

U.S. DEPARTMENT OF HOMELAND SECURITY
 FEDERAL EMERGENCY MANAGEMENT AGENCY
 National Flood Insurance Program
ELEVATION CERTIFICATE

FP 37629
39

OMB Control Number: 1660-0008
 Expiration: 11/30/2018

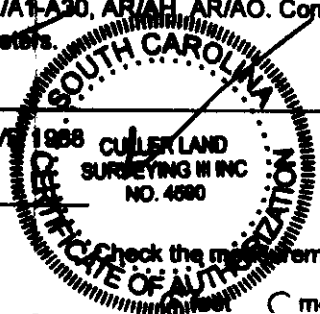
IMPORTANT: FOLLOW THE INSTRUCTIONS ON PAGES 8-15

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

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE	
A1. Building Owner's Name CREEKSIDE DR. LLC		Policy Number: <i>OK</i>	
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 630 NORTH CREEK SIDE DRIVE		Company NAIC Number: <i>6-1676</i>	
City MURRELLS INLET	State SC	Zip Code 29528	
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) LOT 3 MT. GILEAD SUBDIVISION (TMS 197-17-07-006)			
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL			
A5. Latitude/Longitude: Lat. 33°34'22.8843 Long. 79°00'48.1780 Horizontal Datum: <input type="radio"/> NAD 1927 <input checked="" type="radio"/> 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 6			
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) 1545 sq ft	a) Square footage of attached garage N/A sq ft		
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade 9	b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade N/A		
c) Total net area of flood openings in A8.b SEE NOTES sq in	c) Total net area of flood openings in A9.b N/A sq in		
d) Engineered flood openings? <input checked="" type="radio"/> Yes <input type="radio"/> No	d) Engineered flood openings? <input type="radio"/> Yes <input checked="" type="radio"/> No		

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number HORRY 450104		B2. County Name HORRY		B3. State SC	
B4. Map/Panel Number 45051C0734	B5. Suffix H	B6. FIRM Index Date 09/17/2003	B7. FIRM Panel Effective/Revised Date 08/23/1999	B8. Flood Zone(s) AE	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 13
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="radio"/> FIS Profile <input checked="" type="radio"/> FIRM <input type="radio"/> Community Determined <input type="radio"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input checked="" type="radio"/> NGVD 1929 <input type="radio"/> NAVD 1988 <input type="radio"/> Other/Source: _____					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="radio"/> Yes <input checked="" type="radio"/> No Designation Date: <input type="radio"/> CBRS <input type="radio"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)		
C1. Building elevations are based on: <input type="radio"/> Construction Drawings* <input type="radio"/> Building Under Construction* <input checked="" type="radio"/> 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: SCVRS	Vertical Datum: NGVD 29	
Indicate elevation datum used for the elevations in items a) through h) below. <input checked="" type="radio"/> NGVD 1929 <input type="radio"/> NAVD 1988 <input type="radio"/> Other/Source: _____		
Datum used for building elevations must be the same as that used for the BFE.		
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>7.5</u>	<input type="radio"/> feet <input type="radio"/> meters
b) Top of the next higher floor	<u>15.5</u>	<input checked="" type="radio"/> feet <input type="radio"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input type="radio"/> feet <input type="radio"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input type="radio"/> feet <input type="radio"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>14.4</u>	<input checked="" type="radio"/> feet <input type="radio"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>7.3</u>	<input checked="" type="radio"/> feet <input type="radio"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>8.2</u>	<input checked="" type="radio"/> feet <input type="radio"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>N/A</u>	<input type="radio"/> feet <input type="radio"/> meters



Michael F. Callahan

ELEVATION CERTIFICATE, page 2

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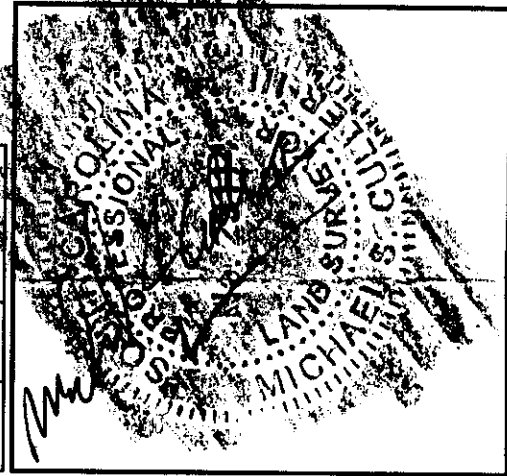
IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 630 NORTH CREEK SIDE DRIVE		Policy Number	
City MURRELLS INLET	State SC	Zip Code 29576	Company NAIC Number

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

Certifier's Name MICHAEL S CULLER, III		License Number 29114	
Title PRESIDENT	Company Name CULLER LAND SURVEYING III, INC.		
Address 1010 5th AVE. NW EXT	City SC	State SC	Zip Code 29575
Signature	Date REV. 6/13/16 5/27/2016	Telephone (843)238-2333	



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

Comments (including type of equipment and location, per C2(e), if applicable)
**ITEM C2-A REFERS TO FLOOR LEVEL OF BELOW ENCLOSURE; ITEM C2-E REFERS TO FLOOR LEVEL OF HVAC SYSTEM:
 NOTE ITEM A8-E (ENGINEERED FLOOD VENT "CRAWL SPACE DOOR SYSTEM" MODEL 816CS NET AREA 105sq.in. x 9 = 945sq.in.; RATED FOR 205sq.ft. x 9 = 1845sq.ft. ENGINEERED CERTIFICATE INCLUDED IN THIS FLOOD CERTIFICATE**

Signature *Michael S. Culler, III* Date **5/27/2016**

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 page 8 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 or Owner's Authorized Representative's Name			
Address	City	State	ZIP Code
Signature	Date	Telephone	

Comments

Check here if attachments.

BUILDING PHOTOGRAPHS

See instructions for Item A6.

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. 630 NORTH CREEK SIDE DRIVE			Policy Number:	
City MURRELLS INLET	State SC	Zip Code 29576	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." 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.



FRONT VIEW (STREET SIDE) PHOTO TAKEN 5/27/2016



RIGHT SIDE VIEW PHOTO TAKEN 5/27/2016



REAR VIEW (CREEK SIDE) PHOTO TAKEN 5/27/2016

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.
630 NORTH CREEK SIDE DRIVE

Policy Number:

City
MURRELLS INLET

State
SC

Zip Code
29576

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. 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.



LEFT SIDE VIEW PHOTO TAKEN 5/27/2016

Certification of Engineered Flood Openings

In accordance with NFIP, FEMA TB 1-08, and ASCE/SEI 24-05

I hereby certify that the **Crawl Space Door Systems flood vents 816CS, 1220CS, 1232CS, 1616CS, 1624CS, 1632CS, 2032CS, 2424CS, and 2436CS** are designed in accordance with the requirements of the NFIP "Flood Insurance Manual" (2011) to provide automatic equalization of hydrostatic flood forces by allowing for the entry and exit of floodwaters, when properly installed and sized as set forth below. This certification follows the design requirements and specifications established in FEMA Technical Bulletin 1-08, "Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings in Special Flood Hazard Areas", and the ASCE Standard for "Flood Resistant Design and Construction" (ASCE/SEI 24-05).

Design Characteristics

Section 2.6.2.2 of ASCE 24 provides an equation to determine the required net area of engineered openings (A_o) for a given enclosed area (A_e). This equation is based on the hydraulic formula for the flow rate across sharp edged orifices. I have utilized this equation to calculate 1) the respected flow rate through the individual openings between louvers; 2) the flow rate through the main frame opening in case the louver is blown out during a flood event; and 3) the flow rate of water flowing through louver blades following hydraulic short tube theory. The ultimate maximum total enclosed area (A_e) that can be serviced by a single vent has then been determined by utilizing the lowest flow rate of the three assessed scenarios for each vent and is listed in Table 1.

These values are based on the following assumptions:

- In absence of reliable data, the rates of rise and fall have been assumed with 5 feet/hour;
- The (maximum) difference between the exterior and interior floodwater levels has been assumed with 1 foot during base flood conditions;
- A factor of safety of 5 has been assumed, which is consistent with design practices related to protection of life and property;
- The net area of openings (A_o) as provided by the manufacturer.

*)	Model	H x W [in]	A_o [in ²]	A_e [ft ²]
<input checked="" type="checkbox"/>	816CS	8 x 16	105	205
<input type="checkbox"/>	1220CS	12 x 20	235	500
<input type="checkbox"/>	1232CS	12 x 32	305	645
<input type="checkbox"/>	1616CS	16 x 16	180	395
<input type="checkbox"/>	1624CS	16 x 24	310	670
<input type="checkbox"/>	1632CS	16 x 32	405	835
<input type="checkbox"/>	2032CS	20 x 32	630	1240
<input type="checkbox"/>	2424CS	24 x 24	570	1230
<input type="checkbox"/>	2436CS	24 x 36	850	1765

Table 1 Maximal total enclosed area (A_e) that can be served by each individual model based on the given net area of engineered openings (A_o)

Installation Requirements and Limitations

This certification will be voided if the following installation requirements and limitations are not enforced:

- There shall be a minimum of two openings on different sides of each enclosed area;
- The bottom of each required opening shall be no more than 1ft above the adjacent ground level;
- No temporary (e.g. during cold weather) or permanent solid cover may be placed into or over the flood vent that would block the automatic entry or exit of floodwaters at any time;
- Where analysis indicates rates of rise and fall greater than 5 ft/hr, the total enclosed area as given in Table 1 shall be reduced accordingly to account for the higher rates of rise and fall.

Identification of the Building and Installed Flood Vents

The flood vent models marked in Table 1*) are being installed at the following building:

Building Address

Certifying Design Professional

Name **Frederick Allen House**
 Title **President-House Engineering P.C.**
 Address **P O Box 466, Kitty Hawk, NC 27949**
 Type of License **Professional Engineer**
 License # **26841**
 Issuing State **South Carolina**

Signature

Frederick Allen House 7/23/12

