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

ELEVATION CERTIFICATE

IMPORTANT: Follow the instructions on pages 1–9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A – PROPERTY INFORMATION

FOR INSURANCE COMPANY USE
Policy Number:
Company NAIC Number:

A1. Building Owner's Name: BRIAN HESTER

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.: 1213 NORTH RAMSEY
City: STILLWATER State: OK ZIP Code: 74074

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.): LOT 10, BK.2, PAYNE'S SUBDIVISION OF LOT 6, BURR'S ADDITION

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

A5. Latitude/Longitude: Lat. N 36 08 05 Long. W 97 04 01 Horizontal Datum: ☐ NAD 1927 XX 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: 8

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s): 1925 sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade: 14
- c) Total net area of flood openings in A8.b: 2016 sq in
- d) Engineered flood openings? XX Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage: NONE 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

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number		B2. County Name: PAYNE			B3. State: OK
B4. Map/Panel Number: 40119C0064	B5. Suffix: F	B6. FIRM Index Date: MAY 16, 2007	B7. FIRM Panel Effective/ Revised Date: N/A	B8. Flood Zone(s): AE	B9. Base Flood Elevation(s) (Zone AO, use base flood depth): 893.7

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9:
XX FIS Profile ☐ FIRM ☐ Community Determined ☐ Other/Source:

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

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes XX No
Designation Date: ___ / ___ / ___ ☐ CBRS ☐ OPA

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* XX 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: SW17 Vertical Datum: VERTCON TO NAVD 88
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 XX 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)	893.5	XX feet	☐ meters
b) Top of the next higher floor	896.3	XX feet	☐ meters
c) Bottom of the lowest horizontal structural member (V Zones only)	N/A	☐ feet	☐ meters
d) Attached garage (top of slab)	NONE	XX feet	☐ meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	895.4	XX feet	☐ meters
f) Lowest adjacent (finished) grade next to building (LAG)	893.5	XX feet	☐ meters
g) Highest adjacent (finished) grade next to building (HAG)	893.9	XX feet	☐ meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	N/A	☐ feet	☐ 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.*

XX Check here if comments are provided on back of form.
☐ Check here if attachments.

Were latitude and longitude in Section A provided by a licensed land surveyor? XX Yes ☐ No

PLACE SEAL HERE

Certifier's Name: JIMMY W. HILL		License Number: PE 6156	
Title: PROFESSIONAL ENGINEER	Company Name: PRIVATE PRACTICE ENGR.		
Address: 2700 S. WESTERN	City: STILLWATER	State: OK	ZIP Code: 74074
Signature: Jimmy W Hill	Date: JULY 5, 2016	Telephone: 405-743-4455	

See reverse side for continuation.

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 used as described 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 vent's louvers in case the louver is blown out during a flood event; and 3) the flow rate of water flowing through louver blades following 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.

Design 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]
☑	816CS	8 x 16	105	210
☐	1220CS	12 x 20	235	300
☐	1232CS	12 x 32	305	[illegible]
☐	1616CS	16 x 16	180	360
☐	1624CS	16 x 24	310	[illegible]
☐	1632CS	16 x 32	405	[illegible]
☐	2032CS	20 x 32	650	[illegible]
☐	2424CS	24 x 24	570	[illegible]
☐	2436CS	24 x 36	850	[illegible]

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

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 entry or exit of floodwaters at any time;
- If the building indicates rates of rise and fall greater than 5 ft/hr, the total enclosed area as given in Table 1 shall be reduced to account for the higher rates of rise and fall.

Location of the Building and Installed Flood Vents

Flood vents (models marked in Table 1*) are being installed at the following building:

Address: 1213 N. Ramsey Stillwater, OK

Engineering Design Professional

Name: Christopher Mark Looney

Title: Professional Engineer

Address: 2105 Laskin Road, Virginia Beach, VA 23455

License: Professional Engineer

Signature

Phone: (757) 202-5400

State: Virginia

CHRISTOPHER M. LOONEY
No. 029000
PROFESSIONAL ENGINEER
COMMONWEALTH OF VIRGINIA