SMART AND STRONG: ENERGY EFFICIENCY & RESILIENCE IN HABITAT HOMES

ALABAMA HABITAT FOR HUMANITY STATE CONFERENCE

October 2, 2025

RURAL
STUDIO

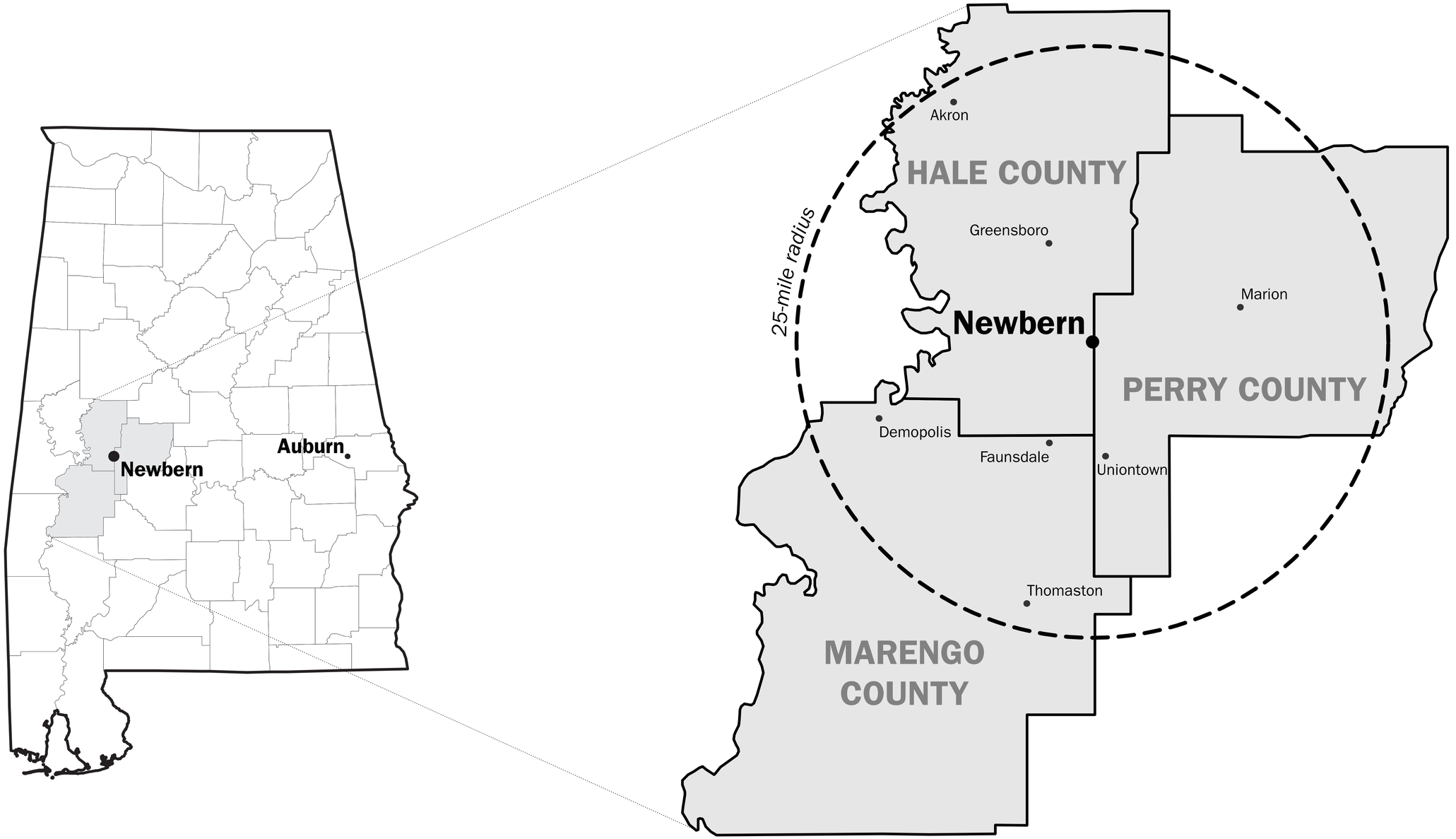
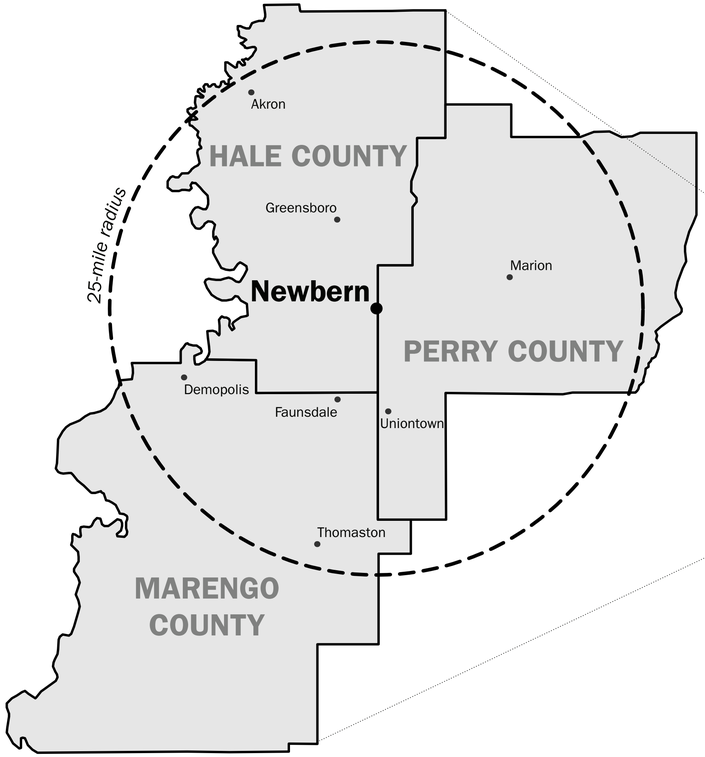
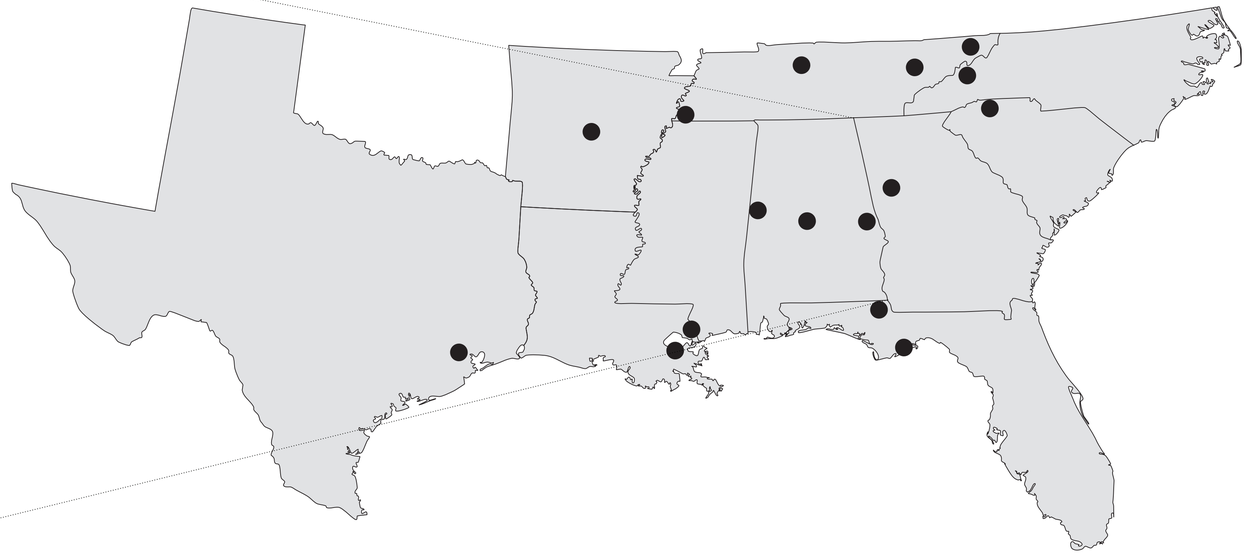

Newbern
Auburn
25-mile radius
Akron
HALE COUNTY
Greensboro
Newbern
Marion
PERRY COUNTY
Demopolis
Faunsdale
Uniontown
Thomaston
MARENGO
COUNTY

photo © Timothy Hursley

Front Porch Initiative

The Front Porch Initiative seeks to extend the impact of Rural Studio's applied research in housing affordability by developing a scalable, sustainable, and resilient process for delivering homes in under-resourced rural communities.





RURAL STUDIO

FRONT PORCH INITIATIVE

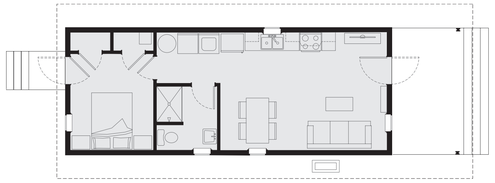
PRODUCT DEVELOPMENT

PARTNER ENGAGEMENT

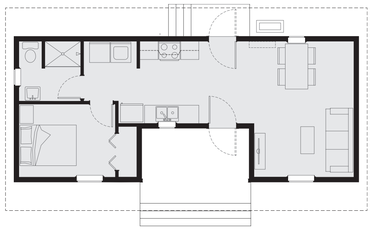
POLICY ADVOCACY

ONE BEDROOM

DAVE'S HOUSE



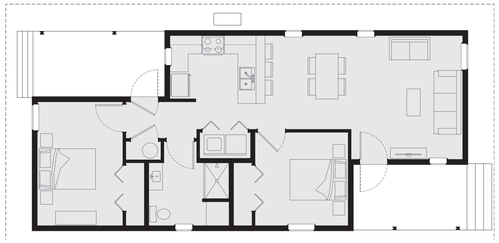
MACARTHUR'S HOUSE



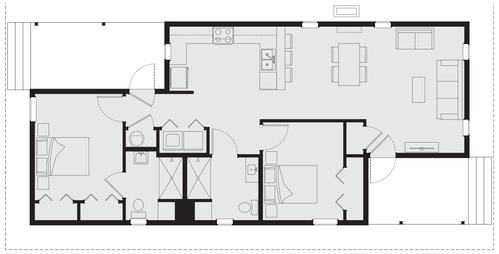
JOANNE'S HOUSE

TWO BEDROOM

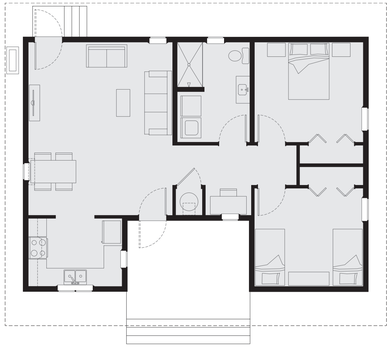
SYLVIA'S 2/1 HOUSE



SYLVIA'S 2/2 HOUSE

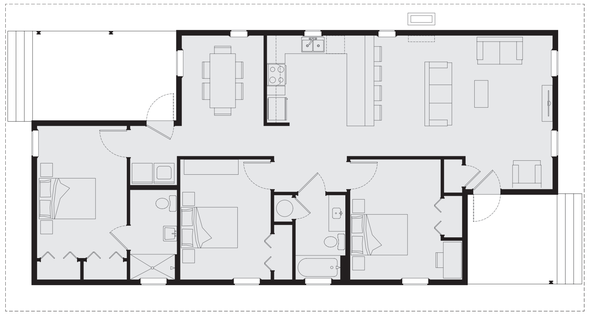


BUSTER'S HOUSE



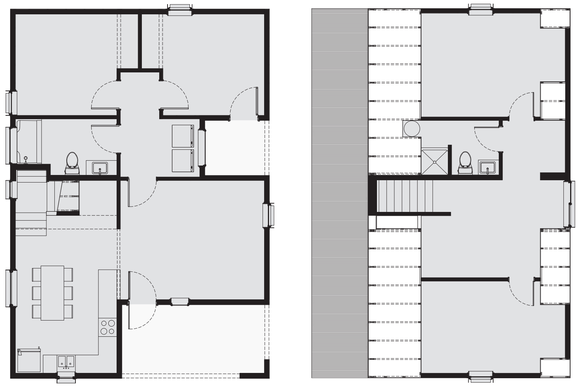
THREE BEDROOM

SYLVIA'S 3/2 HOUSE



FOUR BEDROOM

PATRIECE'S HOUSE



MULTI-UNIT

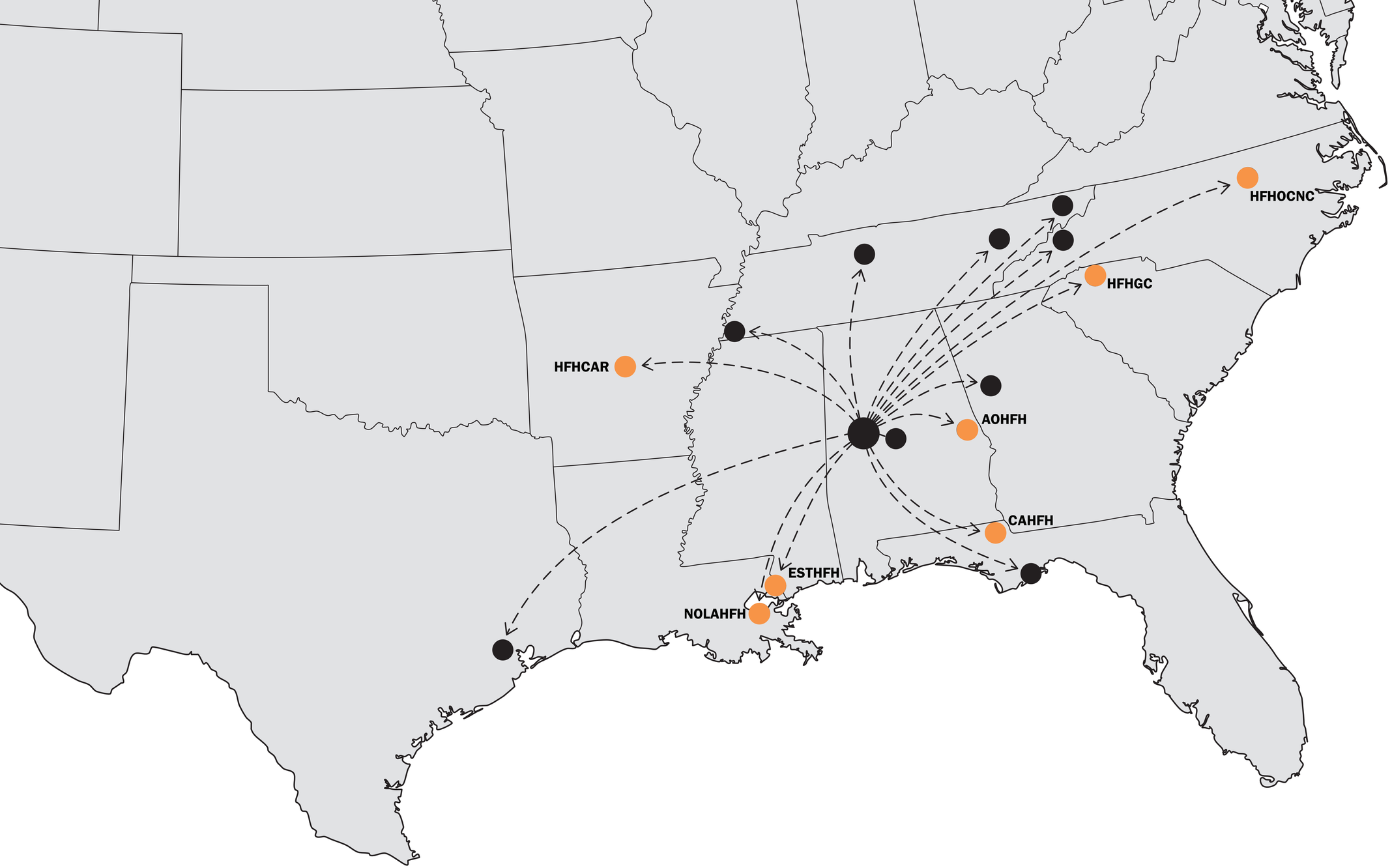
DUPLEX

photos © Ford Photographs, Timothy Hursley, & Matt Hall

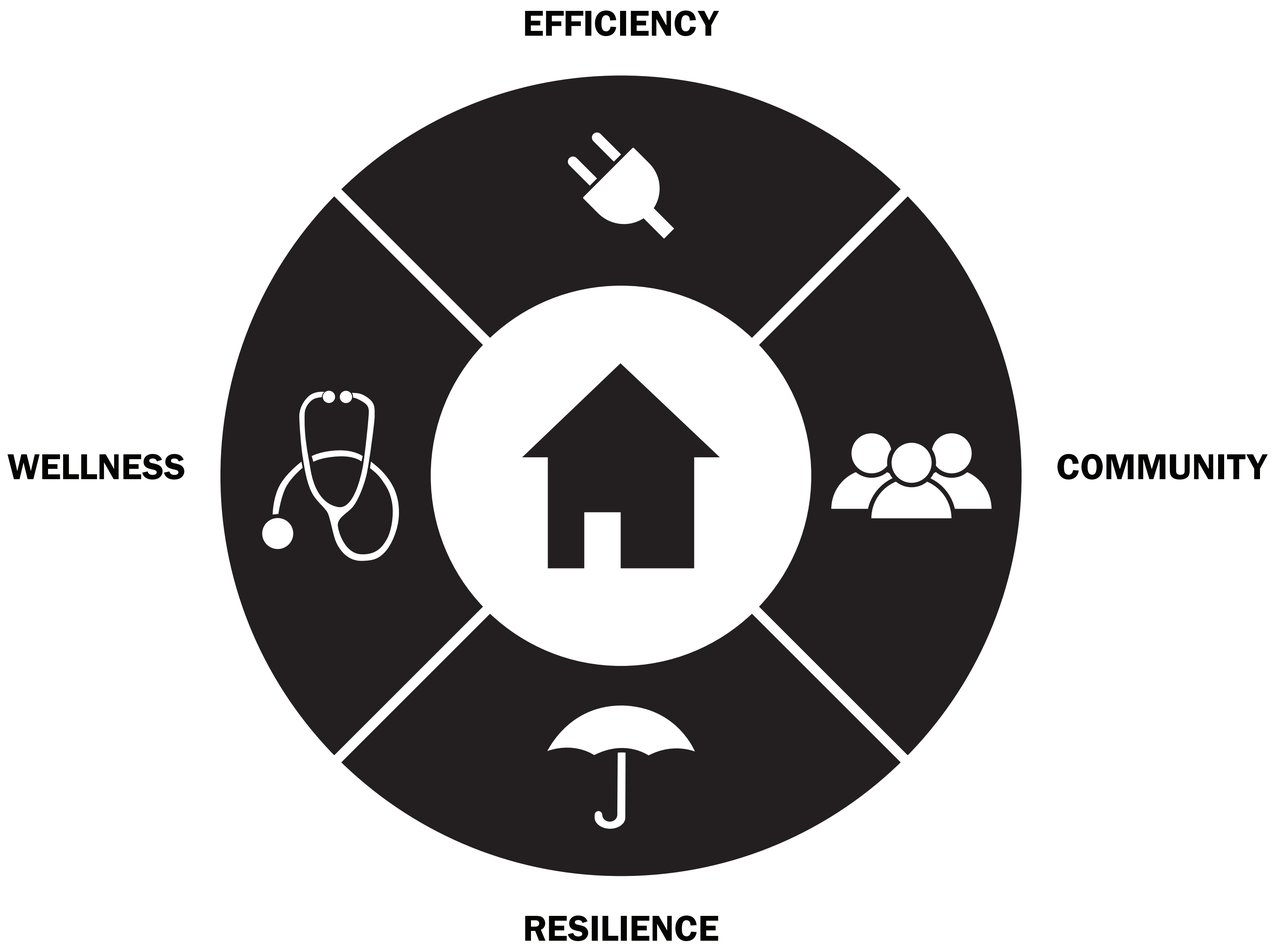
photos © Keith Isaacs, Tanisha Stephens, & Rural Studio

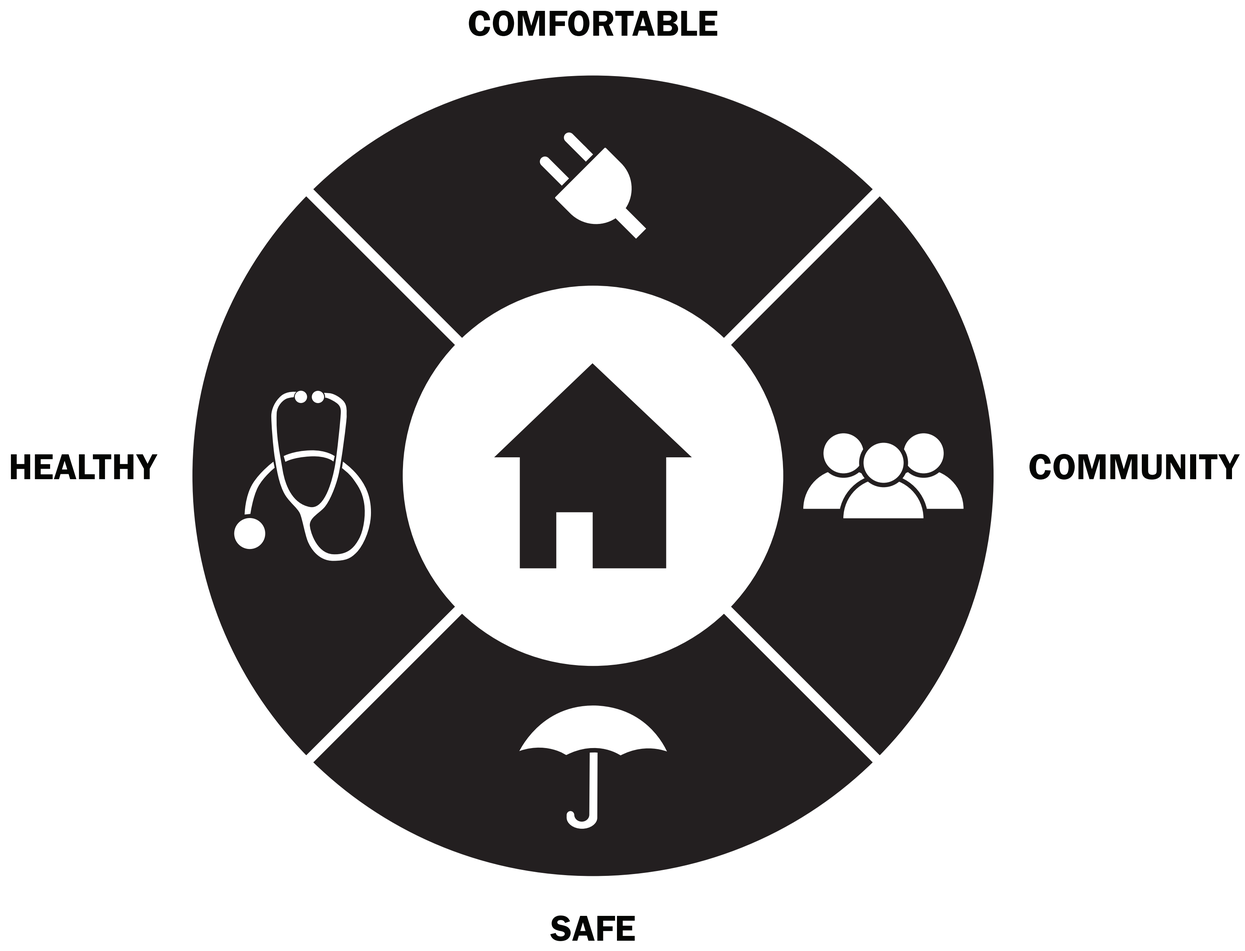
photos © Timothy Hursley, Ford Photographs, & Keith Isaacs

photos © Keith Isaacs, Ford Photographs, Jessica Ashley, & Rural Studio


HFHOCNC
HFHGC
HFHCAR
AOHFH
CAHFH
ESTHFH
NOLAHFH

HIGH-PERFORMANCE HOMES

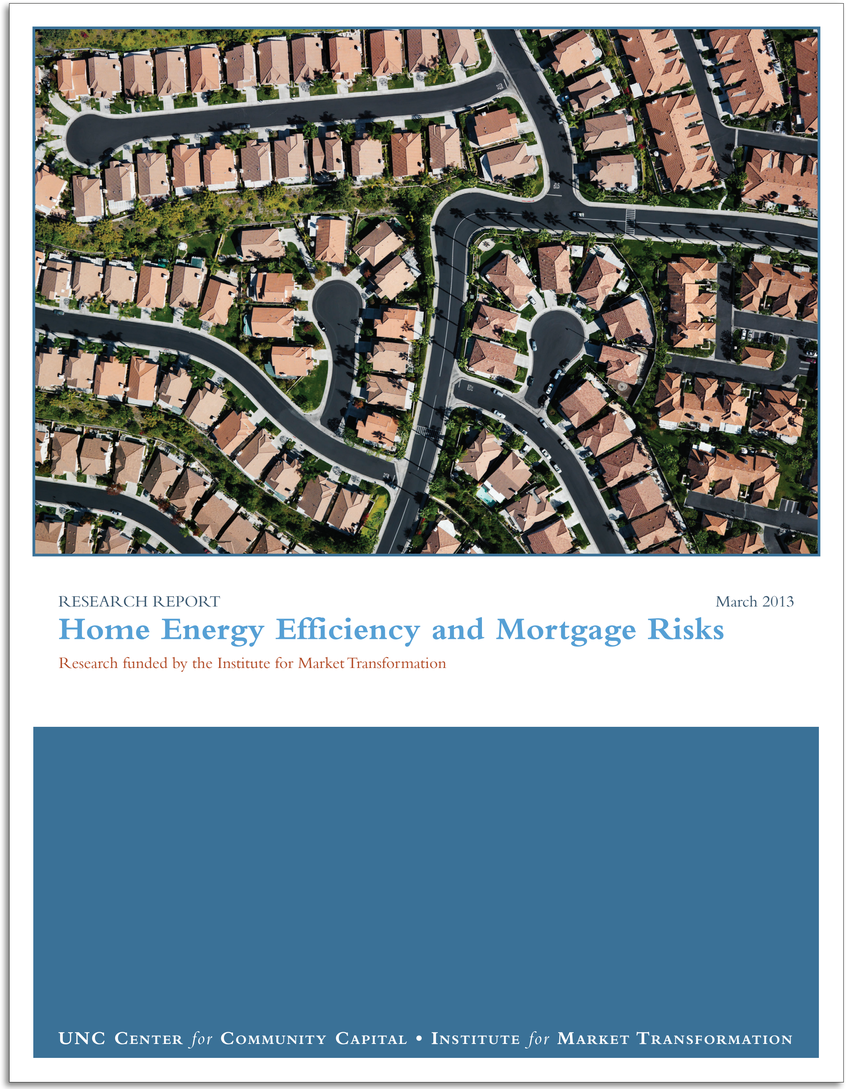

EFFICIENCY
WELLNESS
COMMUNITY
RESILIENCE


COMFORTABLE
HEALTHY
COMMUNITY
SAFE

EFFICIENCY

Default risks are on average 32% lower in energy-efficient homes, controlling for other loan determinates.

Institute for Market Transformation



source: Institute for Market Transformation, "Home Energy Efficiency and Mortgage Risks"

REASONS TO INCREASE ENERGY EFFICIENCY

- **REDUCE ENERGY USE**

  Overall reduction of energy consumption lessens environmental impacts, conserves finite natural resources, and enhances energy independence; in other words, it's good for the society and the environment.

- **REDUCE UTILITY COSTS**

  Decreasing energy consumption should also decrease utility costs; in other words, it's good for the pocketbook.

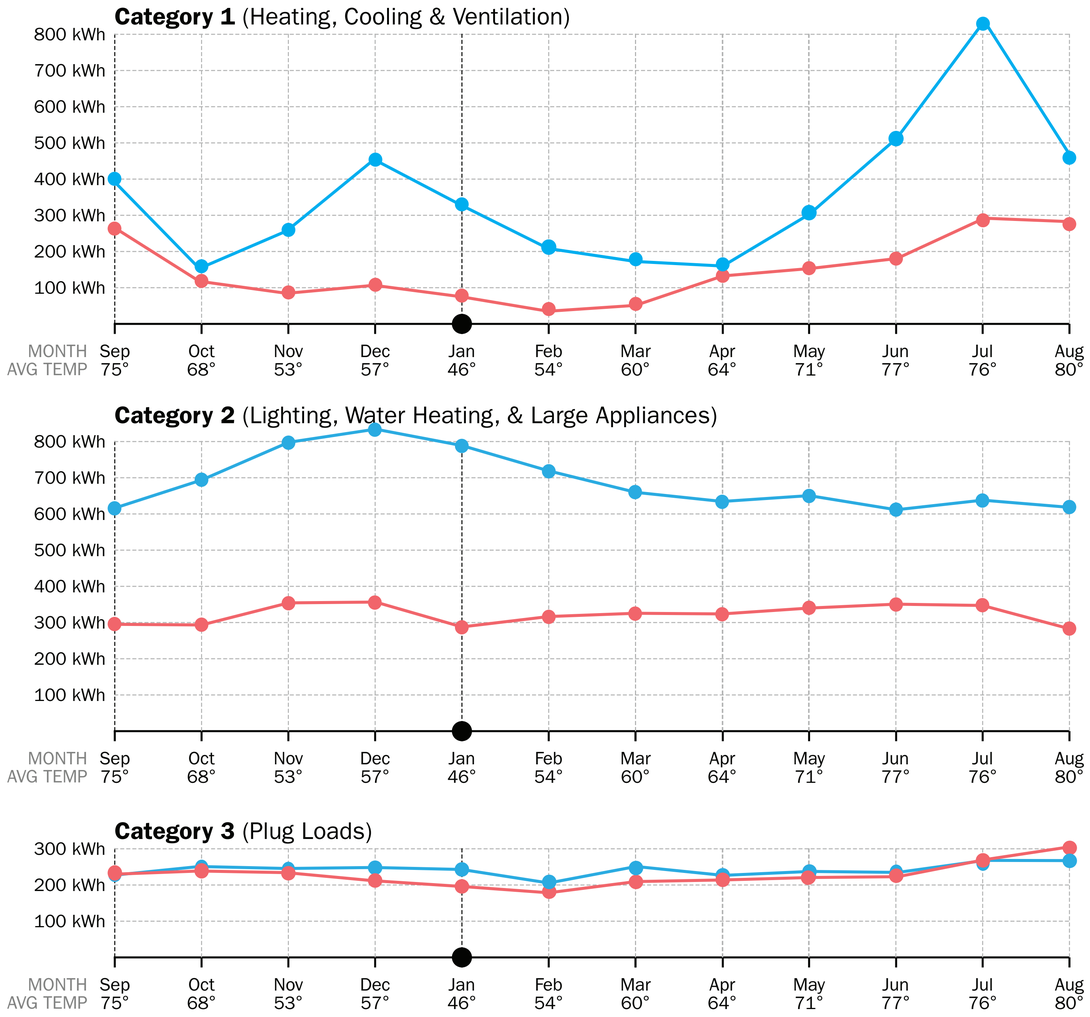
- **INCREASE OCCUPANT COMFORT**

  Energy efficient homes will maintain a more consistent temperature that non energy efficient homes, keep the house cooler longer in the summer and warmer longer in the winter (like a thermos). Furthermore, if there is a service disruption—such as a power outage—the house will maintain its current temperature longer than a comparable inefficient home, even without the heating or cooling systems running.

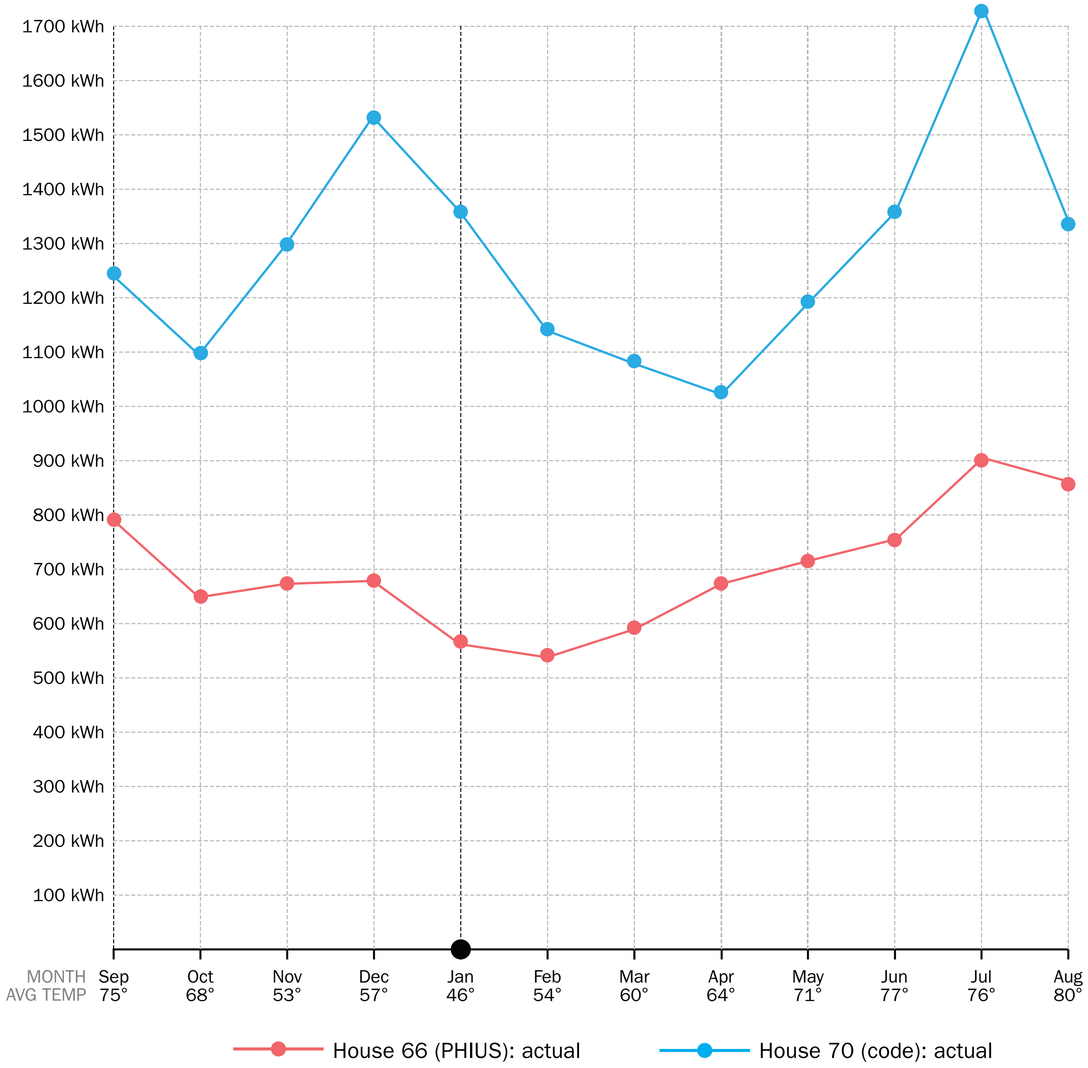
- **STABILIZE UTILITY COSTS**

  An energy efficient house should help level out energy use at the hottest and coldest times of year, helping to stabilize utility bills. And, with both lower and more stable utility costs, the homeowner is potentially better prepared to make timely mortgage payments.

ENERGY CONSUMPTION BY CATEGORY (kWh)

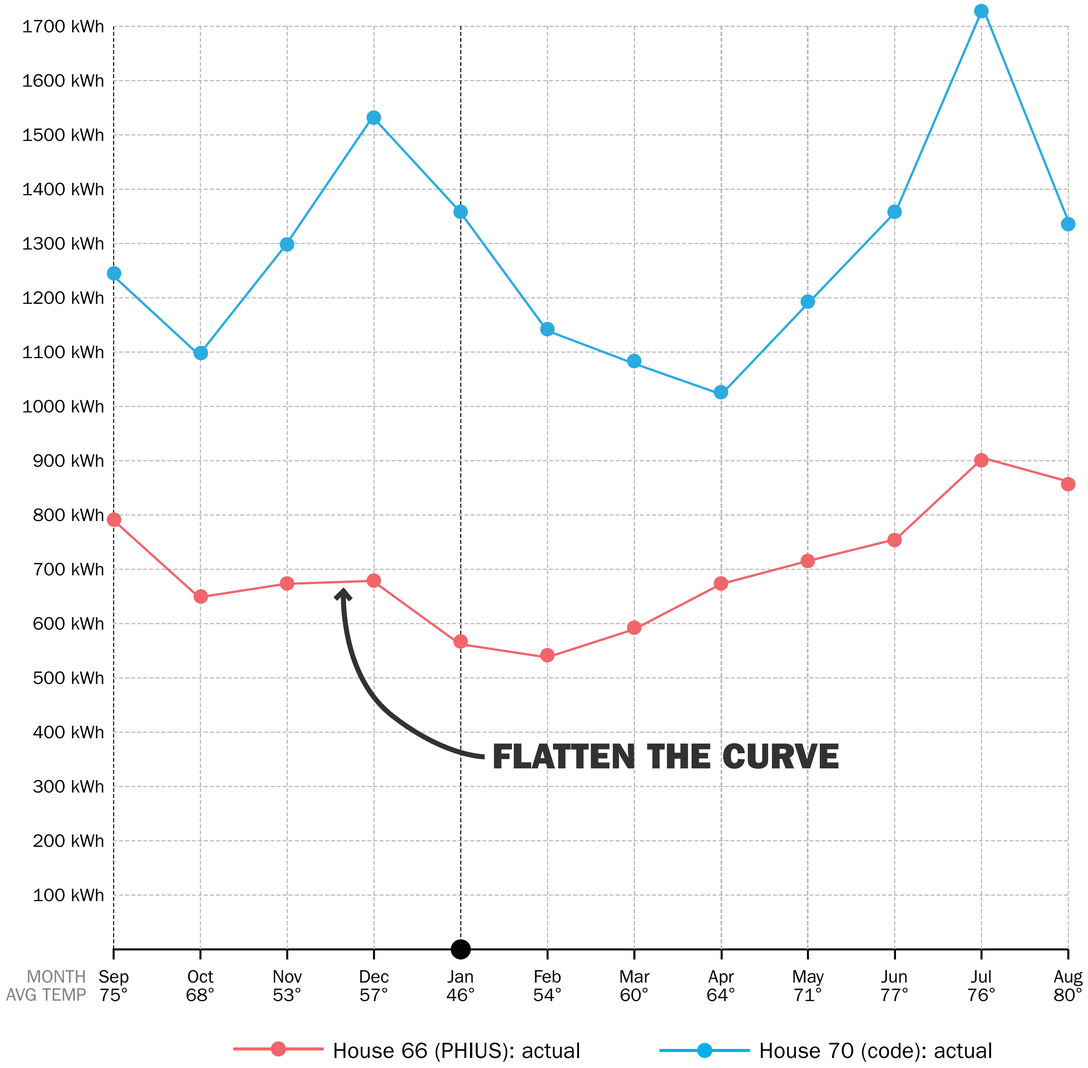


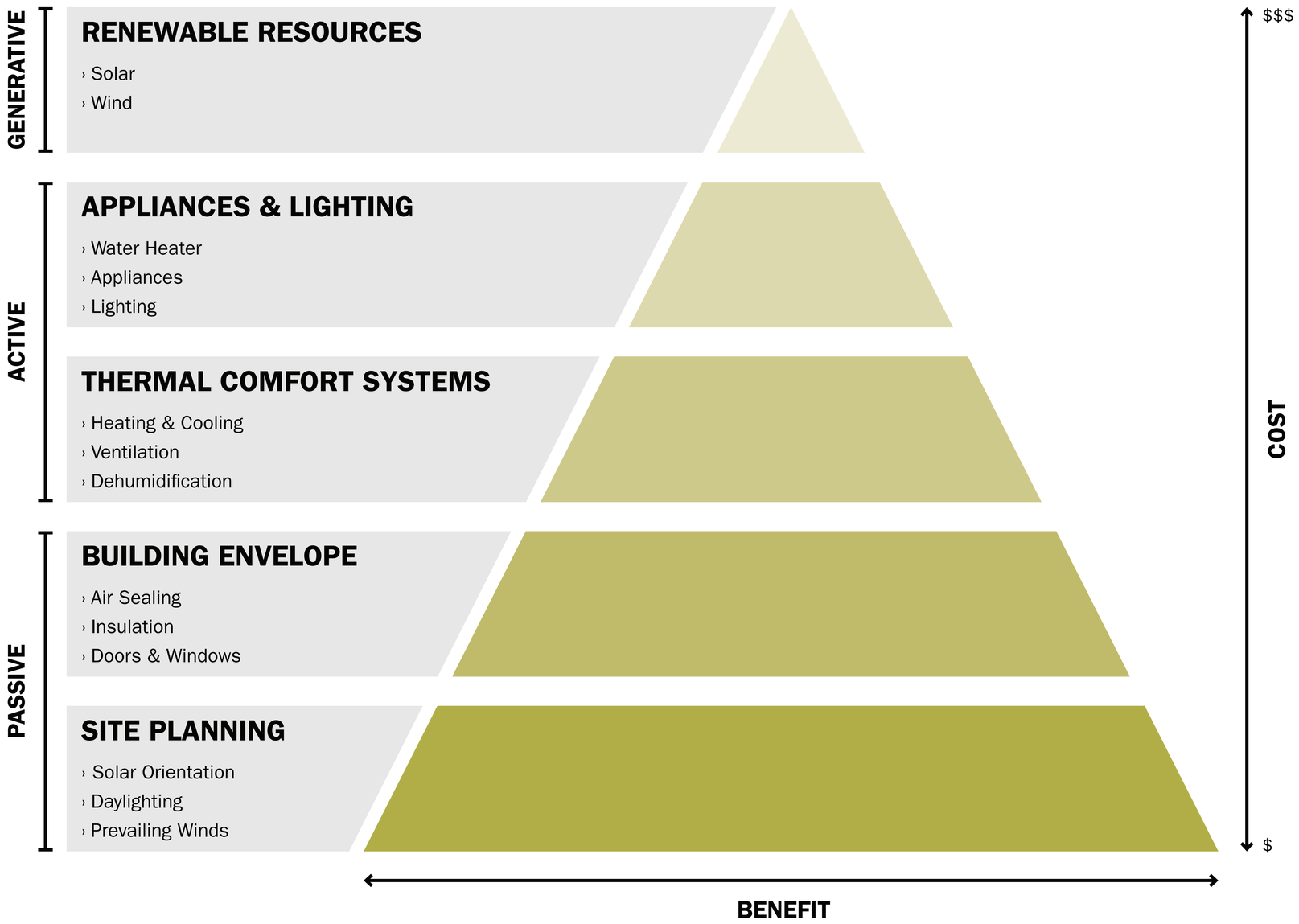
TOTAL ENERGY CONSUMPTION (kWh)



ENERGY CONSUMPTION BY CATEGORY (kWh)

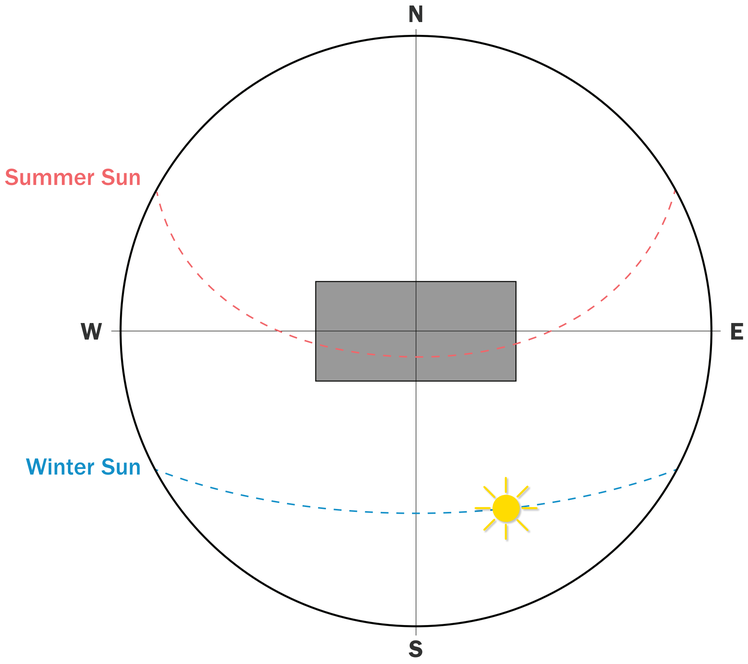
TOTAL ENERGY CONSUMPTION (kWh)

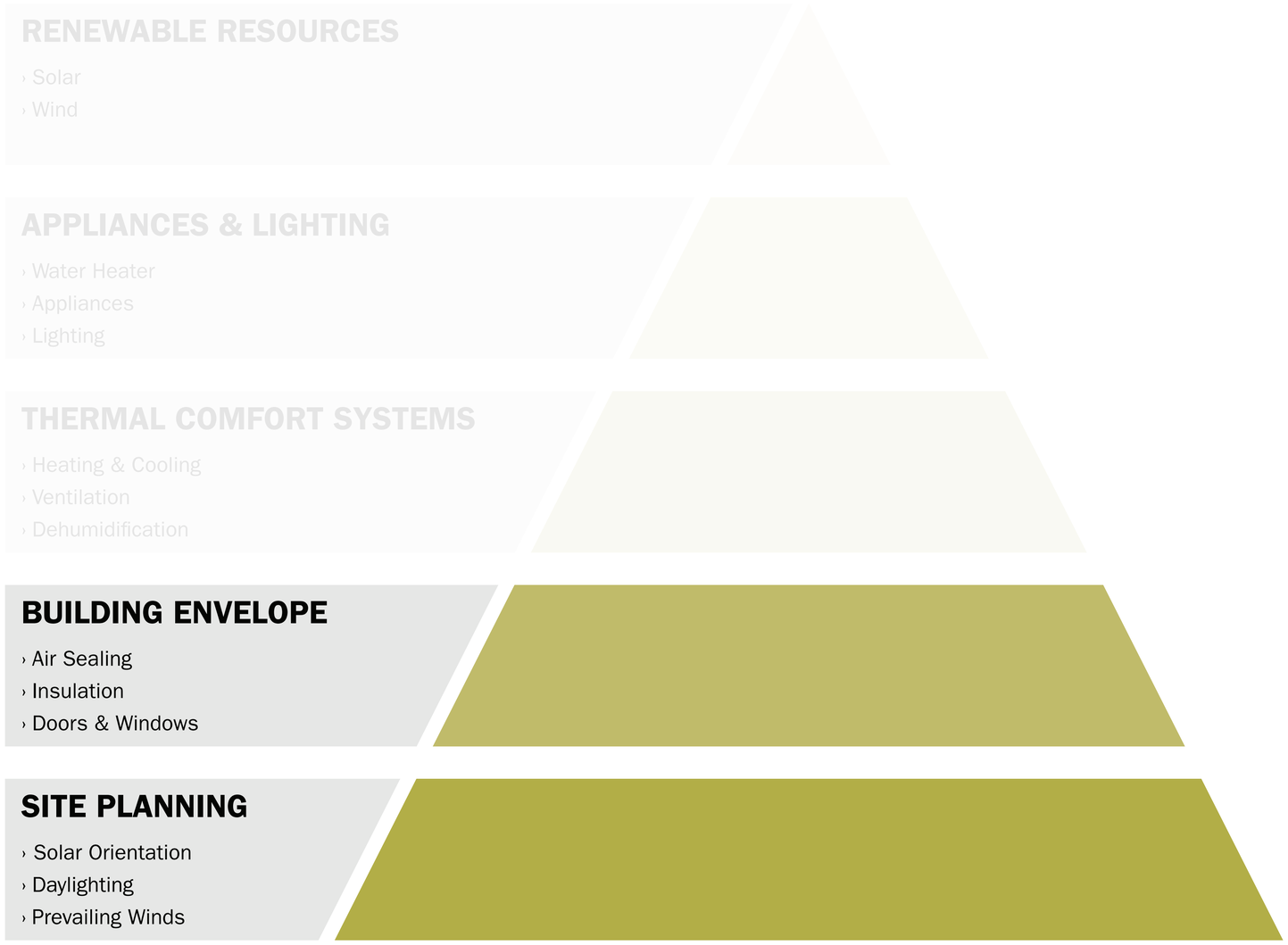



GENERATIVE
RENEWABLE RESOURCES
› Solar
› Wind
ACTIVE
APPLIANCES & LIGHTING
› Water Heater
› Appliances
› Lighting
THERMAL COMFORT SYSTEMS
› Heating & Cooling
› Ventilation
› Dehumidification
PASSIVE
BUILDING ENVELOPE
› Air Sealing
› Insulation
› Doors & Windows
SITE PLANNING
› Solar Orientation
› Daylighting
› Prevailing Winds
$$$
COST
$
BENEFIT

SOLAR ORIENTATION & DAYLIGHTING

- **NORTH** light is indirect & even.
- **SOUTH** light can is direct, but can be shaded via horizontal structures such as roof overhangs.
- **EAST & WEST** light direct and can be challenging to shade or control because of the rising and setting of the sun.

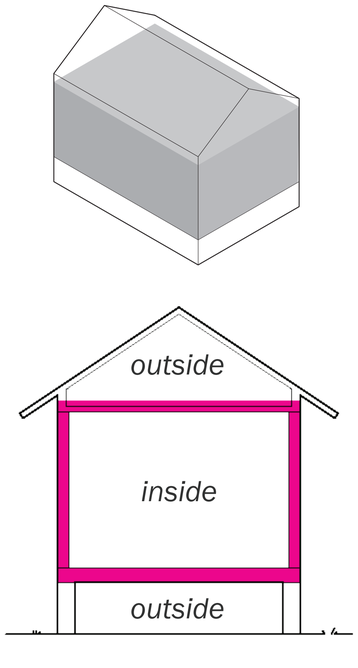




THERMAL ENVELOPE

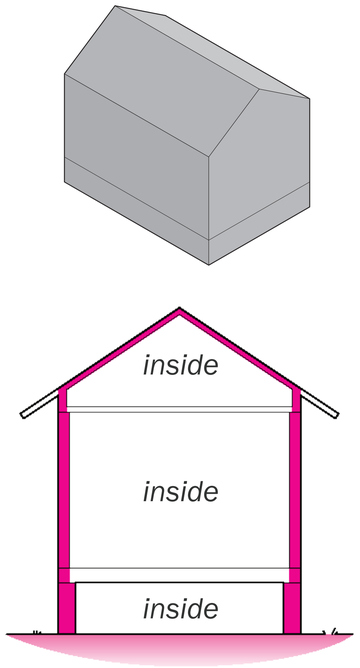
INSULATED BOX

Only the living area (the ‘box’) of the house is inside the thermal envelope. Insulation is at the ceiling plane and the floor.



INSULATED FORM

The living area, attic and foundation are inside the thermal envelope. Insulation is at the roof plane and the foundation walls / ground.



RENEWABLE RESOURCES

› Solar
› Wind

APPLIANCES & LIGHTING

› Water Heater
› Appliances
› Lighting

THERMAL COMFORT SYSTEMS

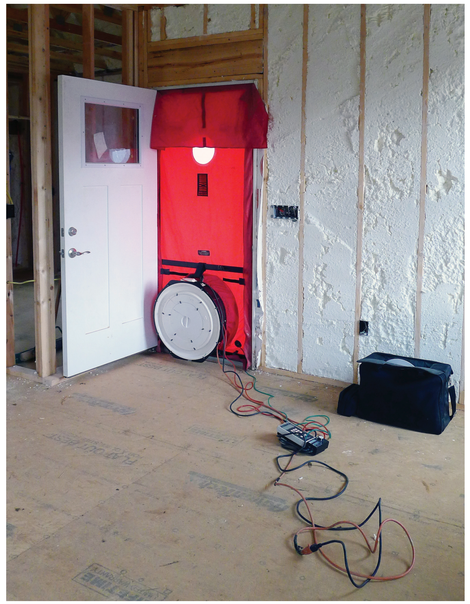
› Heating & Cooling
› Ventilation
› Dehumidification

BUILDING ENVELOPE

› Air Sealing
› Insulation
› Doors & Windows

SITE PLANNING

› Solar Orientation
› Daylighting
› Prevailing Winds

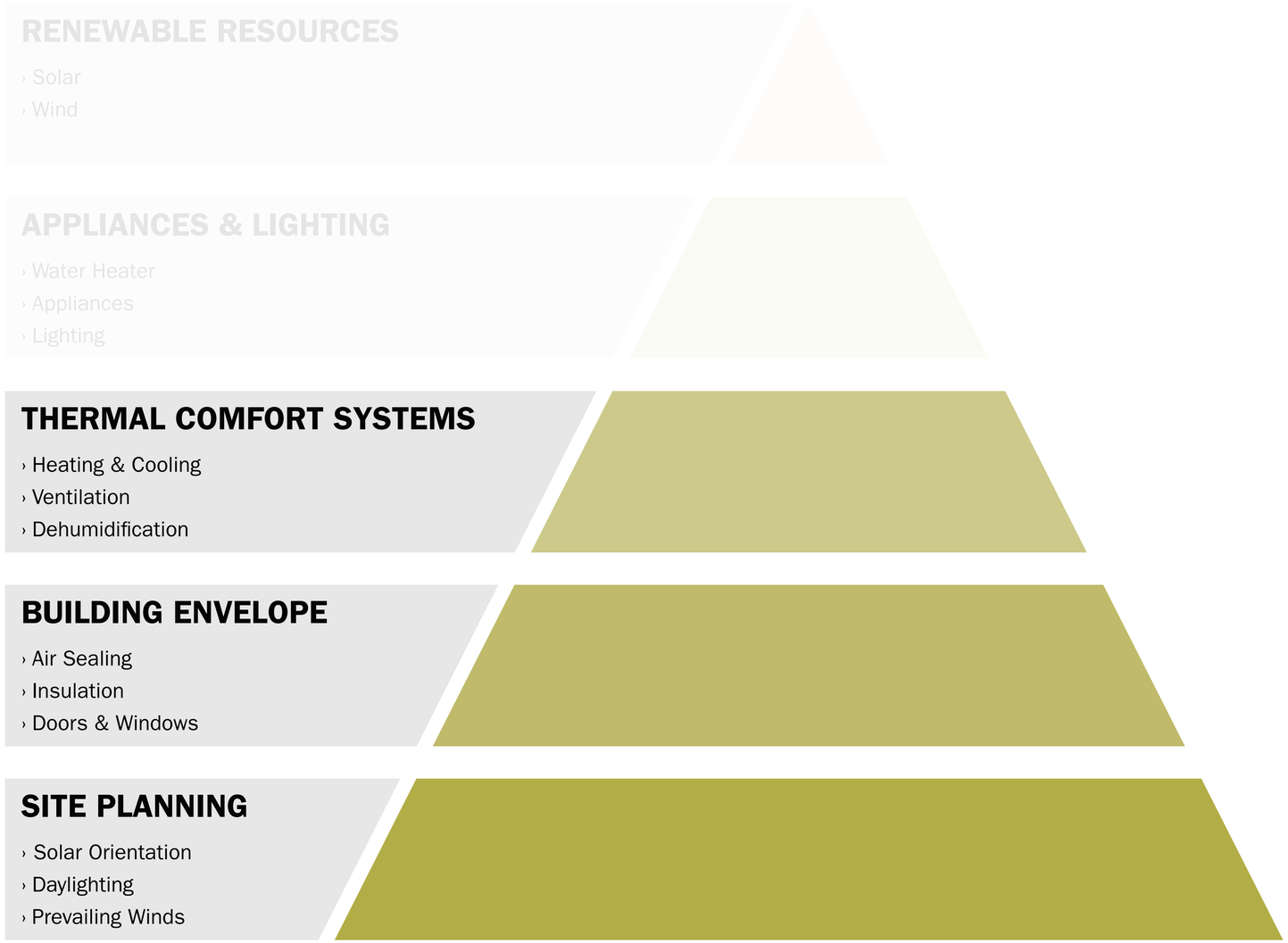


CAN YOU SEAL A HOUSE TOO TIGHTLY?

CAN YOU SEAL A HOUSE TOO TIGHTLY?

NO!

SEAL IT TIGHT, AND VENTILATE IT RIGHT!



THERMAL COMFORT SYSTEM TASKS

› CONDITIONING (HEATING & COOLING)

In Alabama, heat pumps are common—and potentially reasonably efficient—systems. Higher SEER systems and multi-stage systems can increase efficiency.

› CIRCULATION

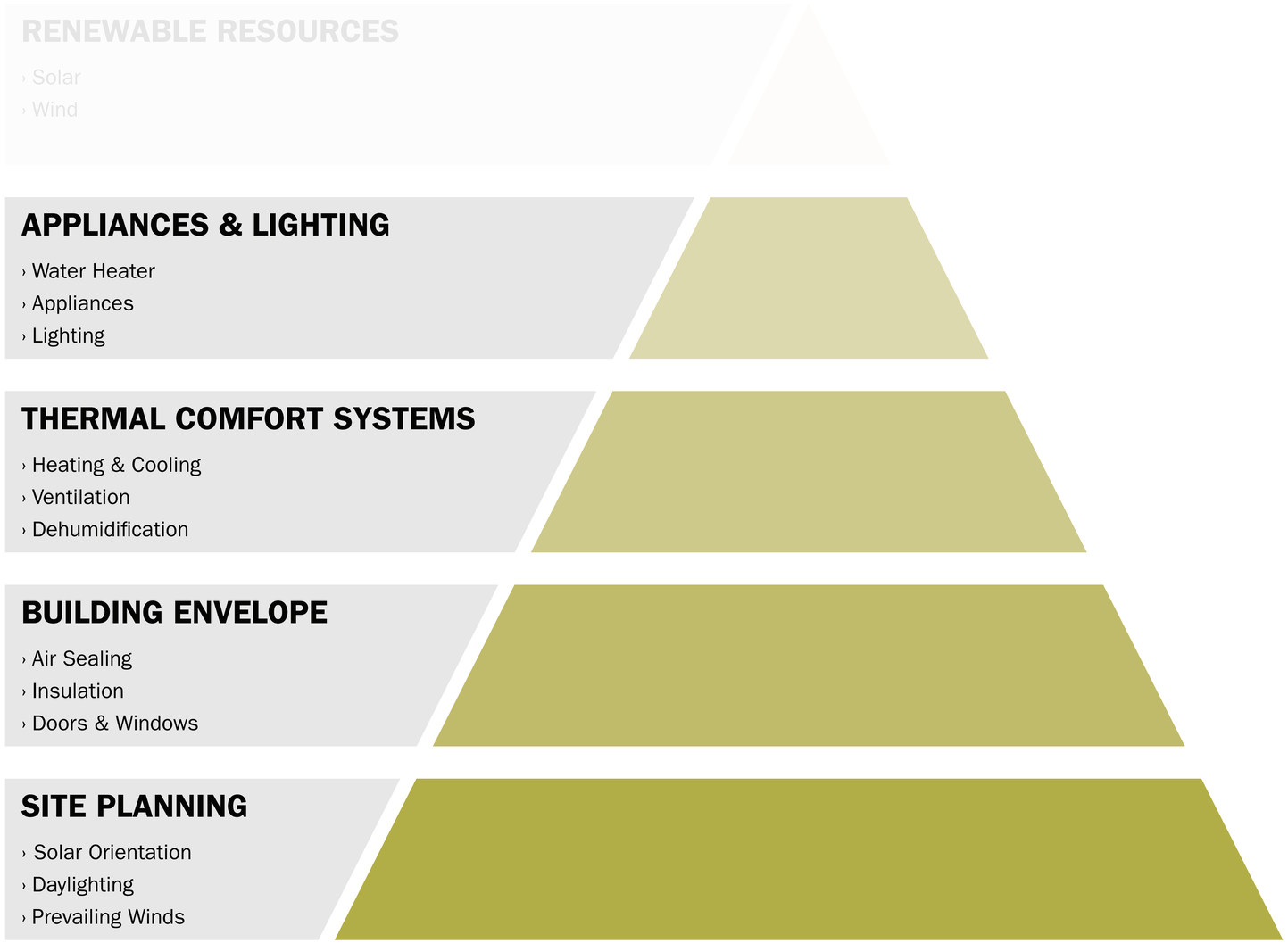
Ductwork distributes the conditioned air around the house. Placing the ductwork inside the thermal envelope can dramatically increase efficiency. Well-installed, well-sealed ductwork also increases efficiency.

› VENTILATION

Fresh air is a requirement of the building code and is critical for good indoor air quality (IAQ). We recommend balanced ventilation for efficiency.

› DEHUMIDIFICATION

In the Southeast, humidity is one of the largest challenges to thermal comfort. Exhaust fans in bathrooms reduce indoor humidity levels, and dehumidifiers can increase comfort, especially in the “shoulder seasons” (fall & spring).



APPLIANCES & LIGHTING

› WATER HEATER

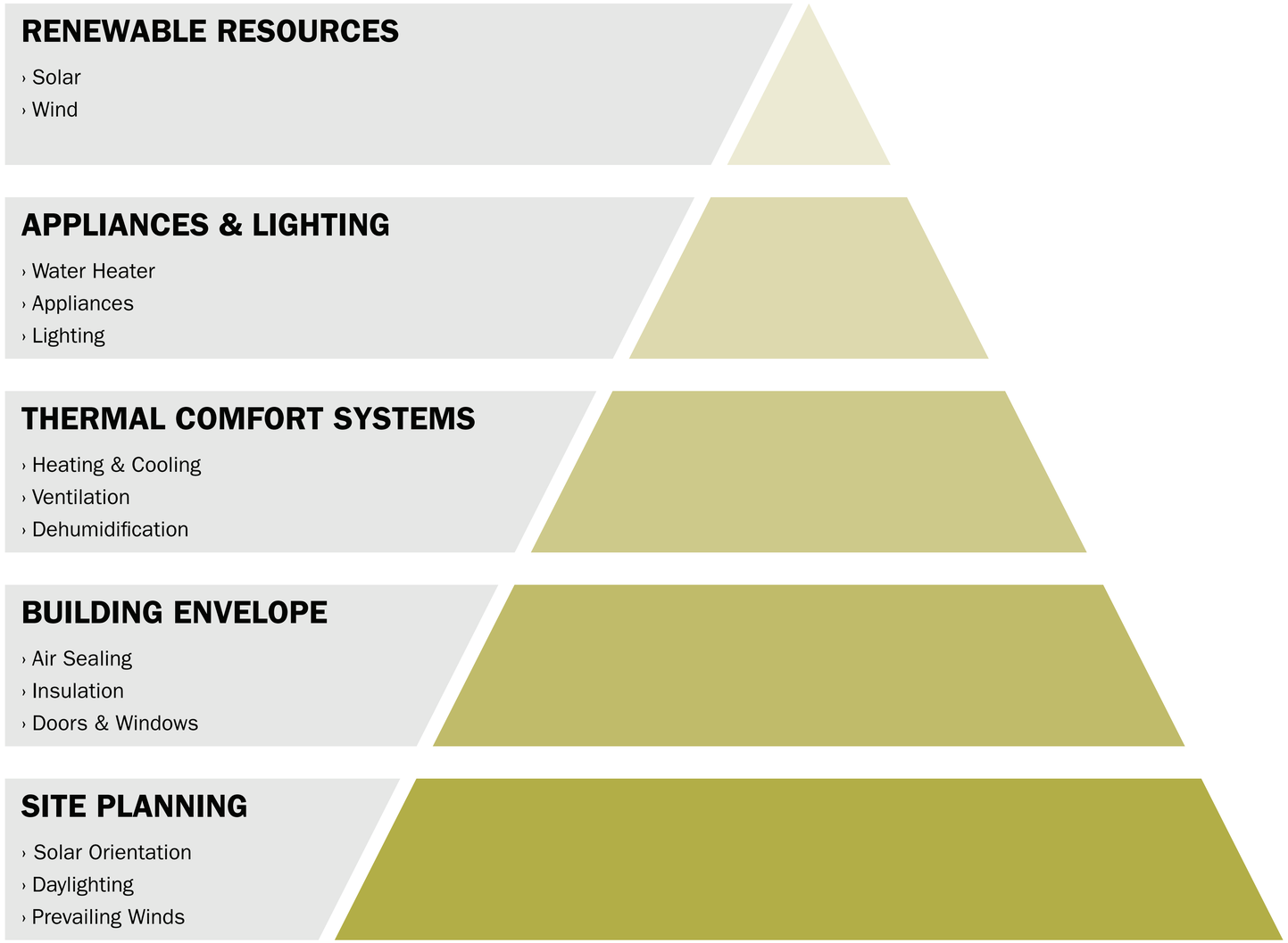
We recommend an efficient tank water heater over a tankless—aka on-demand or instant—water heater in most instances (we do not recommend tankless electric water heaters). Heat pump water heaters, while a higher first cost, greatly improve efficiency (and also provide some dehumidification!).

› APPLIANCES

ENERGY STAR-labeled appliances are a quick way to ensure you're getting an efficient appliance. Look for they yellow "Energy Guide" label for easy cross-comparisons of yearly estimated energy cost.

› LIGHTING

High efficacy bulbs are a simple and widely available method for increasing efficiency. Don't forget about exterior lighting, such as flood lights.



SOLAR / PHOTOVOLTAICS (PV)

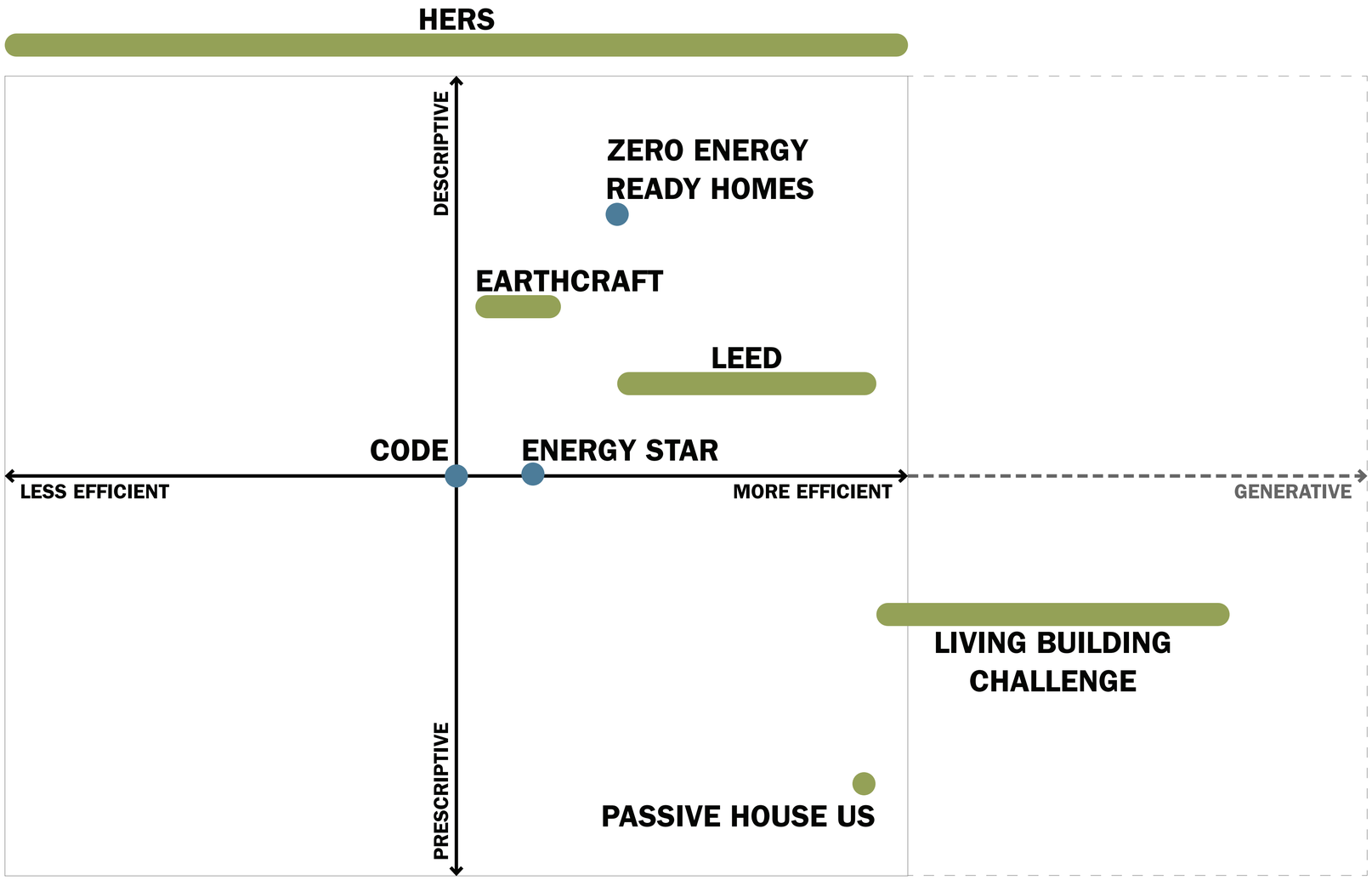
When solar energy is produced, it needs to be stored somewhere until it is used. The two most common strategies are to store it on-site (in batteries), or to send it into the electrical grid.

› BATTERY STORAGE

Storing energy on-site in batteries means that it is available for the owner's use. For example, if the local electrical grid experiences an outage, the homeowner could potentially use their stored energy to maintain power. However, batteries add expense to the cost of a PV system.

› BI-DIRECTIONAL METERING

Bi-directional electrical meters enable energy to be sent back to the utility's electrical grid. This can be a more cost-effective method (versus purchasing batteries), but the homeowner will not be able to use produced energy on-demand. In other words, if the local energy grid experiences an outage, the homeowner will experience it, too.



Program Administered By:

- Local or Federal Government Agency
- Private / Non-Profit Organization

**NOTE: This chart is for illustrative purposes only and does not represent measured benchmarks*

ENERGY CODE (IECC)

state/ county/municipality

Minimum energy efficiency requirements and building specifications.

- First national energy code was introduced through the Energy Conservation and Production Act (1975), in response to ‘73 oil embargo
- Now updated on a 3-year cycle
- Each edition is analyzed by DOE to determine if it is more efficient than the previous edition

ENERGY STAR

Managed by the US Environmental Protection Agency

Improve energy efficiency to lower energy bills and increase thermal comfort.

1. Efficient windows, doors, & insulation
2. Fully-aligned air barriers
3. Reduce thermal bridging
4. Air sealing
5. Heating & cooling equipment
6. Quality duct installation
7. Ventilation
8. Filtration

Related EPA Programs:

ZERO ENERGY READY HOMES

Managed by the US Department of Energy

Optimize efficiency, manage related risks, and help ensure future readiness.

1. Optimize efficiency
   - Enclosure
   - Equipment
   - Appliances / lighting
2. Do no harm
   - Water protection
   - Ensured comfort
   - Indoor air quality
3. Ensure future ready
   - Solar ready
   - Forthcoming codes

EARTHCRAFT

Administered by Southface Institute

Blueprint or energy, water, & resource efficient building throughout the Southeast.

1. Performance
2. Health
3. Environment
4. Comfort

LEED

Administered by US Green Building Council (USGBC)

Provide clean indoor air and ample natural light, use safe building materials, consume less enery & water, and ensure comfort and good health.

1. Integrative process
2. Location & transportation
3. Sustainable sites
4. Water efficiency
5. Energy & Atmosphere
6. Materials & resources
7. Indoor Environmental Quality
8. Innovation
9. Regional priority

PASSIVE HOUSE

Administered by the Passive House Institute US (PHIUS)

Making high-performance passive building the mainstream market standard.

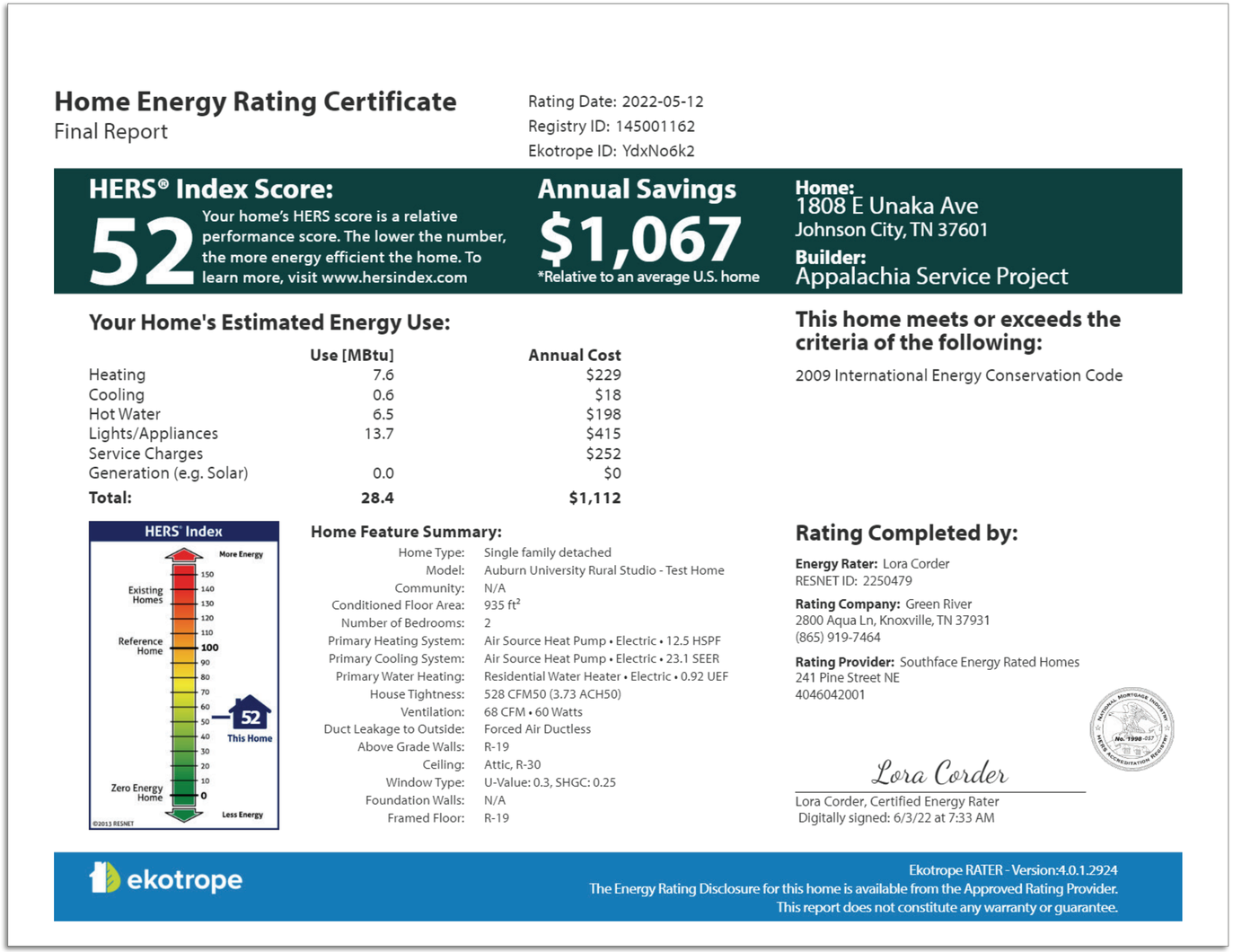
1. Continuous insulation
   (no thermal bridging)
2. Attention to air sealing
3. Window & door performance
4. Active ventilation
5. Energy efficient equipment
6. Active ventilation

HERS INDEX

Administered by RESNET

Industry standard by which a home's energy efficiency is measured.

- A HERS Index score of 100 is the same level of energy efficiency as the HERS Reference Home (2006 IECC)
- A HERS Index score of 0 is a Net Zero Energy Home, meaning the home produces as much energy as it consumes
- In 2024, the average HERS rating was 55



Home Energy Rating Certificate
Final Report

Rating Date: 2022-05-12
Registry ID: 145001162
Ekotrope ID: YdxNo6k2

HERS® Index Score: 52
Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings $1,067
*Relative to an average U.S. home

Home:
1808 E Unaka Ave
Johnson City, TN 37601
Builder:
Appalachia Service Project

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	7.6	$229
Cooling	0.6	$18
Hot Water	6.5	$198
Lights/Appliances	13.7	$415
Service Charges		$252
Generation (e.g. Solar)	0.0	$0
Total:	**28.4**	**$1,112**

This home meets or exceeds the criteria of the following:
2009 International Energy Conservation Code

HERS® Index
More Energy
Existing Homes
Reference Home
Zero Energy Home
Less Energy
This Home
©2013 RESNET

Home Feature Summary:

Home Type:	Single family detached
Model:	Auburn University Rural Studio - Test Home
Community:	N/A
Conditioned Floor Area:	935 ft²
Number of Bedrooms:	2
Primary Heating System:	Air Source Heat Pump • Electric • 12.5 HSPF
Primary Cooling System:	Air Source Heat Pump • Electric • 23.1 SEER
Primary Water Heating:	Residential Water Heater • Electric • 0.92 UEF
House Tightness:	528 CFM50 (3.73 ACH50)
Ventilation:	68 CFM • 60 Watts
Duct Leakage to Outside:	Forced Air Ductless
Above Grade Walls:	R-19
Ceiling:	Attic, R-30
Window Type:	U-Value: 0.3, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-19

Rating Completed by:

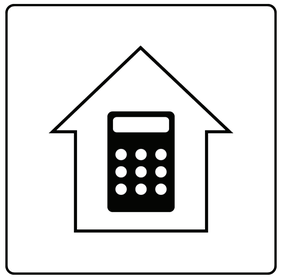
Energy Rater: Lora Corder
RESNET ID: 2250479

Rating Company: Green River
2800 Aqua Ln, Knoxville, TN 37931
(865) 919-7464

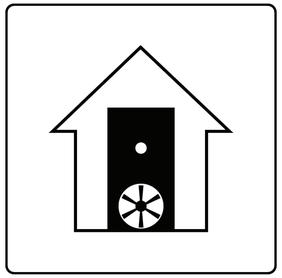
Rating Provider: Southface Energy Rated Homes
241 Pine Street NE
4046042001

Lora Corder
Lora Corder, Certified Energy Rater
Digitally signed: 6/3/22 at 7:33 AM

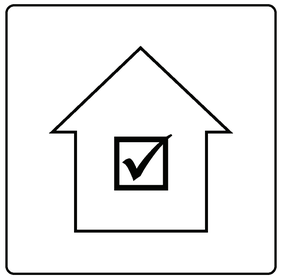
ekotrope
Ekotrope RATER - Version:4.0.1.2924
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.



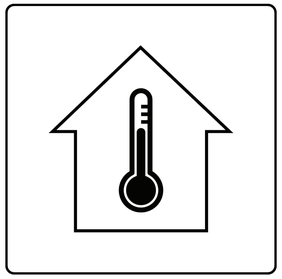
MODEL



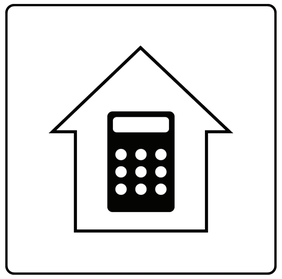
TEST



VERIFY



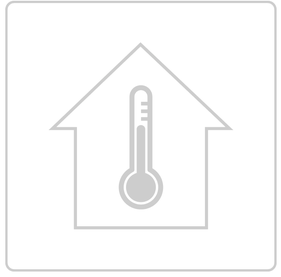
MONITOR



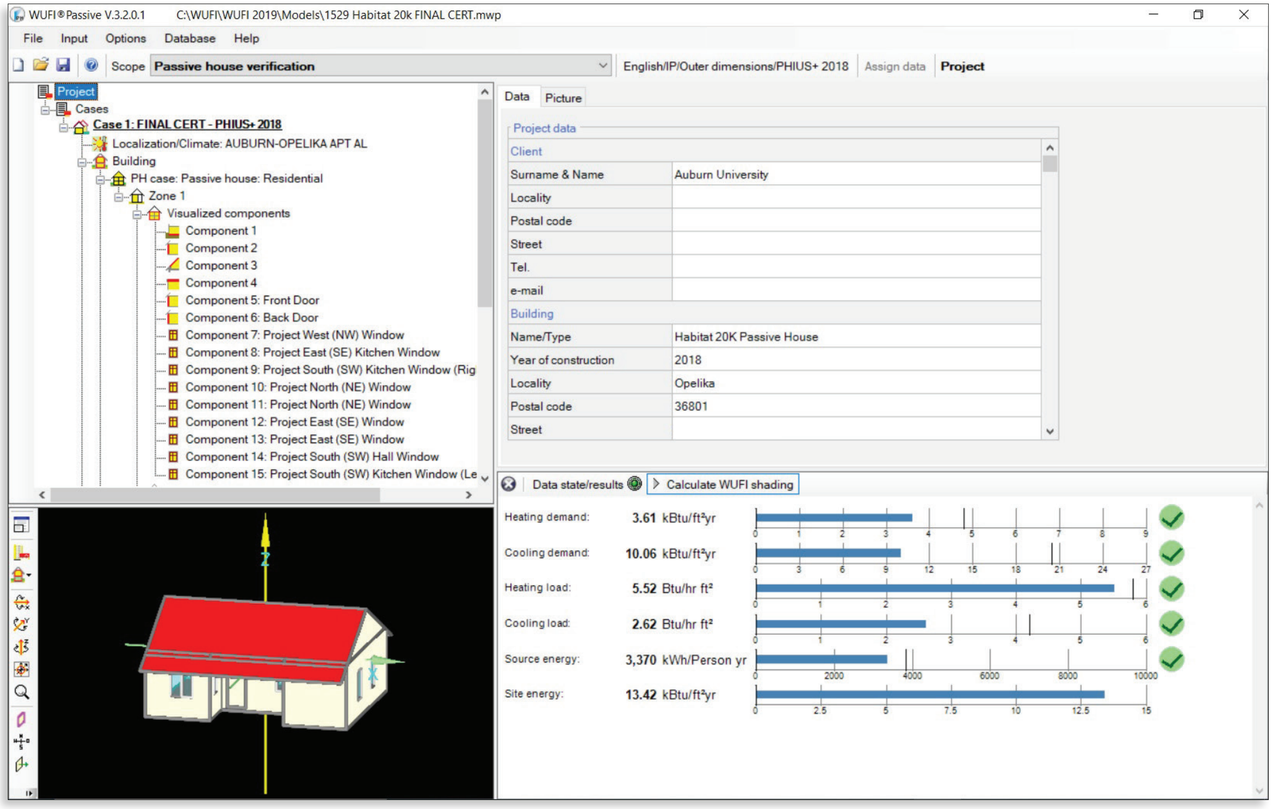
MODEL

TEST

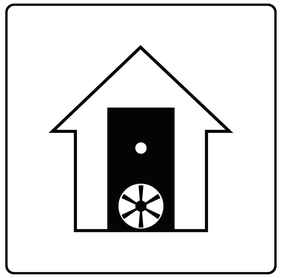
VERIFY



MONITOR



MODEL



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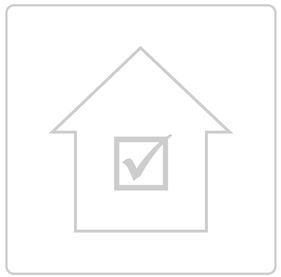

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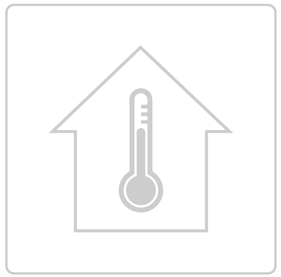

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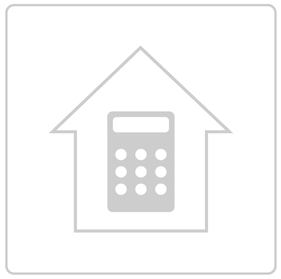

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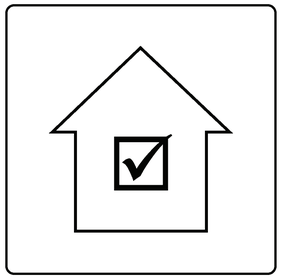

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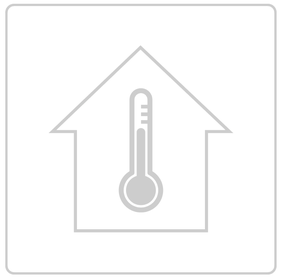


MONITOR

Home Energy Rating Certificate

Final Report

Rating Date: 2018-09-10
Registry ID: 318060912
Ekotrope ID: j2rp3yGd

HERS® Index Score: 38
Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

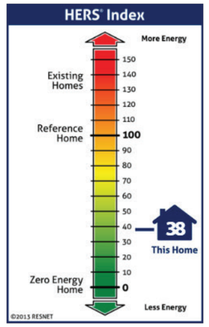
Annual Savings $855
*Relative to an average U.S. home

Home:

Builder: Real Life Homes

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	3.7	$99
Cooling	0.4	$12
Hot Water	1.3	$34
Lights/Appliances	11.7	$309
Service Charges		$0
Generation (e.g. Solar)	0.0	-$0
Total:	**17.2**	**$454**



Home Feature Summary:

Home Type:	Single family detached
Conditioned Floor Area:	915 sq. ft.
Number of Bedrooms:	2
Primary Heating System:	Air Source Heat Pump • Electric • 12.8 HSPF
Primary Cooling System:	Air Source Heat Pump • Electric • 24.6 SEER
Primary Water Heating:	Water Heater • Electric • 3.42 Energy Factor
House Tightness:	40 CFM50 (0.35 ACH50)
Ventilation:	72.0 CFM • 40.0 Watts
Duct Leakage to Outside:	Untested
Above Grade Walls:	R-31
Ceiling:	Attic, R-61 + Radiant Barrier
Window Type:	U-Value: 0.18, SHGC: 0.25
Foundation Walls:	N/A

This home meets or exceeds the criteria of the following:

Energy Star v3
Energy Star v3.1
2018 International Energy Conservation Code
2015 International Energy Conservation Code
2012 International Energy Conservation Code
2009 International Energy Conservation Code
2006 International Energy Conservation Code

Rating Completed by:

Energy Rater: Bruce Kitchell
RESNET ID:7668731

Rating Company: Airedale Energy Consultants
1464 Shadowrock Heights, Marietta, GA 30062
404-218-0905

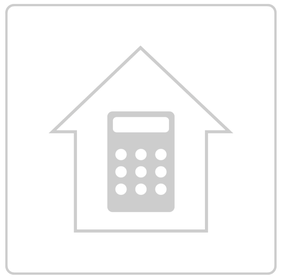
Rating Provider: Energy Vanguard
533 W Howard, Suite E, Decatur, GA 30030
678-662-4332

B. Kitchell

Bruce Kitchell, Certified Energy Rater
Digitally signed: 10/10/18 at 2:56 PM

ekotrope™

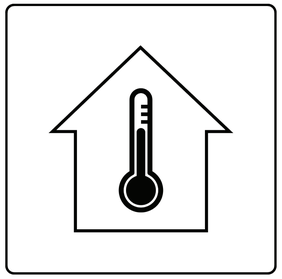
Ekotrope RATER - Version:3.1.0.2024
The Home Energy Rating Standard Disclosure for this house is available from the rating provider.
This report does not constitute any warranty or guarantee.



MODEL

TEST

VERIFY



MONITOR

IMPLEMENTING ENERGY EFFICIENCY

› **SET EXPECTATIONS AT THE OUTSET OF THE PROJECT.**

Develop an energy model at the outset of the project to set performance expectations. This model can also be used as a tool to identify which components and assemblies are most impactful in decreasing predicted energy use.

› **SYSTEMS CHOICES CAN INFLUENCE COST/EASE OF THIRD-PARTY CERTIFICATIONS.**

Third-party certifications depend on third-party evaluation. However, they also sometimes depend on having certified installers. In areas with lower demand for beyond-code certification, certified installers can be hard to come by. However, there may be systems or components available that facilitate certification. For example, while ENERGY STAR requires a certified HVAC installer for ducted systems, packaged mini split systems, which require no balancing and testing, may be installed by any HVAC professional.

› **TEST AND COURSE CORRECT THROUGHOUT THE PROJECT.**

Tools such as blower doors and duct blasters can be used *during* the construction process to test envelope and system performance. These tools can identify specific deficiencies that can be corrected during construction in order to get a tighter, more efficient house without increasing construction costs.

NAME A FUNDAMENTAL STRATEGY FOR INCREASING ENERGY EFFICIENCY

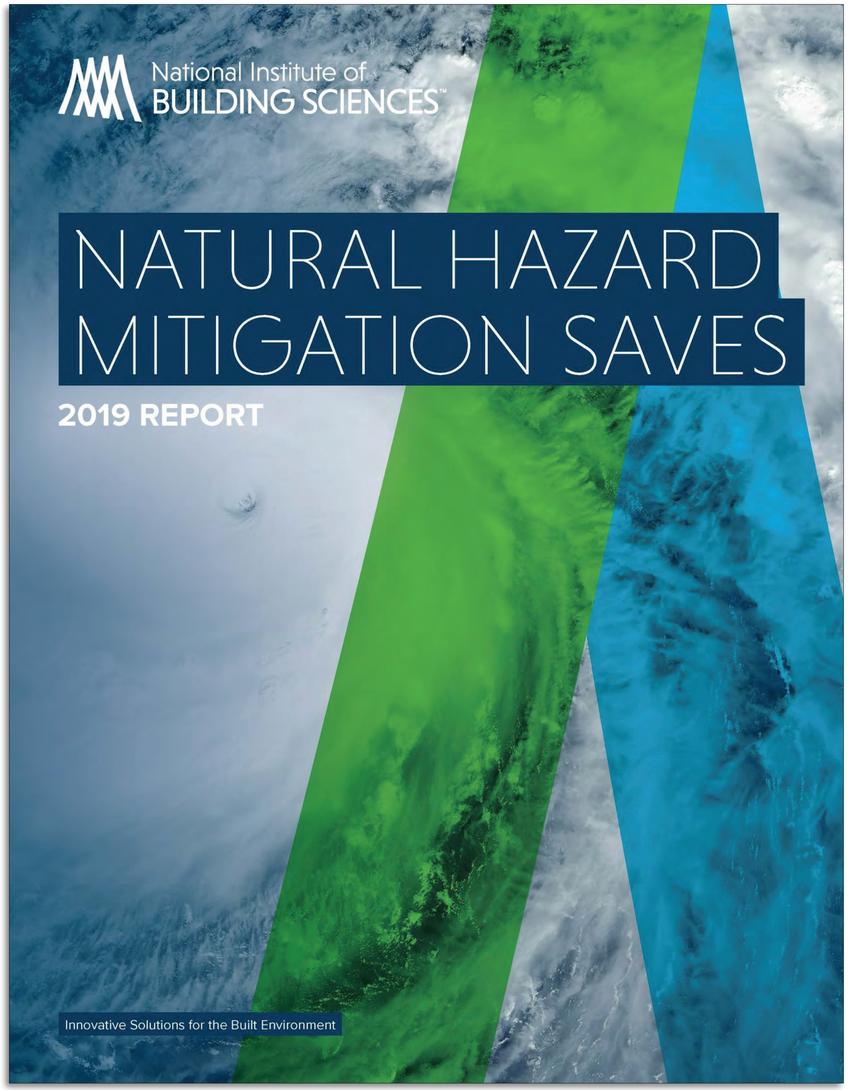
NAME A FUNDAMENTAL STRATEGY FOR INCREASING ENERGY EFFICIENCY

AIR SEALING

RESILIENCE

Mitigation can result in significant savings in terms of safety, preventing property loss, and preventing disruption of day-to-day life. For example, exceeding building codes on average saves $4 per $1 spent.

National Institute of Building Sciences



source: National Institute of Building Sciences, "Natural Hazard Mitigations Saves: 2019 Report"

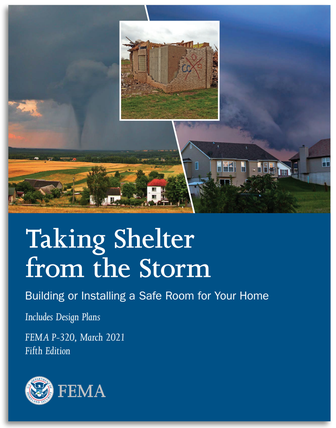
Resilience is the ability of a system, entity, community, or person to withstand shocks while still maintaining its essential functions. Resilience also refers to the ability to recover quickly and effectively from catastrophe and the capability to endure greater stress.

Definition from Rockefeller Foundation 100 Resilient Cities

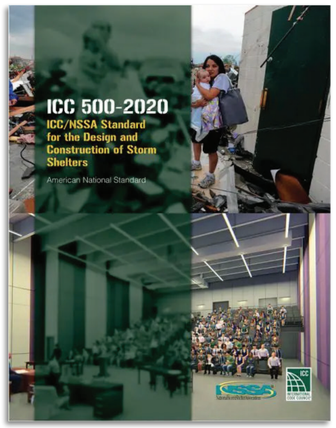
source: FEMA / John Fleck via Smart Home America

PROTECTION OF OCCUPANT

Federal, State, & Municipality



FEMA P-320



ICC 500

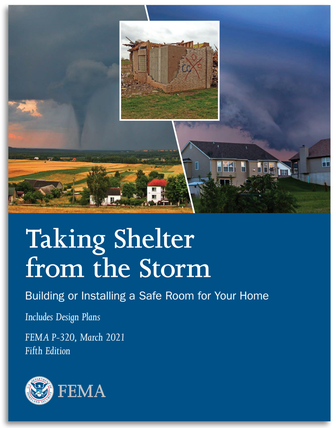
PROTECTION OF ASSET

Private Entities (Insurance Companies)

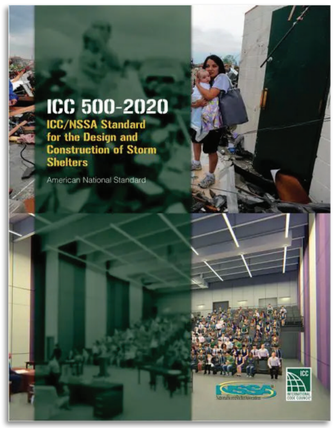
IBHS FORTIFIED

PROTECTION OF OCCUPANT

Federal, State, & Municipality



FEMA P-320



ICC 500

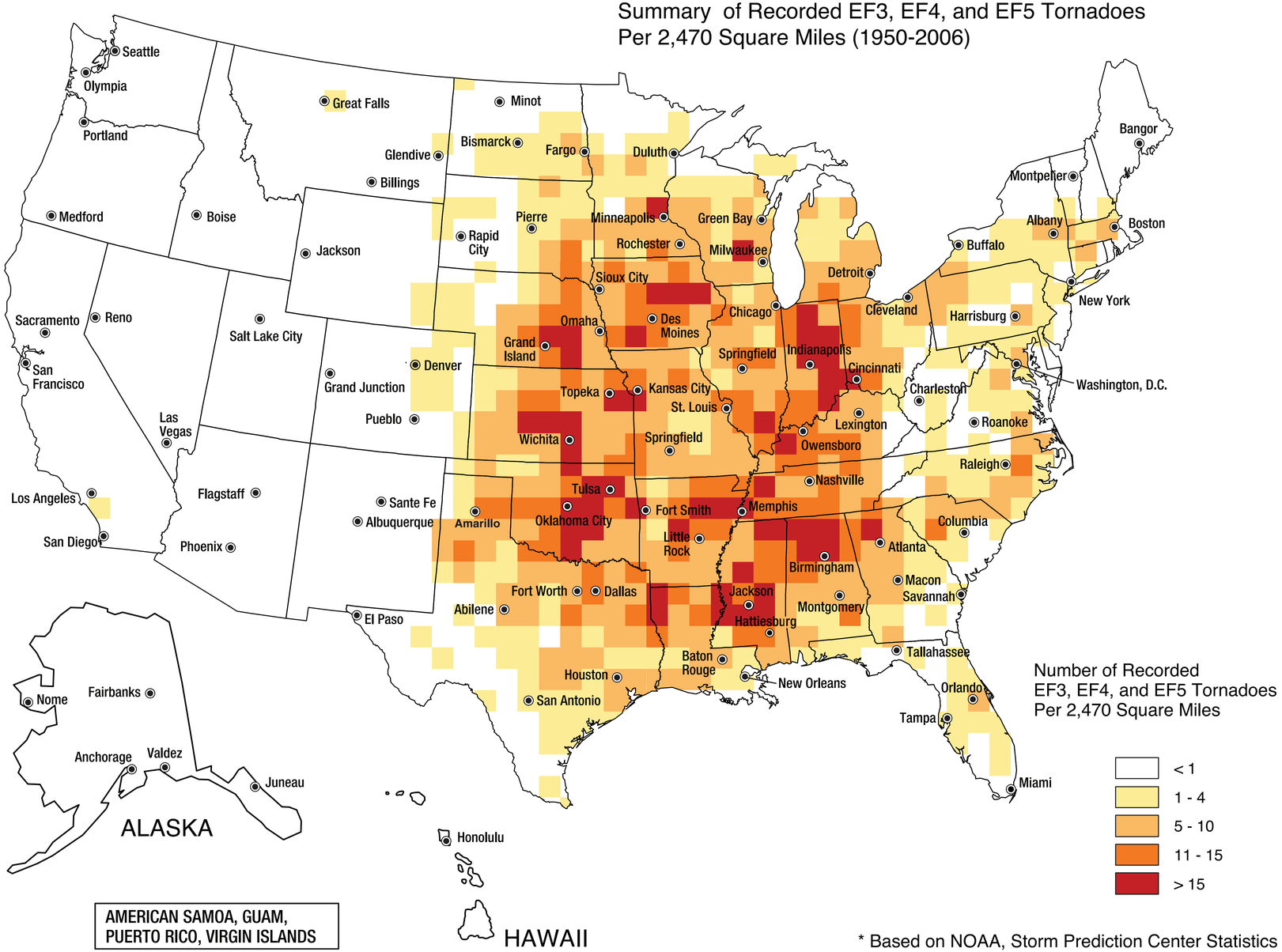
PROTECTION OF ASSET

Private Entities (Insurance Companies)

IBHS FORTIFIED

TORNADO ACTIVITY IN THE UNITED STATES*

Summary of Recorded EF3, EF4, and EF5 Tornadoes
Per 2,470 Square Miles (1950-2006)

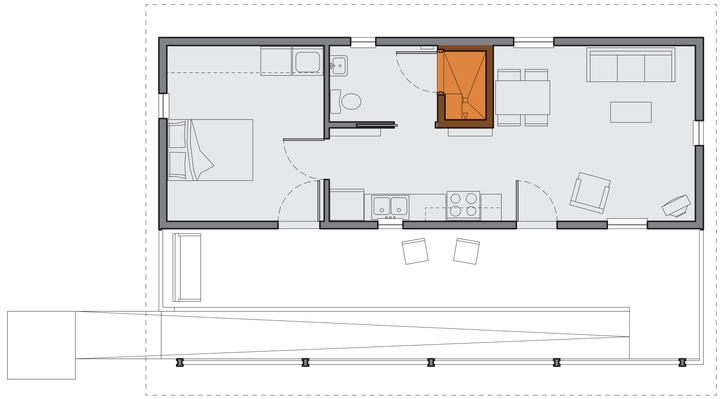


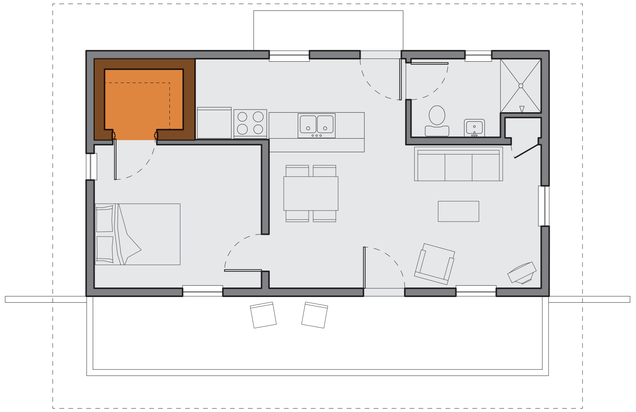
Number of Recorded
EF3, EF4, and EF5 Tornadoes
Per 2,470 Square Miles

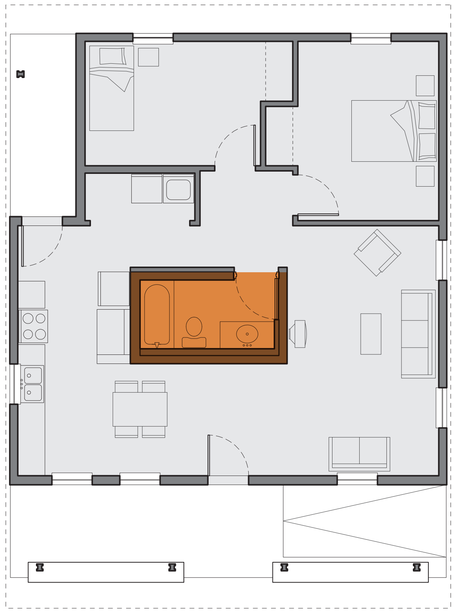
- < 1
- 1 - 4
- 5 - 10
- 11 - 15
- > 15

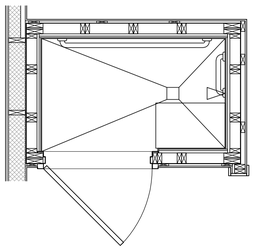
* Based on NOAA, Storm Prediction Center Statistics

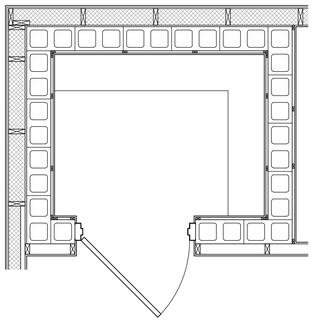
source: FEMA "Taking Shelter from the Storm: Building a Safe Room Inside Your Home"

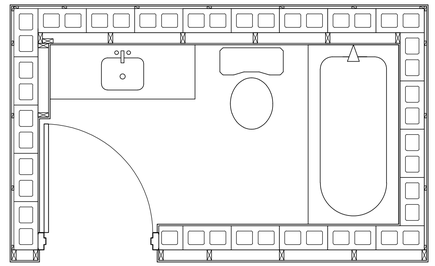












TURNER’S HOUSE

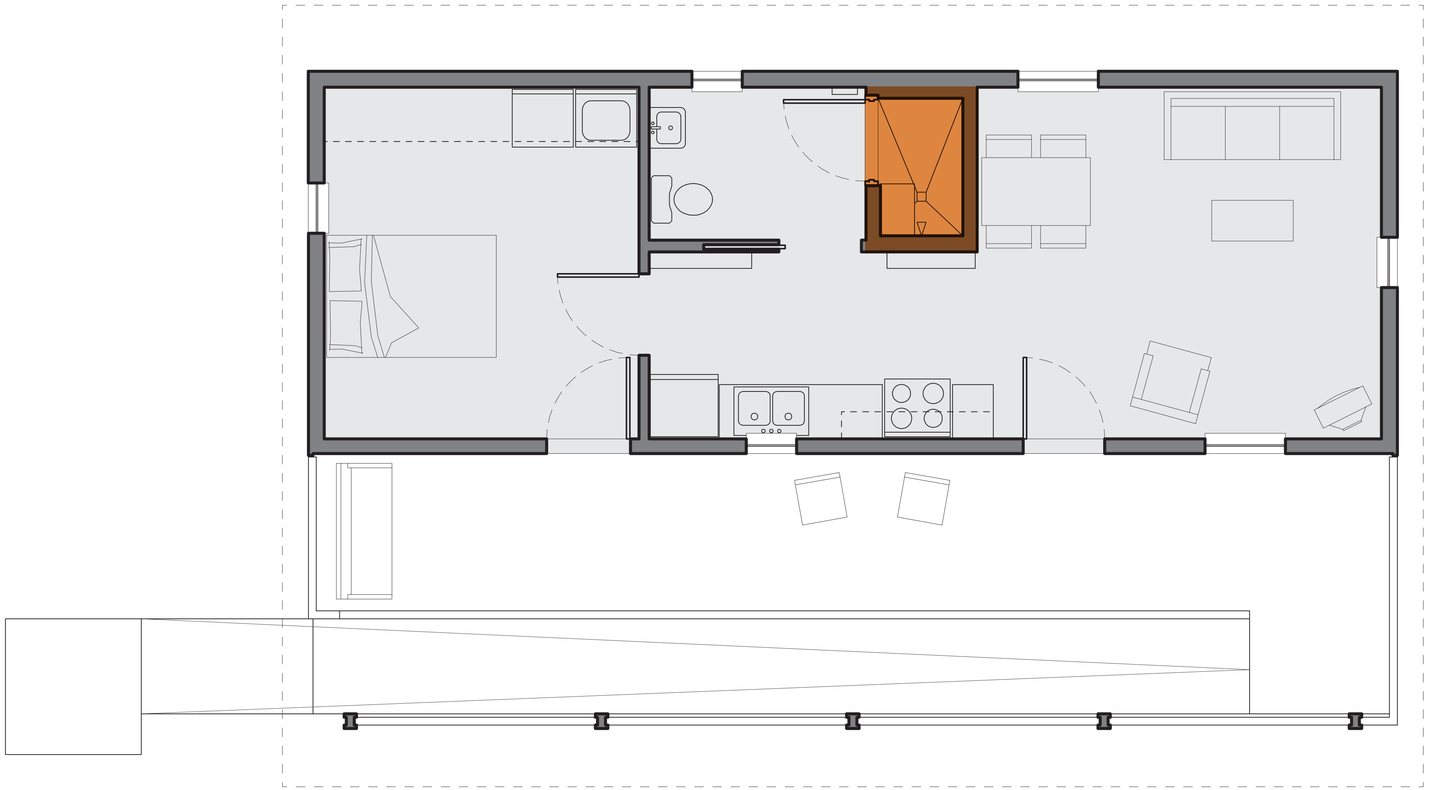
EDDIE’S HOUSE

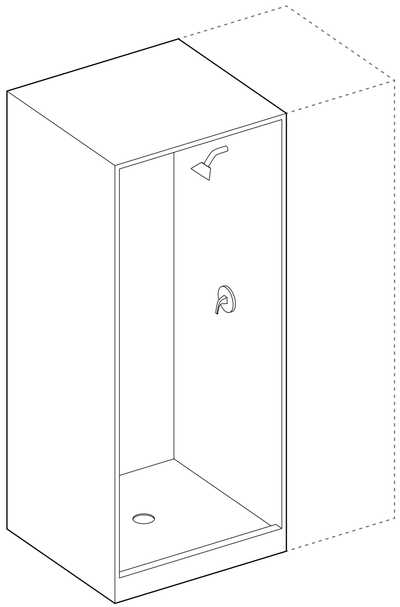
IDELLA’S HOUSE

Turner’s House

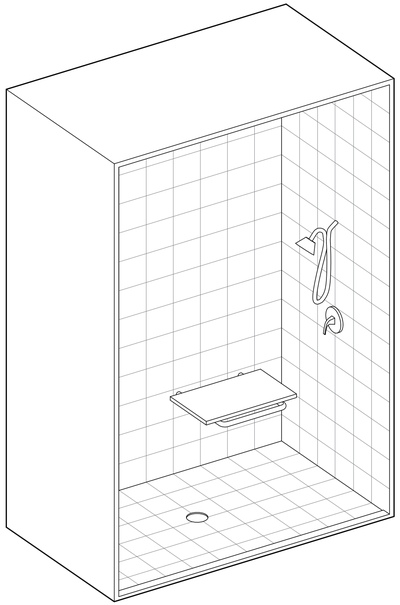
Faundsale, AL

photo © Timothy Hursley

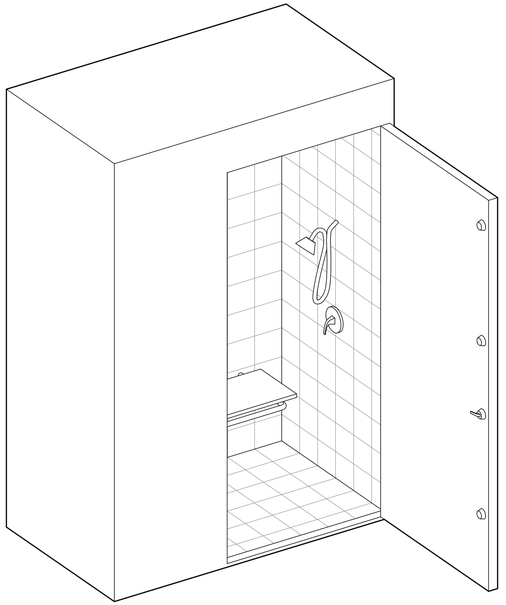




STANDARD SHOWER

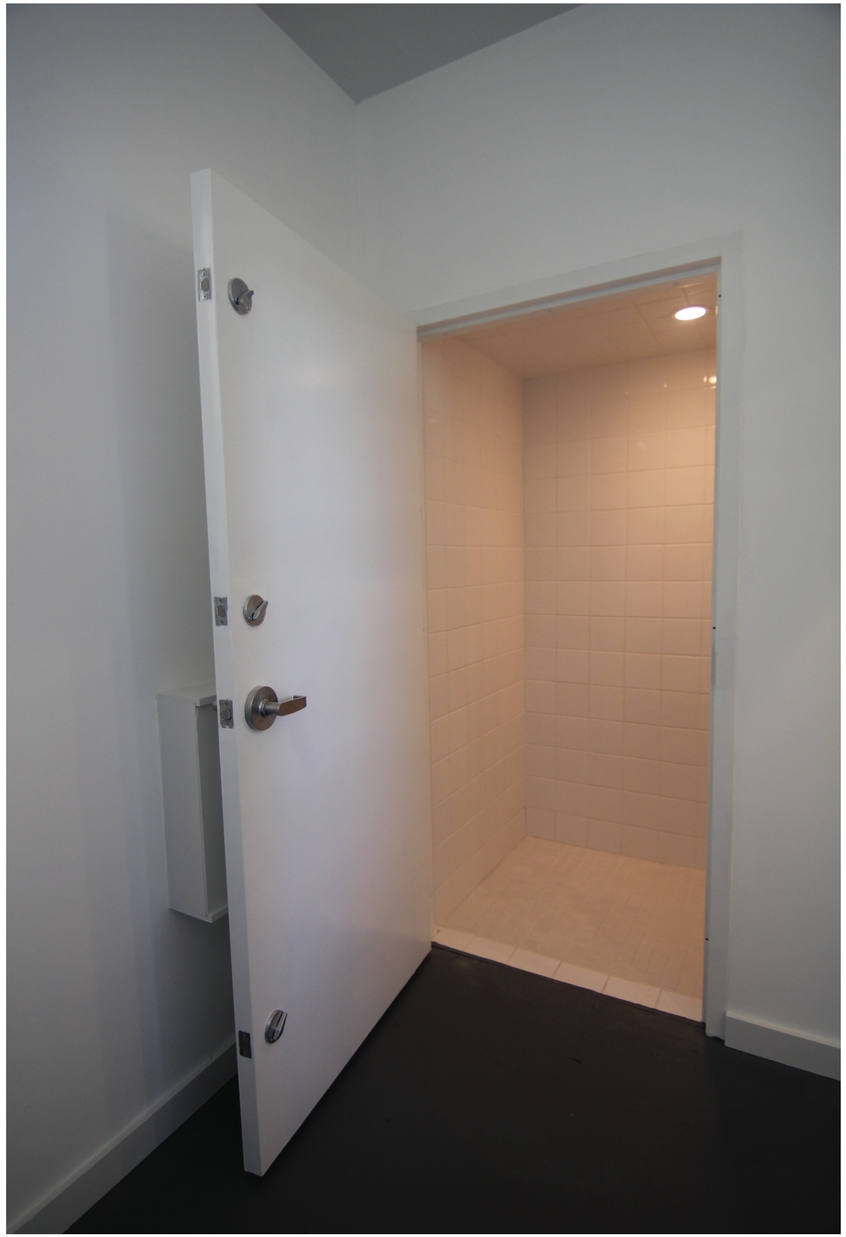


ACCESSIBLE SHOWER



ACCESSIBLE SHOWER SAFE ROOM

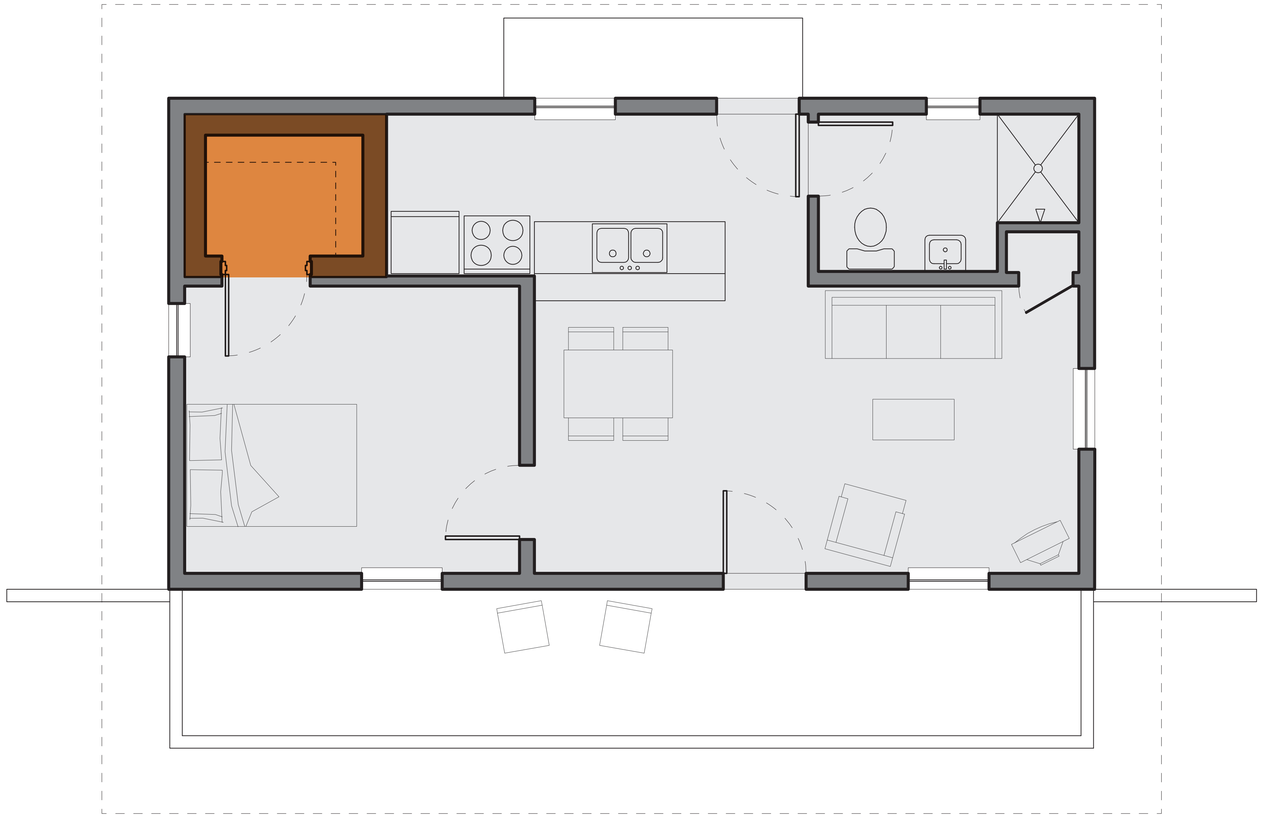
R-30 9¼"
R-19 6¼"

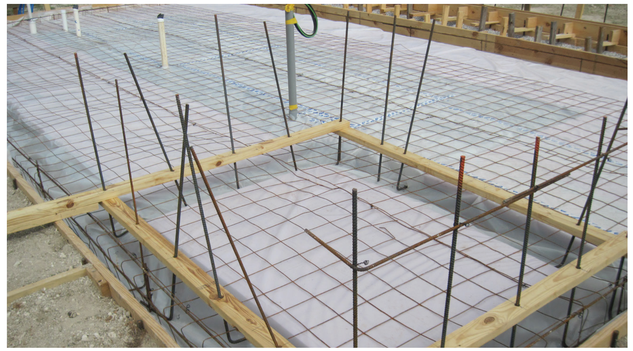


Eddie’s House

Faundsale, AL

photo © Timothy Hursley

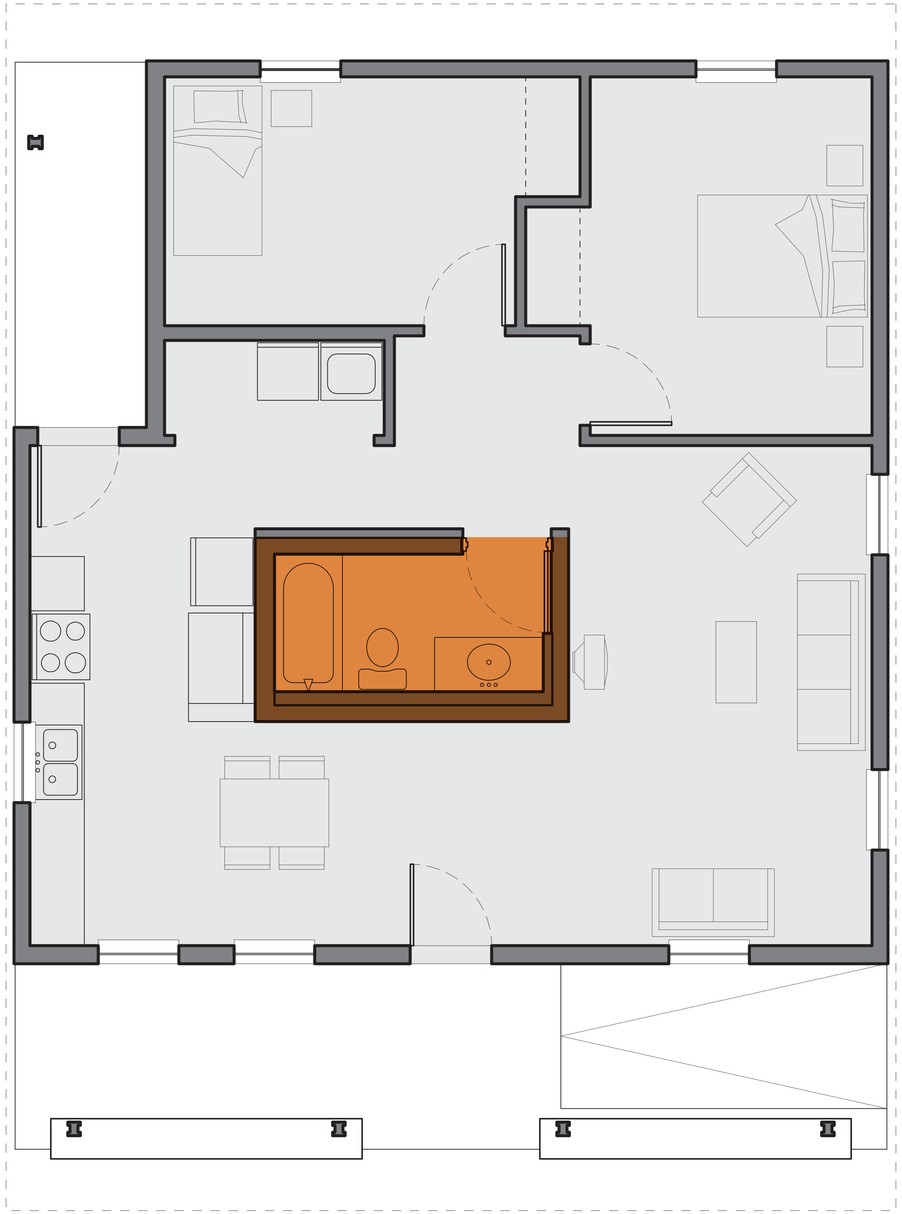


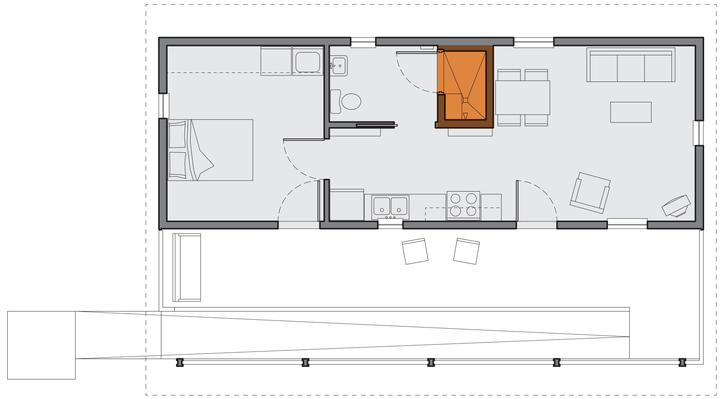


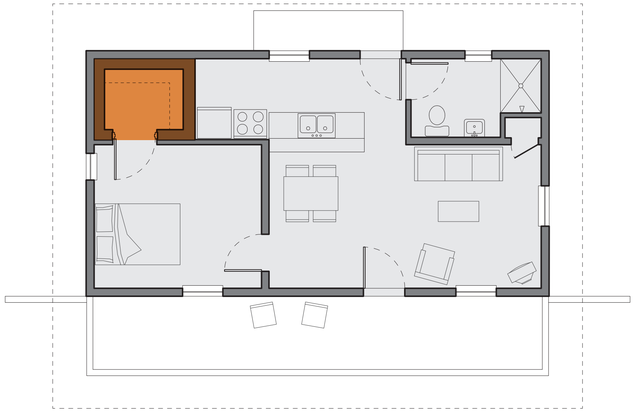
Idella’s House

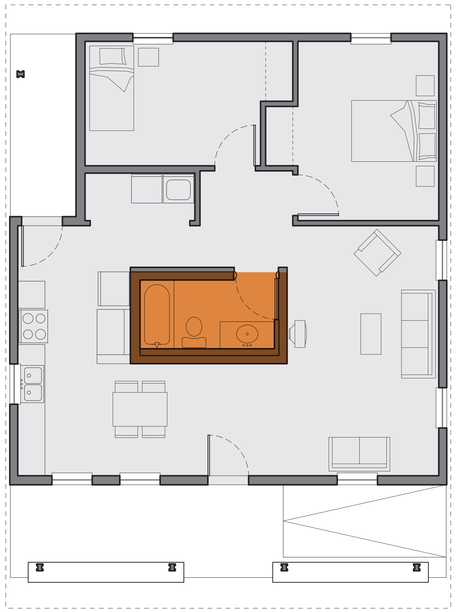
Newbern, AL

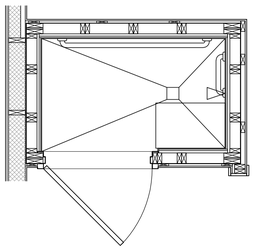
photo © Timothy Hursley

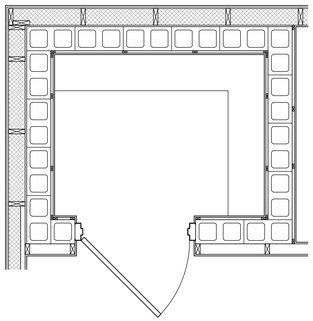


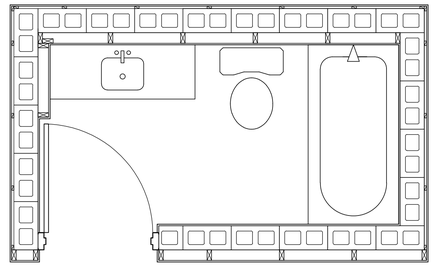












TURNER’S HOUSE

EDDIE’S HOUSE

IDELLA’S HOUSE

PROTECTION OF OCCUPANT

Federal, State, & Municipality

FEMA P-320

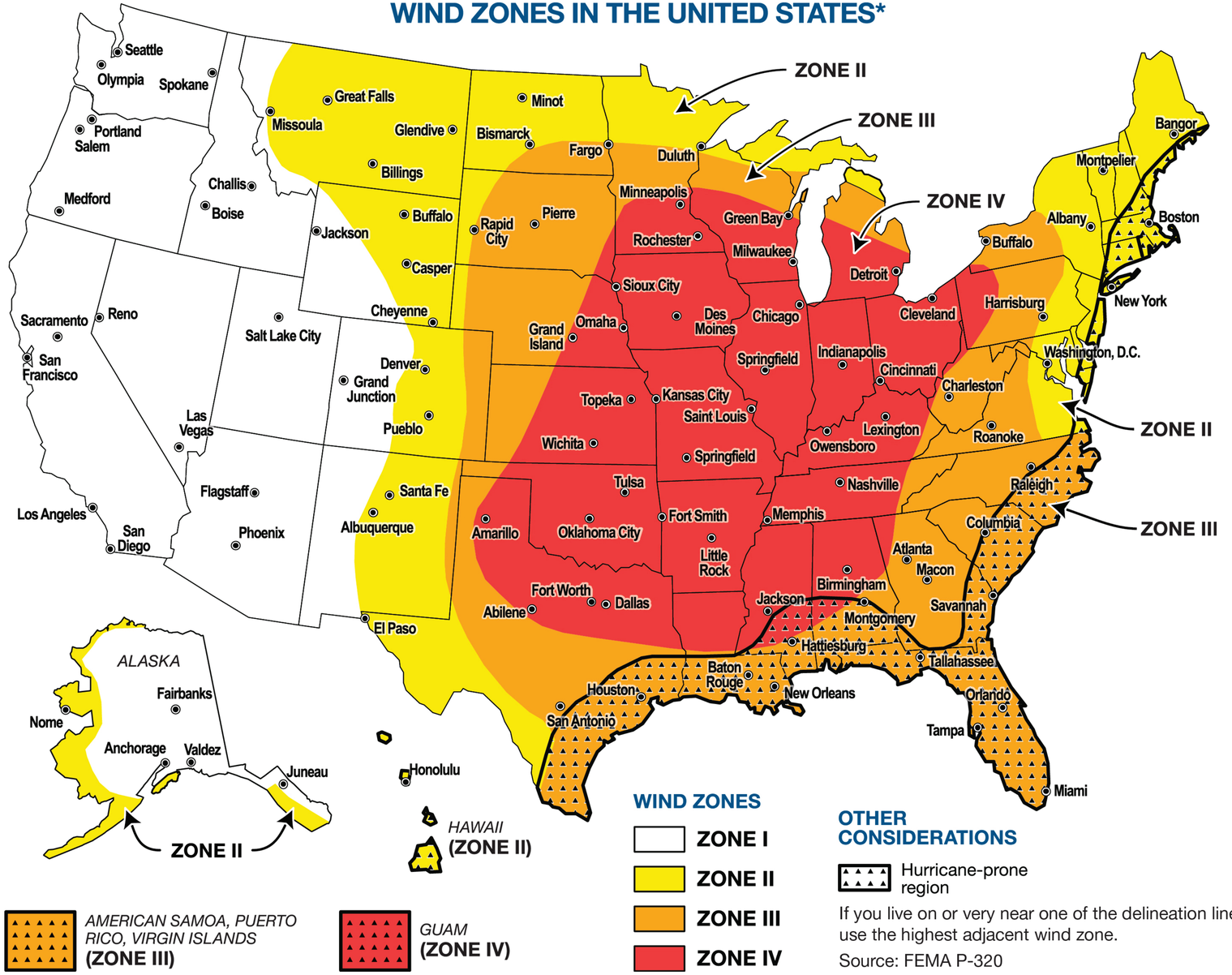
ICC 500

PROTECTION OF ASSET

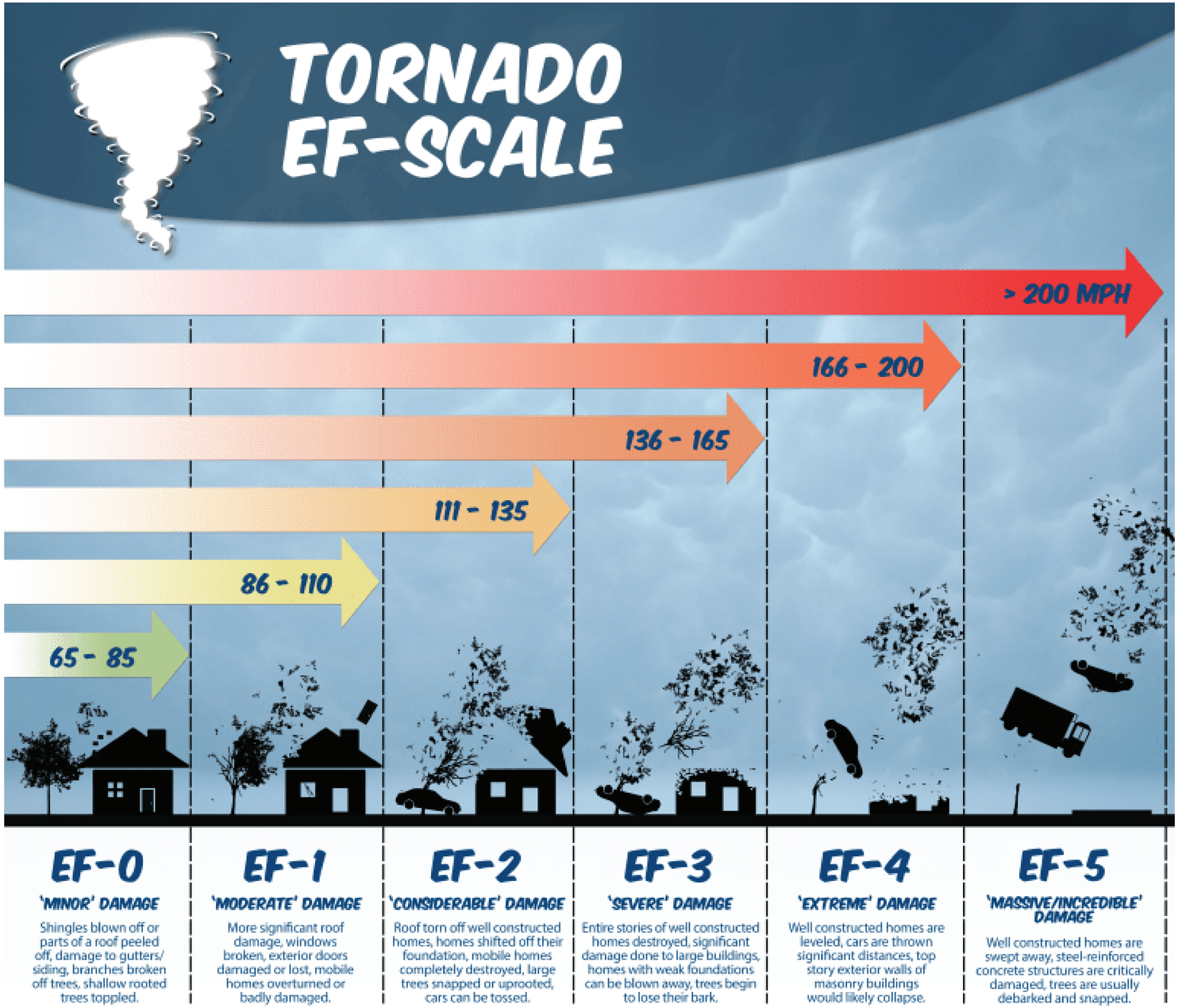
Private Entities (Insurance Companies)

IBHS FORTIFIED

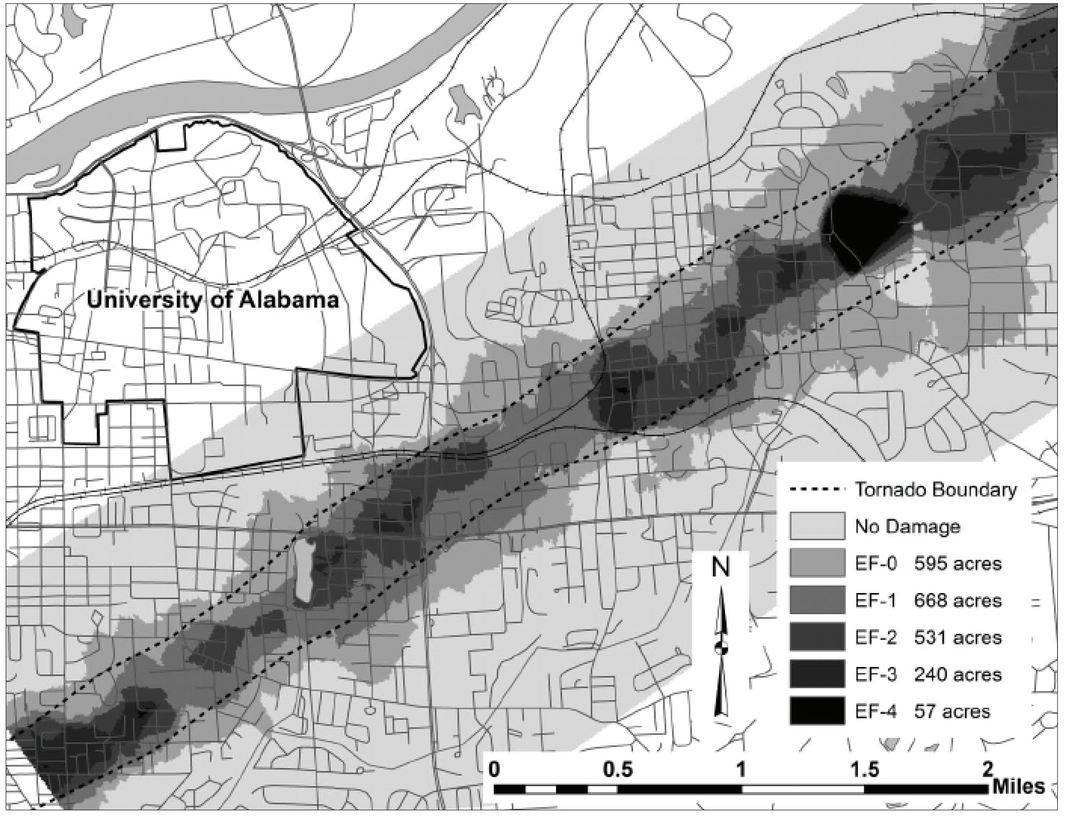
WIND ZONES IN THE UNITED STATES*

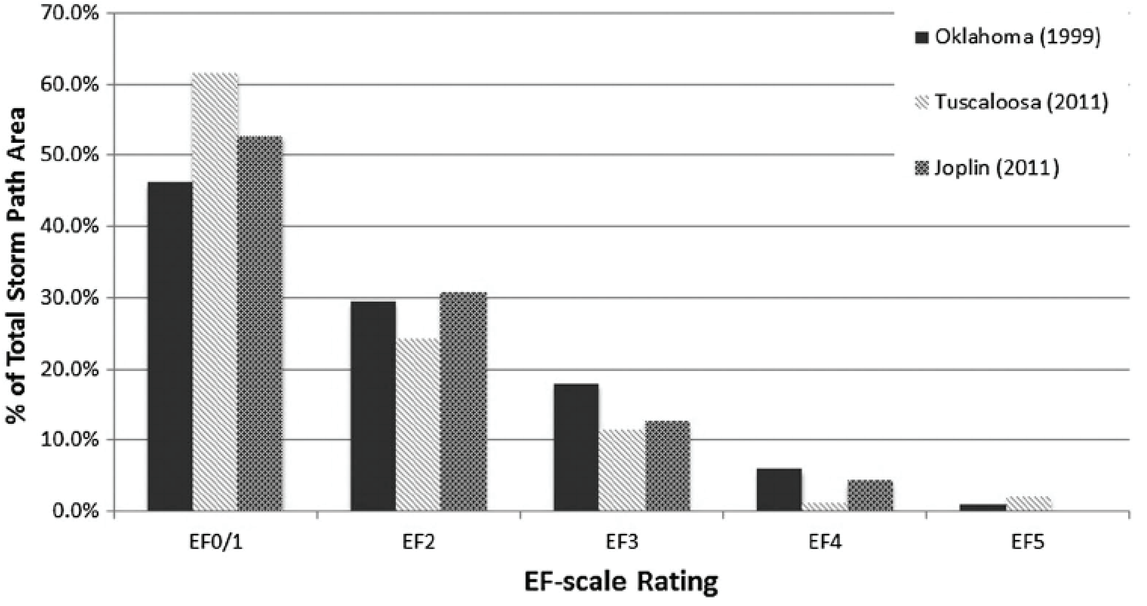


source: FEMA "Overview of FEMA P-804 (2023), Wind Retrofit Guide for Residential Buildings in Hurricane-Prone Regions"

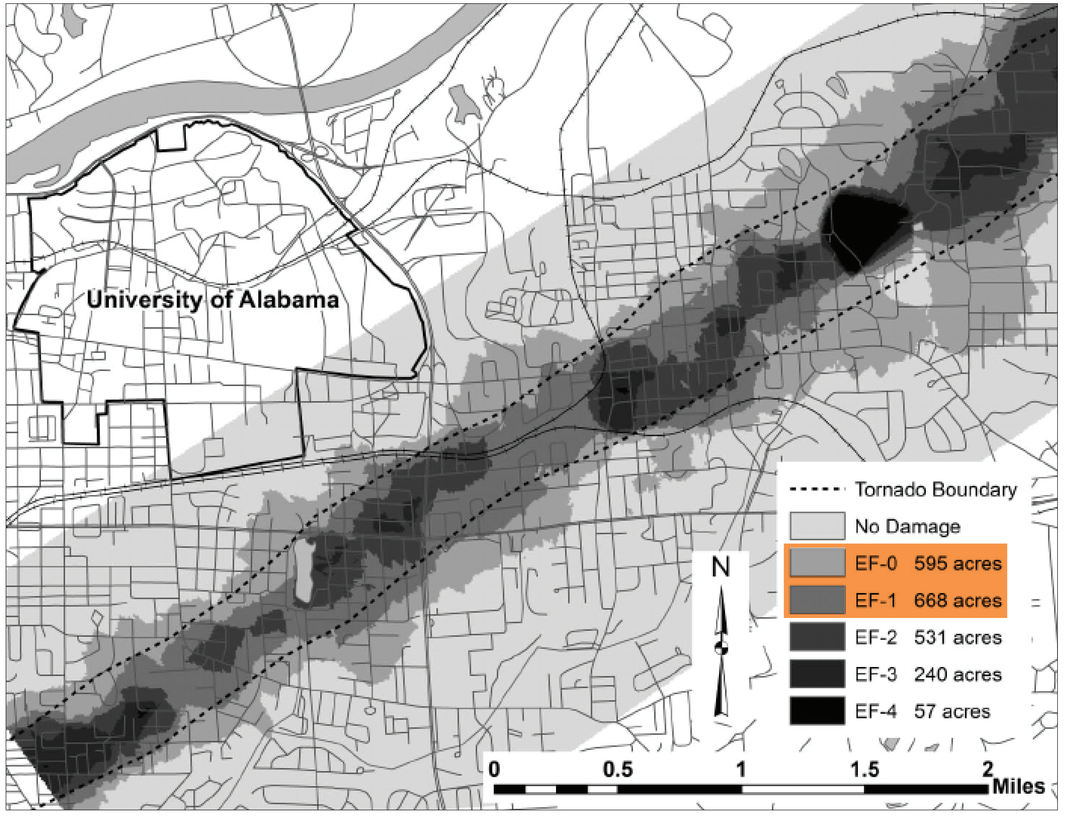


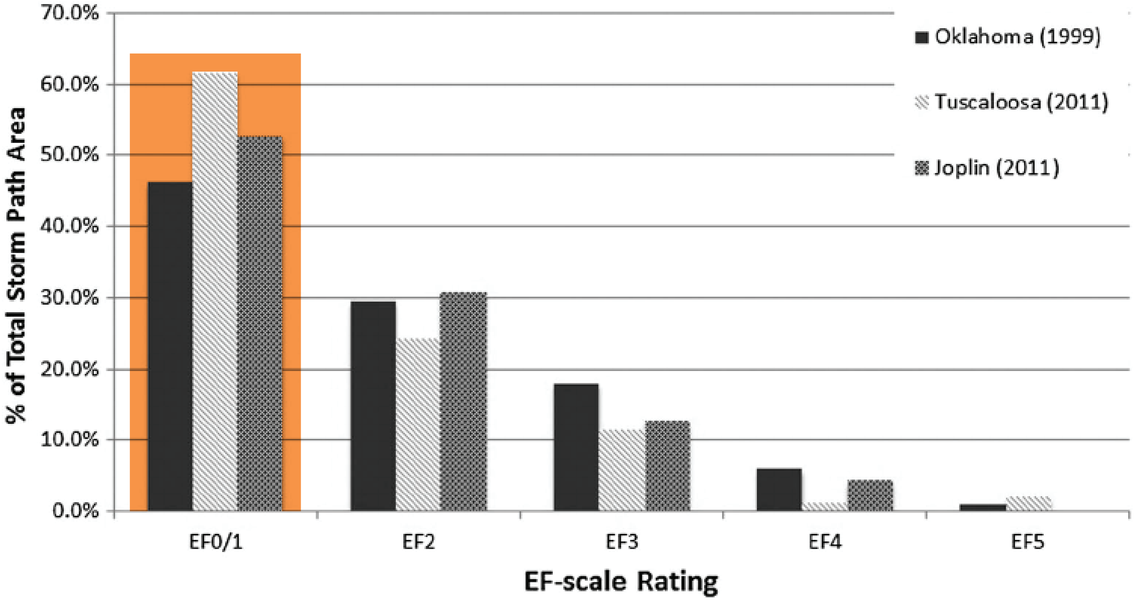
Source: Insurance Institute for Business and Home Safety (IBHS)





Source: "Making the Case for Improved Structural Design: Tornado Outbreaks of 2011," Leadership and Management in Engineering, October 2012





Source: "Making the Case for Improved Structural Design: Tornado Outbreaks of 2011," Leadership and Management in Engineering, October 2012

FORTIFIED FOR HURRICANE

wind speeds above 115 mph (per ASCE7)

+ HAIL SUPPLEMENT

FORTIFIED FOR HIGH WIND

wind speeds up to 115 mph (per ASCE7)

+ HAIL SUPPLEMENT

source: logos from Insurance Institute for Business and Home Safety (IBHS)

Keep the roof on, water out.
Reduce damage amplifiers:
Strengthen gable walls
Strengthen garage door openings.
Secure chimney to house structure.
Anchor attached structures –
porches and carports.
Protect openings against debris impact

FORTIFIED SILVER™

Keep the roof on and water out.
Enhanced by a sealed roof deck and a high performing wind rated roof cover.

FORTIFIED GOLD™

Keep the roof on, water out
Reduce damage amplifiers
Keep the entire building intact with a continuous load path & protect openings against high pressures

FORTIFIED HOME™ HURRICANE

*HAIL SUPPLEMENT

Adds impact rated roof cover.

*Must meet the **Good** or **Excellent** rating by IBHS.

A PROGRAM OF IBHS FORTIFIED HOME

FORTIFIED ROOF™

Keep the roof on and water out.
Enhanced by a sealed roof deck and a high performing wind rated roof cover.

Keep the roof on, water out.
Reduce damage amplifiers:
Strengthen gable ends & overhangs.
Secure chimney to house structure..
Anchor attached structures - porches and carports.

FORTIFIED SILVER™

FORTIFIED GOLD™

Keep the roof on, water out
Reduce damage amplifiers
Keep the entire building intact with a continuous load path & protect openings against high pressures.
Install wind rated garage door.

FORTIFIED HOME™ HIGH WIND

Where the design wind speed is 115 and below as per ASCE 7-10 to 7-16

*HAIL SUPPLEMENT

Adds impact rated roof cover.

*Must meet the **Good** or **Excellent** rating by IBHS.

FORTIFIED HOME™

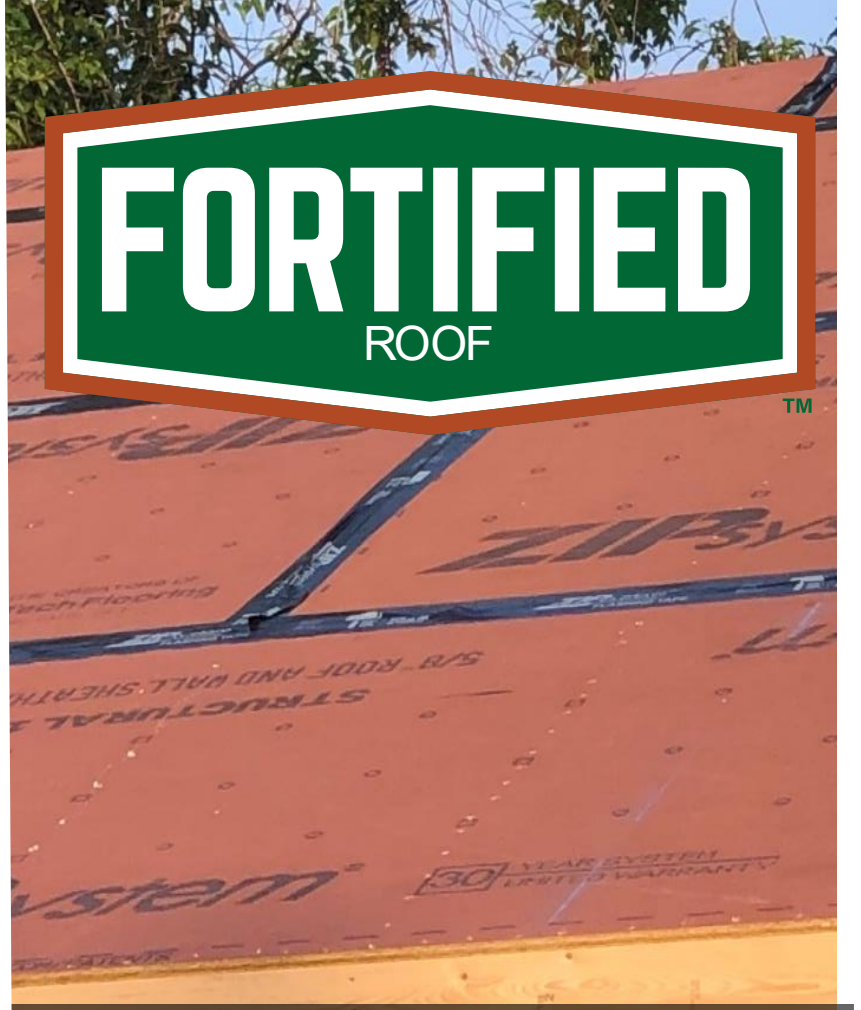
	HURRICANE *> 115 mph*	HIGH WIND *≤ 115 mph*
FORTIFIED ROOF	› SECURE ROOF DECK › SEALED ROOF DECK › DRIP EDGE	SAME AS HURRICANE
FORTIFIED SILVER	› IMPACT-PROTECTED WINDOWS/DOORS › IMPACT-PROTECTED GARAGE DOORS › ANCHOR ATTACHED STRUCTURES › SECURE CHIMNEY TO HOUSE › GABLE END BRACING	~~› IMPACT-PROTECTED WINDOWS/DOORS~~ › PRESSURE-RATED GARAGE DOORS SIMILAR TO HURRICANE, BUT FASTENING/ STRAPPING REQUIREMENTS WILL DEPEND ON WIND SPEED
FORTIFIED GOLD	› CONTINUOUS LOAD PATH	SIMILAR TO HURRICANE, BUT FASTENING/ STRAPPING REQUIREMENTS WILL DEPEND ON WIND SPEED (UPLIFT RESISTANCE)
HAIL SUPPLEMENT	› IMPACT-RATED ROOF COVER	SAME AS HURRICANE

Every FORTIFIED designation requires **independent third-party** verification of key requirements

1

Nail it Down

Keep the Roof On



2

Seal it Up

Keep the Water Out

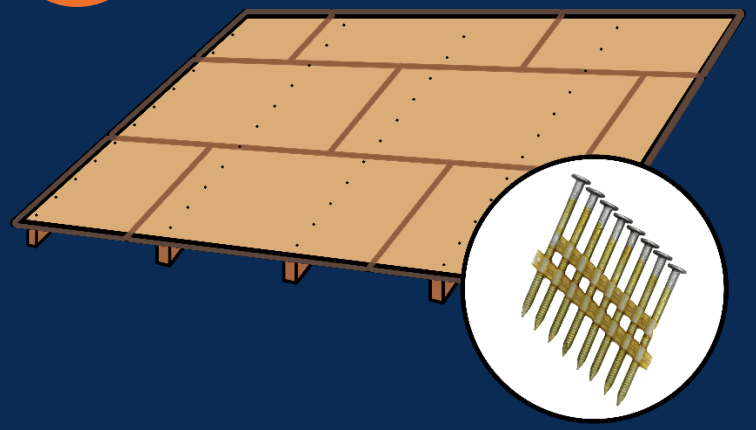
3

Lock it In

Keep the Wind Out

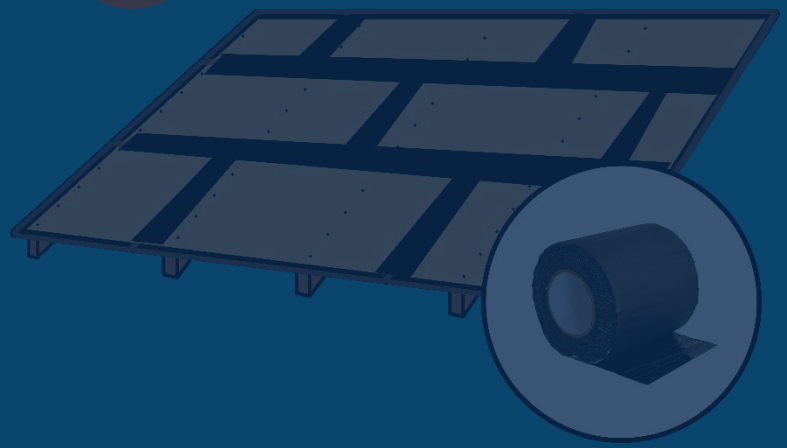
3 KEYS TO ROOF DURABILITY

1 Nail it down.



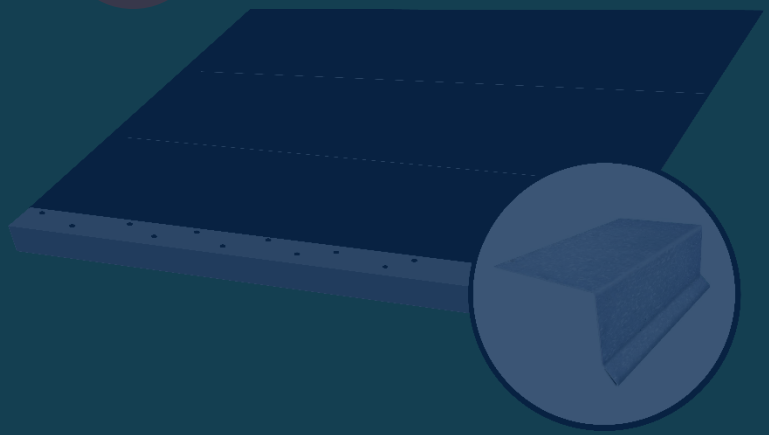
KEEP THE ROOF ON.

2 Seal it up.

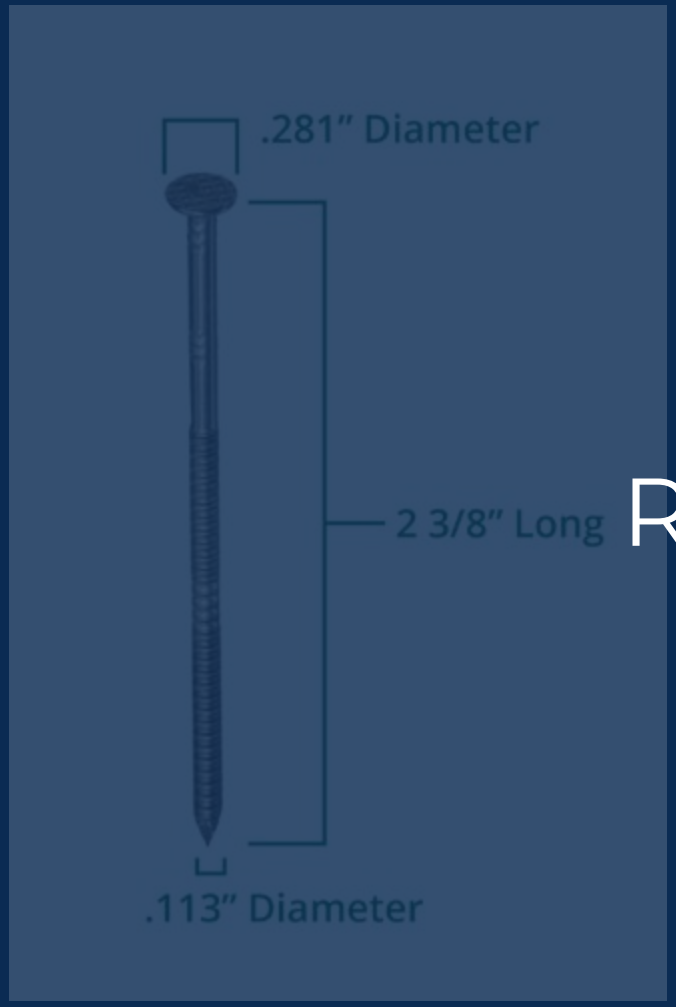


KEEP THE WATER OUT.

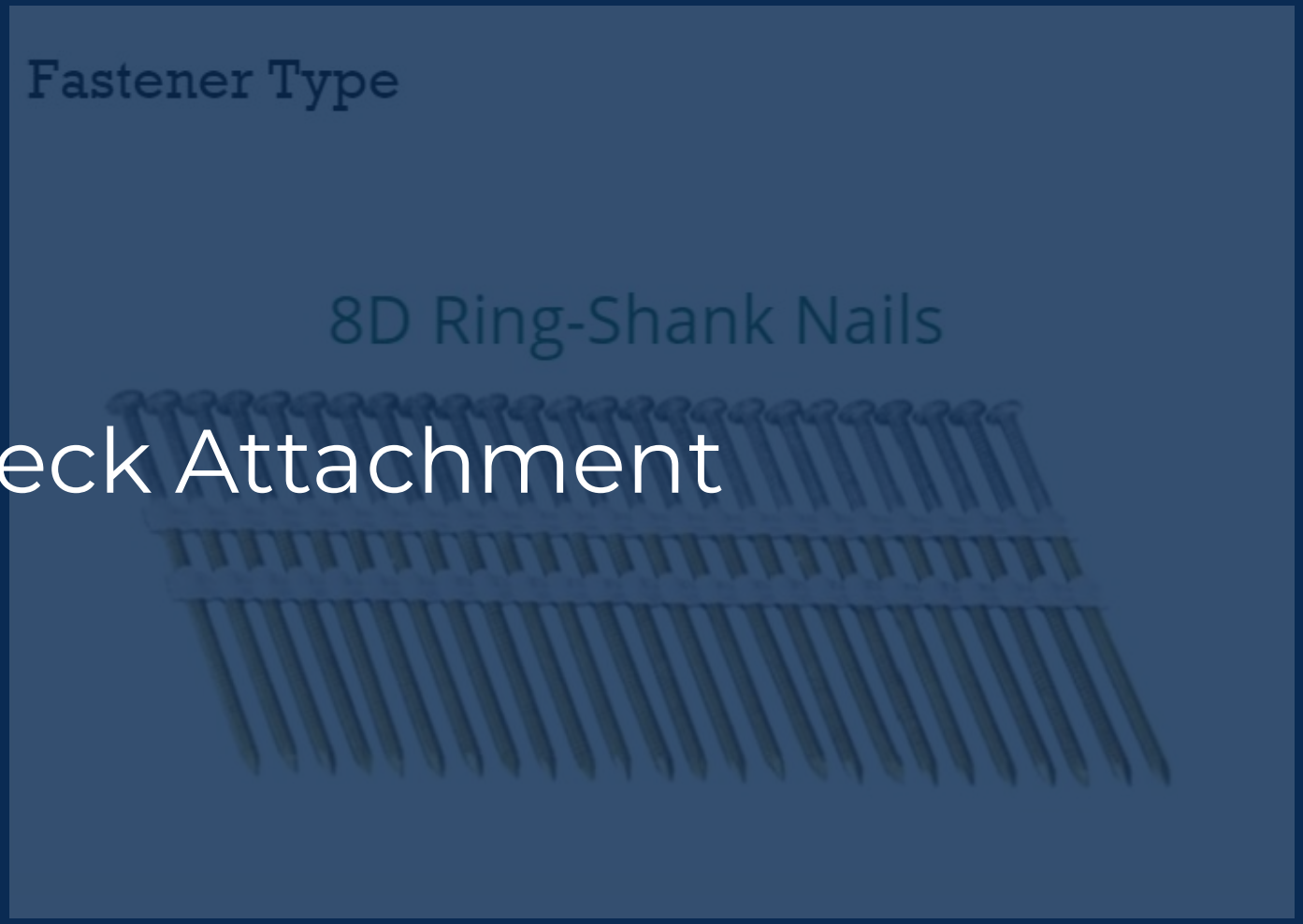
3 Lock it in.



KEEP THE WIND OUT.

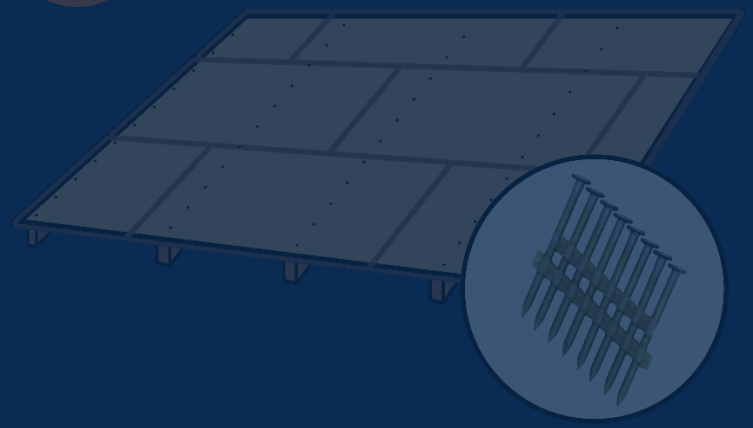


Roof Deck Attachment



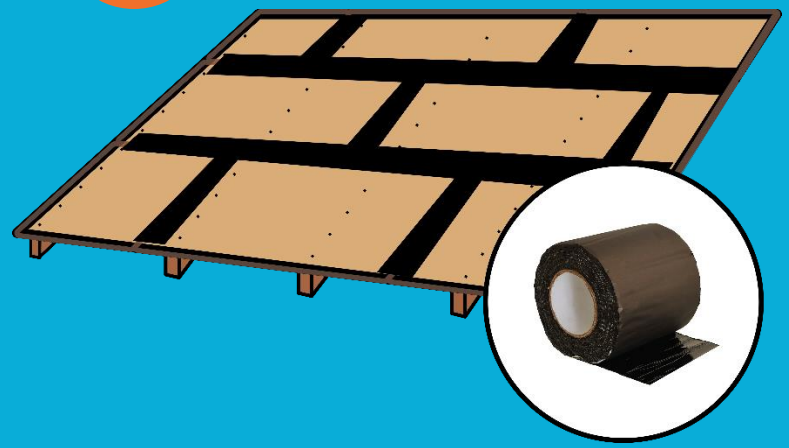
3 KEYS TO ROOF DURABILITY

1 Nail it down.



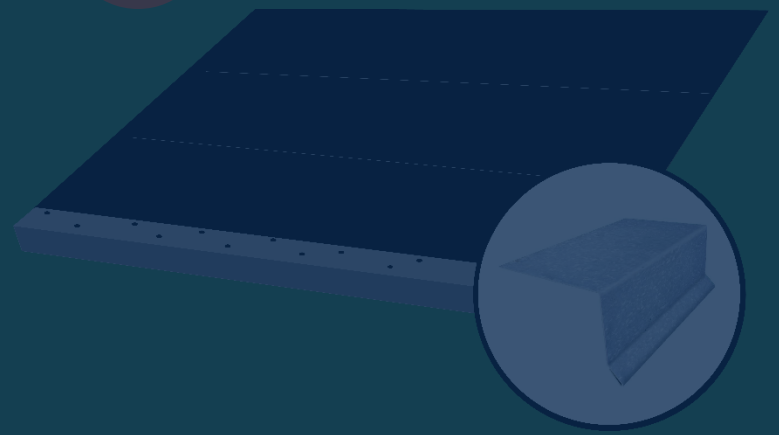
KEEP THE ROOF ON.

2 Seal it up.



KEEP THE WATER OUT.

3 Lock it in.



KEEP THE WIND OUT.

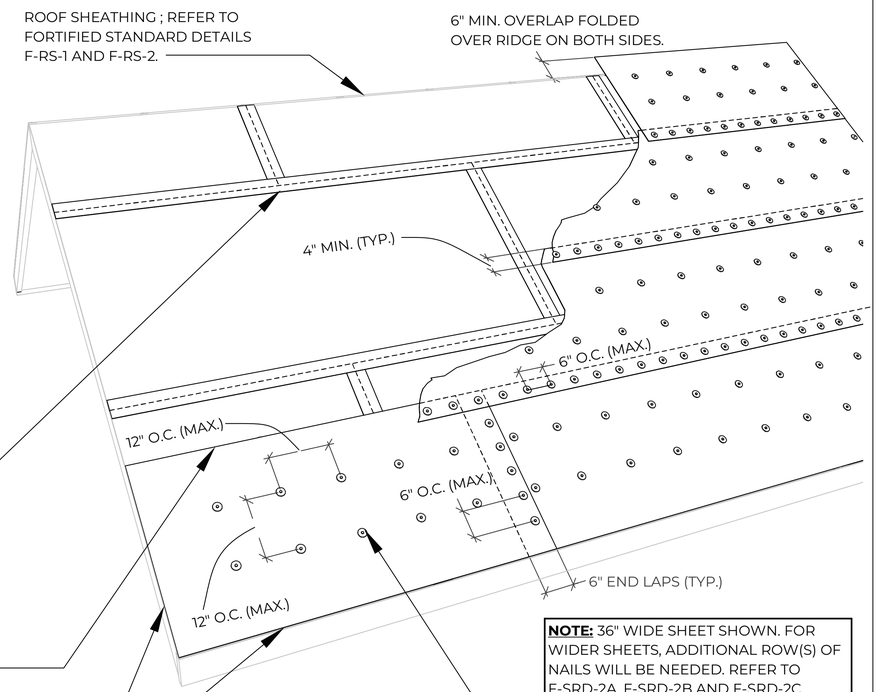
ROOF DECK SEALING | METHOD 1: TAPE + UNDERLAYMENT

GENERAL NOTES:

1. REFER TO APPLICABLE FORTIFIED HOME STANDARDS FOR ADDITIONAL INFORMATION.
2. REFER TO FORTIFIED STANDARD DETAIL F-G-1 FOR CORROSION PROTECTION REQUIREMENTS.
3. APPLICABLE FOR ROOF PITCH 2:12 OR GREATER.
4. NAILS USED TO ATTACH UNDERLAYMENT SHALL BE ANNULAR RING OR DEFORMED SHANK ROOFING NAILS W/ 0.083" MINIMUM DIAMETER AND SUFFICIENT LENGTH TO PENETRATE THROUGH THE ROOF SHEATHING OR NOT LESS THAN 3/4" INTO THE ROOF SHEATHING W/ 1" DIAMETER BUTTON CAPS (METAL BUTTON CAPS ARE REQUIRED FOR ULTIMATE DESIGN WIND SPEED OF 170 MPH OR GREATER).
5. FOR WOOD SHAKE AND SHINGLE ROOF COVERS, SYNTHETIC/SELF-ADHERED UNDERLAYMENT IS NOT PERMITTED. REFER TO TECHNICAL BULLETIN FH 2021-03 FOR MORE INFORMATION.
6. FORTIFIED HOME STANDARDS ARE TO BE APPLIED IN CONJUNCTION WITH FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS IN ADDITION TO THE STRUCTURAL DESIGN WHICH IS BY OTHERS. IN CASE OF A CONFLICT BETWEEN PROVISIONS, USE WHICHEVER IS MORE STRINGENT.

FLASHING TAPE AT ALL PANEL SEAMS FULLY ADHERED W/ NO WRINKLES OR VOIDS USING ROLLER.
MATERIAL OPTION 1 : 4" WIDE ASTM D1970 COMPLIANT SELF-ADHERING POLYMER - MODIFIED BITUMEN FLASHING TAPE.
MATERIAL OPTION 2 : 3 - 3/4" WIDE AAMA 711 LEVEL 3 (FOR EXPOSURE UP TO 80°C/176°F) COMPLIANT SELF-ADHERING FLASHING TAPE.

ASTM D226 TYPE II #30 OR ASTM D4869 TYPE III OR TYPE IV #30 UNDERLAYMENT. (FOR ASHPALT SHINGLE ROOF COVERS, ASTM D6757 UNDERLAYMENT IS ALSO ACCEPTABLE)
ALT: REINFORCED SYNTHETIC ROOF UNDERLAYMENT WITH ICC APPROVAL AS ASTM D226 TYPE II ;
MINIMUM TEAR STRENGTH = 15 LBF PER ASTM D4533
MINIMUM TENSILE STRENGTH = 20 PSF PER ASTM D5035
PASS ASTM D4869 SHOWER TEST.
HORIZONTAL LAPS = 4" MIN.
END LAPS = 6" MIN.

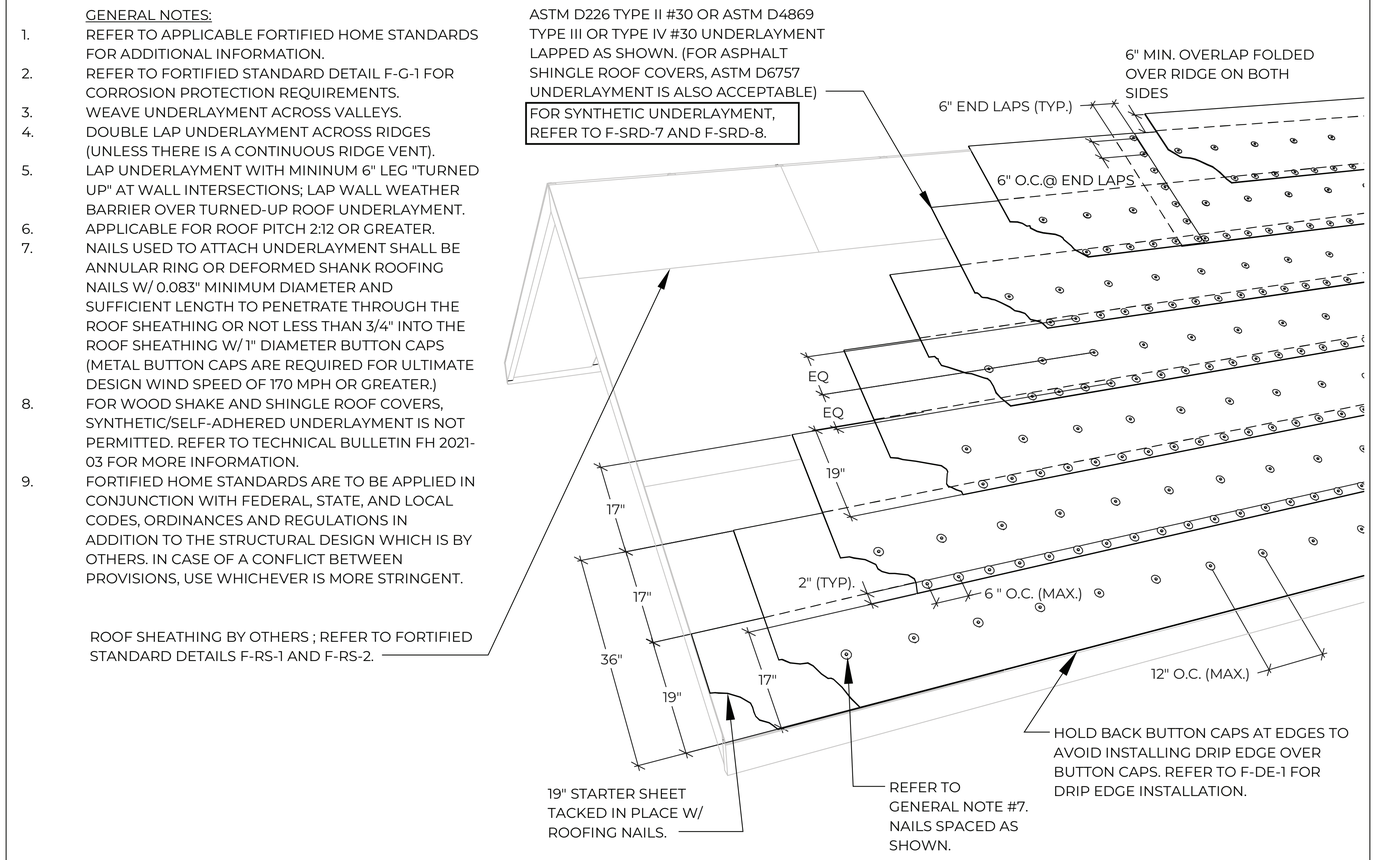


FORTIFIED HOME	**APPLICABLE STANDARDS:** FORTIFIED HOME™ - HURRICANE (2025) FORTIFIED HOME™ - HIGH WIND (2025)	**DESCRIPTION:** STEEP SLOPE SEALED ROOF DECK - FLASHING TAPE AND UNDERLAYMENT - SHINGLE OR METAL ROOF COVERS	**DRAWING #:** F-SRD-2 **DATE:** 11/01/2024

ROOF DECK SEALING | METHOD 2: 2 LAYERS OF UNDERLAYMENT

GENERAL NOTES:

1. REFER TO APPLICABLE FORTIFIED HOME STANDARDS FOR ADDITIONAL INFORMATION.
2. REFER TO FORTIFIED STANDARD DETAIL F-G-1 FOR CORROSION PROTECTION REQUIREMENTS.
3. WEAVE UNDERLAYMENT ACROSS VALLEYS.
4. DOUBLE LAP UNDERLAYMENT ACROSS RIDGES (UNLESS THERE IS A CONTINUOUS RIDGE VENT).
5. LAP UNDERLAYMENT WITH MININUM 6" LEG "TURNED UP" AT WALL INTERSECTIONS; LAP WALL WEATHER BARRIER OVER TURNED-UP ROOF UNDERLAYMENT.
6. APPLICABLE FOR ROOF PITCH 2:12 OR GREATER.
7. NAILS USED TO ATTACH UNDERLAYMENT SHALL BE ANNULAR RING OR DEFORMED SHANK ROOFING NAILS W/ 0.083" MINIMUM DIAMETER AND SUFFICIENT LENGTH TO PENETRATE THROUGH THE ROOF SHEATHING OR NOT LESS THAN 3/4" INTO THE ROOF SHEATHING W/ 1" DIAMETER BUTTON CAPS (METAL BUTTON CAPS ARE REQUIRED FOR ULTIMATE DESIGN WIND SPEED OF 170 MPH OR GREATER.)
8. FOR WOOD SHAKE AND SHINGLE ROOF COVERS, SYNTHETIC/SELF-ADHERED UNDERLAYMENT IS NOT PERMITTED. REFER TO TECHNICAL BULLETIN FH 2021-03 FOR MORE INFORMATION.
9. FORTIFIED HOME STANDARDS ARE TO BE APPLIED IN CONJUNCTION WITH FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS IN ADDITION TO THE STRUCTURAL DESIGN WHICH IS BY OTHERS. IN CASE OF A CONFLICT BETWEEN PROVISIONS, USE WHICHEVER IS MORE STRINGENT.

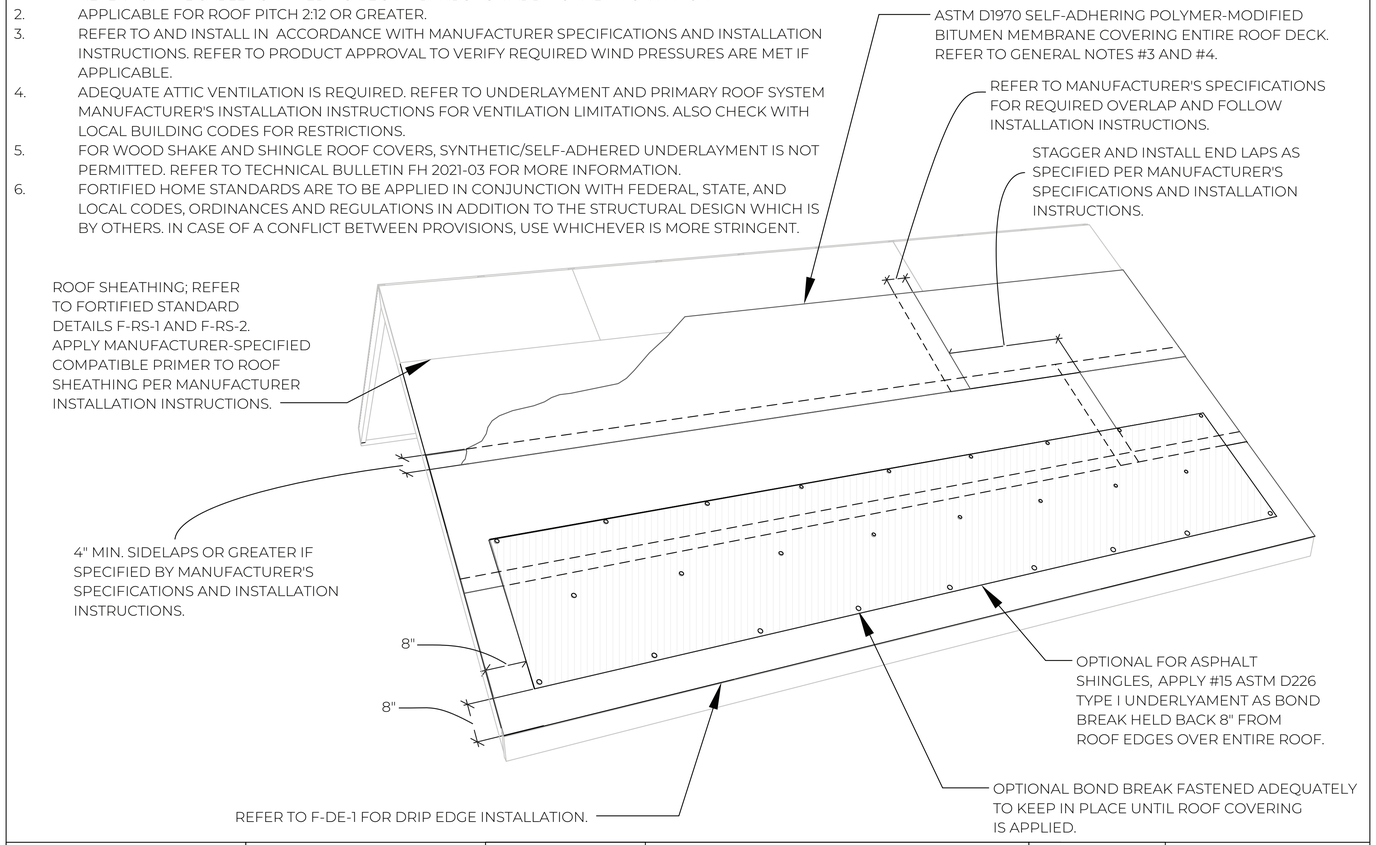


FORTIFIED HOME	**APPLICABLE STANDARDS:** FORTIFIED HOME™ - HURRICANE (2025) FORTIFIED HOME™ - HIGH WIND (2025)	**DESCRIPTION:** STEEP SLOPE SEALED ROOF DECK - TWO LAYERS **FELT** UNDERLAYMENT - SHINGLE OR METAL ROOF COVERS	**DRAWING #:** F-SRD-3 **DATE:** 11/01/2024

ROOF DECK SEALING | METHOD 3: SELF-ADHERED MEMBRANE

GENERAL NOTES:

1. REFER TO APPLICABLE FORTIFIED HOME STANDARDS FOR ADDITIONAL INFORMATION.
2. APPLICABLE FOR ROOF PITCH 2:12 OR GREATER.
3. REFER TO AND INSTALL IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS AND INSTALLATION INSTRUCTIONS. REFER TO PRODUCT APPROVAL TO VERIFY REQUIRED WIND PRESSURES ARE MET IF APPLICABLE.
4. ADEQUATE ATTIC VENTILATION IS REQUIRED. REFER TO UNDERLAYMENT AND PRIMARY ROOF SYSTEM MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR VENTILATION LIMITATIONS. ALSO CHECK WITH LOCAL BUILDING CODES FOR RESTRICTIONS.
5. FOR WOOD SHAKE AND SHINGLE ROOF COVERS, SYNTHETIC/SELF-ADHERED UNDERLAYMENT IS NOT PERMITTED. REFER TO TECHNICAL BULLETIN FH 2021-03 FOR MORE INFORMATION.
6. FORTIFIED HOME STANDARDS ARE TO BE APPLIED IN CONJUNCTION WITH FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS IN ADDITION TO THE STRUCTURAL DESIGN WHICH IS BY OTHERS. IN CASE OF A CONFLICT BETWEEN PROVISIONS, USE WHICHEVER IS MORE STRINGENT.



APPLICABLE STANDARDS:

FORTIFIED HOME™ - HURRICANE (2025)

FORTIFIED HOME™ - HIGH WIND (2025)

DESCRIPTION:

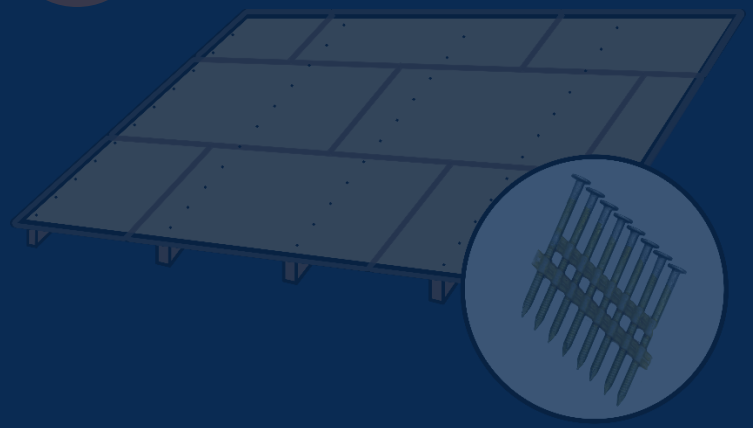
STEEP SLOPE SEALED ROOF DECK - SELF-ADHERED MEMBRANE (SHOWING BOND BREAK FOR ASPHALT SHINGLES) - SHINGLE AND METAL ROOF COVERS

DRAWING #: F-SRD-4

DATE: 11/01/2024

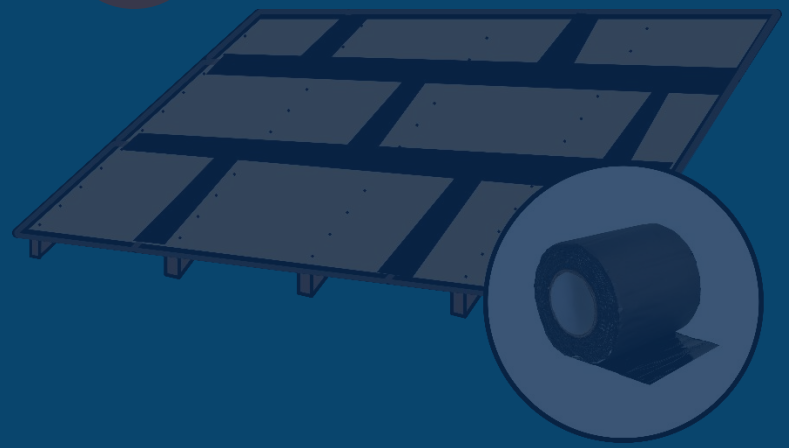
3 KEYS TO ROOF DURABILITY

1 Nail it down.



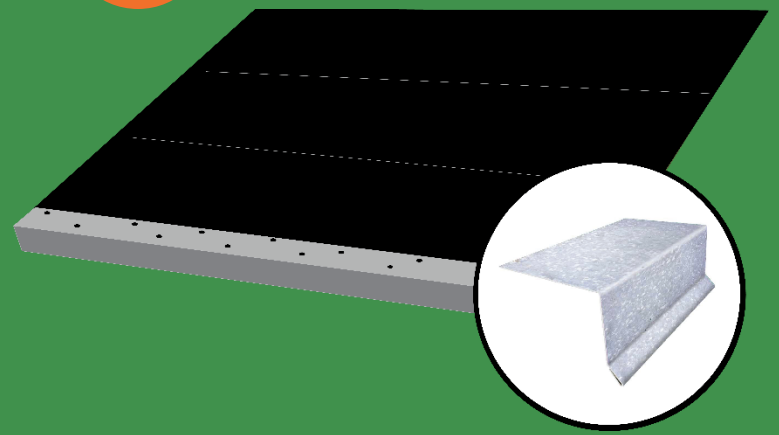
KEEP THE ROOF ON.

2 Seal it up.



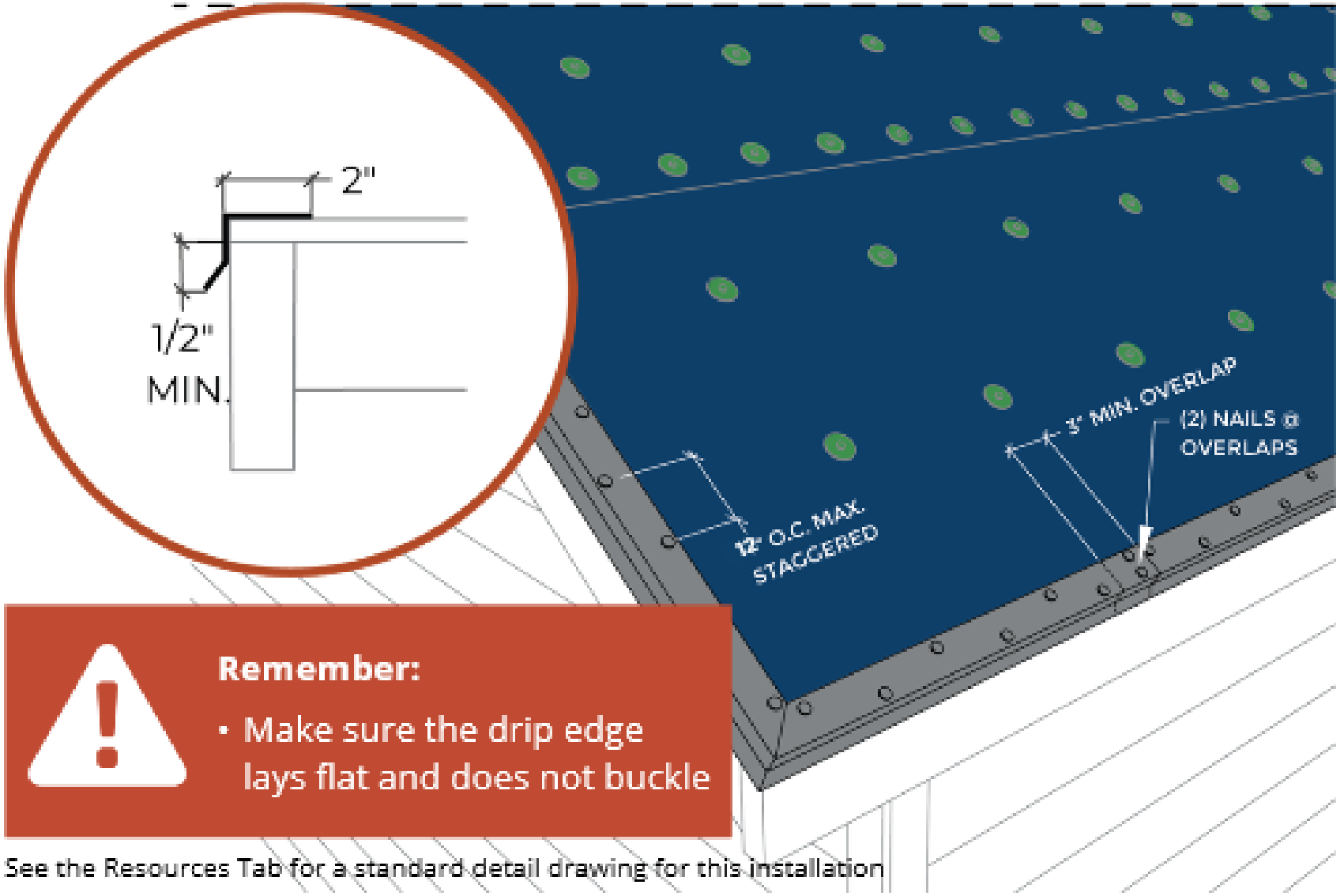
KEEP THE WATER OUT.

3 Lock it in.



KEEP THE WIND OUT.

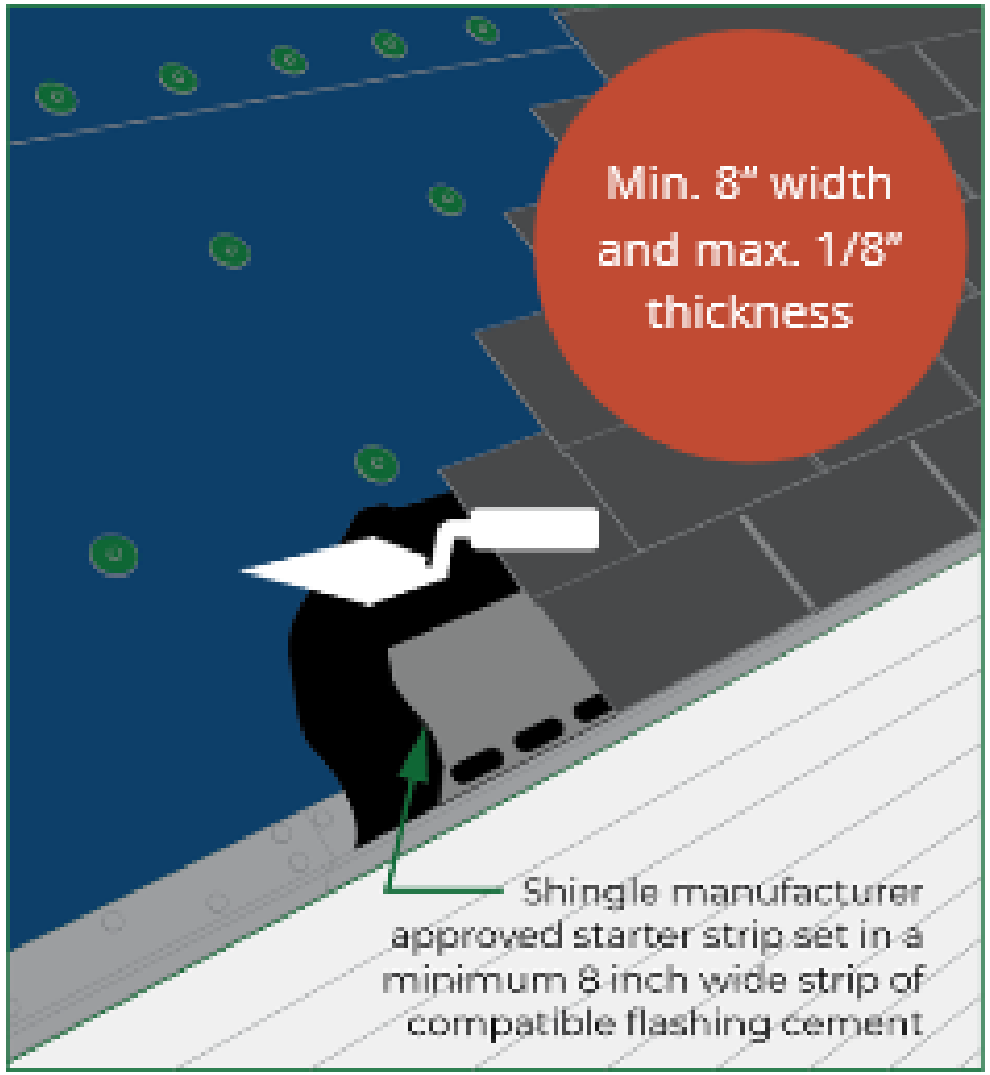
Installation: Drip Edges

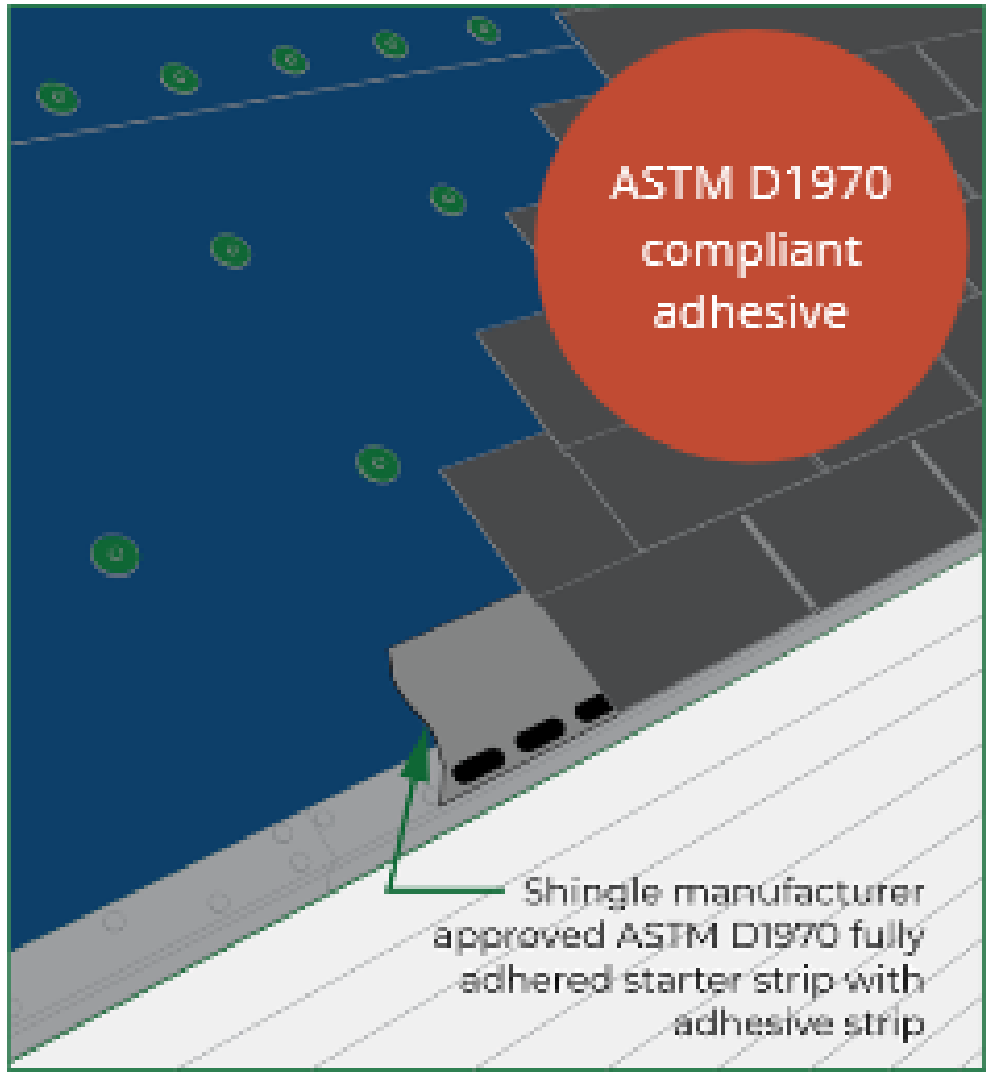


Remember:

- Make sure the drip edge lays flat and does not buckle

See the Resources Tab for a standard detail drawing for this installation


Min. 8" width and max. 1/8" thickness
Shingle manufacturer approved starter strip set in a minimum 8 inch wide strip of compatible flashing cement


ASTM D1970 compliant adhesive
Shingle manufacturer approved ASTM D1970 fully adhered starter strip with adhesive strip

FORTIFIED online training.

www.fortifiedwise.com

SECURE & SEALED ROOF DECK

› **SECURE ROOF DECK**

8d, 2-3/8” ring shank nails @ 6” O.C. max (in the field and on the edge)

› **SEAL ROOF DECK**

Tape seams (with qualifying tape)

+ Underlayment (30#)

BONUS

self-adhered membrane (aka ice & water shield)

in lieu of sealed roof deck

Habitat for Humanity®

Secure & Sealed Roof Deck

Construction method and documentation

SIMPSON Strong-Tie®

How to do it

1. Use 8d, 2 3/8" ring-shank nails for roof sheathing.
   a. Include one photo of nails with reference OR a nail box with specs.
2. Use 6" oc max roof sheathing nailing pattern in field and edge.
   a. Include photo showing spacing with ruler.
   b. Include photo of completed deck.
3. Tape roof deck seams with qualifying tape.
   a. Use modified bitumen, butyl or acrylic tape, at least 4 inches wide.
   b. Qualifying products include:
      - DuPont Tyvek FlexWrap
      - Huber ZIP System tape
      - DOW Weathermate
      - Protecto Flex
   c. Include photo of completed deck with taped seams.

How to show it

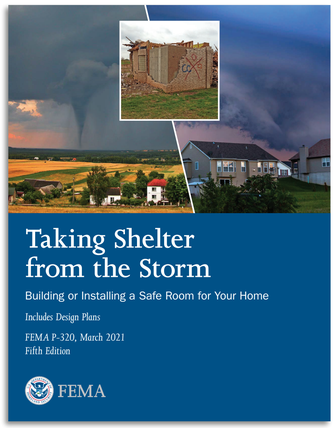
1. Pictures of:
   a. Nails
   b. Nailing pattern with ruler
   c. Roof
   d. Roof with taped seams

285 Peachtree Center Ave. NE, Suite 2700, Atlanta, GA 30303-1246
322 W. Lamar St., Americus, GA 31709
(800) 422-4828 fax (229) 924-6541 publicinfo@habitat.org habitat.org

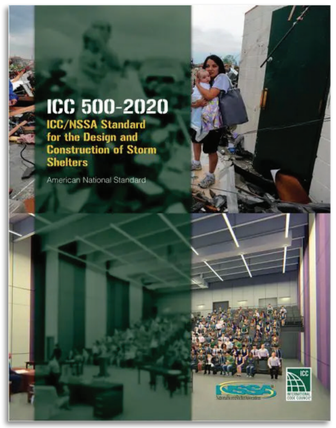
https://hfhi.sharepoint.com/sites/Construction/Shared%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FConstruction%2FShared%20Documents%2FSecure%5FSealed%5FRoof%5FDeck%2DGuide%2Epdf&parent=%2Fsites%2FConstruction%2FShared%20Documents

PROTECTION OF OCCUPANT

Federal, State, & Municipality



FEMA P-320



ICC 500

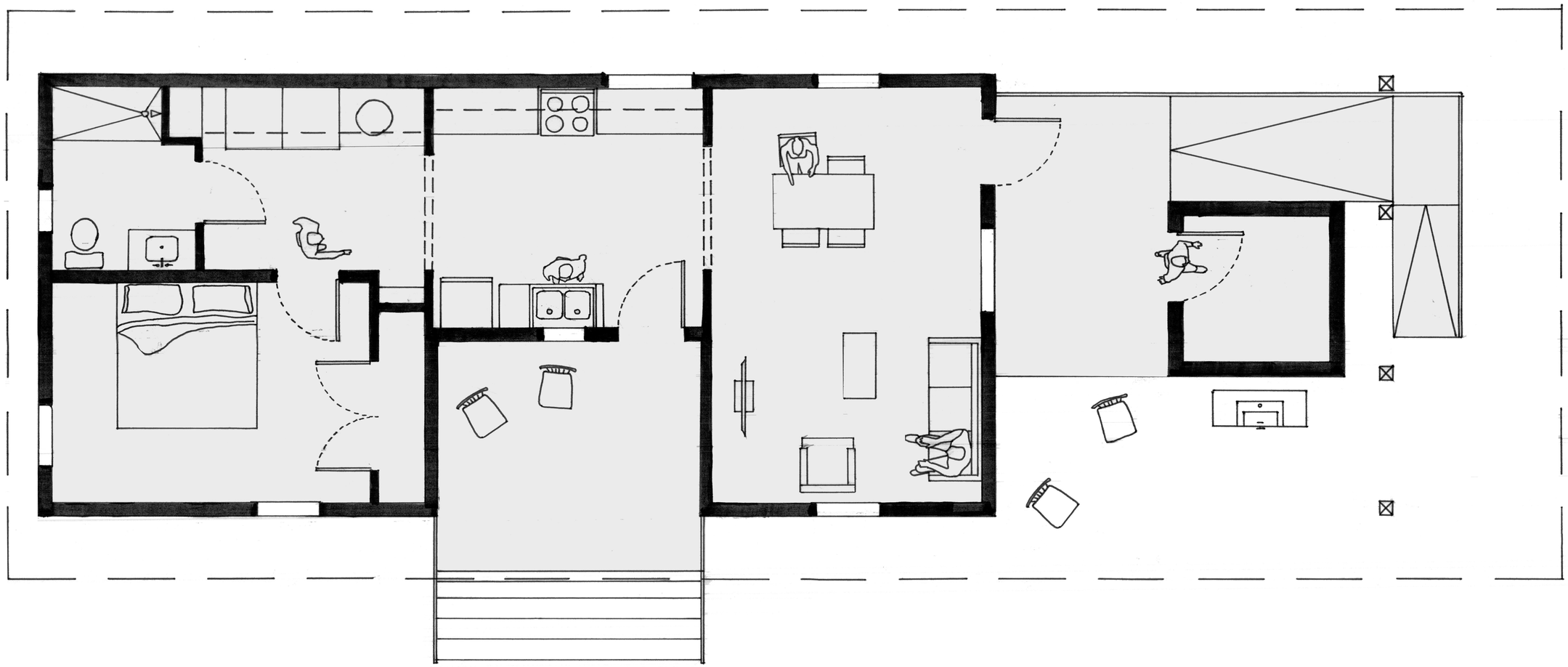
+

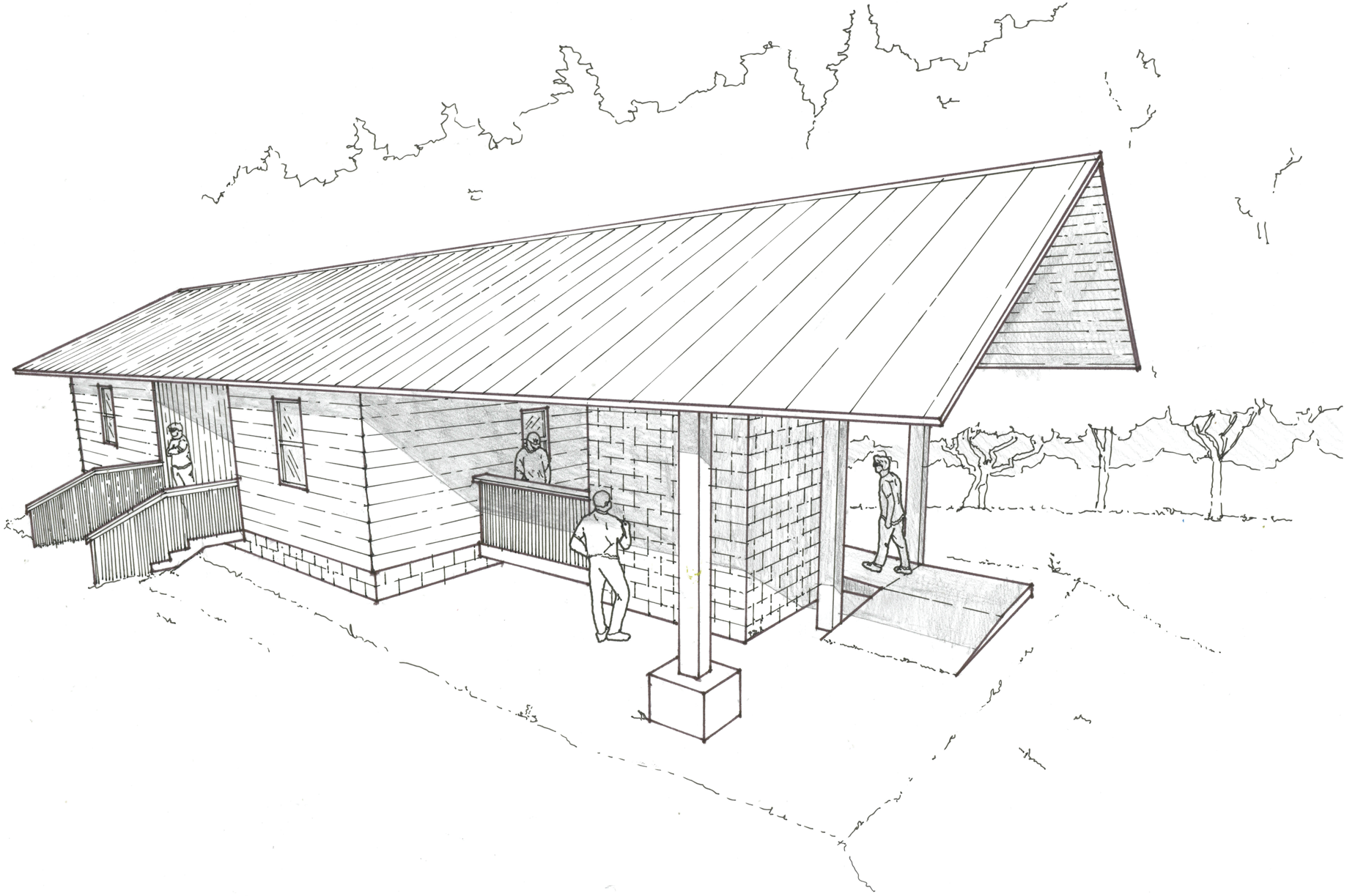
PROTECTION OF ASSET

Private Entities (Insurance Companies)

IBHS FORTIFIED

AUBURN
UNIVERSITY





NAME A FUNDAMENTAL STRATEGY FOR INCREASING RESILIENCE

NAME A FUNDAMENTAL STRATEGY FOR INCREASING RESILIENCE

SECURE & SEALED ROOF DECK

WELLNESS

9 FOUNDATIONS OF A HEALTHY BUILDING

› Ventilation

› Air Quality

› Thermal Health

› Moisture

› Dust & Pests

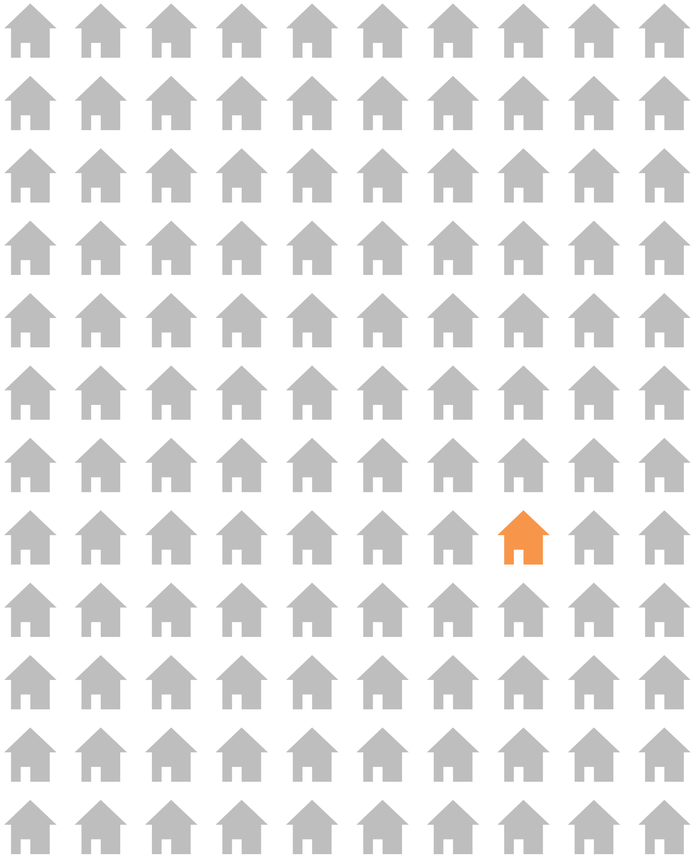
› Safety & Security

› Water Quality

› Noise

› Lighting & Views

source: Harvard T.H. Chan School of Public Health "The 9 Foundations of a Healthy Building"



ONLY 1% OF EXISTING HOMES HAVE EACH OF THE 5 UNIVERSAL DESIGN FEATURES

› No step entry

› Single floor living

› Extra-wide hallways & doors

› Accessible electrical controls

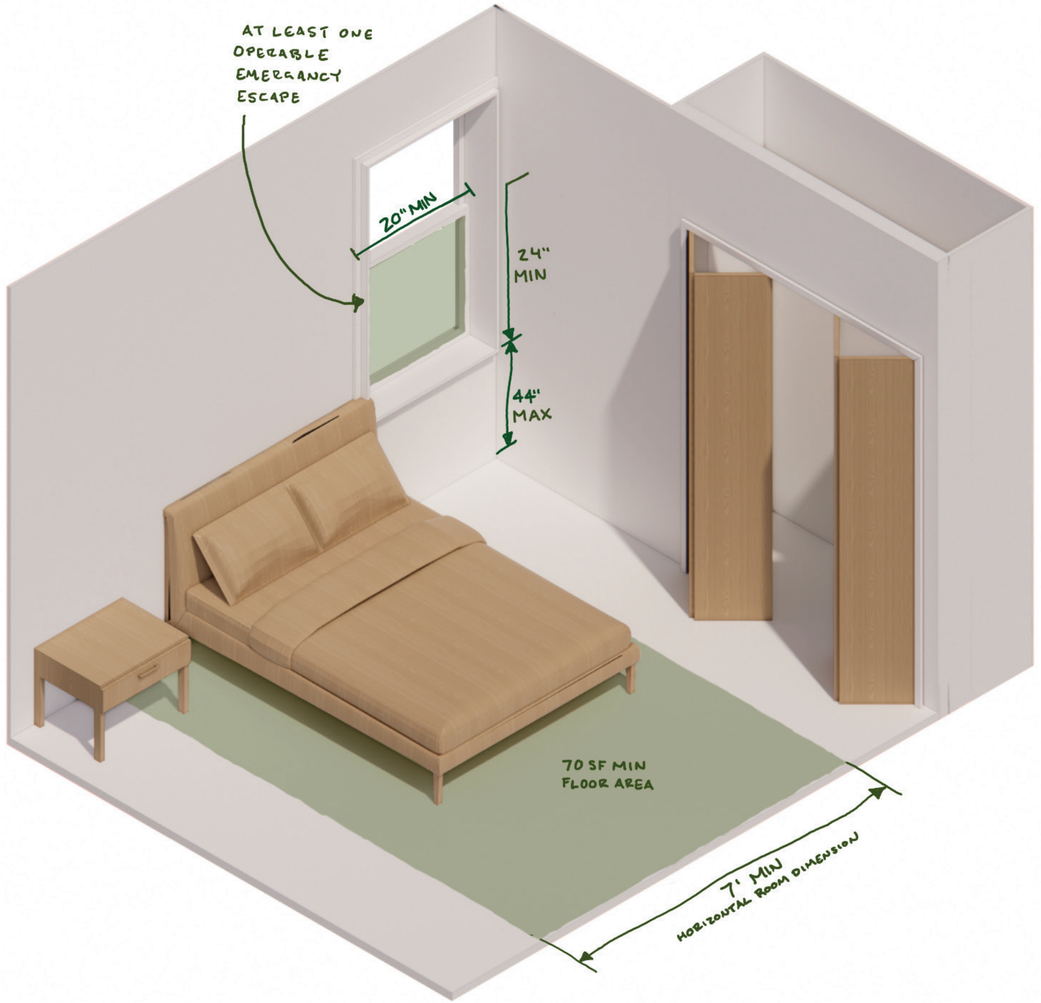
› Lever-style handles on doors & faucets

BEDROOM: CODE REQUIREMENTS

› **MINIMUM 70 SQUARE FEET**
IRC R304.1

› **MINIMUM 7’ WIDE/LONG**
IRC R304.2

› **EMERGENCY ESCAPE/RESCUE OPENING**
IRC R310.1
IRC R310.2



BEDROOM: RURAL STUDIO RECOMMENDATIONS

› **MINIMUM BEDROOM SIZE**

10’ x 10’ (excluding closet)

› **MINIMUM BED SIZE**

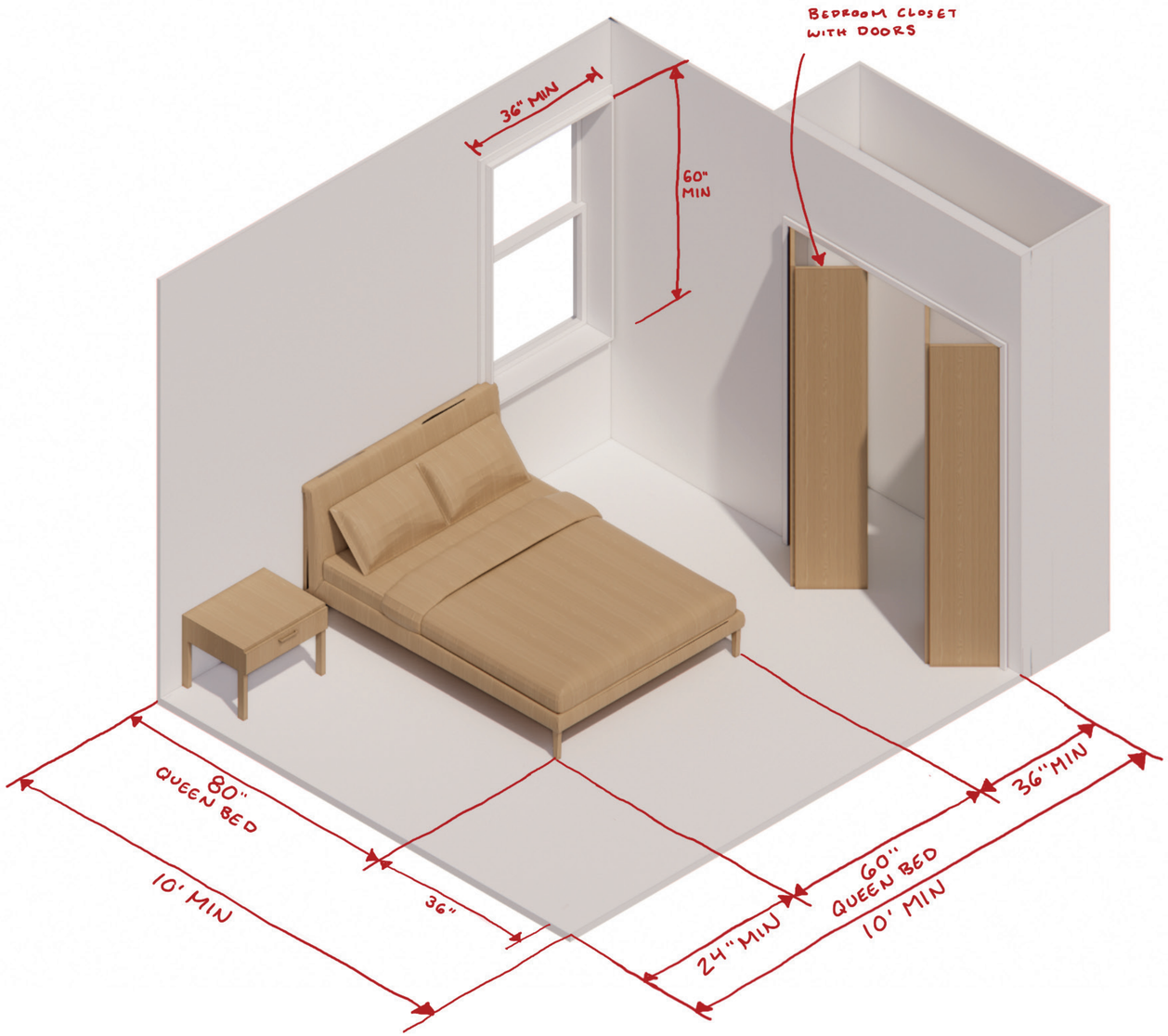
Plan for at least a queen-size bed (60” W x 80” L)

› **MINIMUM SPACE AROUND BED**

At least 36” clear around at least 1 side and base of bed

› **BEDROOM CLOSET**

Each bedroom should have a closet with doors



BEDROOM: RURAL STUDIO BEST PRACTICES

› **EFFICIENT CIRCULATION**

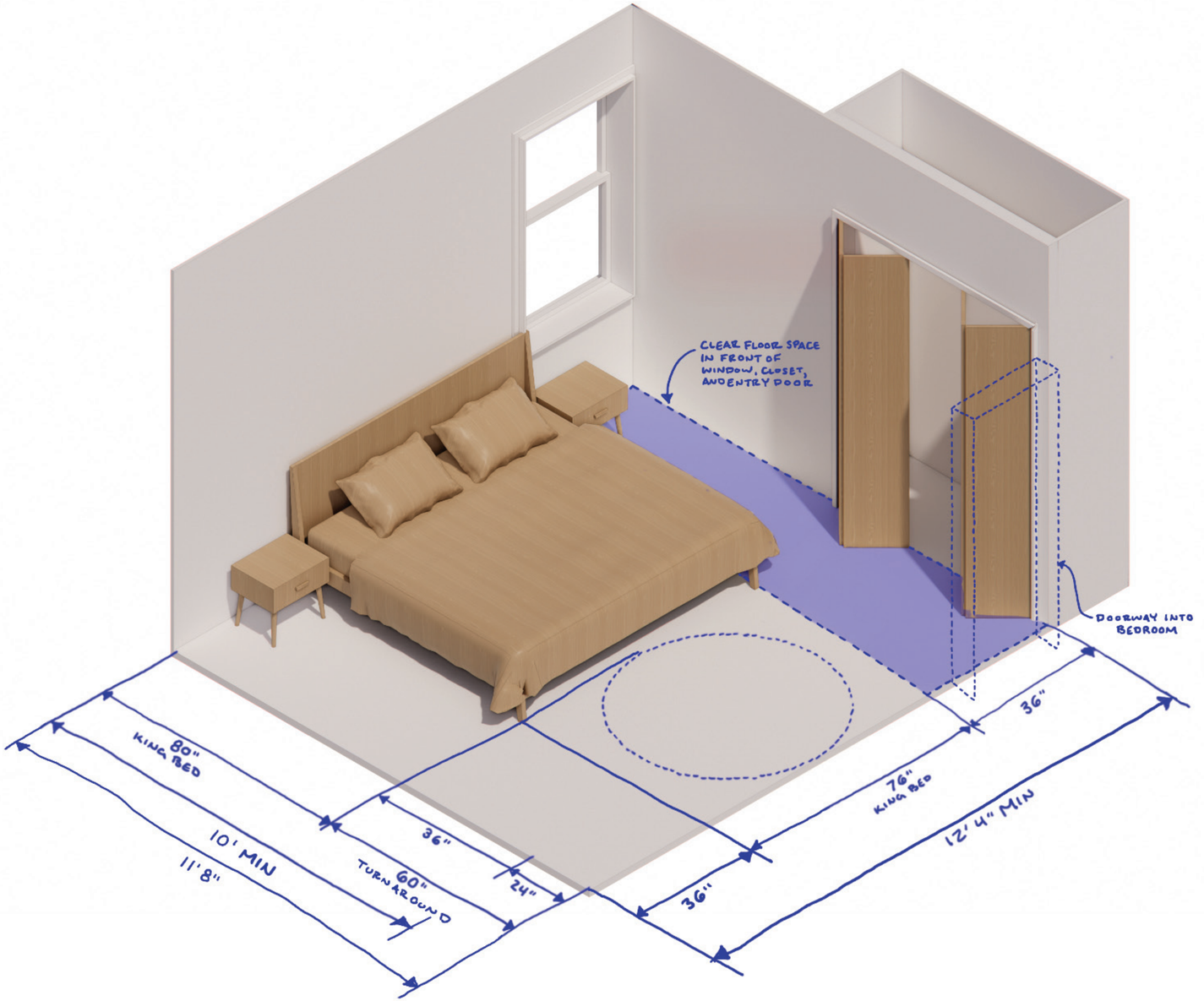
Create circulation zones (ie. room door and closet doors in same zone; consider aligning doors & windows)

› **TURN-AROUND SPACE**

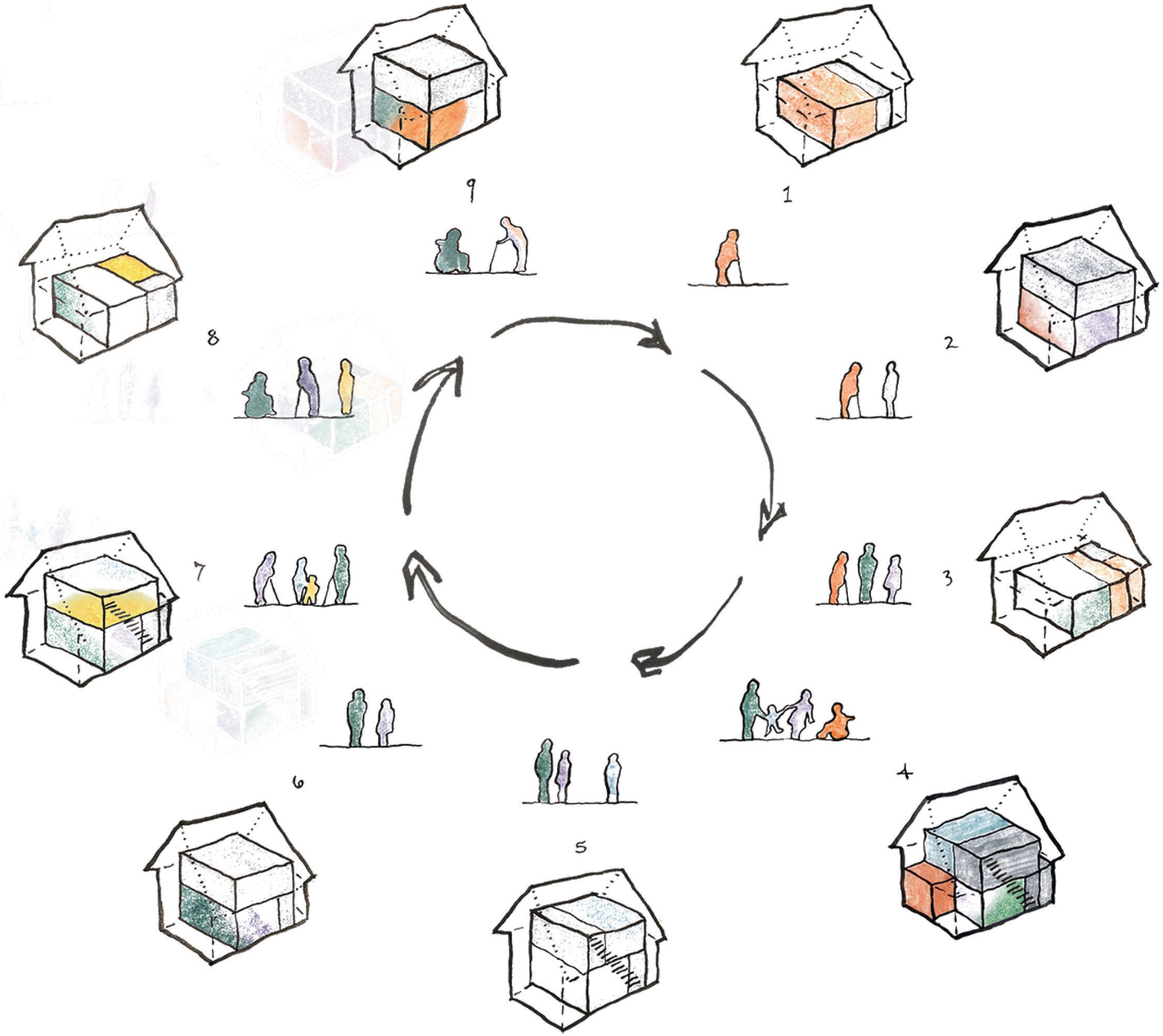
Include a 5’ (60”) turning radius somewhere in the bedroom

› **BED SIZE**

Design with a king bed (76” W x 80” L)



COMMUNITY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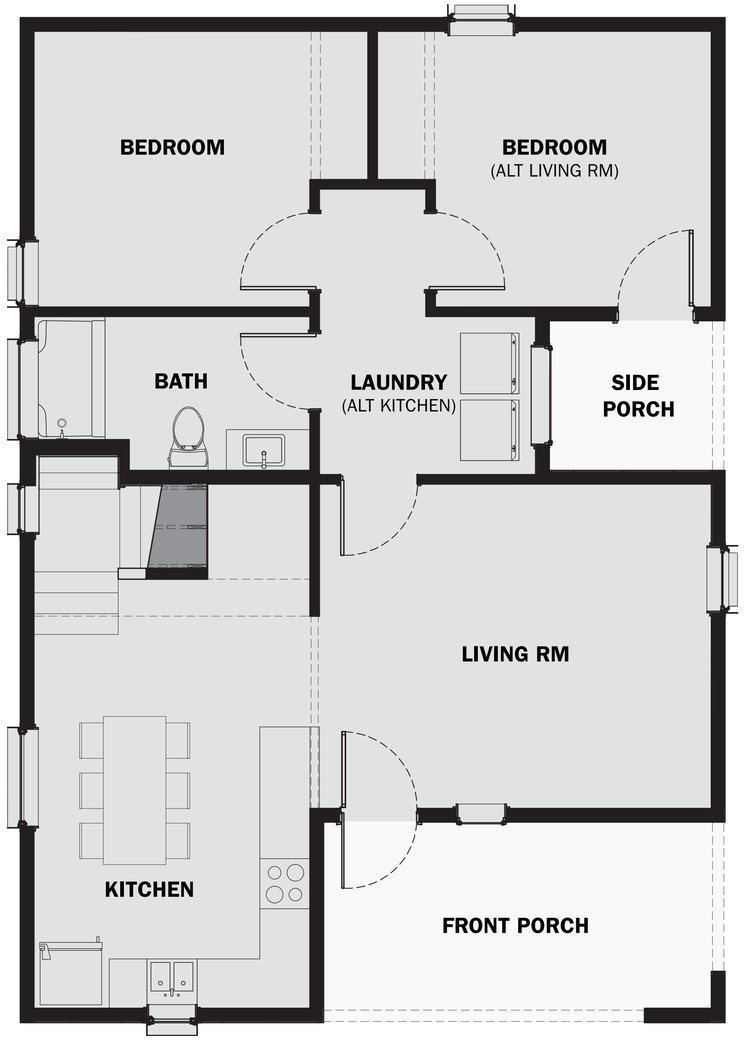
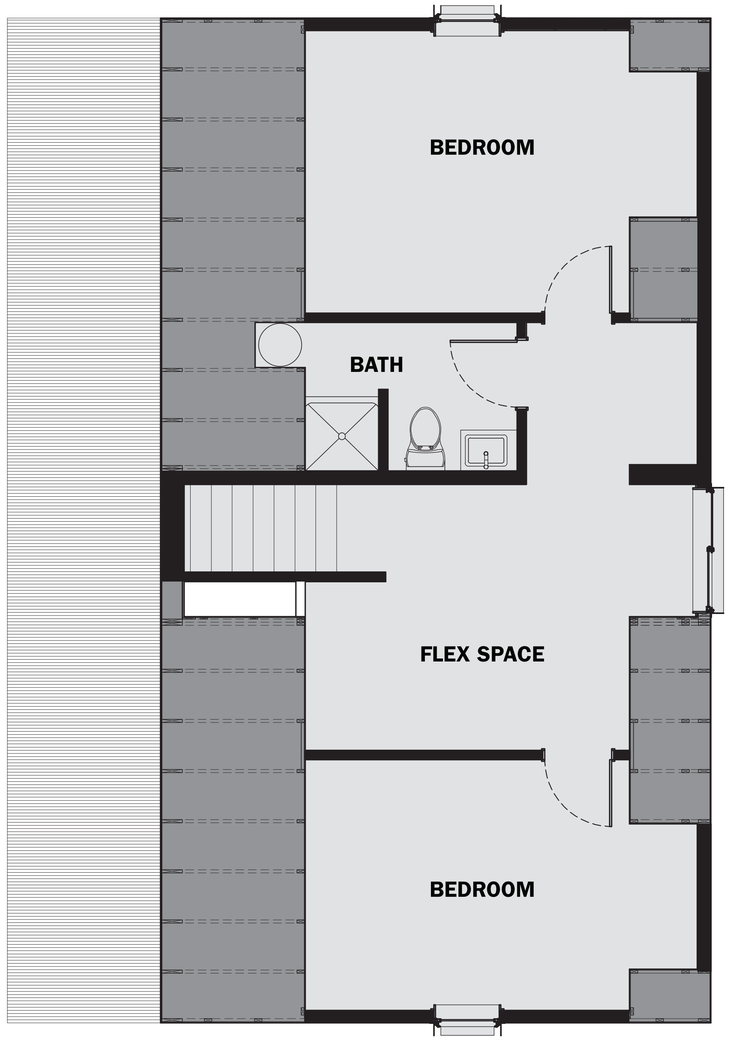
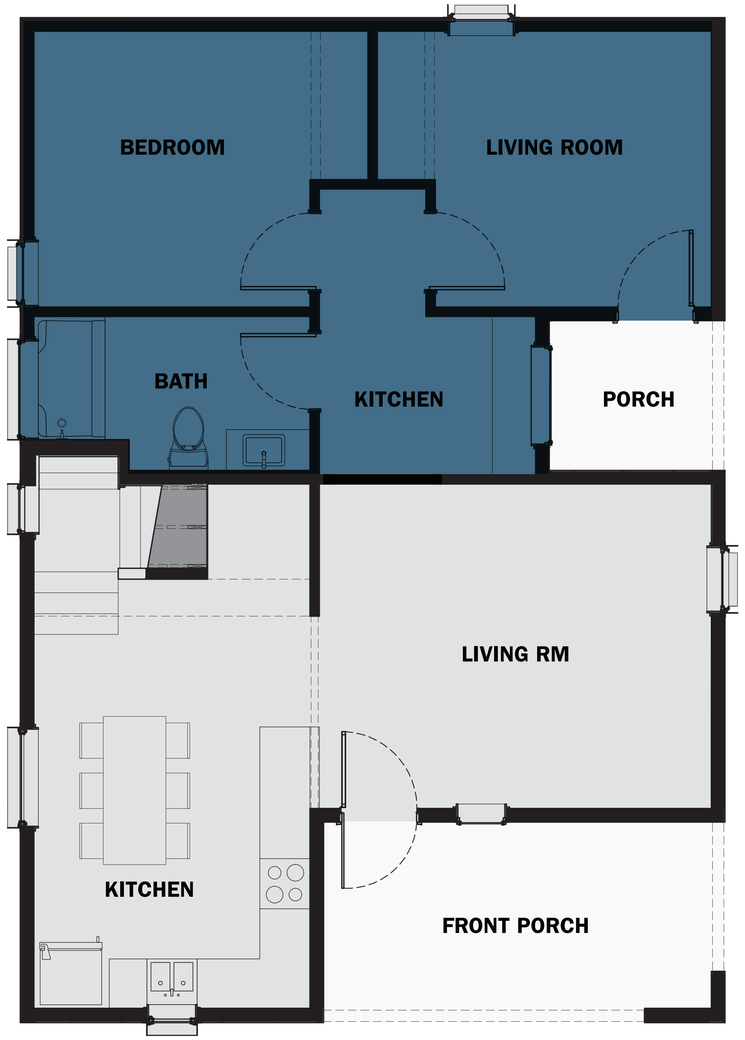


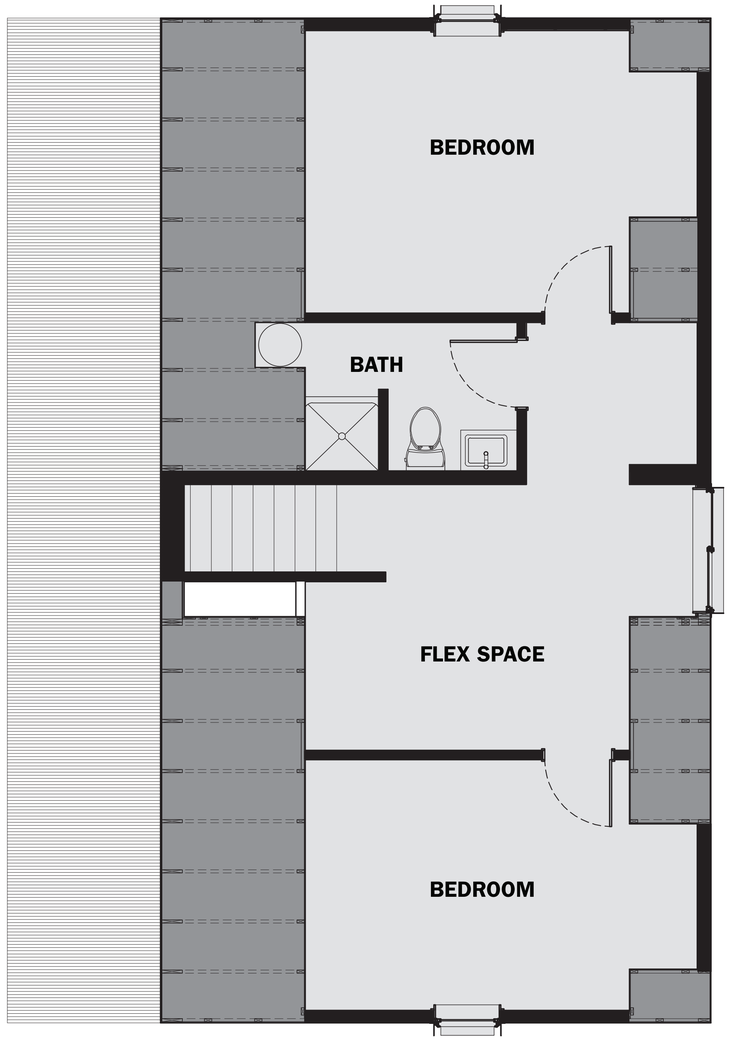
GROUND FLOOR



SECOND FLOOR

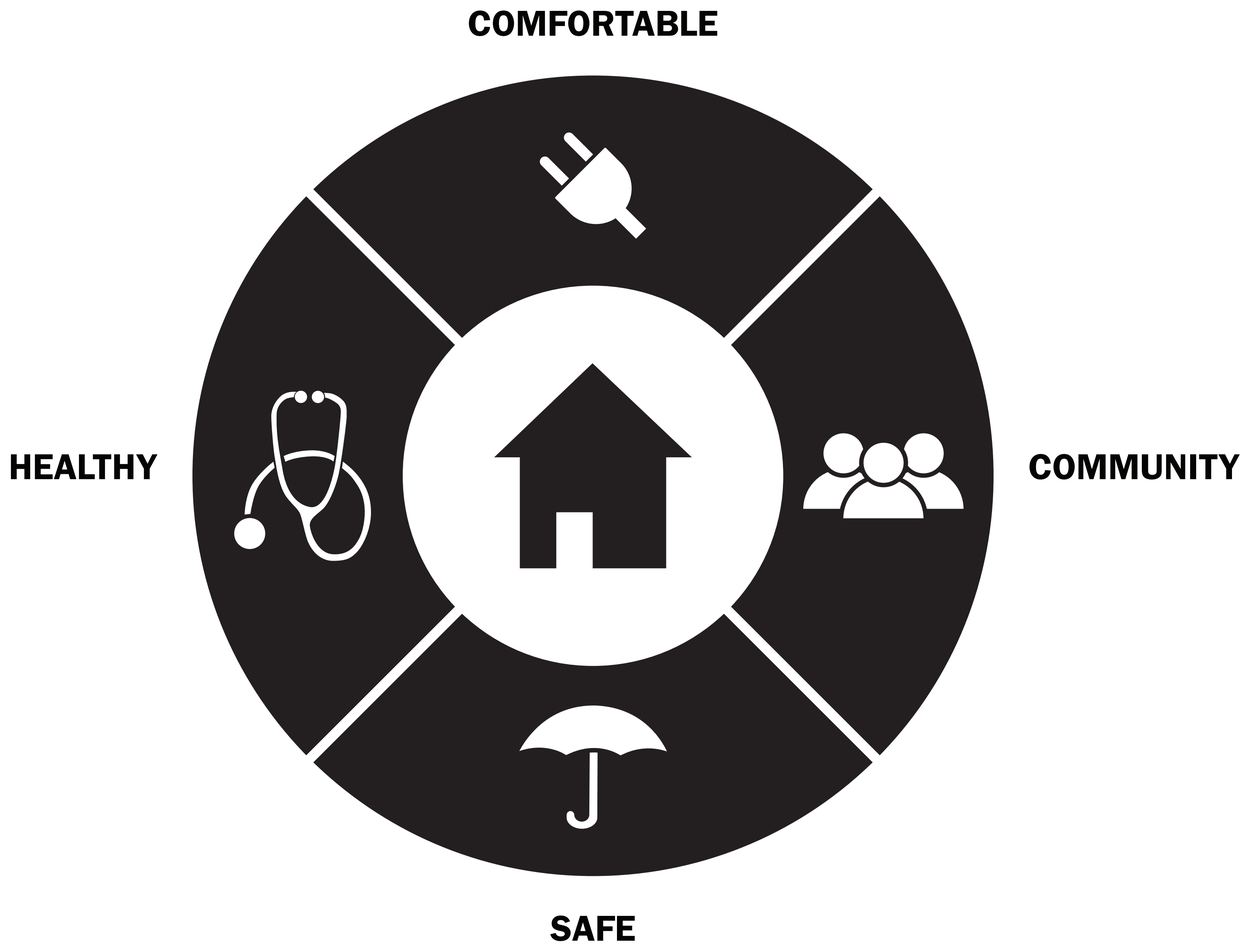


GROUND FLOOR



SECOND FLOOR

DOWNTOWN
GROCERY STORE
PROJECT SITE


COMFORTABLE
HEALTHY
COMMUNITY
SAFE

POLICY CAN INCENTIVIZE UPTAKE OF INCREASED PERFORMANCE

Adoption of current building codes

Building codes set a minimum acceptable standard for construction. Newer building codes require more stringent performance measures. Adopting the most current building codes not only increases performance across the board, it also increases access to high-performance products such as more energy-efficient windows, insulation, and more.

Performance requirements on funds for housing assistance

Some state-sponsored programs are requiring homes meet third-party performance standards in order to access funds for housing assistance. For example, Florida's Homeownership Pool (HOP) Program requires certification to at least one of a selection of green building standards in order to qualify for purchase assistance.

Utility energy efficiency programs

Utilities can incentivize energy efficiency in a number of ways. Through offering bidirectional metering and programs to sell energy to the grid, they increase accessibility to on-site energy generation. Many utilities also have retrofit/weatherization programs that allow homeowners to 'pay as you save.'

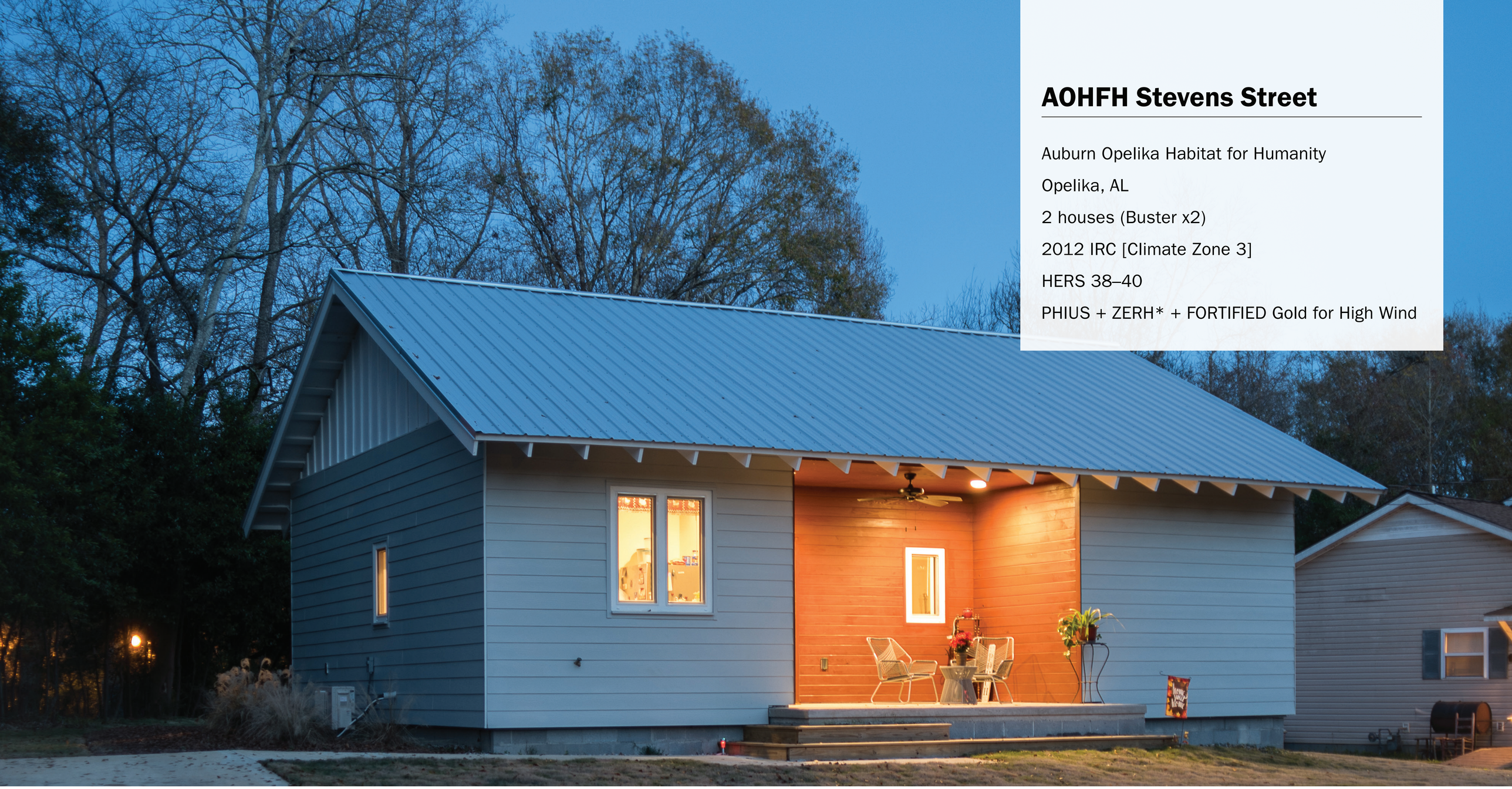
Tax credits /deductions / rebates

Developers, builders, and homeowners are eligible to receive various tax incentives for high-performance homes. For example, the 45L New Energy Efficiency Home Tax Credit provides up to a $2000 federal tax credit for each qualifying home. And an increasing number of states are offering tax credits for mitigation measures and FORTIFIED homes.

Insurance premium discounts

Insurance companies have long used incentives to mitigate future expenditures – such as health insurers offering wellness checks or memberships to fitness programs. In many states, insurers offer homeowners insurance discounts for FORTIFIED homes.

CASE STUDIES



AOHFH Stevens Street

Auburn Opelika Habitat for Humanity

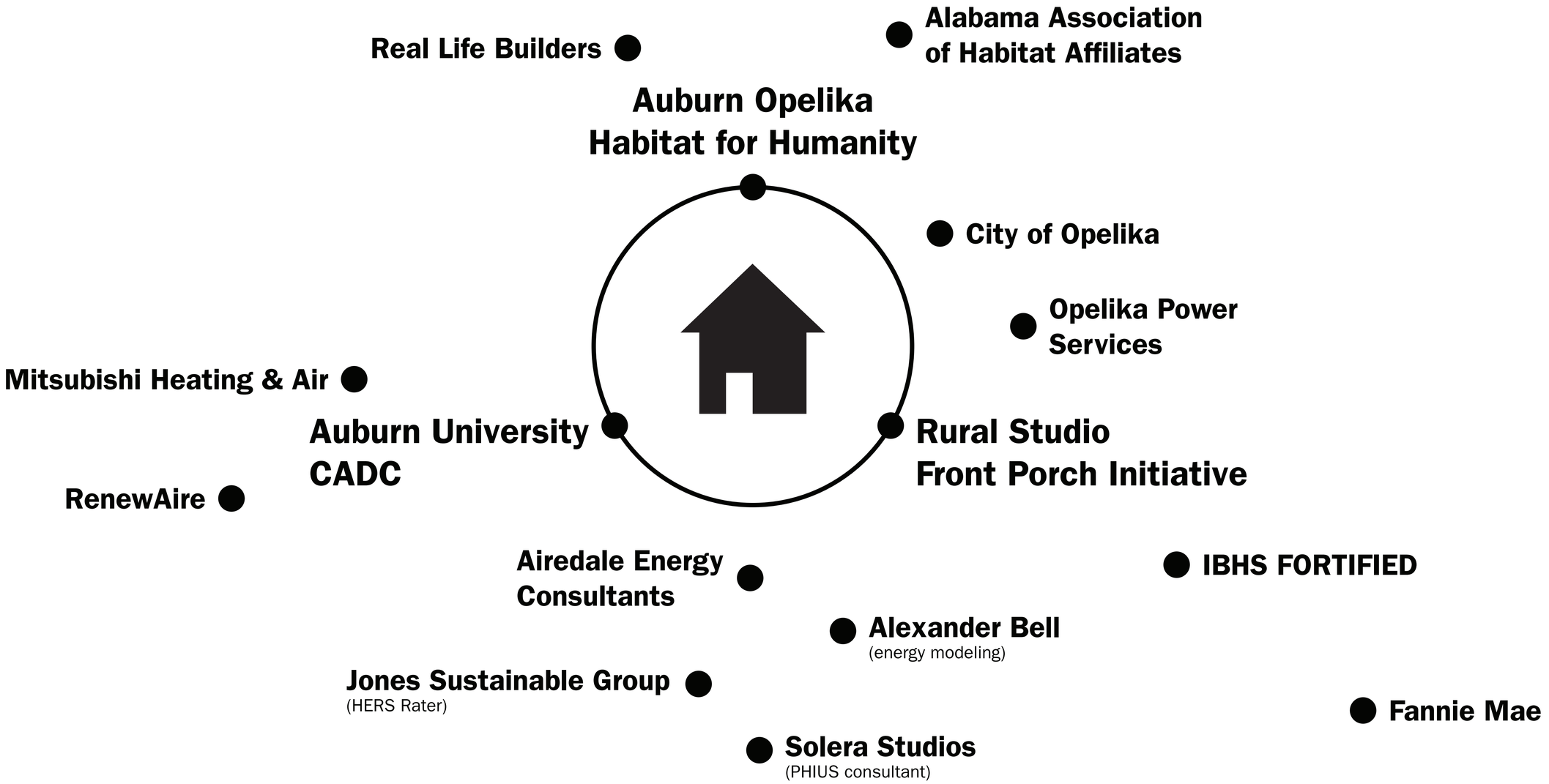
Opelika, AL

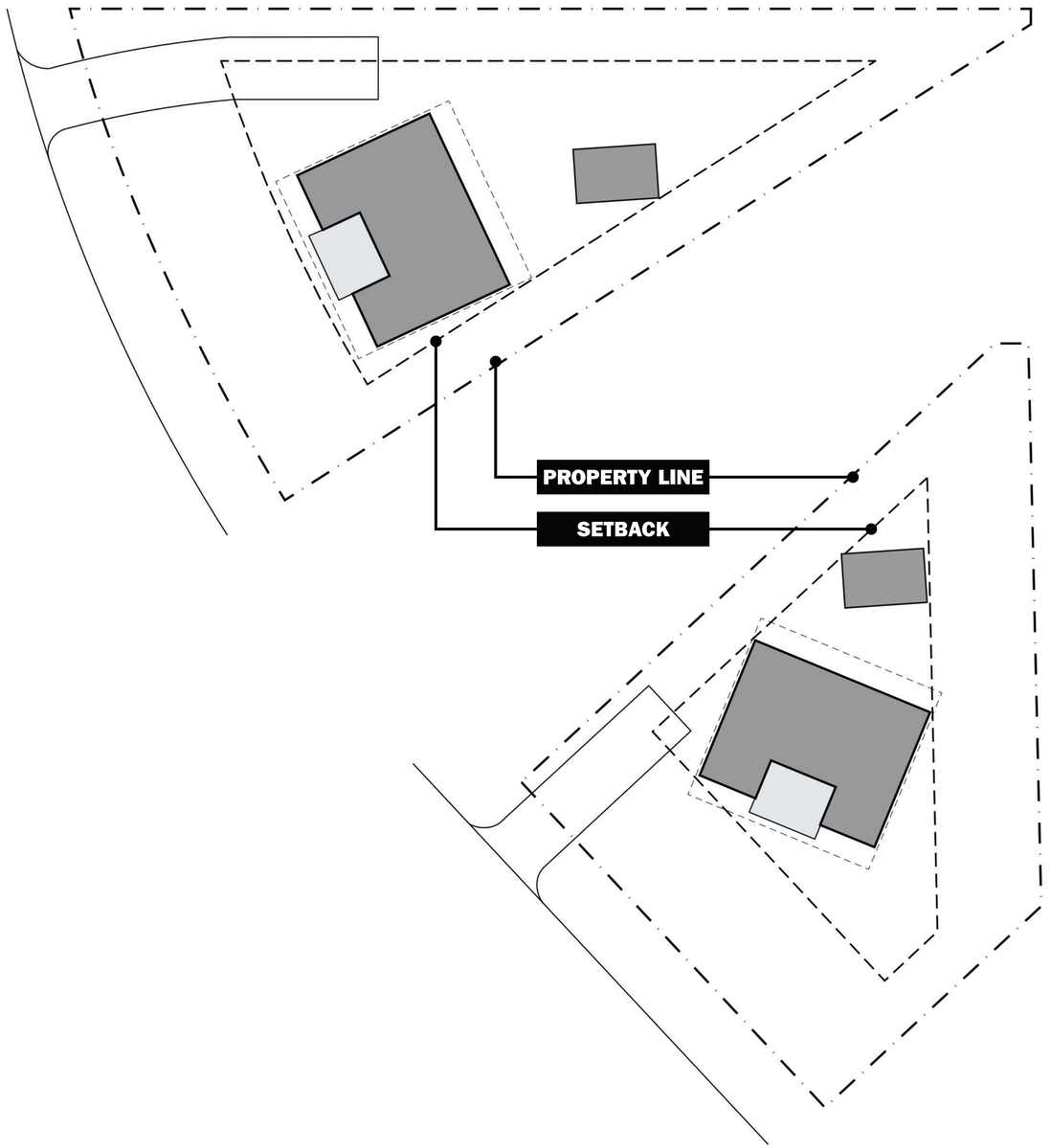
2 houses (Buster x2)

2012 IRC [Climate Zone 3]

HERS 38–40

PHIUS + ZERH* + FORTIFIED Gold for High Wind


Real Life Builders
Alabama Association of Habitat Affiliates
Auburn Opelika Habitat for Humanity
City of Opelika
Opelika Power Services
Mitsubishi Heating & Air
Auburn University CADC
Rural Studio Front Porch Initiative
RenewAire
Airedale Energy Consultants
IBHS FORTIFIED
Alexander Bell
(energy modeling)
Jones Sustainable Group
(HERS Rater)
Fannie Mae
Solera Studios
(PHIUS consultant)


PROPERTY LINE
SETBACK

HOUSE 66
PHIUS + FORTIFIED

HOUSE 68
ZERH + FORTIFIED

HOUSE 66
PHIUS
Passive House Institute US
HOUSE 68
ZERO
ENERGY READY HOME
ZERO
ENERGY READY HOME
Building
AMERICA
U.S. Department of Energy
Building
AMERICA
U.S. Department of Energy
EPA Indoor
airPLUS
QUALIFIED HOME
EPA Indoor
airPLUS
QUALIFIED HOME
energy
ENERGY STAR
energy
ENERGY STAR
energy
ENERGY STAR
IECC
IECC
IECC
IECC

PASSIVE HOUSE

Making high-performance passive building the mainstream market standard.

1. Continuous insulation
   (no thermal bridging)
2. Attention to air sealing
3. Window & door performance
4. Active ventilation
5. Energy efficient equipment
6. Active ventilation

FORTIFIED FOR HIGH WINDS

Strengthen home to improve resistance to damage from high winds.

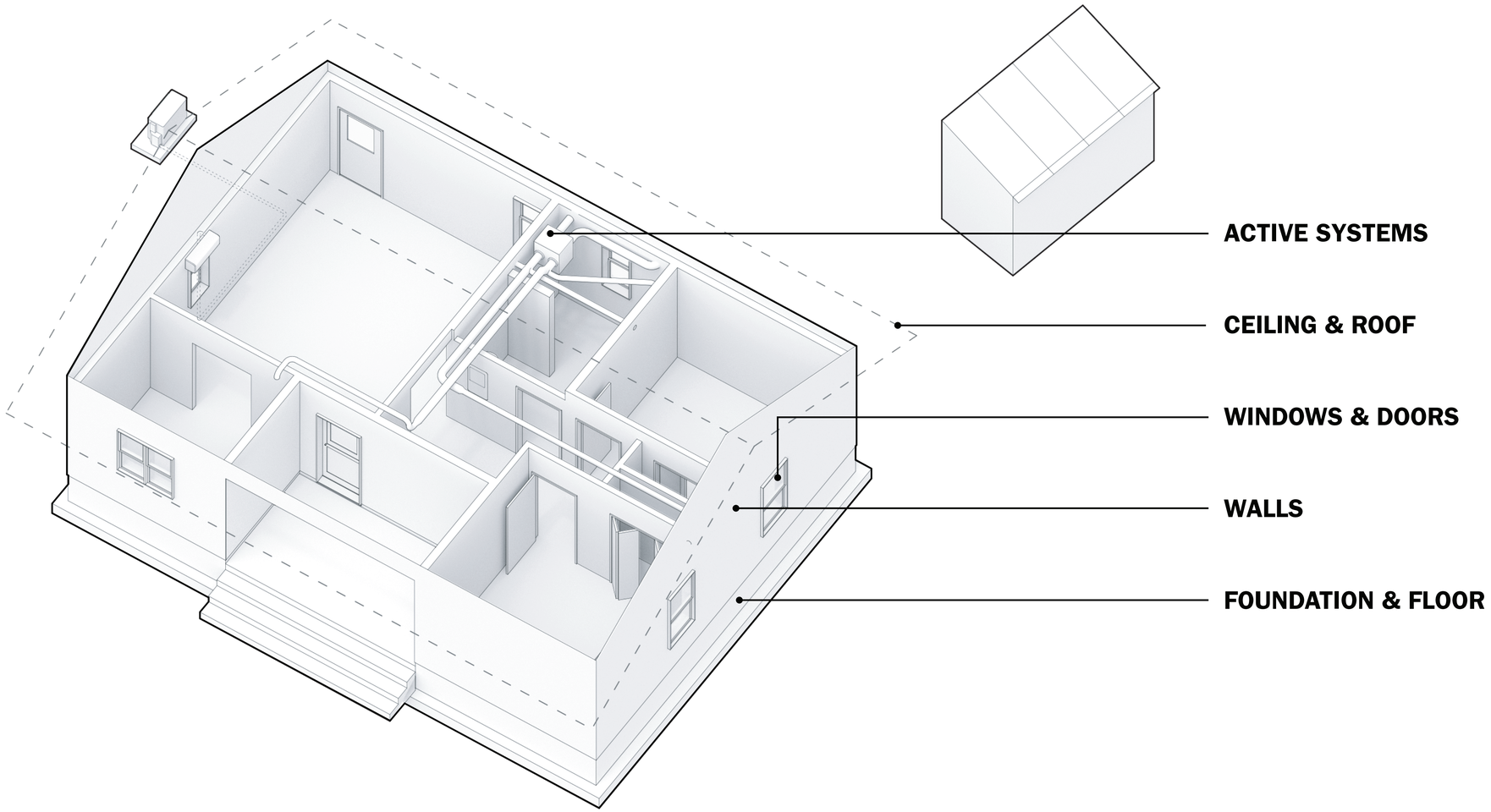
1. Roof
2. Gable end bracing
3. Continuous load path

ZERO ENERGY READY HOMES

Optimize efficiency, manage related risks, and help ensure future readiness.

1. Optimize efficiency
   - Enclosure
   - Equipment
   - Appliances / lighting
2. Do no harm
   - Water protection
   - Ensured comfort
   - Indoor air quality
3. Ensure future ready
   - Solar ready
   - Forthcoming codes

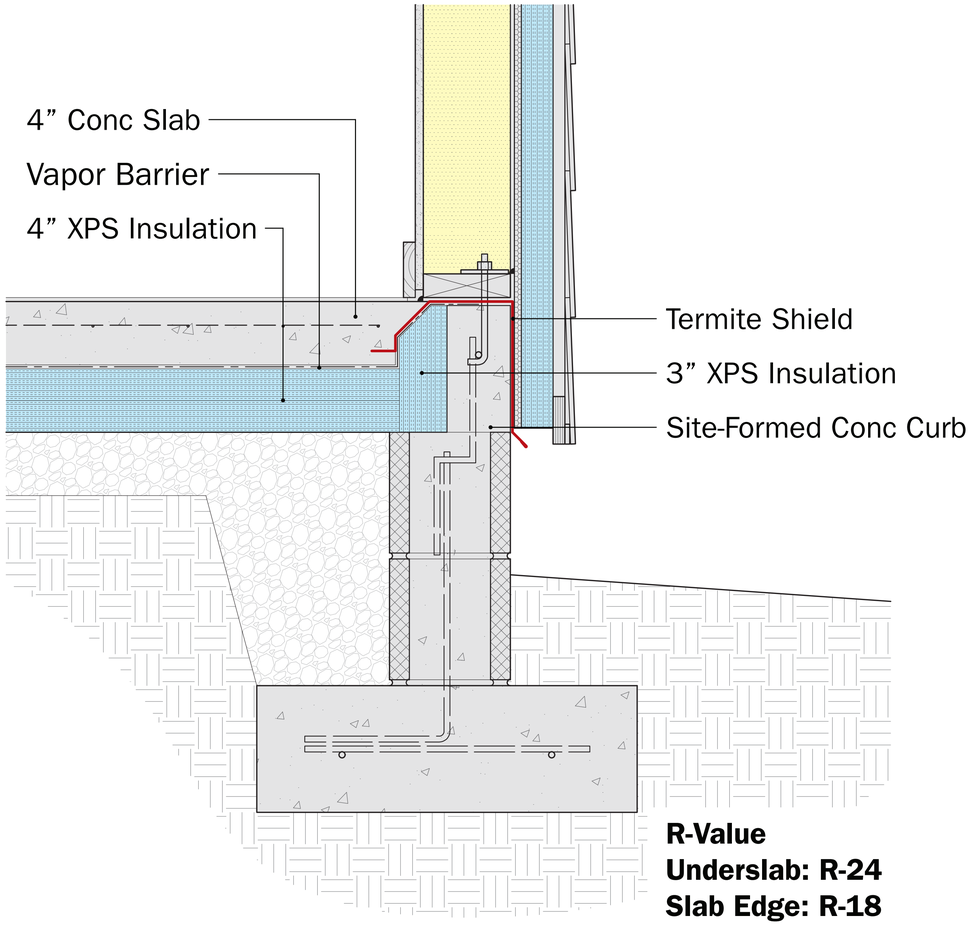
KEY AREAS OF ENVELOPE COST / PERFORMANCE DIFFERENCE



ASSEMBLY COMPARISON: FOUNDATION & FLOOR

House 66

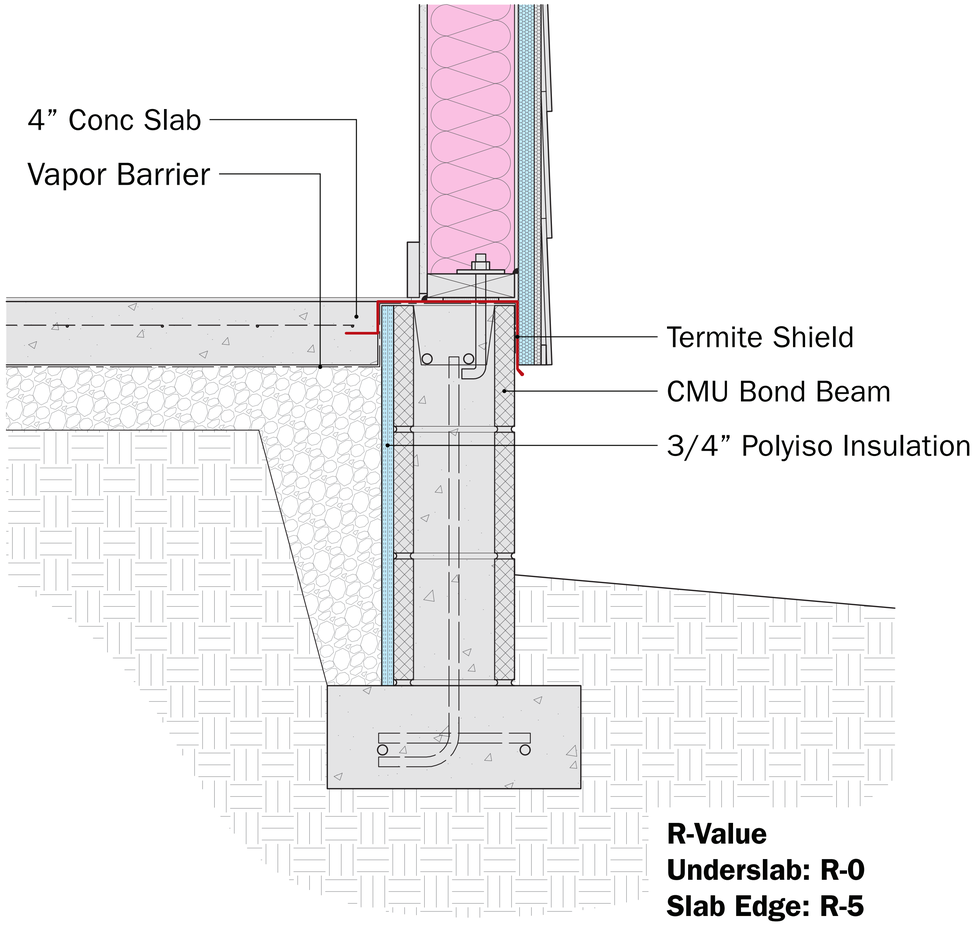
PHIUS



R-Value
Underslab: R-24
Slab Edge: R-18

House 68

ZERH

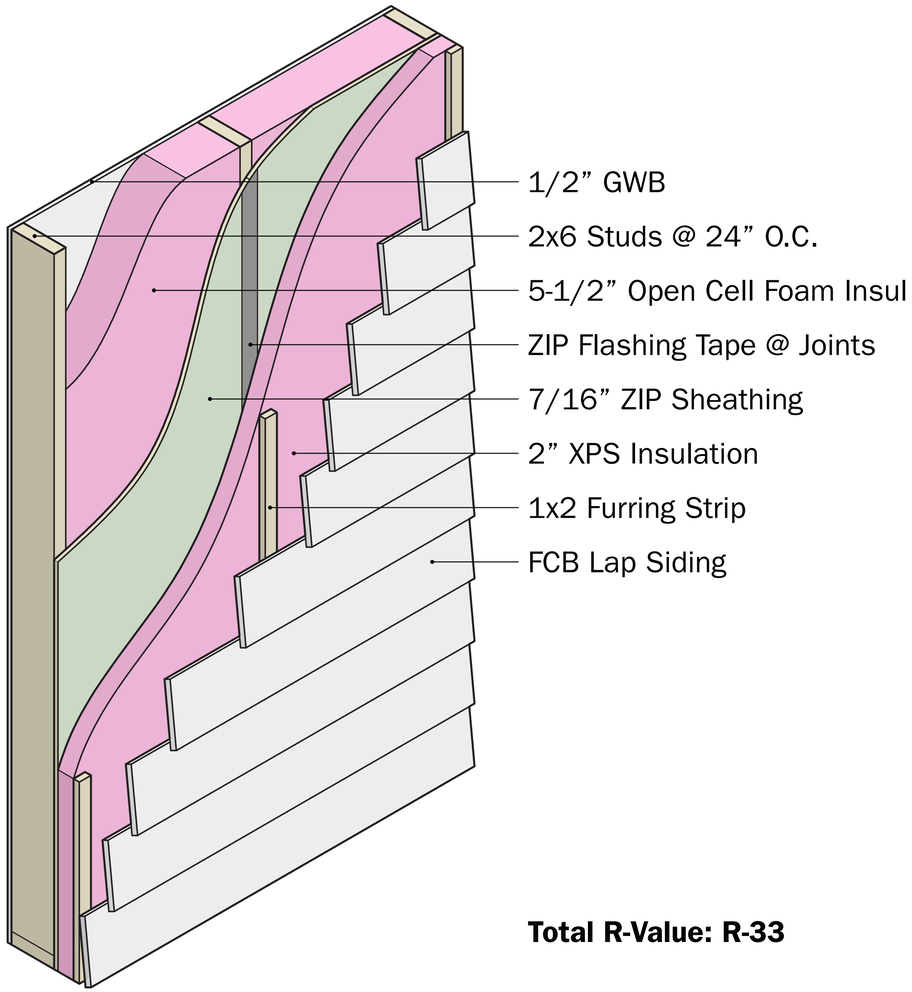


R-Value
Underslab: R-0
Slab Edge: R-5

ASSEMBLY COMPARISON: WALL

House 66

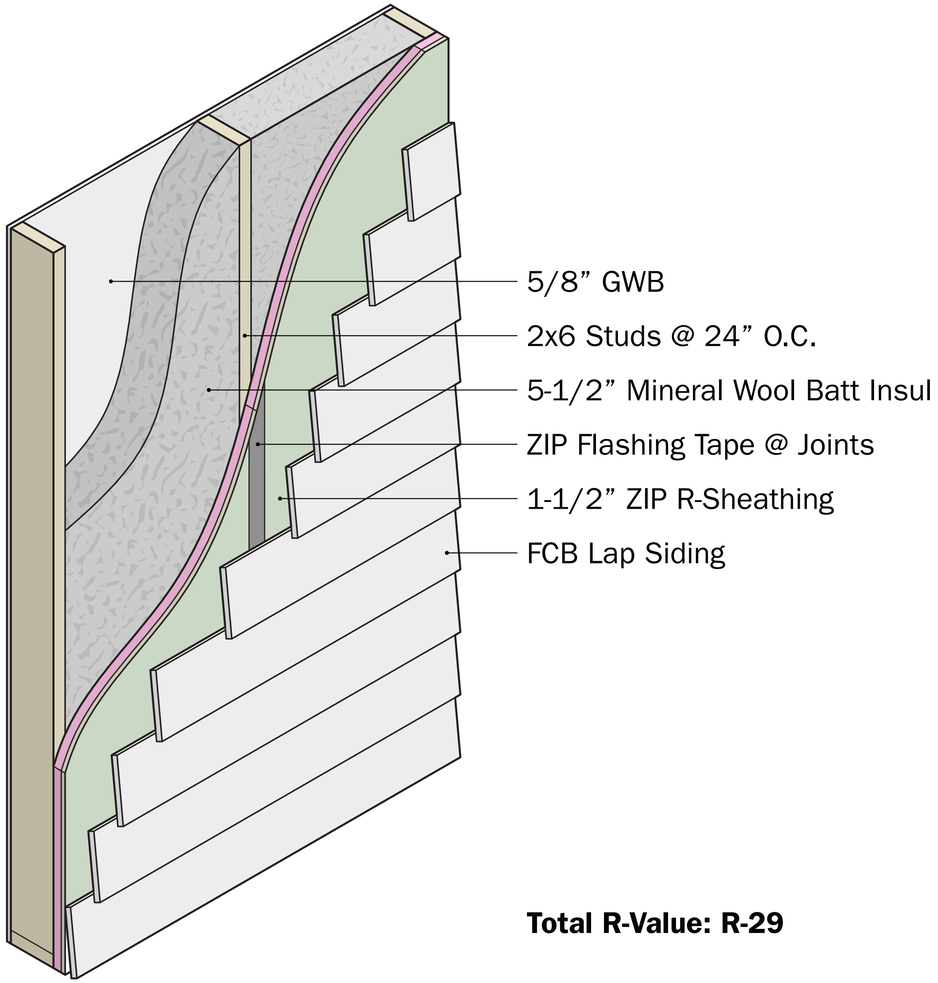
PHIUS



Total R-Value: R-33

House 68

ZERH

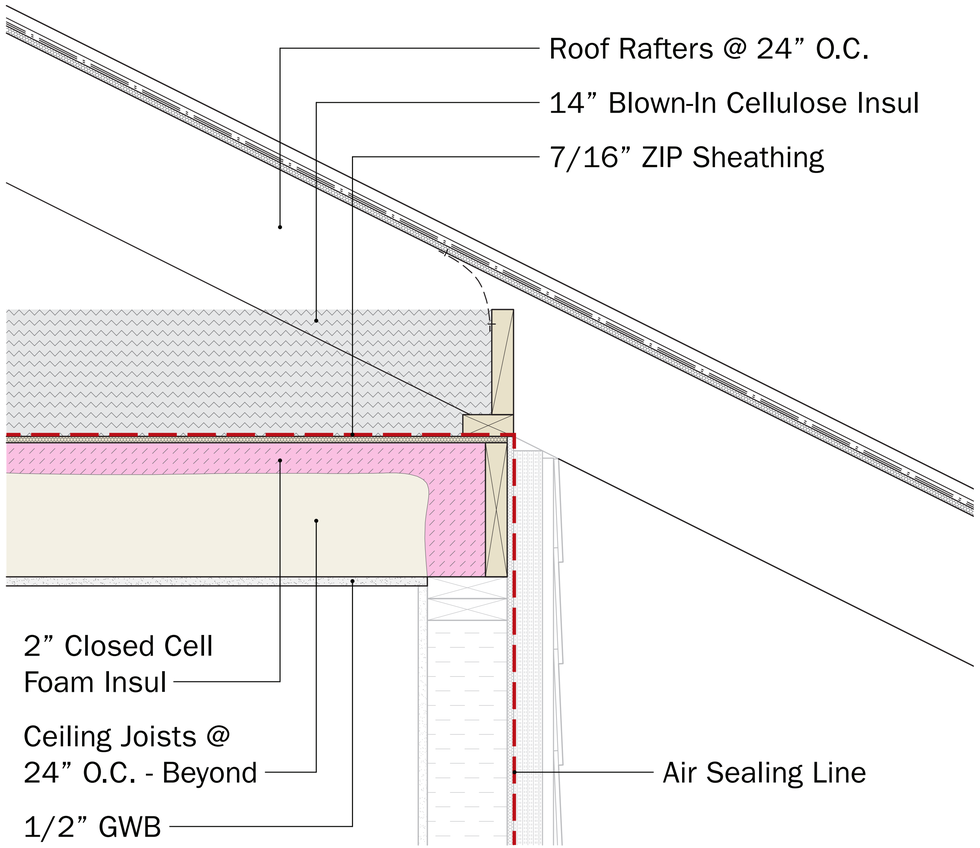


Total R-Value: R-29

ASSEMBLY COMPARISON: CEILING & ROOF

House 66

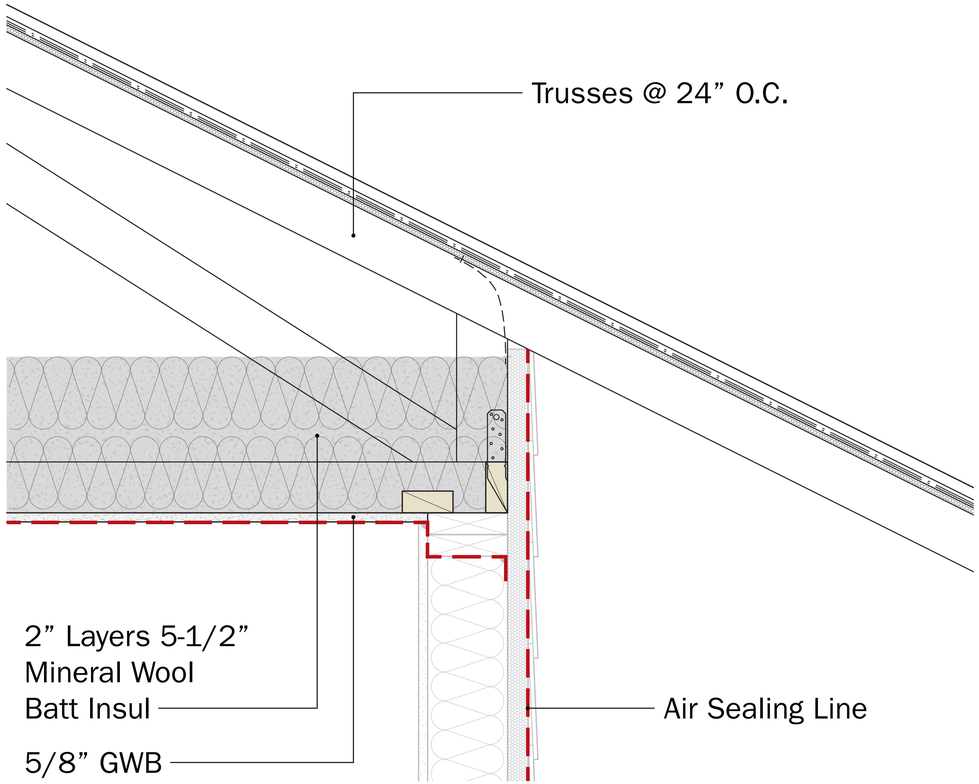
PHIUS



Total R-Value: R-62

House 68

ZERH



Total R-Value: R-46

ASSEMBLY COMPARISON: WINDOWS

House 66

PHIUS

Alpen Tyrol

U-Factor	0.17
SHGC	0.39

House 68

ZERH

Sierra Pacific Vinyl 800

U-Factor	0.28
SHGC	0.18

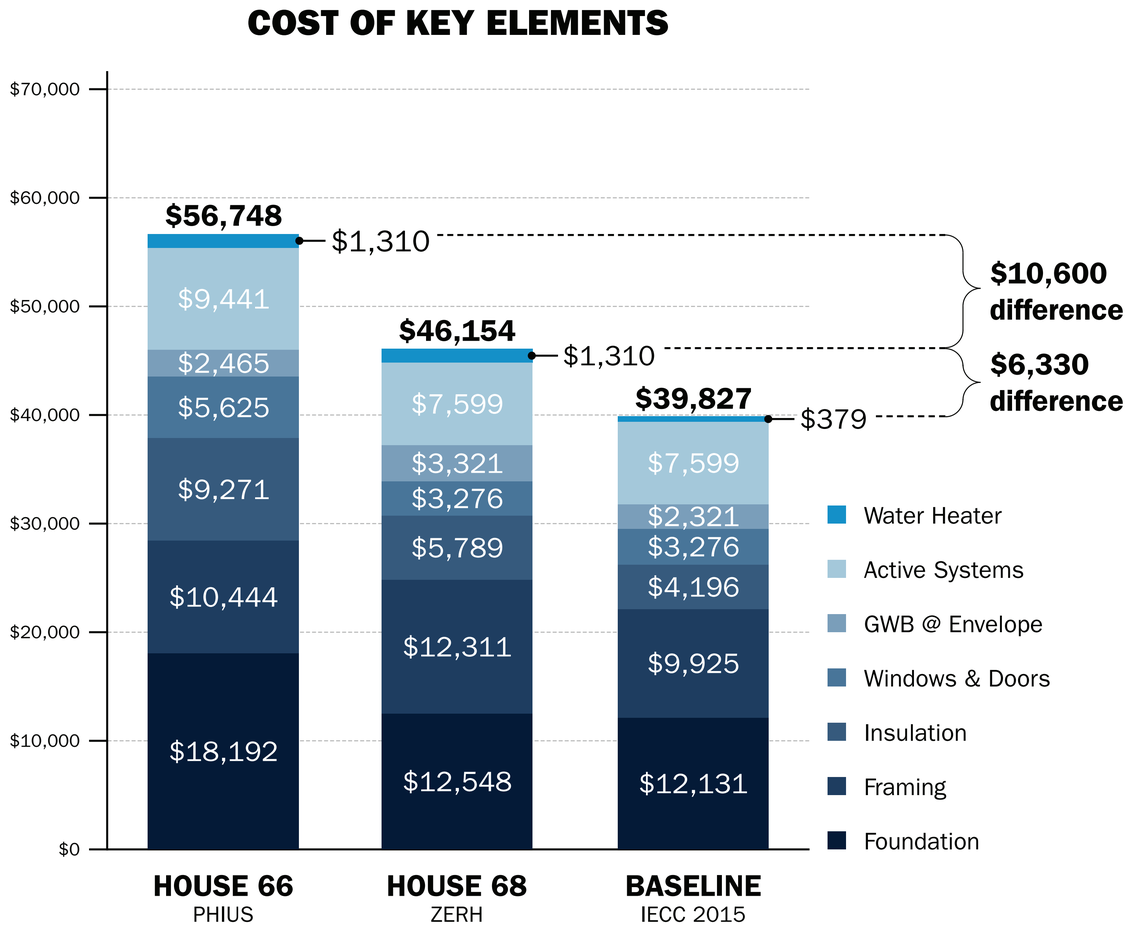
ENVELOPE PERFORMANCE METRICS

	BASELINE **MODELED SIMULATION** *IECC 2015*	**OPTIMIZED** **HOUSE 68** *ZERH*	**BENCHMARK** **HOUSE 66** *PHIUS*
Foundation Insulation	R-0	R-0 / R-5 @ edge	R-24 / R-18 @ edge
Wall Insulation	R-13	R-29	R-33
Attic Insulation	R-30	R-46	R-62
Window U-Factor	0.30	0.28	0.17
Door U-Factor	0.35	0.20	0.14
Air Leakage Test	5.0 ACH50	1.76 ACH50	0.37 ACH50
HERS Rating	HERS 72 (estimated)	HERS 40	HERS 38

RESEARCH QUESTION 1

What is the difference in cost to <u>build</u> to PHIUS vs. ZERH?

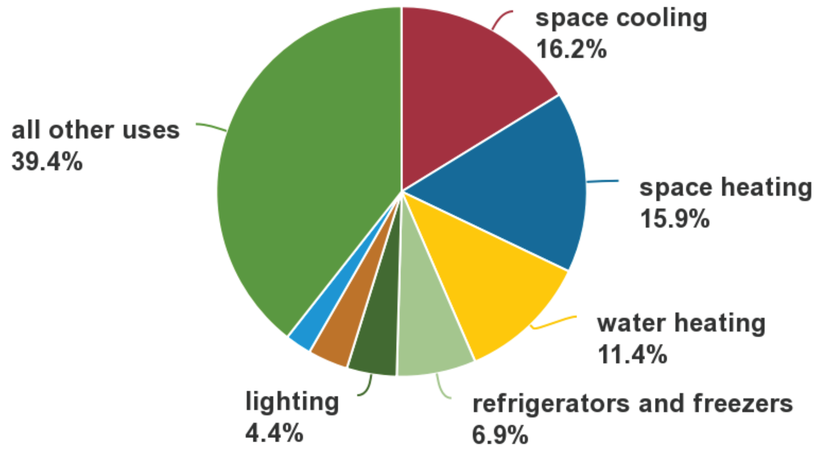
	COST OF KEY ELEMENTS OF ENVELOPE	COST OF ACTIVE SYSTEMS	TOTAL
House 66 (PHIUS)	$45,997	$9,441	$55,438
House 68 (ZERH)	$37,245	$7,599	$44,844
Baseline (IECC 2015)	$31,849	$7,978	$39,827



RESEARCH QUESTION 2

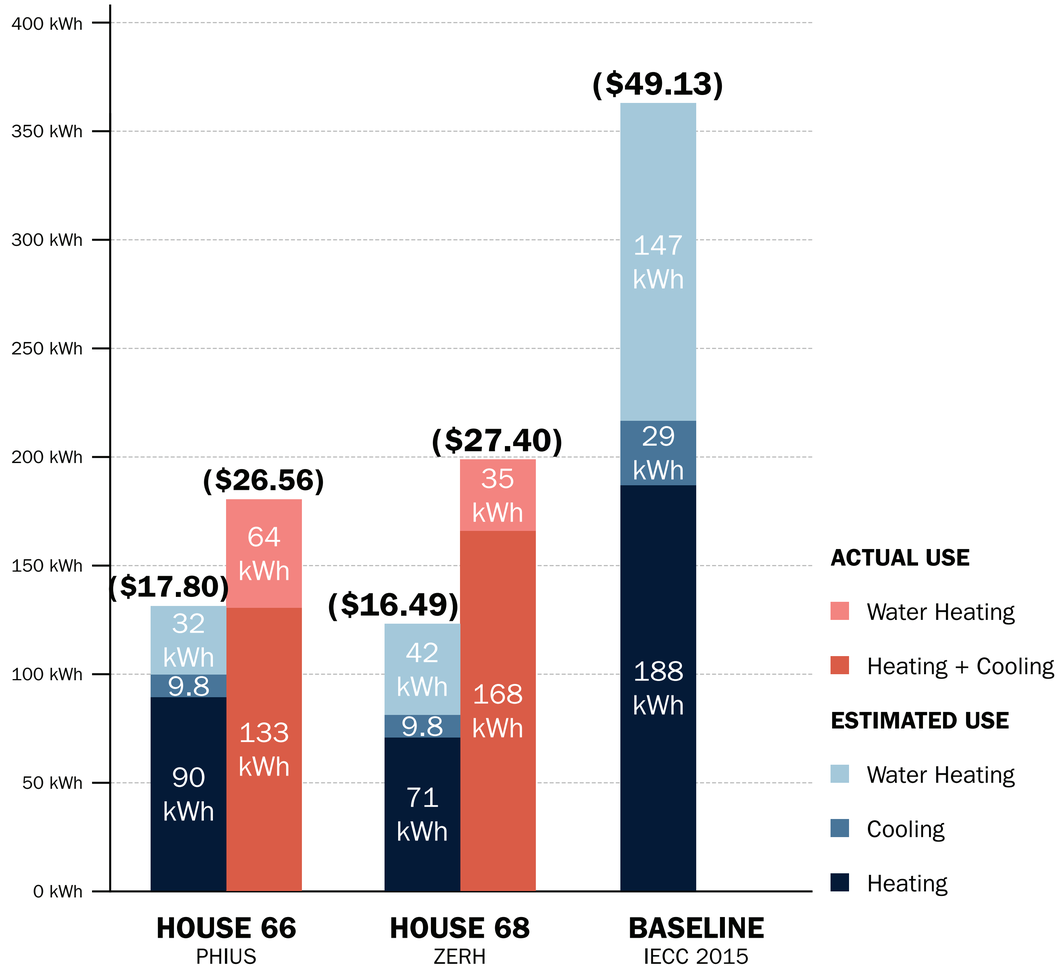
What is the difference in cost to <u>operate</u> for PHIUS vs. ZERH vs. IECC?

Three highest electric loads are Space Heating, Space Cooling and Water Heating per USEIA.



U.S. Energy Information Administration, *Annual Energy Outlook 2022*, Table 4, March 2023

AVERAGE MONTHLY THERMAL ENERGY USE

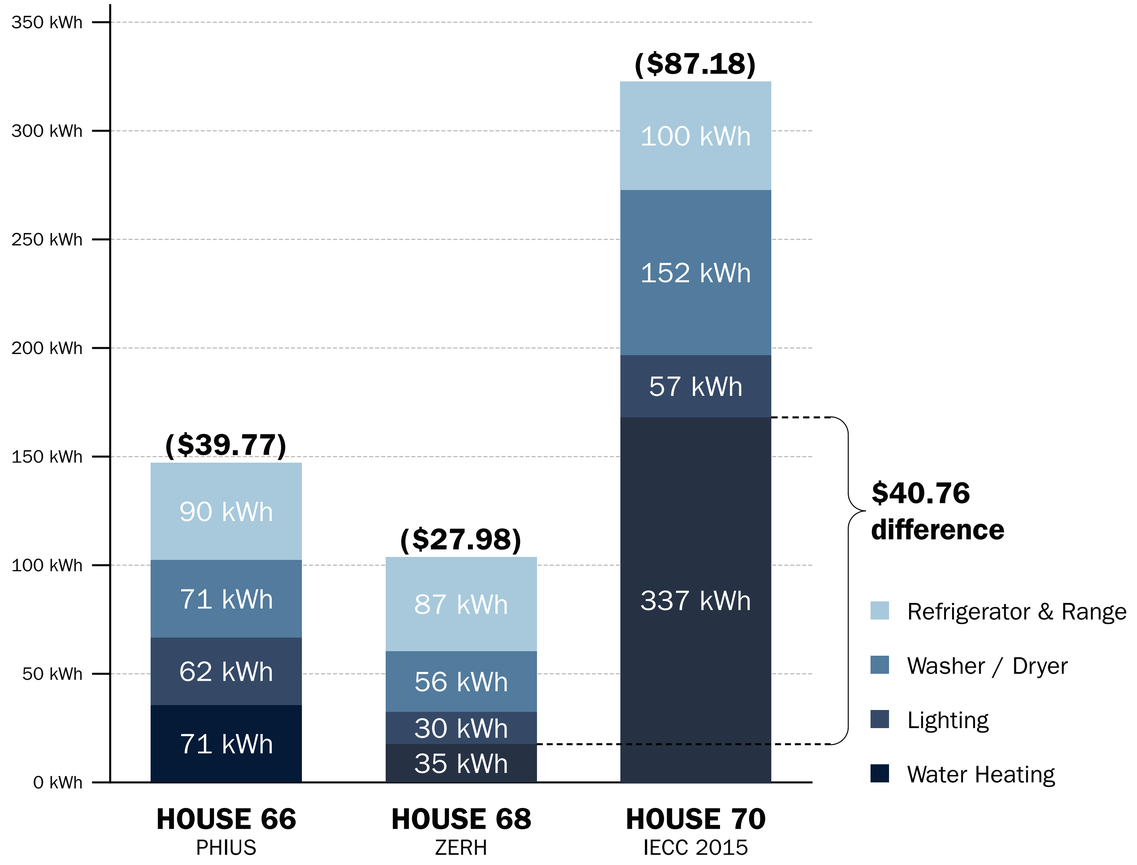


CATEGORY 2 (Lighting, Water Heating, & Large Appliances)

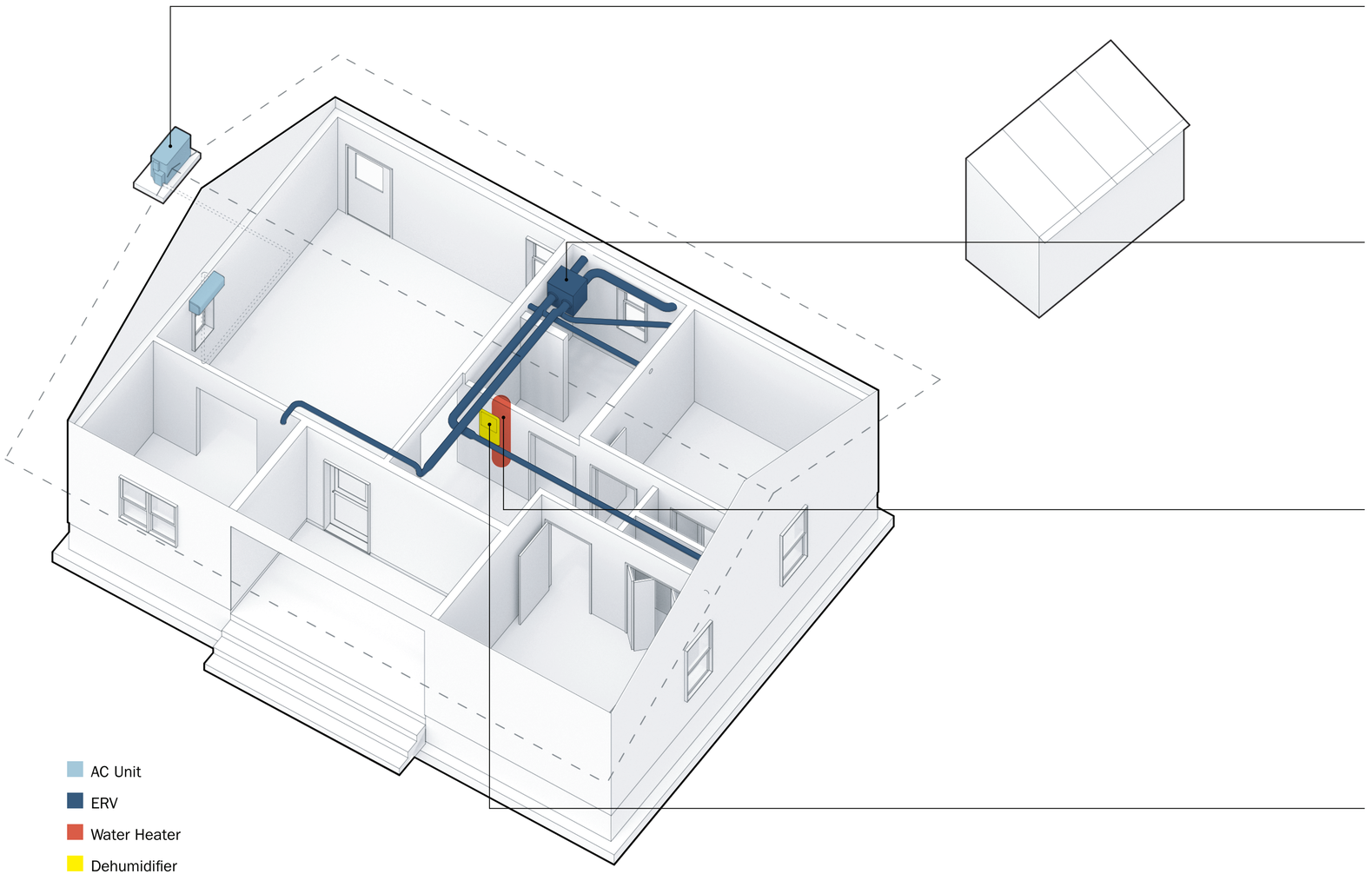
Hybrid Water Heater
(heat pump)

Conventional Water Heater
(electric element)

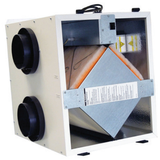
AVERAGE MONTHLY ENERGY USE



ACTIVE SYSTEMS: CONSUMPTION



Ductless Mini Split
Mitsubishi

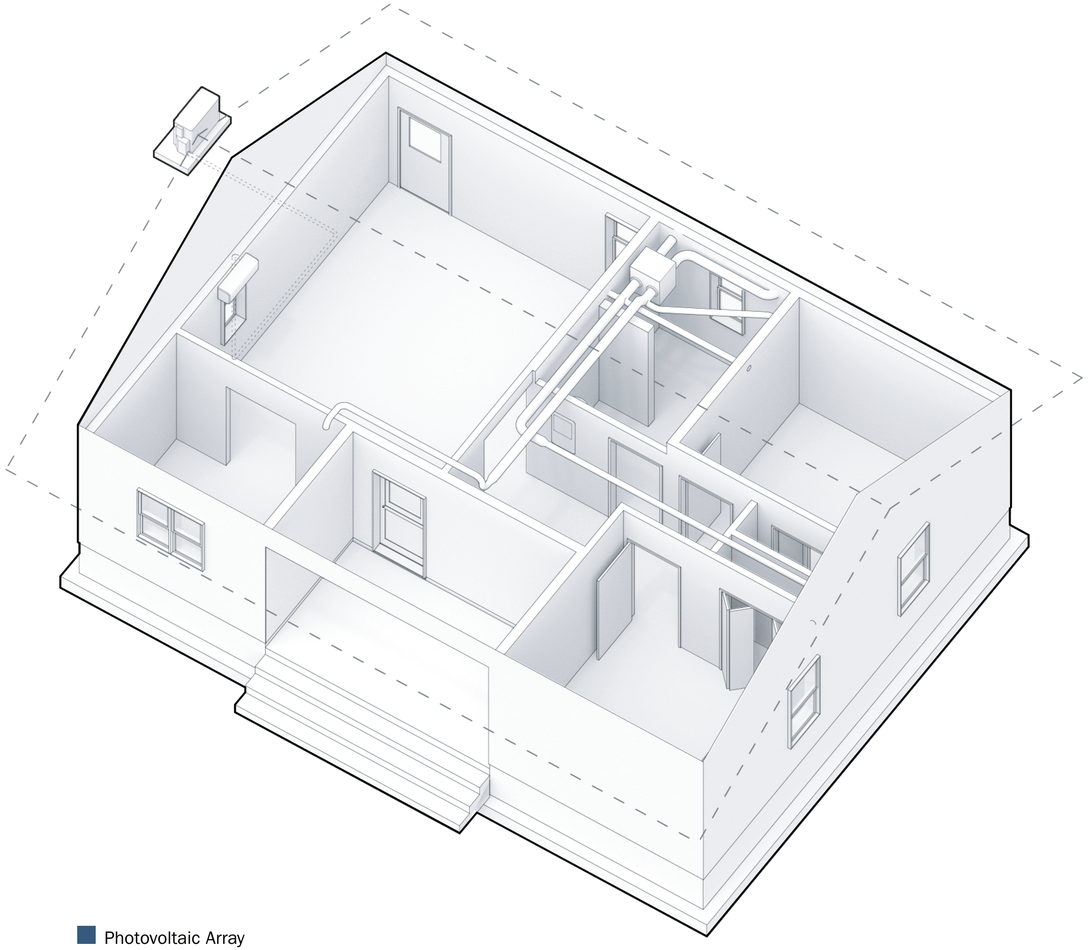


ERV
Renew-aire

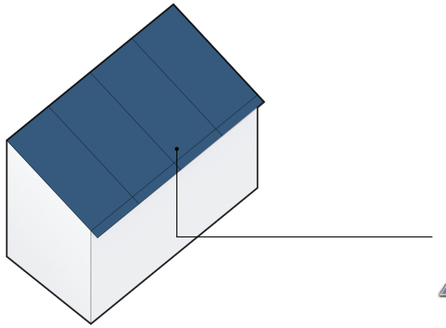
Heat Pump Water Heater
AO Smith

Dehumidifier
Ultra-Aire

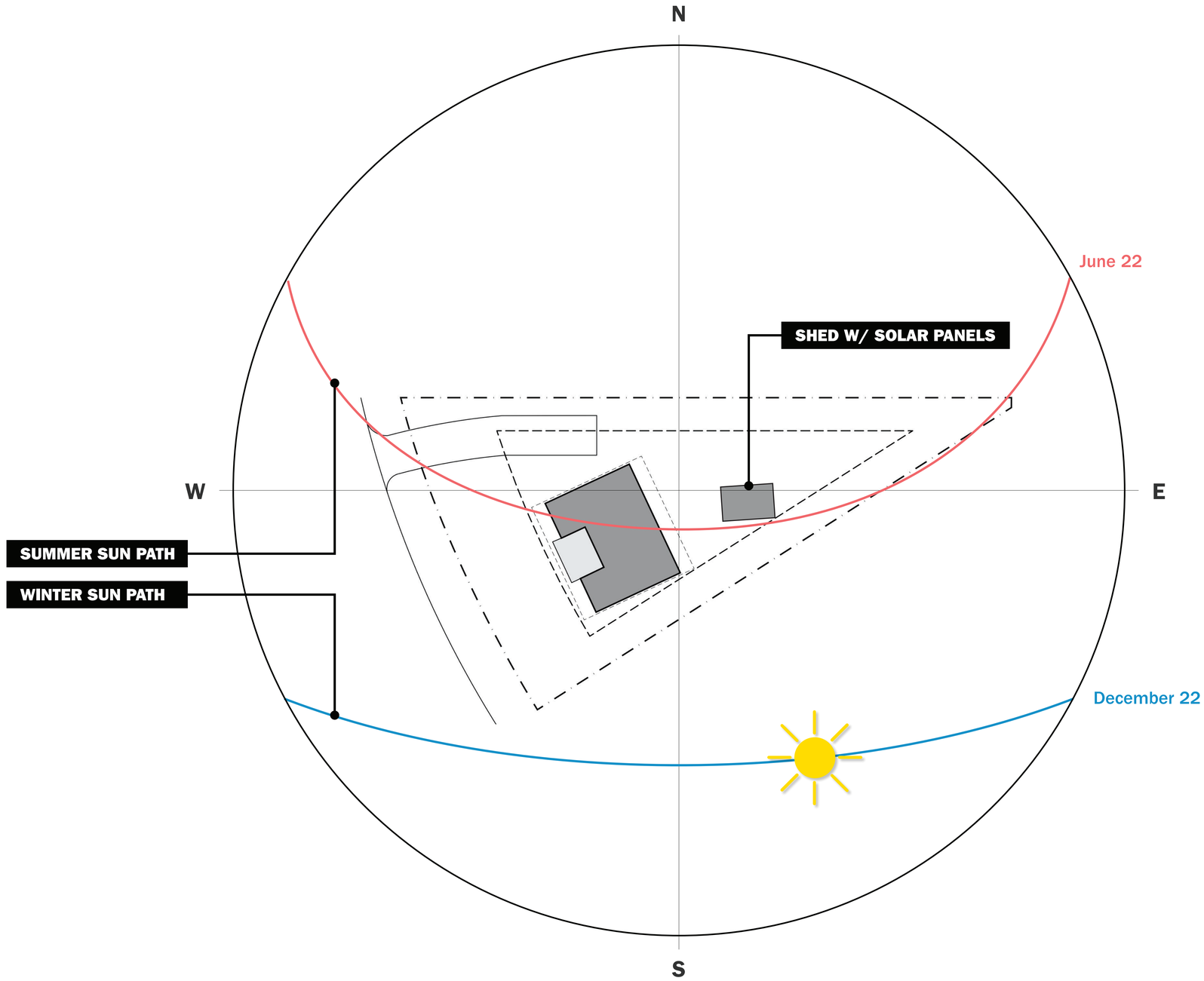
ACTIVE SYSTEMS: PRODUCTION



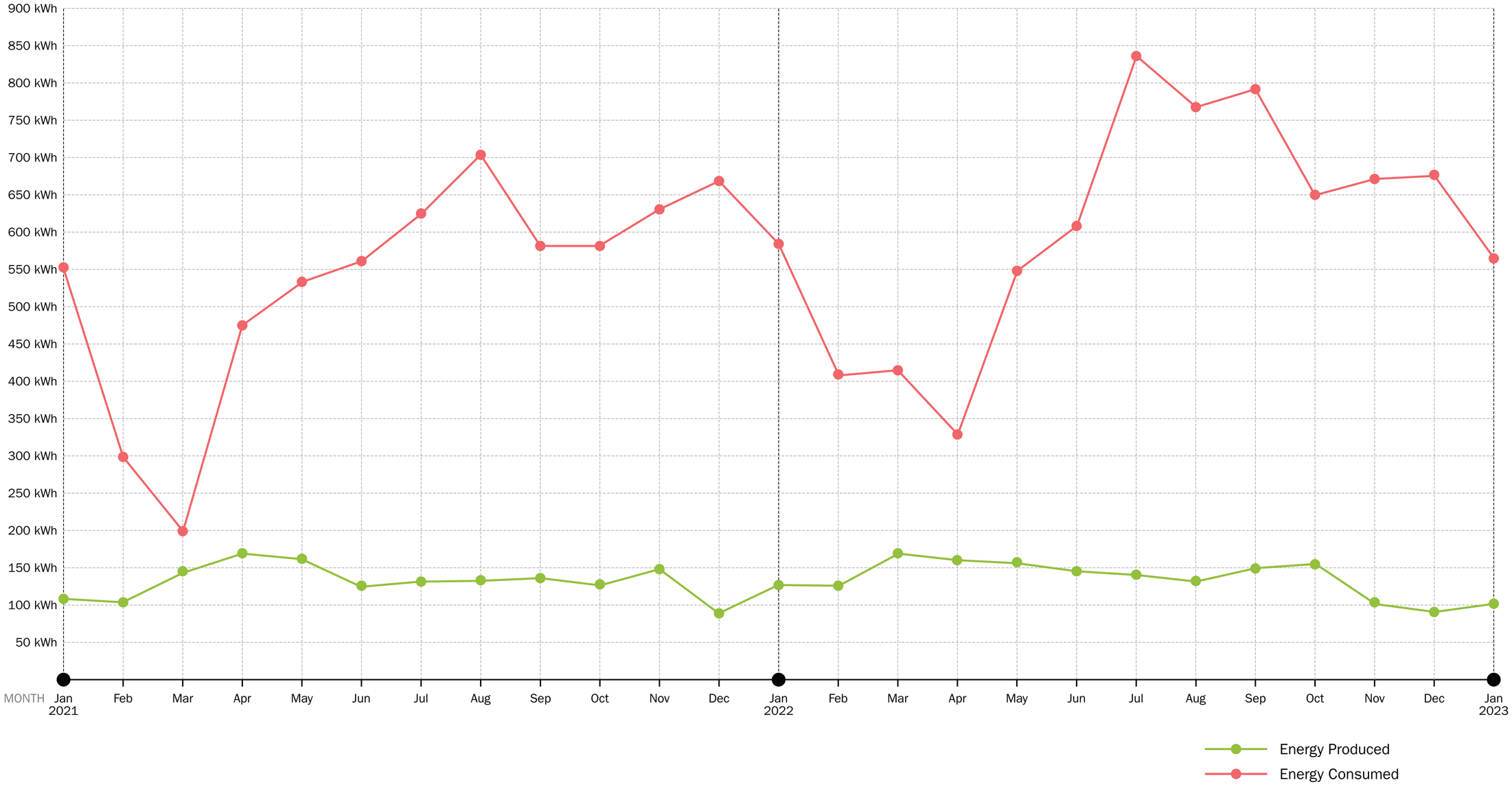
Photovoltaic Array



PV Panels
(4) 330W LG panels


N
W
E
S
June 22
December 22
SHED W/ SOLAR PANELS
SUMMER SUN PATH
WINTER SUN PATH

HOUSE 66: CONSUMPTION VS. PRODUCTION



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Opelika takes step toward renewable energy
Ali Selman | Reporter
Opelika-Auburn News
aselman@oanow.com
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Jan 10, 2019
Pictured are the solar panels at the Opelika Power Services building.
Emily Enfinger/eenfinger@oanow.com
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BIG BROTHER
NOW PLAYING
1 of 23
HD
Don't Miss! - 01/21 Preview
NEXT Don't Miss! - 01/21
Most Popular
Articles
1. Opelika's traffic-light cameras were 'unpopular with citizens'
2. Foster, Jr., Marshall Harland
3. Filling the gaps: Tigers bring in linebacker, O-line prospects on road to signing day
4. Pugh, Carole Sandra
5. Reeder, George W.

CAHFH Chipola Street

Chipola Area Habitat for Humanity

Marianna, FL

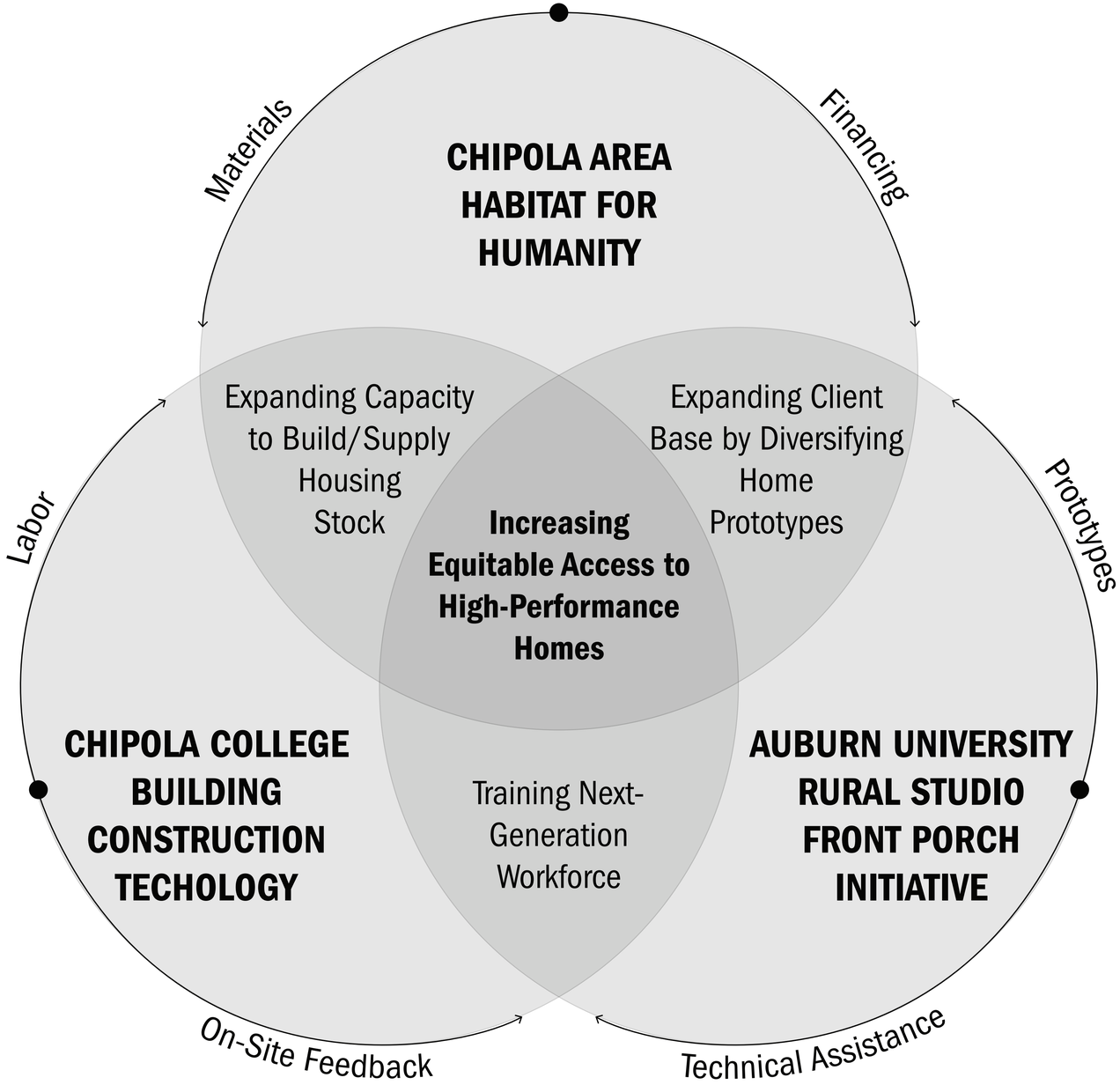
4 houses (Buster, Dave, Joanne, Sylvia 2/1)

2017 FRC (2015 IRC) [Climate Zone 2]

HERS 36–40

FORTIFIED Hurricane Gold + ENERGY STAR + FGBC Green Home

photo © Keith Isaacs


CHIPOLA AREA HABITAT FOR HUMANITY
Materials
Financing
Expanding Capacity to Build/Supply Housing Stock
Expanding Client Base by Diversifying Home Prototypes
Increasing Equitable Access to High-Performance Homes
Labor
Prototypes
CHIPOLA COLLEGE BUILDING CONSTRUCTION TECHOLOGY
Training Next-Generation Workforce
AUBURN UNIVERSITY RURAL STUDIO FRONT PORCH INITIATIVE
On-Site Feedback
Technical Assistance

ENERGY STAR

Improve energy efficiency to lower energy bills and increase thermal comfort.

1. High-performance windows, doors, & insulation
2. Fully-aligned air barriers
3. Reduce thermal bridging
4. Air sealing
5. Heating & cooling equipment
6. Quality duct installation
7. Ventilation
8. Filtration

FORTIFIED FOR HURRICANE

Strengthen home to improve resistance to damage from high winds and rain.

1. Roof
2. Impact protection @ windows & doors
3. Overhang & gable end bracing
4. Continuous load path

FGBC GREEN HOME

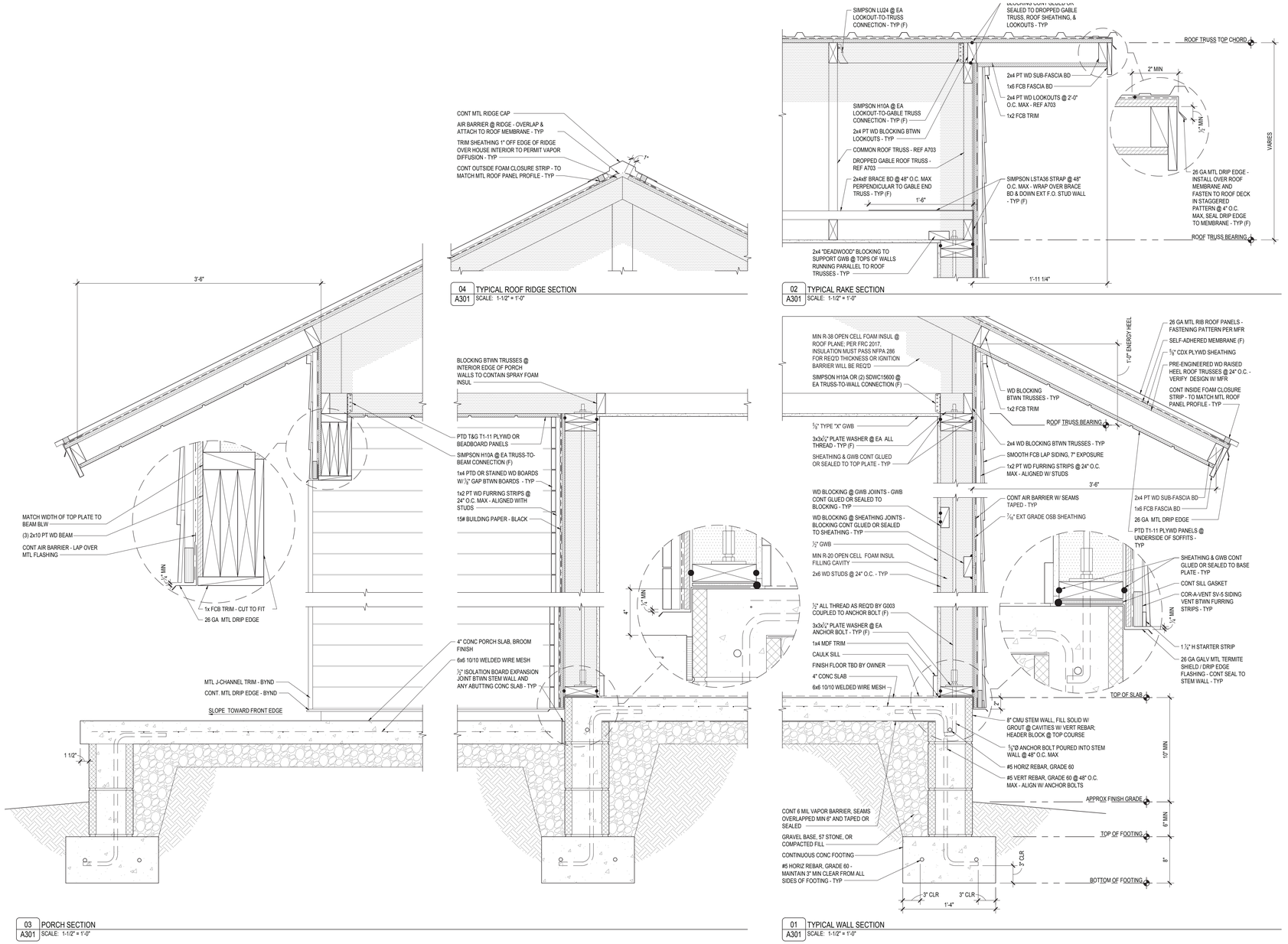
Address Florida-specific climactic conditions for improved efficiency, health, and resilience performance.

1. Energy performance
2. Water conservation
3. Site conditions (minimize disturbance)
4. Healthy materials
5. Local, efficient, recycled materials
6. Disaster mitigation

ENERGY STAR

Improve energy efficiency to lower energy bills and increase thermal comfort.

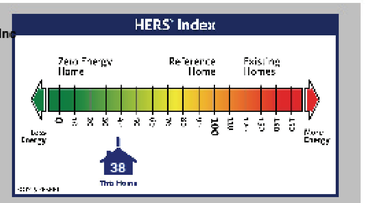
1. High-performance windows, doors, & insulation
2. Fully-aligned air barriers
3. Reduce thermal bridging
4. Air sealing
5. Heating & cooling equipment
6. Quality duct installation
7. Ventilation
8. Filtration



Air Infiltration Test: 2.05 ACH50

ENERGY STAR® CERTIFIED NEW CONSTRUCTION

Builder/Developer Name: Chipola Area Habitat for Humanity, In
Permit Date/Number: 10/14/2020 / 101420-3328
Home/Unit Address: 2836 Chipola St
Marianna FL 32448
Rating Company: ES Green Co LLC
Rater Identification Number: 3651017
Rating Date: 6/23/2022
ENERGY STAR Program/Version Number: FL v3.1



This value is not intended to be used for code compliance.

Standard Features of ENERGY STAR Certified New Homes and Apartments

Your ENERGY STAR certified new home has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

Thermal Enclosure System

A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation, and high-performing windows to deliver improved comfort and lower utility bills.

Air Infiltration Test: 2.05 ACH50
Primary Insulation Levels:
Ceiling: 0 **Floor:** 21
Wall: 21 **Slab:** NA

Primary Window Efficiency:
U-Value: 0.35 **SHGC:** 0.27

Water Management System

A comprehensive water management system to protect roofs, walls, and foundations.

Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home.

Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering into the home or building.

Management of moisture levels in building materials during construction.

Heating, Cooling, and Ventilation System

A high-efficiency heating, cooling and ventilation system that is designed and installed for optimal performance.

Total Duct Leakage: NAN CFM25 per 100 sq.ft.
Duct Leakage to Outdoors: NAN CFM25 per 100 sq.ft.

Primary Heating (System Type : Fuel Type : Efficiency):
Electric Heat Pump : Electric : 14.00 HSPF

Primary Cooling (System Type : Fuel Type : Efficiency):
Central Unit : Electric : 30.50 SEER

Energy-Efficient Lighting and Appliances

Energy efficient products to help reduce utility bills, while providing high-quality performance.

Energy Efficient Lighting: 100%

ENERGY STAR Certified Appliances and Fans:
Refrigerators: 0 **Dishwashers:** 1
Ceiling Fans: 3 **Exhaust Fans:** 1

Primary Water Heater (System Type : Fuel Type : Efficiency):
Tankless : Natural Gas : 0.82 EF

About This certificate

This certificate provides a summary of the major energy efficiency and other construction features that contribute to this home or apartment earning the ENERGY STAR, as delivered through independent inspection and verification performed by a trained professional. The Energy Rating Index or HERS Index for this home, if reported, is calculated in accordance with ANSI/RESNET/ICC Standard 301, with any exceptions approved by EPA. Because the version of Standard 301 used to calculate this index may not align with the version referenced by code, this value is not intended to be used to demonstrate compliance with code.

Note that when a home or apartment contains multiple performance levels for a particular feature (e.g. window efficiency or insulation levels), the predominant value is shown. Also, homes and apartments may be verified to meet the ENERGY STAR using a sampling protocol, whereby one home or apartment is randomly selected from a set for representative inspections and testing. In such cases, the features found in each home or apartment within the set are intended to meet or exceed the values presented on this certificate. The actual values for your home or apartment may differ, but offer equivalent or better performance.

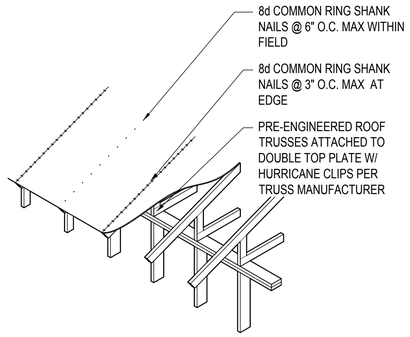
This certificate was printed using EnergyGauge (Version/#).

RESNET ID: 255528809

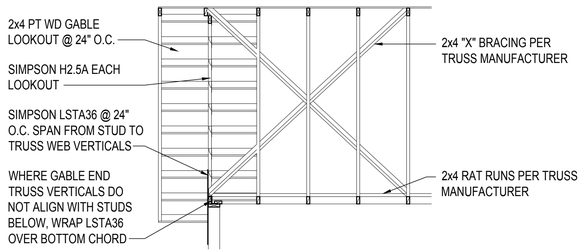
FORTIFIED FOR HURRICANE

Strengthen home to improve resistance to damage from high winds and rain.

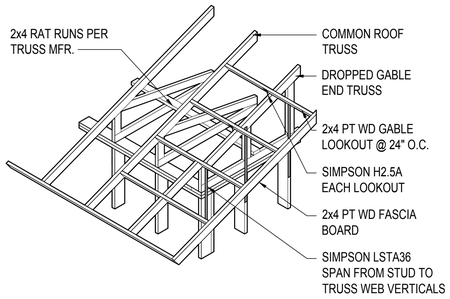
1. Roof
2. Impact protection @ windows & doors
3. Overhang & gable end bracing
4. Continuous load path



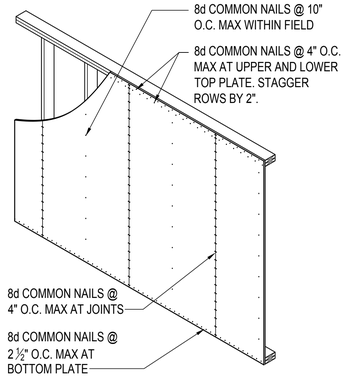
13 G003 WIND RESISTANCE: ROOF SHEATHING & TRUSS ATTACHMENT
SCALE: NOT TO SCALE



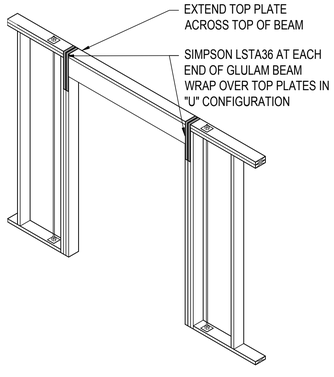
12 G003 WIND RESISTANCE: TRUSS X-BRACING
SCALE: NOT TO SCALE



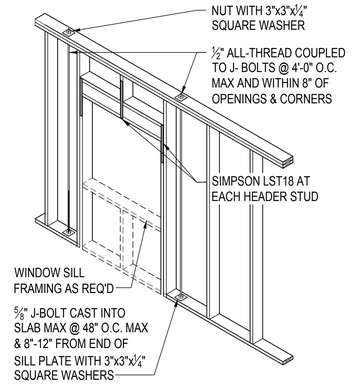
11 G003 WIND RESISTANCE: GABLE END WALL
SCALE: NOT TO SCALE



10 G003 WIND RESISTANCE: WALL SHEATHING PANEL
SCALE: NOT TO SCALE



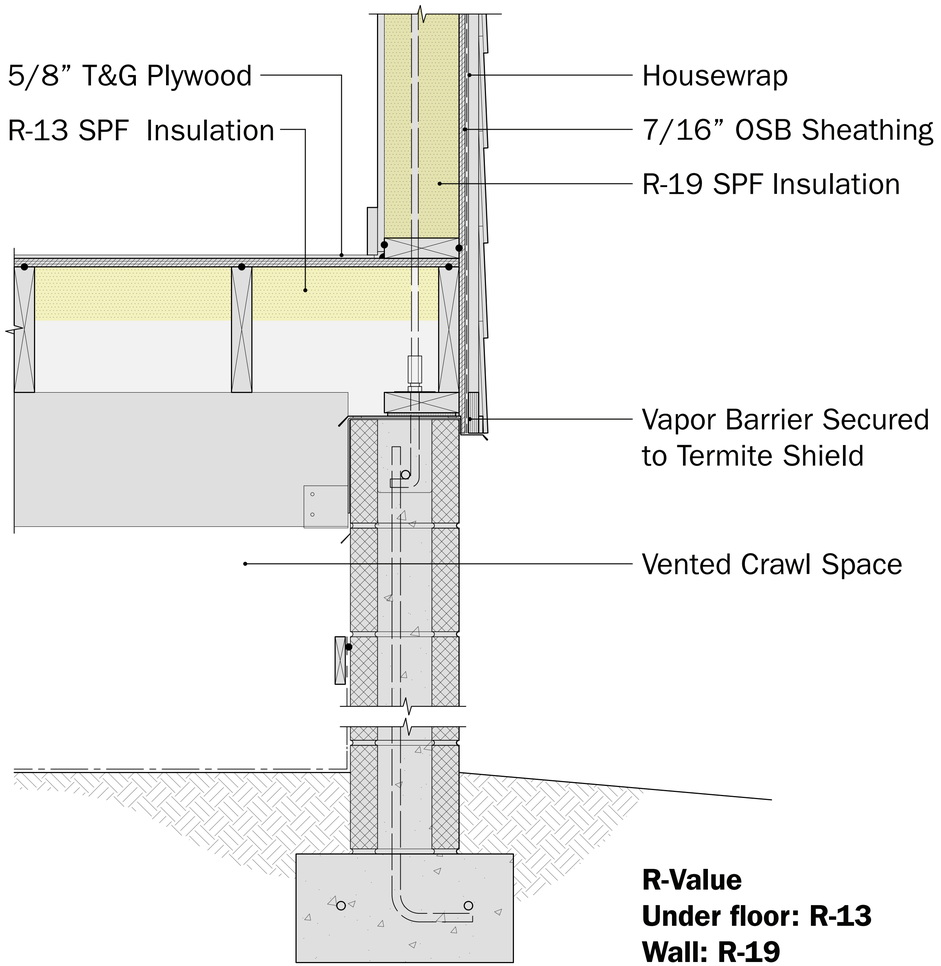
09 G003 WIND RESISTANCE: BEAM TIE-DOWN
SCALE: NOT TO SCALE



08 G003 WIND RESISTANCE: STUD WALL LOAD PATH
SCALE: NOT TO SCALE

ASSEMBLY ANALYSIS: FOUNDATION & FLOOR

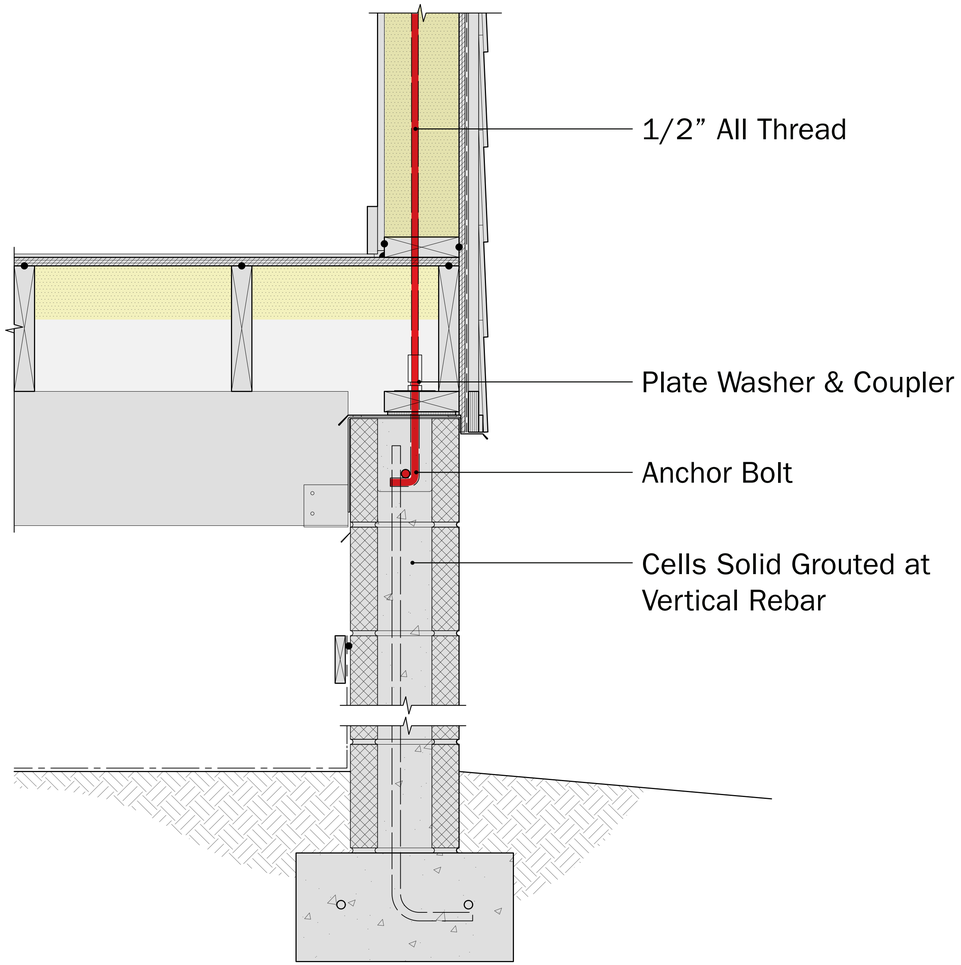
ENERGY STAR



R-Value
Under floor: R-13
Wall: R-19

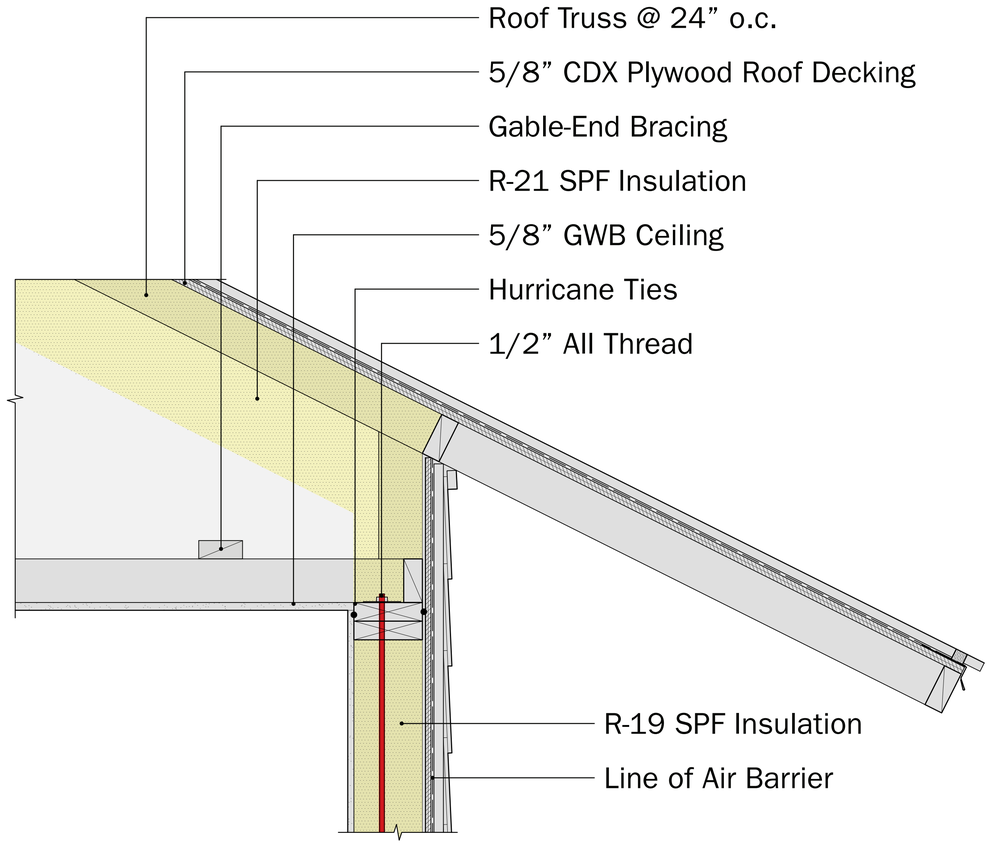
ASSEMBLY ANALYSIS: FOUNDATION & FLOOR

FORTIFIED



ASSEMBLY ANALYSIS: CEILING & ROOF

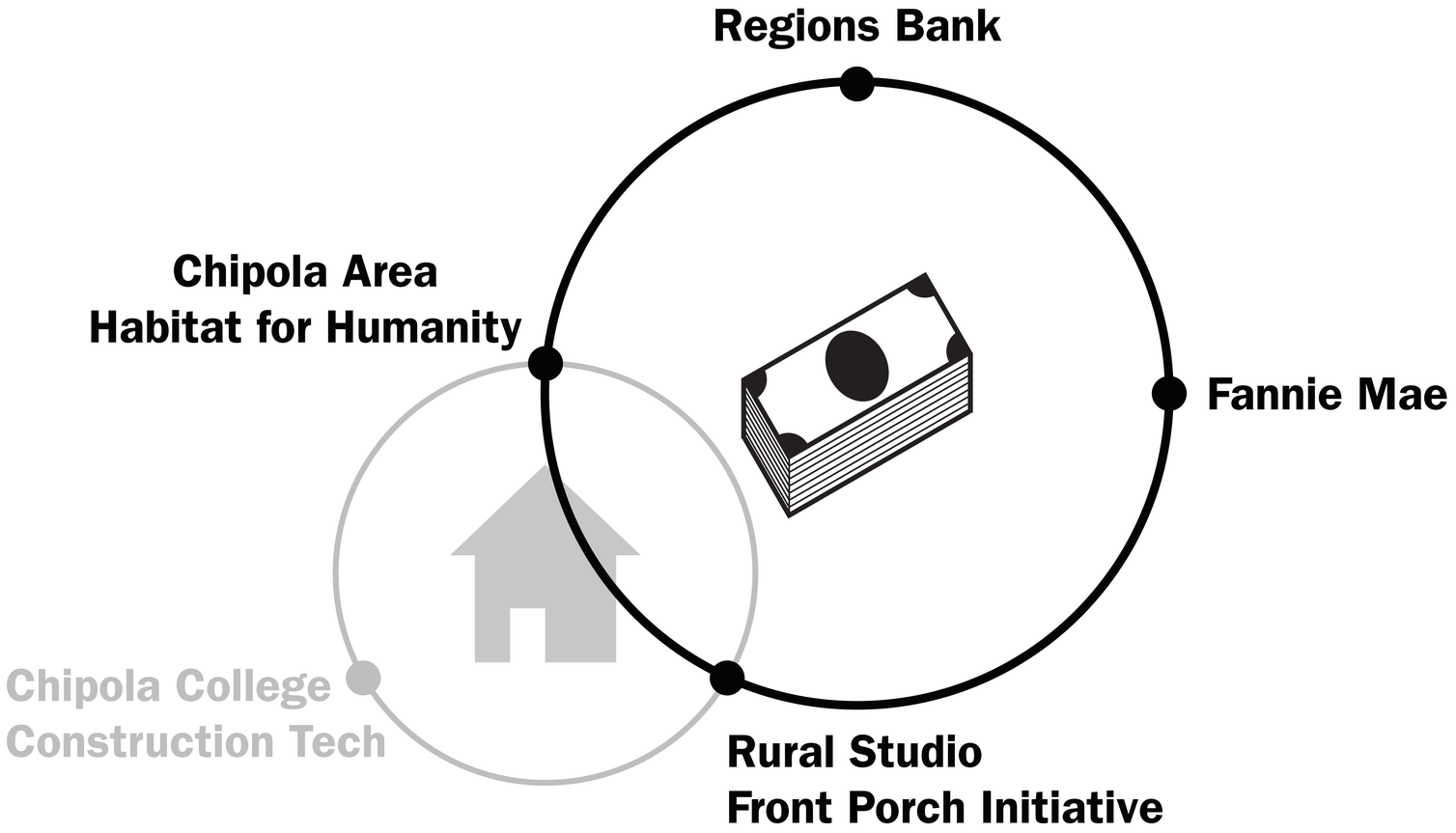
ENERGY STAR + FORTIFIED



Air Infiltration: 2.05 ACH50

photo © Chipola Area Habitat for Humanity

photos © Chipola College


Regions Bank
Chipola Area
Habitat for Humanity
Fannie Mae
Chipola College
Construction Tech
Rural Studio
Front Porch Initiative

CAPITAL STACK

$153,000 **Construction Cost**

› Property already owned by developer

$140,000 **Appraised Value**

$140,000 **Sales Price**

› Sales price set by appraised value

$72,016 **Total Downpayment**

$39,216	Sweat equity valuation*
$25,000	HFHI disaster grant
$5,000	SHIP program funding
$4,000	Lender assistance (Regions)
$1,000	Borrower cash contribution

$67,984 **Unpaid Principal Balance (UPB)**

› 49% LTV (Mortgage insurance required if LTV is greater than 80%)

$140,000	Sales Price
- $72,016	Downpayment
$67,984	UPB

CAPITAL STACK

$153,000

Sweat Equity Valuation

	Value	*Hourly Rate*	*Hours*	*Tracking Mechanism*
Homeowner	$6,000	$12.00/hr	500	Homeowner Services software
Volunteer	$33,216	$27.68/hr	1200	Volunteer Mgmt software
	$39,216	**Total Valuation**		

$140,000

$140,000

$72,016 **Total Downpayment**

- **$39,216** **Sweat equity valuation**
- $25,000 HFHI disaster grant
- $5,000 SHIP program funding
- $4,000 Lender assistance (Regions)
- $1,000 Borrower cash contribution

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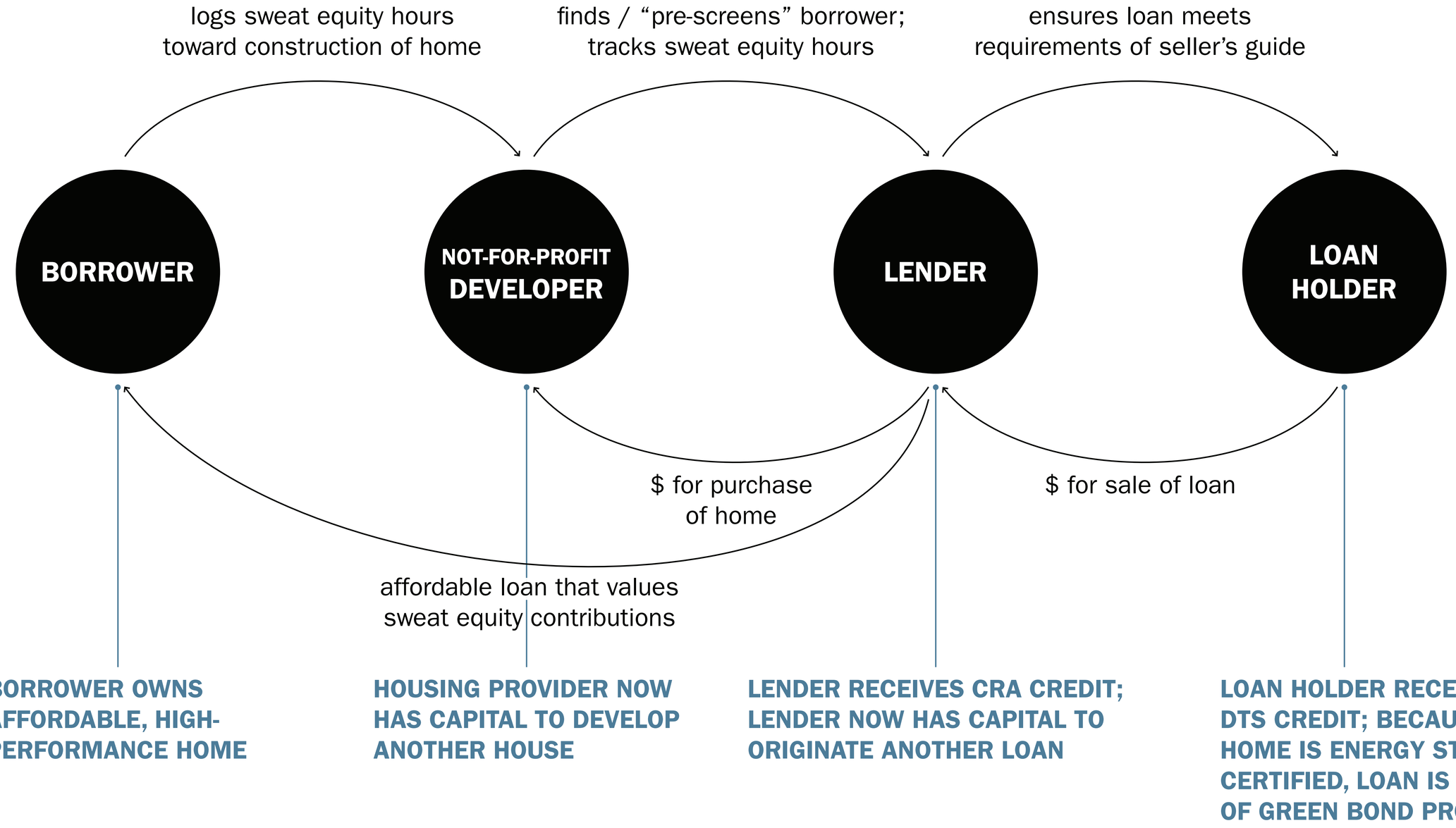
logs sweat equity hours
toward construction of home
finds / “pre-screens” borrower;
tracks sweat equity hours
ensures loan meets
requirements of seller’s guide
BORROWER
NOT-FOR-PROFIT
DEVELOPER
LENDER
LOAN
HOLDER
$ for purchase
of home
$ for sale of loan
affordable loan that values
sweat equity contributions
BORROWER OWNS AFFORDABLE, HIGH-PERFORMANCE HOME
HOUSING PROVIDER NOW HAS CAPITAL TO DEVELOP ANOTHER HOUSE
LENDER RECEIVES CRA CREDIT; LENDER NOW HAS CAPITAL TO ORIGINATE ANOTHER LOAN
LOAN HOLDER RECEIVES DTS CREDIT; BECAUSE THE HOME IS ENERGY STAR CERTIFIED, LOAN IS PART OF GREEN BOND PROGRAM

Fannie Mae

Selling Guide Announcement (SEL-2023-02)

March 1, 2023

The *Selling Guide* has been updated to include changes to the following:

- Valuation modernization: transitioning to a range of options to establish a property's market value, with the option matching the risk of the collateral and loan transaction
- Sweat equity: providing additional guidance on the use of sweat equity and nonprofit program providers
- Lender quality control updates: revising timelines and expectations for both prefunding and post-closing quality control reviews
- Required use of Condo Project Manager™: requiring the use of CPM™ for projects where a Full Review is required
- Miscellaneous updates:
  - Maintaining seller/servicer eligibility
  - HomeStyle® Renovation indicator
  - Government loan guaranty or insurance

View the list of impacted topics.

Valuation modernization

Valuation modernization involves leveraging technologies, data, and analytics to enhance the management of collateral risk, making the process more efficient for lenders, borrowers, appraisers, and secondary-market investors. Valuation modernization helps lenders, appraisers, and risk investors manage collateral risk more effectively, while also benefiting consumers via greater appraisal accuracy, lower costs, and increased speed of loan decisioning.

We are on a journey of continuous improvement to make the home valuation process more efficient and accurate. As such, we are transitioning to a range of options to establish a property's market value, with the option matching the risk of the collateral and the loan transaction. The spectrum balances traditional appraisals with appraisal alternatives. With this update, we are introducing the following:

- **Value acceptance is being used in conjunction with the term "appraisal waiver" to better reflect the actual process of using data and technology to accept the lender-provided value. We are moving away from implying that an appraisal is a default requirement. (Note that we are using "value acceptance (appraisal waiver)" for a period of time and will eventually move to "value acceptance" after the market absorbs this change.)**
- **Value acceptance + property data is a new option that utilizes property data collection by a third party who conducts interior and exterior data collection on the subject property. To ensure consumer protections, the lender must verify and be able to demonstrate that data collectors are**
  - **vetted through an annual background check,**
  - **professionally trained, and**
  - **they possess the essential knowledge to competently perform the property data collection.**

  The property data collection is used by the lender to confirm property eligibility, and an appraisal is not required. This option also requires submission of the data to Fannie Mae's Property Data API based on a new data standard and delivery of Special Feature Code 774. See Fannie Mae's website for additional information.
- **Hybrid appraisals are based on interior and exterior property data collection by a vetted and trained third-party that is provided to an appraiser to inform the appraisal. They are permitted for certain one-unit transactions where value**

acceptance + property data was initially started, but changes in loan characteristics results in the transaction not being eligible for that option.
- A new policy allows alternative methods to the *Appraisal Update and/or Completion Report* (Form 1004D). These include a borrower/builder attestation letter to verify completion of construction, and a borrower attestation letter to confirm completion of repairs for existing construction in lieu of Form 1004D. The policy further describes required exhibits and controls. These **completion alternatives** are necessary for lenders to confirm completion of repairs or alterations with the value acceptance + property data option because Form 1004D cannot be used when there is no appraisal. This change also allows appraisers to use virtual inspection technology to supplement the 1004D process with certain constraints.

We also clarified the long-standing policy related to property condition and quality of construction of the improvements. Properties with a condition rating of C6 are not eligible for sale to us. Any deficiencies impacting the safety, soundness, or structural integrity of the property must be repaired with a resulting minimum condition rating of C5 prior to sale of the loan to Fannie Mae.

Effective: Lenders may take advantage of completion alternatives immediately. Desktop Underwriter® (DU®) will be updated the weekend of April 15, 2023, to support these updates.

Sweat equity

We allow sweat equity as an acceptable source of down payment for a HomeReady® loan meeting certain eligibility criteria. With this update, we expand the circumstances and limit to which sweat equity may be used, further define program provider requirements, and define how to calculate the contributory value of sweat equity labor. Specifically, we removed the following limitations from HomeReady sweat equity transactions:

- The borrower is no longer required to contribute at least 3% of their own funds when sweat equity is used towards the down payment on a one-unit property.
- There is no longer a cap of 2% sweat equity that may be used as part of the minimum down payment of 5% for a one-unit property.

In addition, we clarified our expectations for sweat equity program providers, which must be recognized by the IRS as a 501(c)(3) organization. We also added new guidance to determine the dollar value for sweat equity to be based on an hourly rate established by the nonprofit.

We believe these changes will allow more borrowers to use sweat equity as a source of down payment while providing lenders with additional resources to ensure nonprofit partners meet our eligibility guidelines.

Effective: Lenders may take advantage of these updates immediately. The DU messages specific to sweat equity will be updated the weekend of April 15, 2023.

Lender quality control updates

In an effort to improve overall loan quality and reduce the number of loans requiring remediation by lenders, we have enhanced both our prefunding and post-closing quality control policies.

Lenders must complete a minimum number of prefunding reviews monthly. The total number of loans to be reviewed must equal either:

- 10% of the prior month's total number of closings, or
- 750 loans.

DISCUSSION

INCEPTION & EVOLUTION

- WHY/WHEN DID YOU START THINKING ABOUT HOME PERFORMANCE OR BUILDING BEYOND-CODE?
- HOW HAVE YOUR THOUGHTS ABOUT HOME PERFORMANCE EVOLVED OVER TIME?

MAKING DECISIONS

- WHAT KIND OF HIGH-PERFORMANCE FEATURES ARE YOU INTEGRATING INTO YOUR HOMES?
- HOW DO YOU DETERMINE WHAT “UPGRADES” OR “IMPROVEMENTS” TO MAKE?
- WHAT ARE THE CHALLENGED BY BUILDING BEYOND-CODE? HOW HAVE YOU MINIMIZED OR OVERCOME THOSE CHALLENGES?
- WHAT BENEFITS DO YOU SEE IN THESE IMPROVEMENTS?

THIRD-PARTY STANDARDS / CERTIFICATIONS

- ARE YOU PURSUING THIRD-PARTY STANDARDS?
- IF YES, WHICH STANDARDS AND WHY THOSE?
- ARE YOU SEEKING CERTIFICATION, OR JUST USING THE STANDARDS AS GUIDELINES? WHY?
- DOES BUILDING BEYOND-CODE / TO THIRD-PARTY STANDARDS UNLOCK FUNDING OPPORTUNITIES (EITHER FOR THE AFFILIATE OR FOR THE HOMEOWNER)?

WHAT'S NEXT?

- WHERE DO YOU WANT TO GO NEXT?
- WHAT RESOURCES DO YOU NEED TO GET WHERE YOU WANT TO GO?