

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

# ELEVATION CERTIFICATE *FP 164638 permit*

OMB No. 1860-0008  
Expiration Date: July 31, 2015

Important: Read the Instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name <b>RONALD H. AND ANNA T. GOODRICH</b>		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. <b>220 LANDS END BLVD.</b>		Company NAIC Number:
City <b>MYRTLE BEACH</b> State <b>SC</b> ZIP Code <b>29572</b>		
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) <b>LOT 4, PHASE 4-B LANDS END BLVD T.M.S. # 155-00-01-138</b>		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <b>RESIDENTIAL</b>		
A5. Latitude/Longitude: Lat. <b>33-48-34</b> Long. <b>78-45-58</b> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <b>g</b>		
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) <b>1284</b> sq ft		a) Square footage of attached garage _____ sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <b>9</b>		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 A8.b <b>1845</b> sq in		c) Total net area of flood openings in A9.b _____ sq in
d) Engineered flood openings? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No

*NO* *OK* *11-7-13* *16975*

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number <b>HORRY CO. 450104</b>		B2. County Name <b>HORRY</b>		B3. State <b>SC</b>	
B4. Map/Panel Number <b>45051C0569</b>	B5. Suffix <b>H</b>	B6. FIRM Index Date <b>8-17-03</b>	B7. FIRM Panel Effective/Revised Date <b>8-23-99</b>	B8. Flood Zone(s) <b>AE</b>	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) <b>15</b>
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input type="checkbox"/> FIS Profile <input checked="" type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input checked="" type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input checked="" type="checkbox"/> 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: <b>S435 B</b> Vertical Datum: <b>NGVD 29</b>	
Indicate elevation datum used for the elevations in Items a) through h) below: <input checked="" type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> 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)	<b>11.0</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<b>22.7</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<b>N/A</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<b>N/A</b> <input checked="" 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)	<b>16.4</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<b>8.8</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<b>11.0</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<b>11.0</b> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

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.	
<input type="checkbox"/> Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> Check here if attachments.	
Certifier's Name <b>J. LUCKEY SANDERS</b>	License Number <b>4554</b>
Title <b>LAND SURVEYOR</b>	Company Name <b>SANDERS SURVEYORS, LLC</b>
Address <b>210 CLELAND STREET</b>	City <b>GEORGETOWN</b> State <b>SC</b> ZIP Code <b>29440</b>
Signature <i>[Signature]</i>	Date <b>10-12-13</b> Telephone <b>843-527-2300</b>

*[Signature]*  
*10-12-13*

# 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 <sup>2</sup> ]	$A_e$ [ft <sup>2</sup> ]
<input 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

## 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.

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 ( $A_o$ )

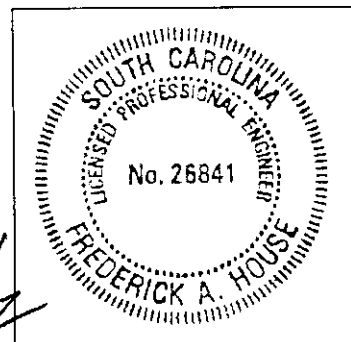
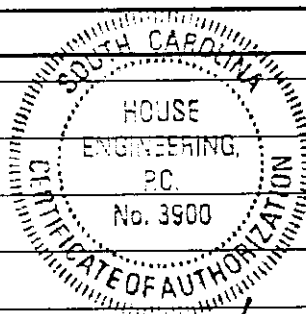
## Identification of the Building and Installed Flood Vents

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	<i>Frederick A. House</i> 7/23/12



**Horry County Code Enforcement**

1301 2<sup>nd</sup> Ave Suite 1D09  
Conway, SC 29526



Phone: (843) 915-5090  
(843) 205-5090

Fax: (843) 915-6090

**MEMO OF REVIEW FOR CORRECTNESS AND COMPLETION**

In accordance with this community's participation in the National Flood Insurance Program's Community Rating System, all FEMA Elevation Certificates must be correct and complete. The attached Certificate has some incorrect items which are noted here.

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A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. <u>220 LANDS END BLVD.</u>	Company NAIC Number	
City <u>MYRTLE BEACH</u> State <u>SC</u> ZIP Code <u>29572</u>		
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) <u>LT # 9, PHASE A-B LANDS END BLVD. TMS # 155-00-01-12 R</u>		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) _____		
A5. Latitude/Longitude: Lat. _____ Long. _____		Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number _____		
A8. For a building with a crawl space or enclosure(s), provide		A9. For a building with an attached garage, provide: <u>N/A</u> a) Square footage of attached garage <u>0</u> b) No. of permanent flood openings in the attached garage walls within 1.0 foot above adjacent grade <u>0</u> c) Total net area of flood openings in A9.b <u>0</u> d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
a) Square footage of crawl space or enclosure(s) _____ sq ft		
b) No. of permanent flood openings in the crawl space or enclosure(s) walls within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A8.b _____ sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation (use base flood de
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Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____			

**COMMENTS:**

A9 Not Applicable

Date of Review: 2/25/2015

Community Official: [Signature]