

# North Carolina 2018 - R402.1.5 Total UA



**Property**

, NC 27546  
 Model: Granville 2680  
 Community: NA

**Organization**

Southern Energy Manager  
 Justin Smith

**Inspection Status**

Results are projected

**Builder**

Caviness and Cates

CC 2680-CZ 4 slab

Template - Caviness & Cates - CC 2680

## Building UA

| Elements   | NC Reference | As Designed  |
|--|--------------|--------------|
| Ceilings   | 49.7         | 44.5         |
| Above-Grade Walls                                  | 179.8        | 146.1        |
| Windows, Doors and Skylights                       | 135.5        | 111.3        |
| Slab Floor:  | 86.7         | 113.3        |
| Framed Floors                                      | 4.7          | 4.7          |
| Foundation Walls                                   | 0.0          | 0.0          |
| Rim Joists   | 7.2          | 6.4          |
| <b>Overall UA (Design must be equal or lower):</b> | <b>463.6</b> | <b>426.3</b> |

## Requirements

|   |                                  |   |
|---|----------------------------------|---|
| ✓ | 402.1.5                          | Total UA alternative for insulation and fenestration  |
| ✓ | 402.3.2 Glazed Fenestration SHGC | Average SHGC: 0.23 Max SHGC: 0.30   |
| ✓ | R402.4.2.2                       | Air Leakage Testing Air sealing is 4.80 ACH at 50 Pa. It must not exceed 5.00 ACH at 50 Pa. |
| ✓ | R402.5                           | Area-weighted average fenestration SHGC   |
| ✓ | R402.5                           | Area-weighted average fenestration U-Factor   |
| ✓ | R404.1                           | Lighting Equipment Efficiency   |
| ✓ | Mandatory Checklist              | Mandatory code requirements that are not checked by Ekotrope must be met.                   |
| ✓ | R403.3                           | Duct Insulation   |
| ✓ | 403.3.3                          | Duct Testing  |

**Design exceeds requirements for North Carolina 2018 Prescriptive compliance by 8%.**

Name: Justin Smith

Signature: Justin Smith

Organization: Southern Energy Management

Digitally signed: 1/16/20 at 11:43 AM

**Ekotrope RATER - Version 3.2.3.2336**

North Carolina 2018 Prescriptive compliance results calculated using Ekotrope RATER's energy and code compliance algorithm, including appropriate amendments. Ekotrope RATER is a RESNET Accredited HERS Rating Tool. All results are based on data entered by Ekotrope users. Ekotrope disclaims all liability for the information shown on this report.

# Building Summary



**SOUTHERN ENERGY**  
MANAGEMENT  
ENERGY EFFICIENCY & SOLAR POWER

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## General Building Information

|                                  |                        |
|----------------------------------|------------------------|
| Number Of Bedrooms               | 4                      |
| Number Of Floors                 | 2                      |
| Conditioned Floor Area [sq. ft.] | 2,692                  |
| Unconditioned, attached garage?  | Yes                    |
| Conditioned Volume [cu. ft.]     | 24,650                 |
| Total Units in Building          | 1                      |
| Residence Type                   | Single family detached |
| Floor Number                     | -                      |
| Model                            | Granville 2680         |
| Community                        | NA                     |
| Climate Zone                     | 4A                     |

## Foundation Wall

None Present

## Foundation Wall Library List

None Present

## Slab

| Name | Library Type | Perimeter | Floor Grade | Carpet R | Exposed Masonry Area | Surface Area | Location         | Enclosing         |
|------|--------------|-----------|-------------|----------|----------------------|--------------|------------------|-------------------|
| slab | Uninsulated  | 178       | On Grade    | 1        | 0                    | 1,557.0 ft²  | Exposed Exterior | Conditioned Space |

## Slab Library List

| Name        | Wall Construction Type | Slab Completely Insulated? | Underslab Insulation Width [ft] | Perimeter Insulation Depth [ft] | Perimeter Insulation R Value | Thermal Break | Effective R-value |
|-------------|------------------------|----------------------------|---------------------------------|---------------------------------|------------------------------|---------------|-------------------|
| Uninsulated | Wood Frame / Other     | No                         | 0                               | 0                               | 0                            | No            | 0.00              |

## Framed Floor

| Name        | Library Type          | Carpet R | Floor Grade | Surface Area | Location                       |
|-------------|-----------------------|----------|-------------|--------------|--------------------------------|
| over garage | R-19, 16"OC G1 Carpet | 0        | Above Grade | 101.0 ft²    | Unconditioned, attached garage |

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## Framed Floor Library List

| Name                  | Effective R-value |
|-----------------------|-------------------|
| R-19, 16"OC G1 Carpet | 21.284            |

## Rim Joist

| Name              | Library Type   | Surface Area         | Location                       |
|-------------------|----------------|----------------------|--------------------------------|
| 1st floor ambient | R 19 G2, 16"OC | 99.0 ft <sup>2</sup> | Exposed Exterior               |
| 1st floor garage  | R 19 G2, 16"OC | 31.0 ft <sup>2</sup> | Unconditioned, attached garage |

## Rim Joist Library List

| Name           | Effective Insulation R-value |
|----------------|------------------------------|
| R 19 G2, 16"OC | 15.40                        |

## Wall

| Name              | Library Type       | Surface Color | Surface Area            | Location                       |
|-------------------|--------------------|---------------|-------------------------|--------------------------------|
| 1st floor ambient | R 19 FG G2 16" O.C | Medium        | 1,327.0 ft <sup>2</sup> | Exposed Exterior               |
| 1st floor garage  | R 19 FG G2 16" O.C | Medium        | 275.0 ft <sup>2</sup>   | Unconditioned, attached garage |
| 2nd floor ambient | R 19 FG G2 16" O.C | Medium        | 793.0 ft <sup>2</sup>   | Exposed Exterior               |
| 2nd floor attic   | R 19 FG G2 16" O.C | Medium        | 327.0 ft <sup>2</sup>   | Attic                          |

## Wall Library List

| Name               | Effective R-value |
|--------------------|-------------------|
| R 19 FG G2 16" O.C | 15.977            |

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## Glazing

| Name               | Library Type | Wall Assignment   | Foundation Wall Assignment | Overhang Depth | Overhang Ft To Top | Overhang Ft To Bottom | Orientation | Surface Area         |
|--------------------|--------------|-------------------|----------------------------|----------------|--------------------|-----------------------|-------------|----------------------|
| front 2nd unshaded | 30/23        | 2nd floor ambient |                            | 0              | 0                  | 0                     | East        | 27.0 ft <sup>2</sup> |
| front shaded       | 30/23        | 1st floor ambient |                            | 5              | 1                  | 6                     | East        | 47.0 ft <sup>2</sup> |
| left unshaded      | 30/23        | 1st floor ambient |                            | 0              | 0                  | 0                     | South       | 45.0 ft <sup>2</sup> |
| rear 2nd unshaded  | 30/23        | 2nd floor ambient |                            | 0              | 0                  | 0                     | West        | 45.0 ft <sup>2</sup> |
| rear shaded        | 30/23        | 1st floor ambient |                            | 10             | 2                  | 9                     | West        | 48.0 ft <sup>2</sup> |
| rear unshaded      | 30/23        | 1st floor ambient |                            | 0              | 0                  | 0                     | West        | 60.0 ft <sup>2</sup> |
| right 2nd unshaded | 30/23        | 2nd floor ambient |                            | 0              | 0                  | 0                     | North       | 36.0 ft <sup>2</sup> |
| right unshaded     | 30/23        | 1st floor ambient |                            | 0              | 0                  | 0                     | North       | 31.0 ft <sup>2</sup> |

## Glazing Library List

| Name  | Shgc | U-factor |
|-------|------|----------|
| 30/23 | 0.23 | 0.300    |

## Skylight

None Present

## Skylight Library List

None Present

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## Opaque Door

| Name         | Library Type   | Wall Assignment   | Foundation Wall Assignment | Emittance | Solar Absorptance | Surface Color | Surface Area | Location         |
|--------------|----------------|-------------------|----------------------------|-----------|-------------------|---------------|--------------|------------------|
| attic door   | Fiberglass R-5 | 2nd floor attic   |                            | 0.9       | 0.75              | Medium        | 10.0 ft²     | Exposed Exterior |
| front entry  | Fiberglass R-5 | 1st floor ambient |                            | 0.9       | 0.75              | Medium        | 20.0 ft²     | Exposed Exterior |
| garage entry | Fiberglass R-5 | 1st floor garage  |                            | 0.9       | 0.75              | Medium        | 18.0 ft²     | Exposed Exterior |

## Opaque Door Library List

| Name           | Effective U-factor |
|----------------|--------------------|
| Fiberglass R-5 | 0.200              |

## Roof Insulation

| Name  | Library Type   | Attic Exterior Area [s.f.] | Clay or Concrete Roof Tiles | Surface Color | Surface Area | Location |
|-------|--|----------------------------|-----------------------------|---------------|--------------|----------|
| attic | R-38 Attic BLOWN FG<br>G1 2x10 24"OC w/<br>Radiant Barrier | 2,437.26                   | No                          | Dark          | 1,658.0 ft²  | Attic    |

## Roof Insulation Library List

| Name   | Has Radiant Barrier | Effective R-value |
|--|---------------------|-------------------|
| R-38 Attic BLOWN FG<br>G1 2x10 24"OC w/<br>Radiant Barrier | Yes                 | 37.246            |

## Whole House Infiltration

| Infiltration      | Measurement Type   | Shelter Class |
|-------------------|--------------------|---------------|
| 1972 CFM at 50 Pa | Blower-door tested | 4             |

## Mechanical Ventilation

None Present

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## Lighting

| % Interior Fluorescent Lighting | % Interior LED Lighting | % Exterior Fluorescent Lighting | % Exterior LED Lighting | % Garage Fluorescent Lighting | % Garage LED Lighting |
|---------------------------------|-------------------------|---------------------------------|-------------------------|-------------------------------|-----------------------|
| 0                               | 75                      | 100                             | 0                       | 100                           | 0                     |

## Onsite Generation

None Present

## Onsite Generation Library List

None Present

## Solar Generation

None Present

## Solar Generation Library List

None Present

## Conditioning Equipment

| Name                     | Library Type          | Heating Percent Load | Cooling Percent Load | Hot Water Percent Load | Location    |
|--------------------------|-----------------------|----------------------|----------------------|------------------------|-------------|
| Air-source heat pump (1) | z 36k 13 Seer 7.7hspf | 100%                 | 100%                 | 0%                     | Unspecified |
| Water Heating (2)        | Z 50 gal. 0.91EF elec | 0%                   | 0%                   | 100%                   | Unspecified |

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## Equipment Type: Z 50 gal. 0.91EF elec

|                             |                    |
|-----------------------------|--------------------|
| Fuel Type                   | Electric           |
| Distribution Type           | Hydronic Delivery  |
| Hot Water Efficiency        | 0.91 Energy Factor |
| Tank Capacity (gal.)        | 50                 |
| Hot Water Capacity [kBtu/h] | 40                 |
| Recovery Efficiency         | 0.98               |

## Equipment Type: z 36k 13 Seer 7.7hspf

|                           |                     |
|---------------------------|---------------------|
| Fuel Type                 | Electric            |
| Distribution Type         | Forced Air Ductless |
| Motor Type                | PSC (Single Speed)  |
| Heating Efficiency        | 7.7 HSPF            |
| Heating Capacity [kBtu/h] | 22                  |
| Cooling Efficiency        | 13 SEER             |
| Cooling Capacity [kBtu/h] | 36                  |

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## Distribution System

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| Distribution Type                   | Forced Air                           |
| Heating Equipment                   | Air-source heat pump (1)             |
| Cooling Equipment                   | Air-source heat pump (1)             |
| Sq. Feet Served                     | 2692                                 |
| # Return Grilles                    | 2                                    |
| Supply Duct R Value                 | 8                                    |
| Return Duct R Value                 | 8                                    |
| Supply Duct Area [ft <sup>2</sup> ] | 545.1                                |
| Return Duct Area [ft <sup>2</sup> ] | 201.9                                |
| Leakage to Outdoors                 | 107 CFM @ 25Pa (3.97 / 100 s.f.)     |
| Total Leakage                       | 107 CFM25                            |
| Total Leakage Duct Test Conditions  | Post-Construction                    |
| Use Default Flow Rate               | Yes                                  |
| Duct 1                              |                                      |
| Duct Location                       | Conditioned Space                    |
| Percent Supply Area                 | 25                                   |
| Percent Return Area                 | 25                                   |
| Duct 2                              |                                      |
| Duct Location                       | Attic (well vented, radiant barrier) |
| Percent Supply Area                 | 75                                   |
| Percent Return Area                 | 75                                   |
| Duct 3                              |                                      |
| Duct Location                       | Conditioned Space                    |
| Percent Supply Area                 | 0                                    |
| Percent Return Area                 | 0                                    |
| Duct 4                              |                                      |
| Duct Location                       | Conditioned Space                    |
| Percent Supply Area                 | 0                                    |
| Percent Return Area                 | 0                                    |
| Duct 5                              |                                      |
| Duct Location                       | Conditioned Space                    |
| Percent Supply Area                 | 0                                    |
| Percent Return Area                 | 0                                    |
| Duct 6                              |                                      |
| Duct Location                       | Conditioned Space                    |
| Percent Supply Area                 | 0                                    |
| Percent Return Area                 | 0                                    |

## Ceiling Fan

|                 |     |
|-----------------|-----|
| Has Ceiling Fan | Yes |
| Cfm Per Watt    | 100 |



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## Water Distribution

|  |          |
|--|----------|
| Water Fixture Type                         | Standard |
| Use Default Hot Water Pipe Length          | No       |
| Hot Water Pipe Length [ft]                 | 93       |
| At Least R3 Pipe Insulation?               | No       |
| Hot Water Recirculation System?            | No       |
| Recirculation System Pipe Loop Length [ft] | 20       |
| Drain Water Heat Recovery?                 | No       |

## Clothes Dryer

|                   |                |
|-------------------|----------------|
| Fuel Type         | Electric       |
| Cef               | 2.62           |
| Field Utilization | Timer Controls |

## Clothes Washer

|                     |              |
|---------------------|--------------|
| Label Energy Rating | 151 kWh/Year |
| Electric Rate       | \$0.11/kWh   |
| Annual Gas Cost     | \$12.00      |
| Gas Rate            | \$1.22/Therm |
| Capacity            | 3.31         |
| Imef                | 2.155        |

## Appliances and Controls

|                          |              |
|--------------------------|--------------|
| Programmable thermostat? | Yes          |
| Dishwasher Size          | Standard     |
| Dishwasher Efficiency    | 0.65 EF      |
| Range/Oven Fuel          | Electric     |
| Convection Oven?         | No           |
| Induction Range?         | No           |
| Refrigerator Consumption | 691 kWh/Year |

## Notes

Initial Inputs \_\_\_\_\_ JS 8/13/13 \_\_\_\_\_  
updated JS 09/30/19

- slab insulation included
- confirm HVAC specs
- modeled to worst case orientation