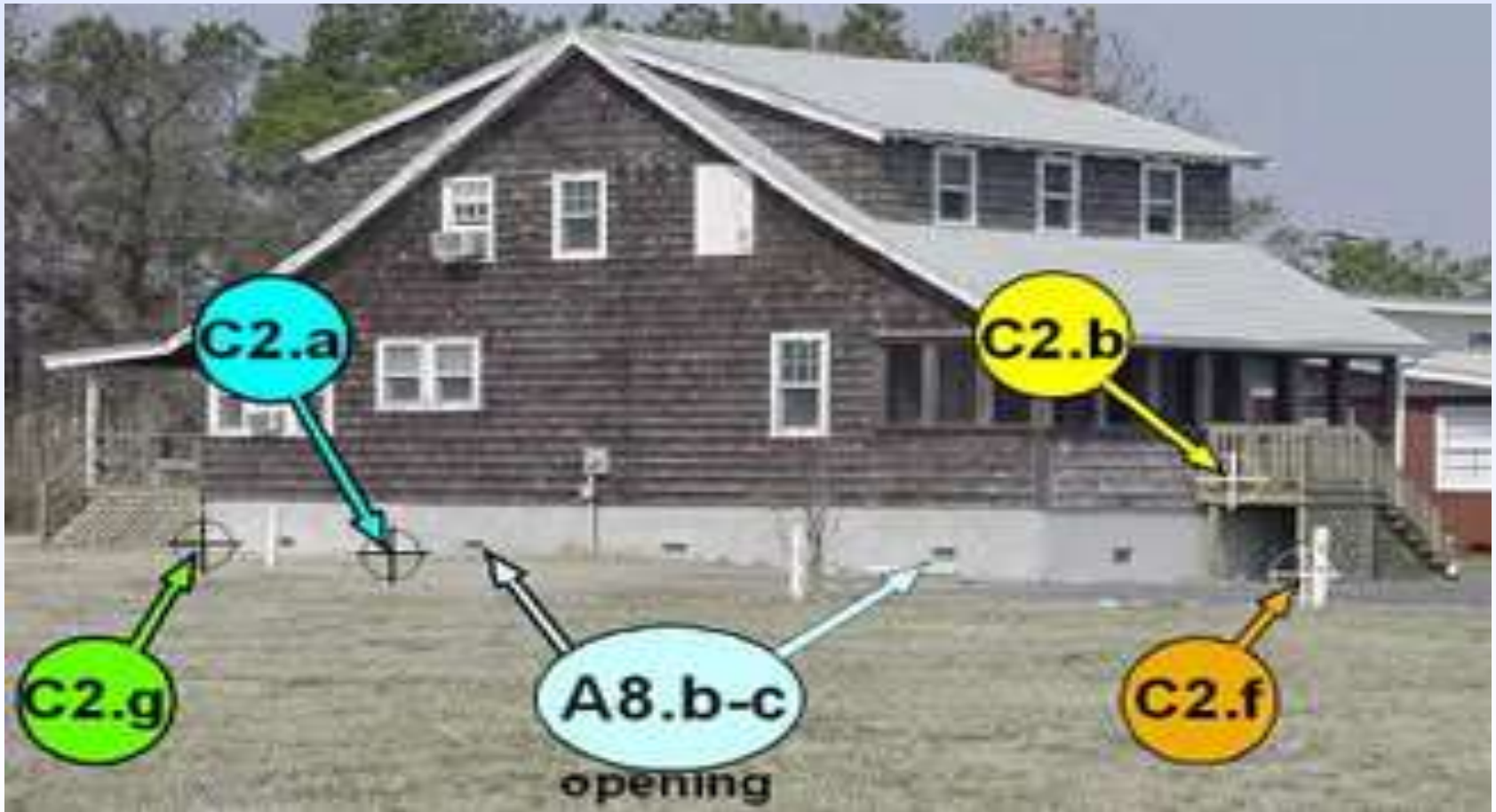
DIAGRAM 8

All buildings elevated on a crawlspace with the floor of the crawlspace at or above grade on at least one side, with or without an attached garage.

Distinguishing Feature – For all zones, the area below the first floor is enclosed by solid or partial perimeter walls. In all A zones, the crawlspace is with or without openings* present in the walls of the crawlspace. Indicate information about crawlspace size and openings in Section A – Property Information.



Multi-level building elevated on crawl space

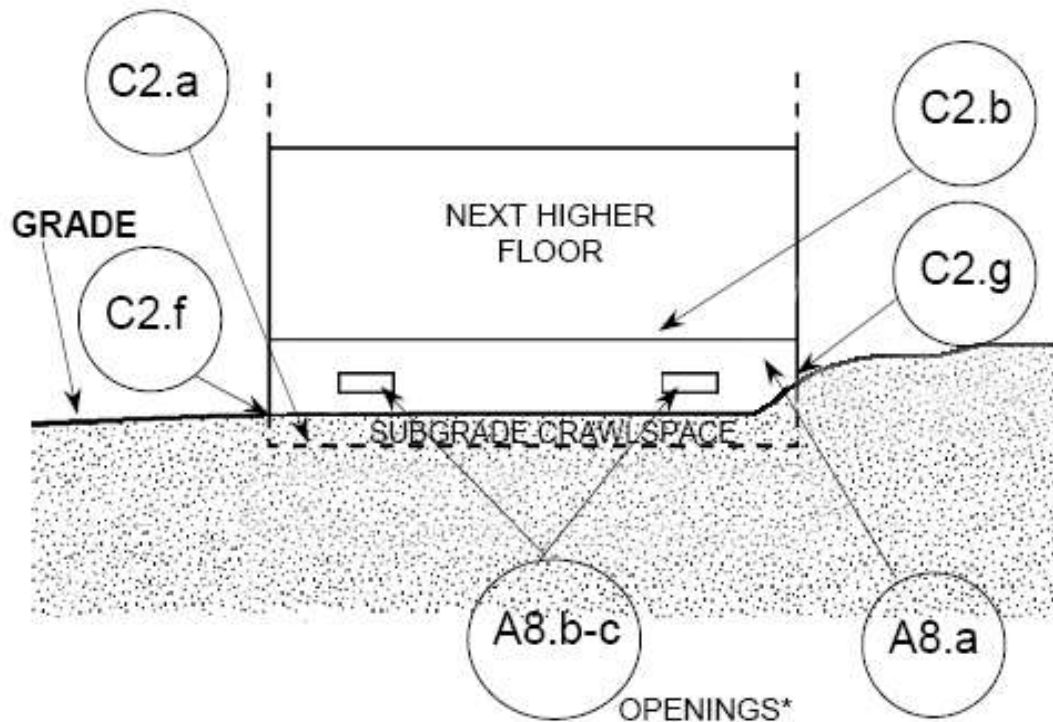


Building Diagram 9

DIAGRAM 9

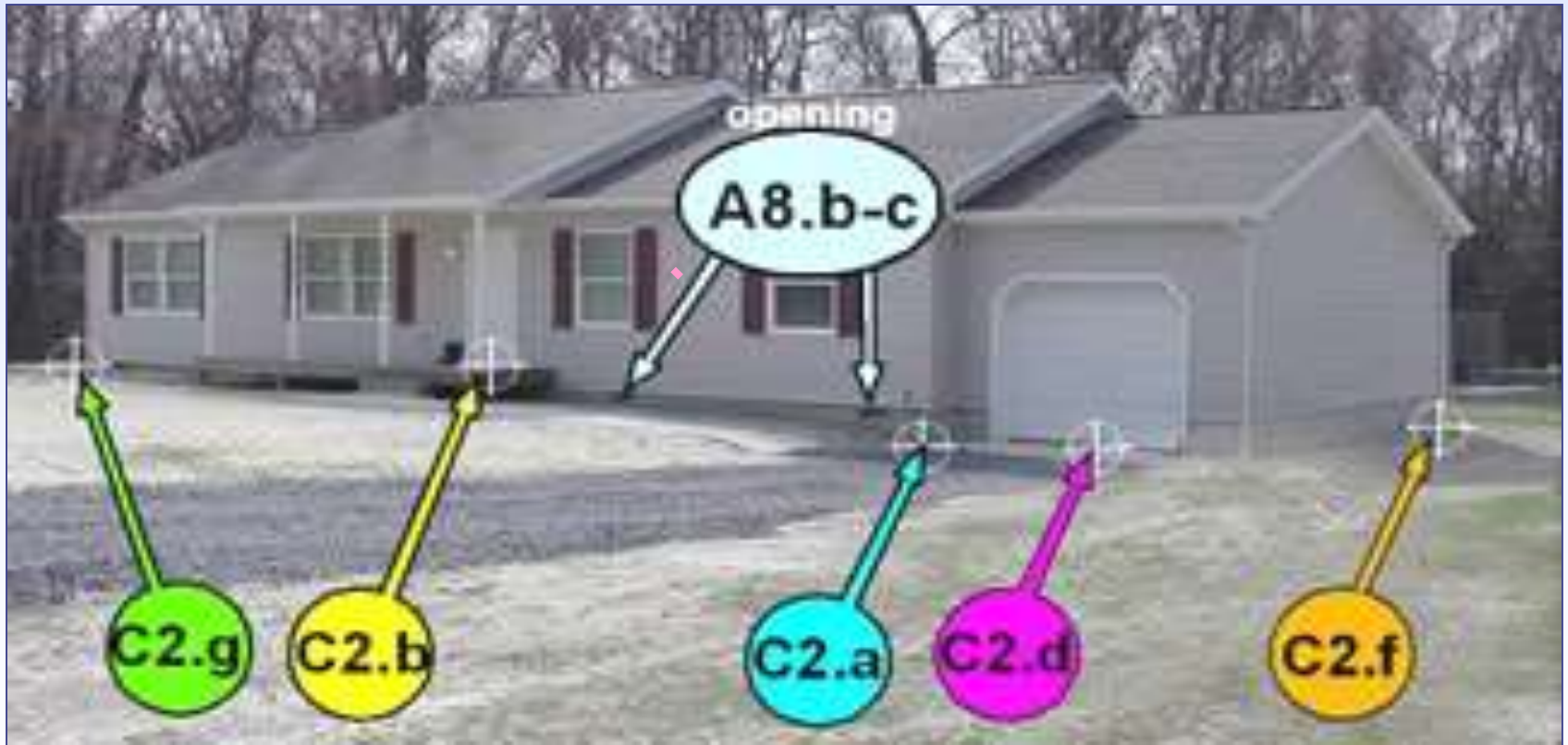
All buildings (other than split-level) elevated on a sub-grade crawlspace, with or without attached garage.

Distinguishing Feature – The bottom (crawlspace) floor is at or below ground level (grade) on all sides.** (If the distance from the crawlspace floor to the top of the next higher floor is more than 5 feet, or the crawlspace floor is more than 2 feet below the grade (LAG) on all sides, use Diagram 2.)



One-story building on crawl space

Attached garage



NFIP Contact Information

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Federal Emergency Management Agency

1-877-FEMA-MAP

http://www.fema.gov/plan/prevent/fhm/fmc_main.shtm



North Carolina Emergency Management



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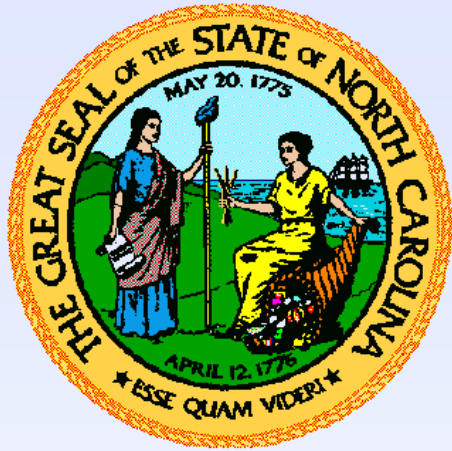
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Questions?

Thank You!



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