

Existing Project Study

Prepared for



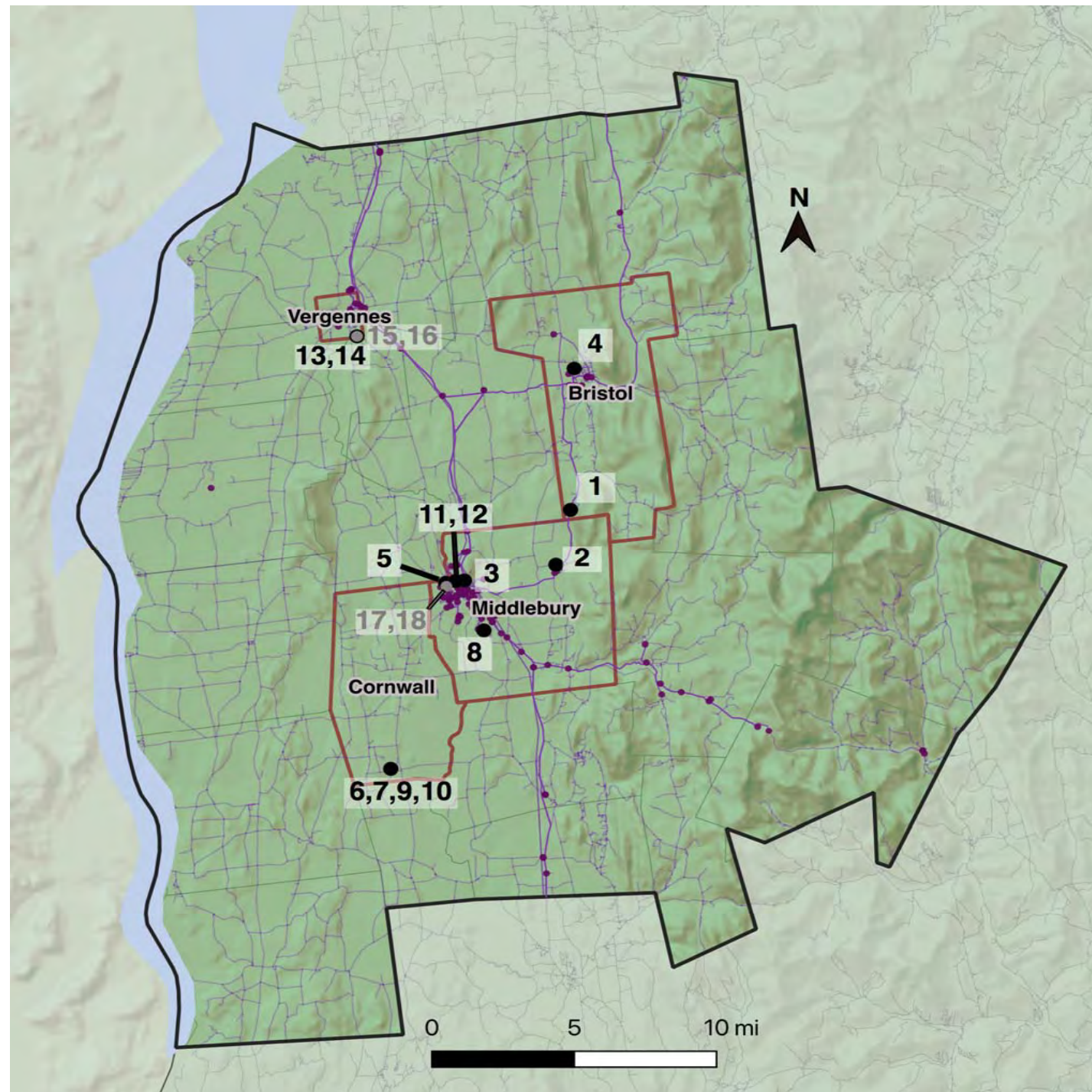
In Partnership with



Middlebury
College

McLEOD ARCHITECTS

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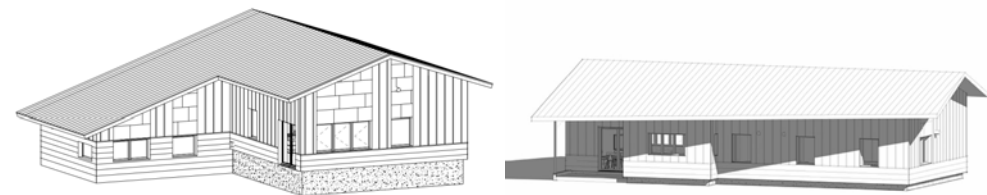
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House Overview



Houses Numbered Chronologically

- #1 5300 Route 116 South, Bristol
- #2 345 Mead Lane, Middlebury
- #3 75 N Pleasant St., Middlebury
- #4 10 Lawson Lane, Bristol
- #5 650 Weybridge St., Middlebury
- #6 116 Carothers Lane, Cornwall
- #7 118 Carothers Lane, Cornwall
- #8 66 Rockwood Lane, Middlebury
- #9 148 Carothers Lane, Cornwall
- #10 150 Carothers Lane, Cornwall
- #11 51 Seymour St., Unit 1, Middlebury
- #12 51 Seymour St., Unit 2, Middlebury
- #13 14 Booth Woods, Vergennes
- #14 16 Booth Woods, Vergennes (Under Construction)
- #15 12 Booth Woods, Vergennes (Finished Design)
- #16 18 Booth Woods, Vergennes (Finished Design)
- #18 19A Gorham Lane, Middlebury (Finished Design)
- #19 27A Gorham Lane, Middlebury (Finished Design)

Section A: Introduction

Executive Summary

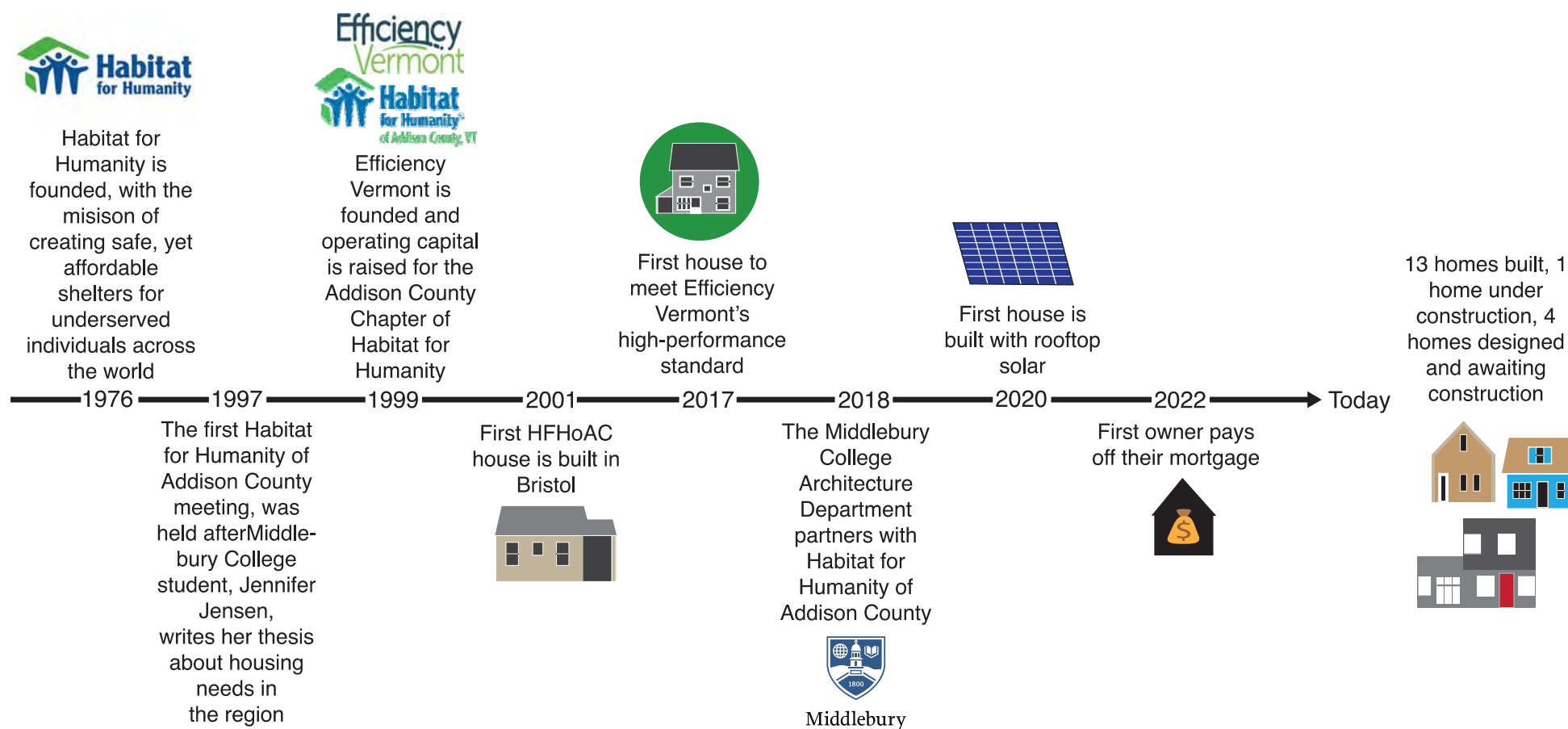
This study aims to summarize Habitat for Humanity of Addison County's work as it approaches its 25th year of operation. The research and analysis explores how the houses built by the organization have changed over the years, identifying ways in which they have improved in addition to areas in which there is room for improvement. Through a careful analysis of the chapter's thirteen built houses and one house under construction, this study identifies trends across the homes to give the board more information on how to proceed in the years to come.

To collect this information, members of Middlebury College's Habitat for Humanity design course visited each of the fourteen houses, taking field notes, measuring dimensions, and assessing the land. When possible, homeowner interviews highlighted what owners liked most about their homes in addition to what they wished they could change about them. Longtime Habitat for Humanity of Addison County representatives and volunteers gave further information about the homes. Online research regarding town and county demographics and zoning provided further information about the context of the homes.

Finally, the study compiles and assesses this information to determine trends across houses. By and large, owners are happy with their homes. The houses are a good size for a single family, in locations proximate to school and work, and offer ample privacy for those living in them. Parking and driveways are challenging for some owners, and others wish their home included a porch. Several owners were able to make improvements or additions to their homes to better accommodate their needs. Homes also became more energy efficient; those built from 2017 onwards adhere to Efficiency Vermont's top tier of high performance housing, and those built from 2020 onwards all have their own solar panels. Several owners of these high performance homes remarked that their utility bills after moving into their single family Habitat home are significantly lower than those when previously living in a smaller apartment. Owners continue to face challenges with utilities, however. Heat pumps in particular have broken down or needed repairs, an issue that poses greater problems in the earlier homes that do not have solar. Design language changed over the years as well. Prior to the partnership with Middlebury College's architecture department, houses adhered very closely to the design language and materials of the older surrounding homes. After the partnership, the houses began to differ from older Vermont homes in their form and materials.

In the pages that follow, this report will detail findings for each town, lot, and home before revisiting design trends and progression. Since its founding, Habitat for Humanity of Addison County has increased its partnerships, reach, and efficiency standards to deliver affordable housing to hard-working families in need.

Habitat Timeline



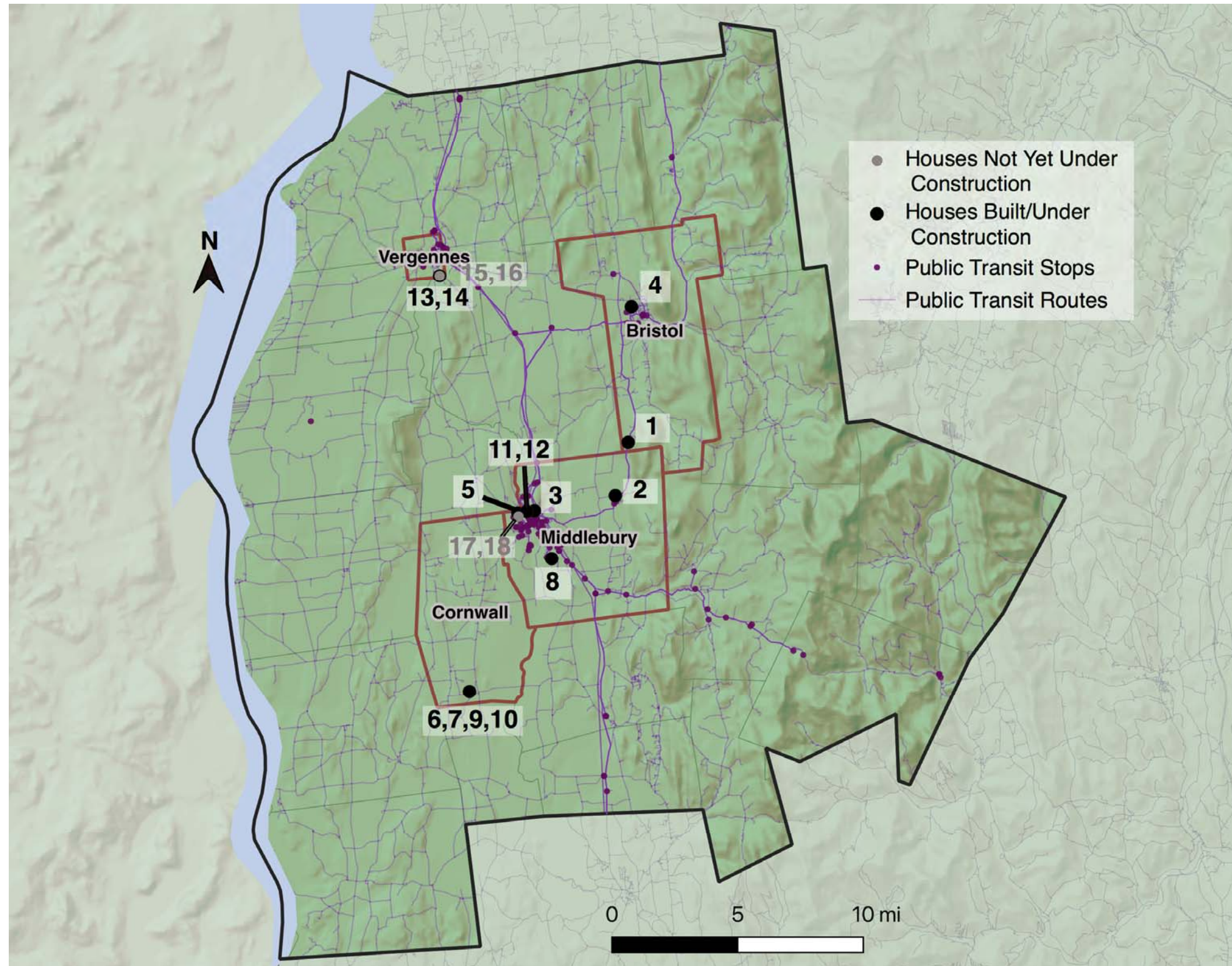
Habitat for Humanity works towards political and social reform with the intent of tackling the root of systemic issues impacting housing.

Partnering with organizations to implement new technologies has created great changes. These partnerships have ensured water sanitation, food and land security, and helped underrepresented groups lead a life in which they feel independent and proud of their living situation.

While writing her thesis, Middlebury College student Jennifer Jensen learned about the housing needs in Addison County. She found that nearly 5% of properties in the area were of substandard quality, over 21% of homeowners, and almost 40% of renters were paying an overproportional amount of their income towards their housing.

As a result, Habitat for Humanity of Addison County was established with the help of local partnerships and generous volunteer efforts, making a significant impact on the local community.

Addison County Map



Houses Numbered Chronologically

- #1 5300 Route 116 South, Bristol
 - #2 345 Mead Lane, Middlebury
 - #3 75 N Pleasant St., Middlebury
 - #4 10 Lawson Lane, Bristol
 - #5 650 Weybridge St., Middlebury
 - #6 116 Carothers Lane, Cornwall
 - #7 118 Carothers Lane, Cornwall
 - #8 66 Rockwood Lane, Middlebury
 - #9 148 Carothers Lane, Cornwall
 - #10 150 Carothers Lane, Cornwall
 - #11 51 Seymour St., Unit 1, Middlebury
 - #12 51 Seymour St., Unit 2, Middlebury
 - #13 14 Booth Woods, Vergennes
 - #14 16 Booth Woods, Vergennes
- *#15, 16, 17, 18 have been designed but not yet constructed

County Demographics



Total Population:
37,306

Median Age:
43.8

Racial Makeup:
White (94.3%)

Population Density:
48.7 per square mile



Housing Units:
17,518

Owner-Occupied
Housing Unit
Rate:
76.5%

Persons per
Household:
2.36



Median Household
Income:
\$77,978

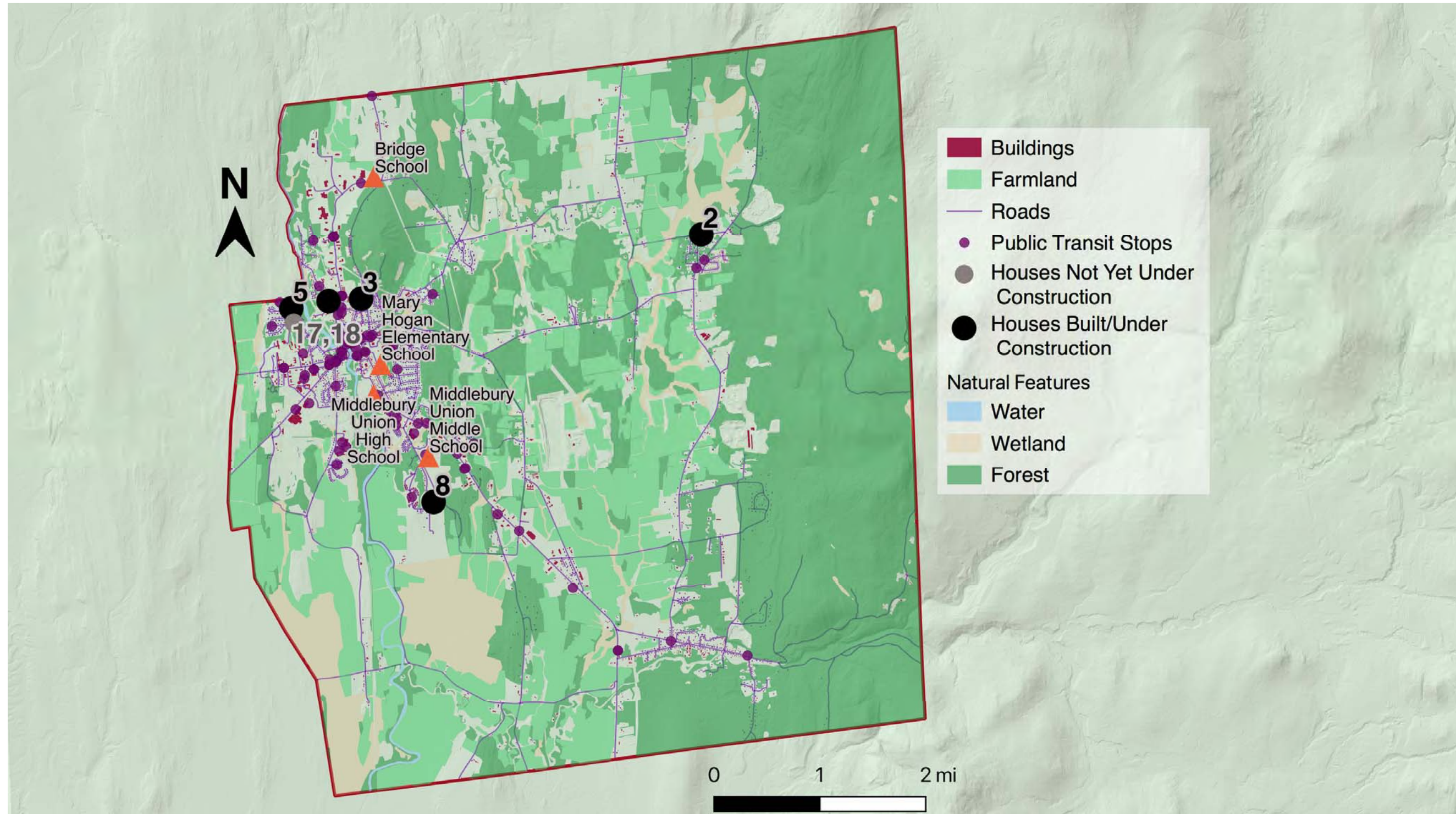
Median Value
of Home:
\$275,800

Poverty
Rate:
8.7%

Addison County's population increased 8 out of the 11 years between year 2010 and year 2021. Its largest annual population increase was 0.8% between 2019 and 2020.

Section B: Middlebury

Town of Middlebury



Middlebury Demographics



Total Population:
7,304

Median Age:
22.6

Racial Makeup:
White (83.2%)

Population Density:
186 per square mile



Housing Units:
2,321

Owner-Occupied
Housing Unit Rate:
54.5%

Persons per
Household:
2.03



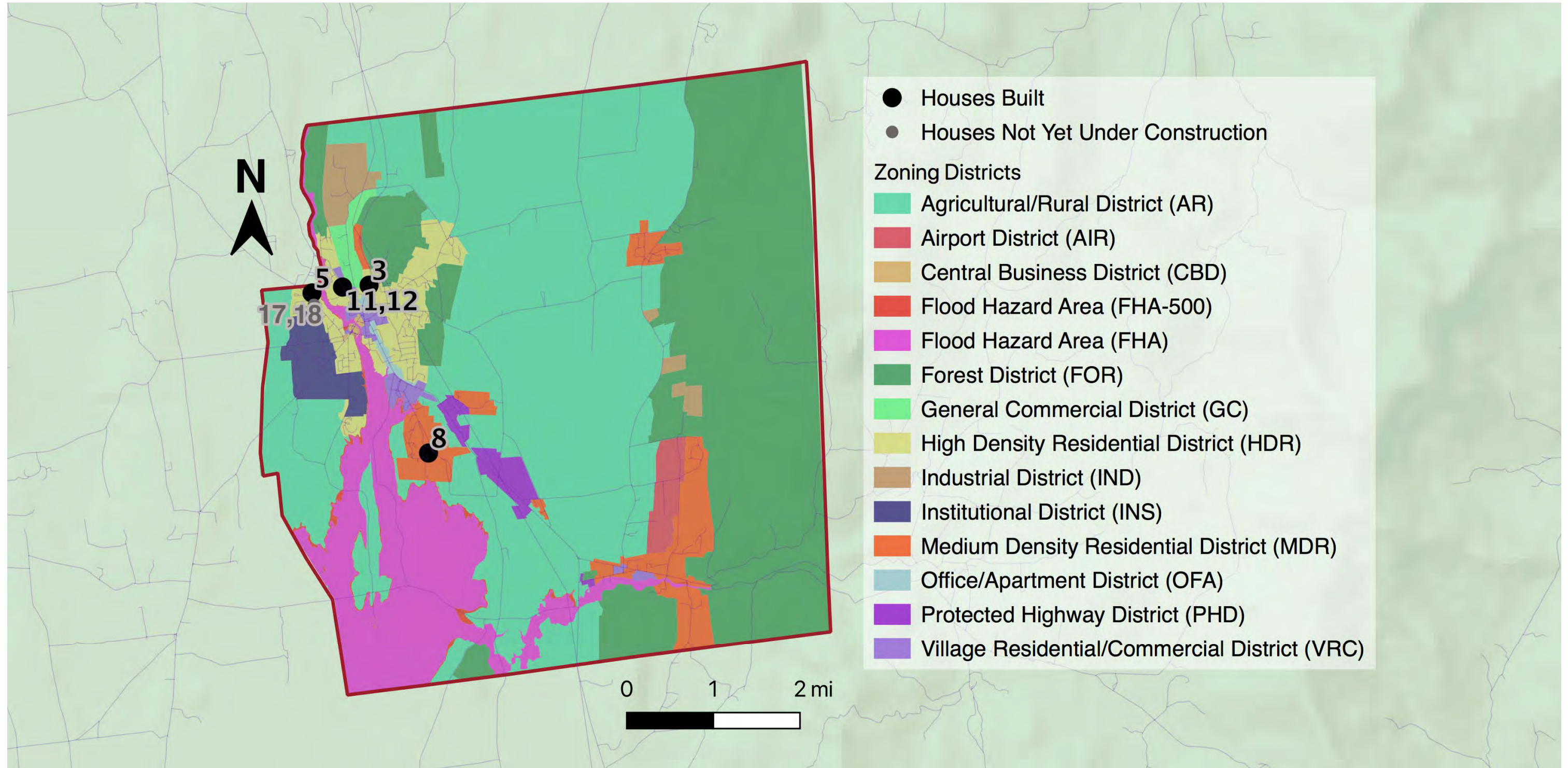
Median Household
Income:
\$65,050

Median Value
of Home:
\$332,200

Poverty
Rate:
10.9%

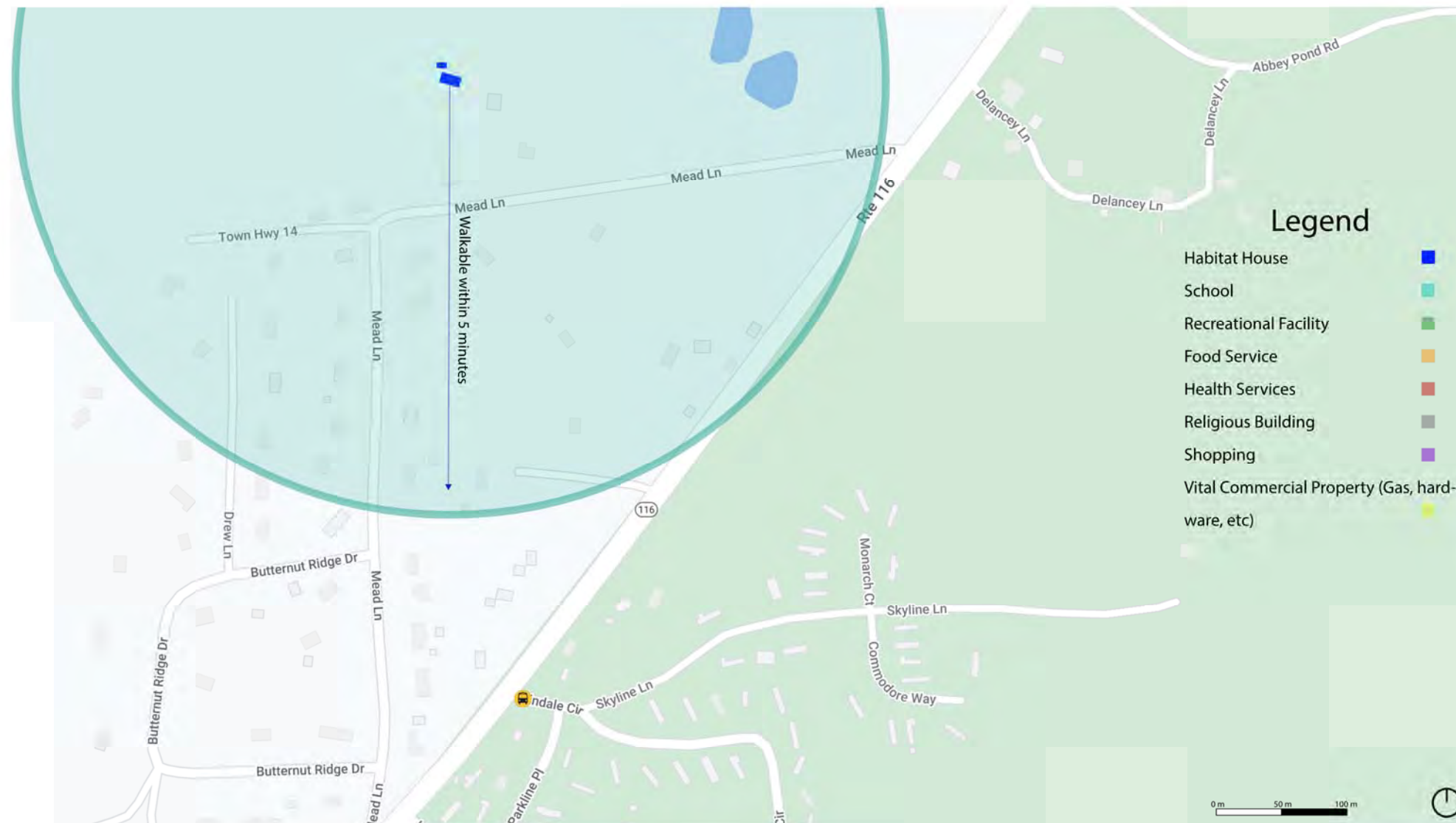
Middlebury's population has increased by 2.96% since the most recent census in 2020.

Middlebury Zoning Maps



345 Mead Lane House #2

Neighborhood Context



- Small, semi-dense suburban neighborhood
- 8 minute walk to bus station, access to grocery store, school, and other services
- 8 minute drive into Middlebury town

345 Mead Lane House #2

Photos



West Elevation



South Elevation



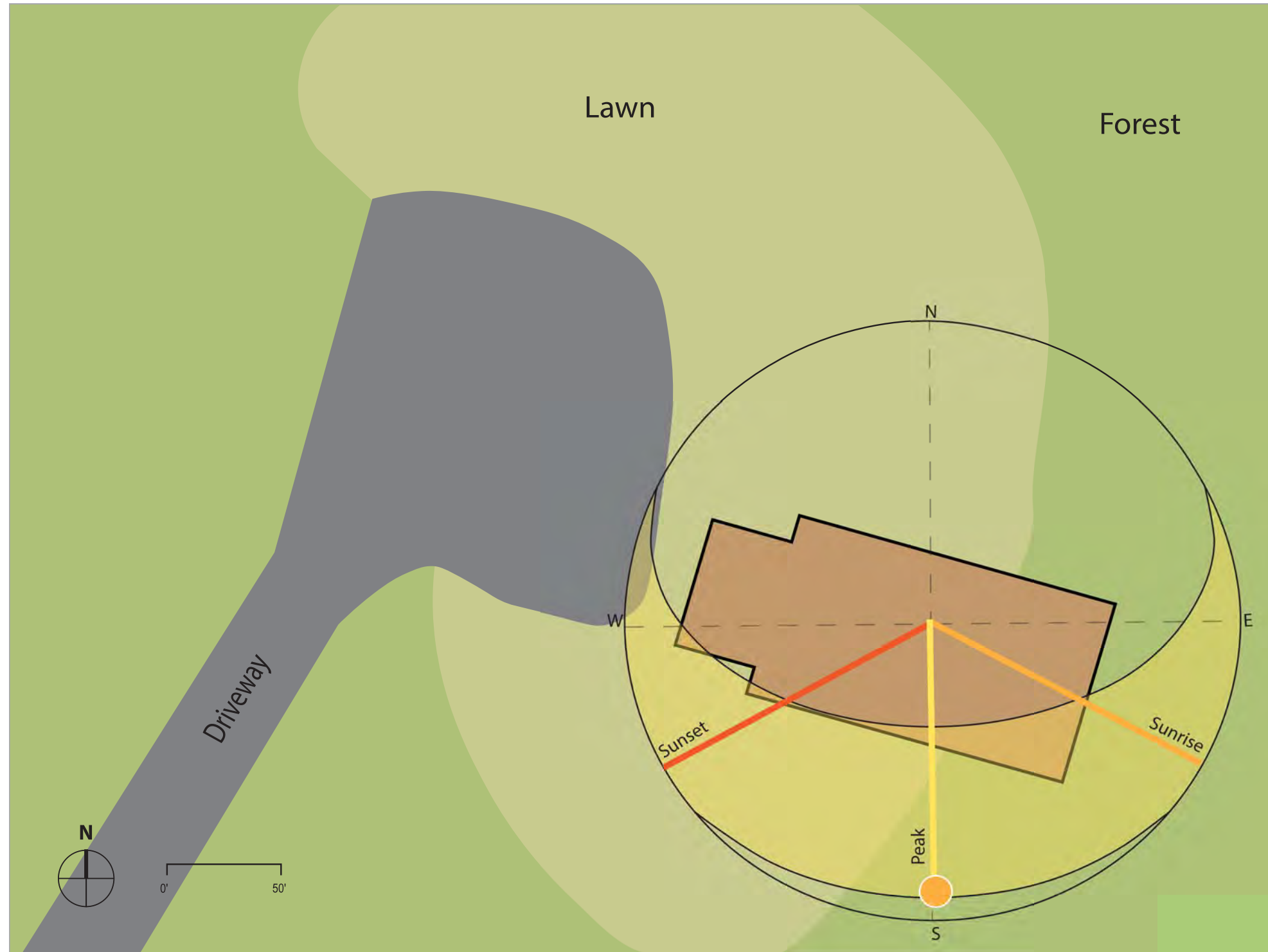
Garden on the North Side



Driveway

345 Mead Lane House #2

House Specifications



- Built 2004
- 3 BR
- 1 BTH
- 1,440 sq. ft.
- Vinyl siding
- Gable roof
- Single story

345 Mead Lane House #2

Evaluation

Drainage

Site Observations:

- House is situated at the bottom of a hill, suggesting some drainage issues

Owners' Feedback:

- Homeowner did not report any significant drainage issues

Building Design

Site Observations:

- Yard space gets very little sunlight; difficult for a garden

Owners' Feedback:

- Found living spaces too small/compact
- Wished overhead lighting was included in the original design
- Steep and curved driveway required her to purchase a vehicle with 4 wheel-drive
- Habitat did ensure the house was wheelchair accessible for her son (widened doorways, etc.)

Passive Solar

Site Observations:

- The longest side of the house faces south with 6 windows to take in sunlight
- Largely unobstructed access to sunlight regardless of season

Comfort Level

Site Observations:

- Lots of greenery around home

Owners' Feedback:

- Appreciates how the lot provides a lot of privacy
- Good neighborhood dynamic

Utility Performance

Site Observations:

- No municipal utilities

Owners' Feedback:

- Utility costs are inconsistent and highly variable month-to-month, not ideal with an unstable income
- Takes 500 gallons of propane a year to keep house at 65 degrees

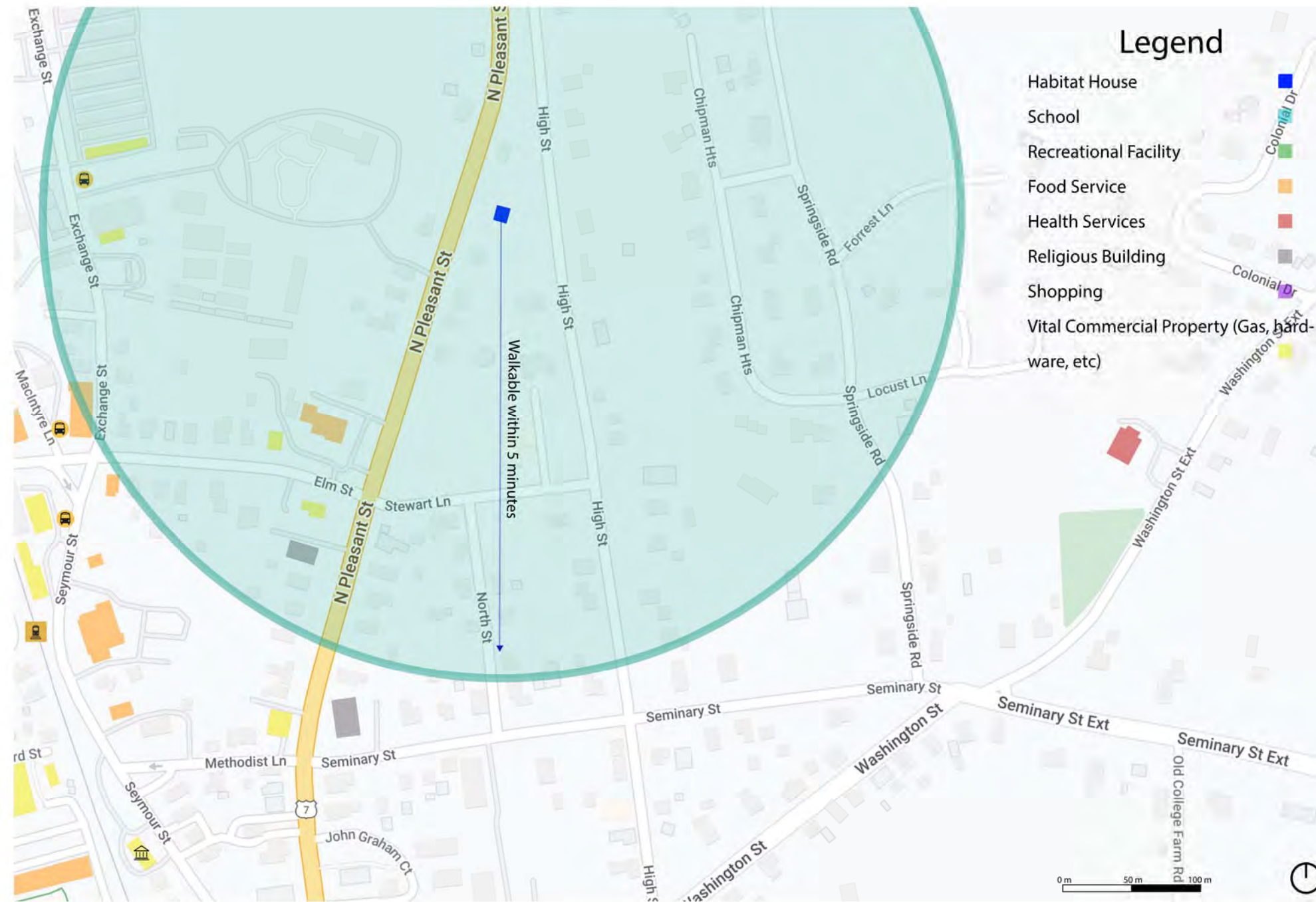
General Opinion

Owners' Feedback:

- Great place for her three sons to grow up and a large improvement from their previous housing, her grandchildren now visit often

75 N Pleasant St. House #3

Neighborhood Context



- Set on the northern edge of Middlebury town sprawl
- Bus stop, grocery stores, liquor store, church, bank, train stop (access to Burlington, other Vermont towns, NYC) all within 10 minutes walking distance
- Hospital, primary and secondary schools within 5 minutes driving, accessible by bus

75 N Pleasant St. House #3

Photos



Front Yard & Landscaping



West Elevation



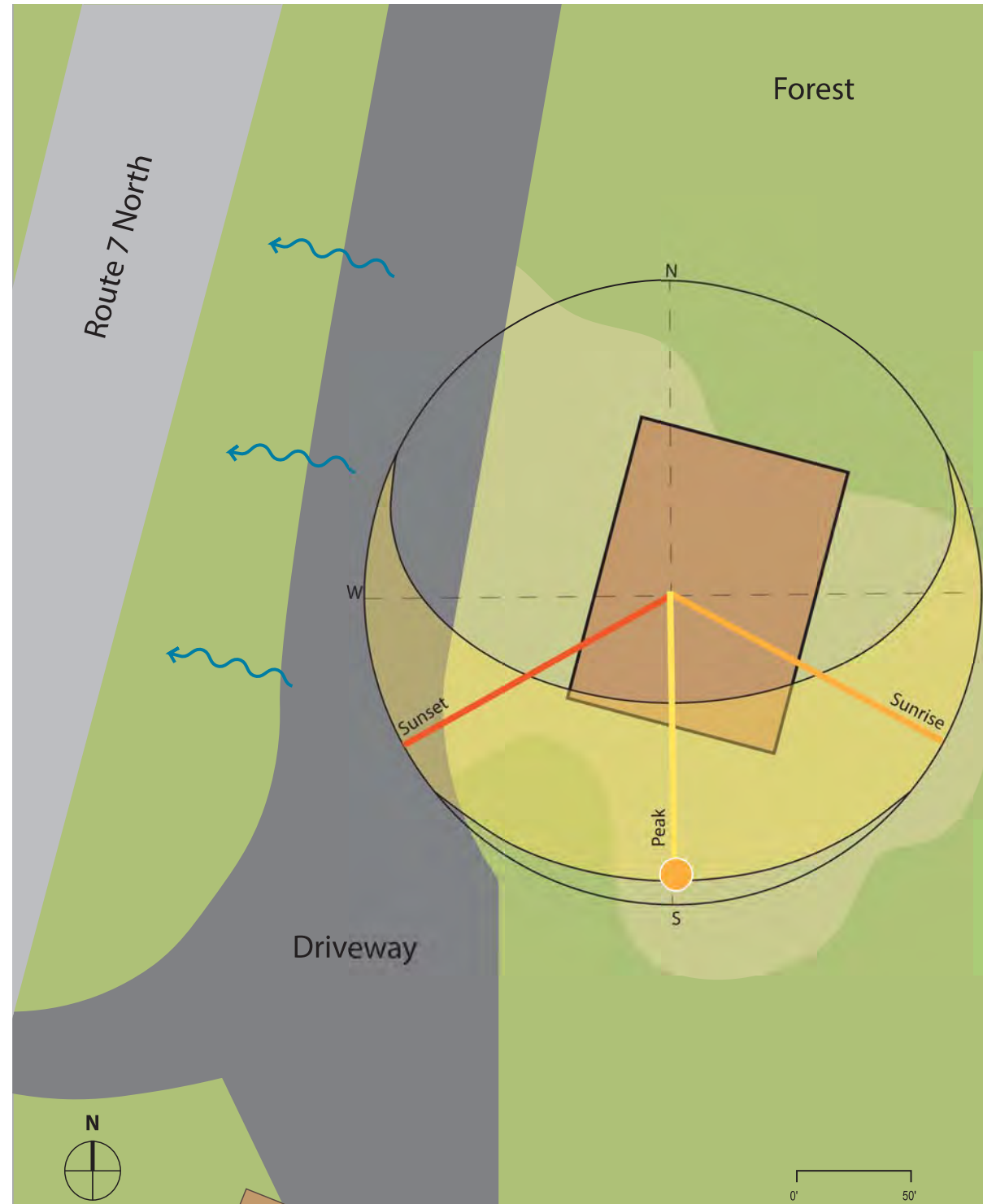
Porch Addition



North Elevation

75 N Pleasant St. House #3

House Specifications



- Built 2006
- 5 BR
- 3 BTH
- 1,550 sq. ft.
- Lot Size
- Vinyl Siding
- Gable Roof
- Single story

75 N Pleasant St. House #3

Evaluation

Drainage

Site Observations:

- Steep pitch of terrain facilitates drainage.
- Terraced, rocky landscaping to help prevent soil erosion while allowing water flow.

Passive Solar

Site Observations:

- Property lacks a strong connection with southern sunlight
- Only three small, south-facing windows.

Utility Performance

Site Observations:

- Some municipal services

Building Design

Site Observations:

- House strongly adheres to neighborhood style with similar coloration and gable-style roof.
- Wheelchair accessibility
- Homeowners likely added porch

Comfort Level

Site Observations:

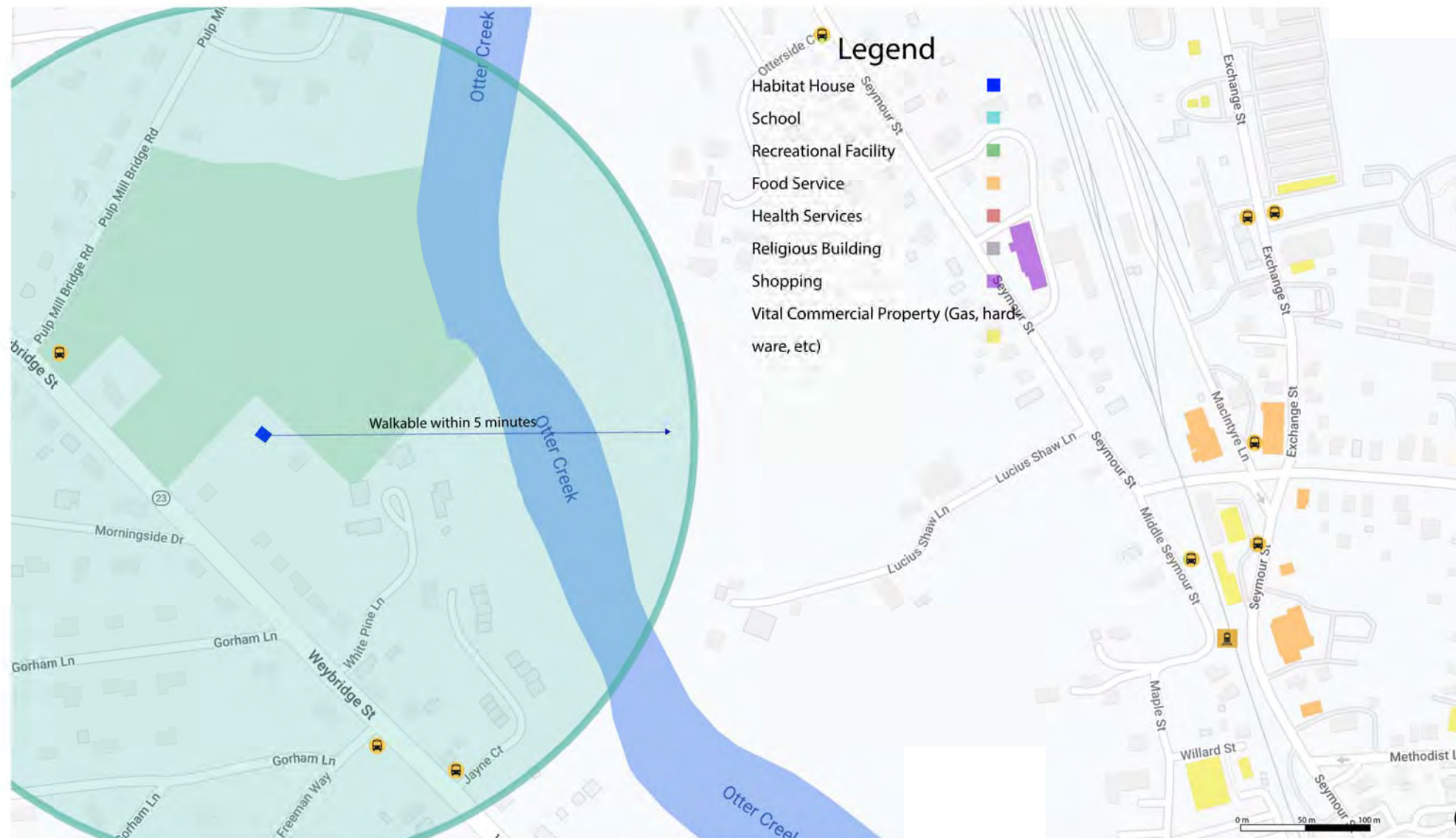
- Close proximity to Middlebury. Reasonable walking/biking distance to downtown. Feels very connected to Middlebury
- Not a lot of privacy
- Potential noise pollution from Highway 7

General Opinion

No interview

650 Weybridge St. House #5

Neighborhood Context



- Semi-dense neighborhood near Middlebury College
- Across Otter Creek from town center, 20 minute walk into downtown
- 3 minute walk to bus stop with access to schools, hospital, grocery store and other services
- Adjacent to large public park

650 Weybridge St. House #5

Photos



Yard View



Southwest Elevation



Southeast Elevation

650 Weybridge St. House #5

House Specifications



- Built 2010
- 3 BR
- 1.5 BTH
- ~1,000 SF
- Lot Size
- Hardie-board clapboard siding
- Gable Roof
- Single story

650 Weybridge St. House #5

Evaluation

Drainage

Site Observations:

- Steep pitch of terrain facilitates drainage

Owners' Feedback:

- Drainage was a major issue after move-in.
- Driveway was coated in ice and very treacherous every winter.
- Homeowner dug a trench and installed a new drain which has resolved the issue.

Building Design

Site Observations:

- Design fits in with the neighborhood very well

Owners' Feedback:

- Overall, homeowners love the style/layout of the home
- Would really like a porch/outdoor space. Disappointed that they cannot add one until their mortgage is paid off in 2043.

Passive Solar

Site Observations:

- Steep pitch of terrain facilitates drainage
- Faces southwest with eave that successfully blocks summer sunlight.
- Large window to take in sunlight that also serves to light the entire upper level.

Owners' Feedback:

- Unobstructed sunlight lights and warms entire upper level

Comfort Level

Site Observations:

- Reasonable walking/biking distance to Middlebury and public transportation available on Weybridge St.

Owners' Feedback:

- Ideal location. Love the neighborhood; are within walking distance of work and school.
- No noise pollution. Appreciate how well-lit the neighborhood is.
- Wish they had more and flatter yard-space

Utility Performance

Owners' Feedback:

- No issues with municipal water service
- "Lifetime" Buderus boiler installed by Habitat has failed and requires a total replacement (\$5500) after only 13 years as technicians will no longer service it.

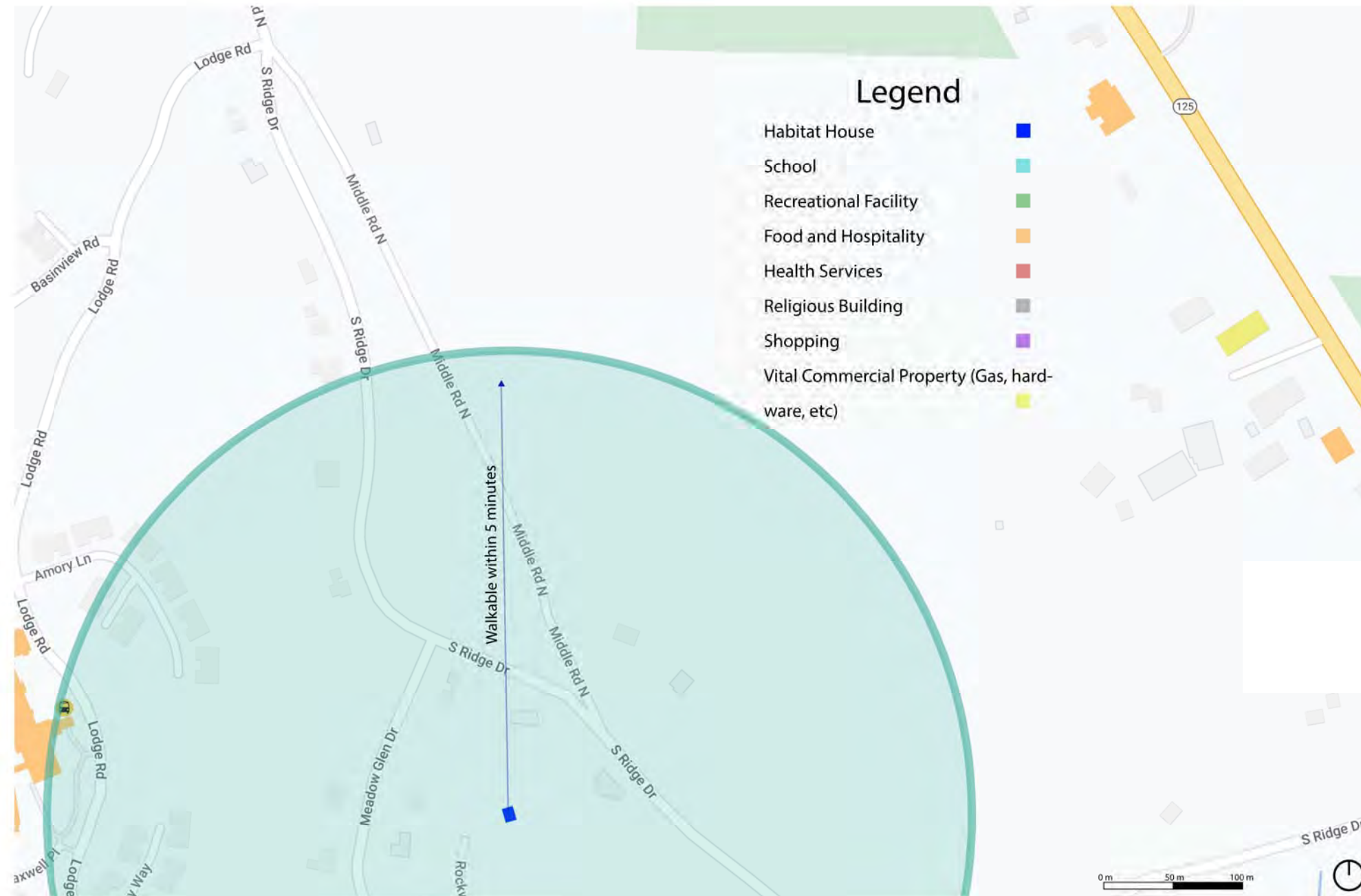
General Opinion

Owners' Feedback:

- Overall very happy with the home and Habitat application process.

66 Rockwood Lane House #8

Neighborhood Context



- Small, low-density neighborhood south of Middlebury
- Bus stop a 5 minute walk with access to schools, hospital and other services
- 10 minute walk to restaurant Rosie's
- 5 minute drive into town

66 Rockwood Lane House #8

Photos



Northwest Elevation



East Elevation



Southeast Elevation



Northeast Elevation



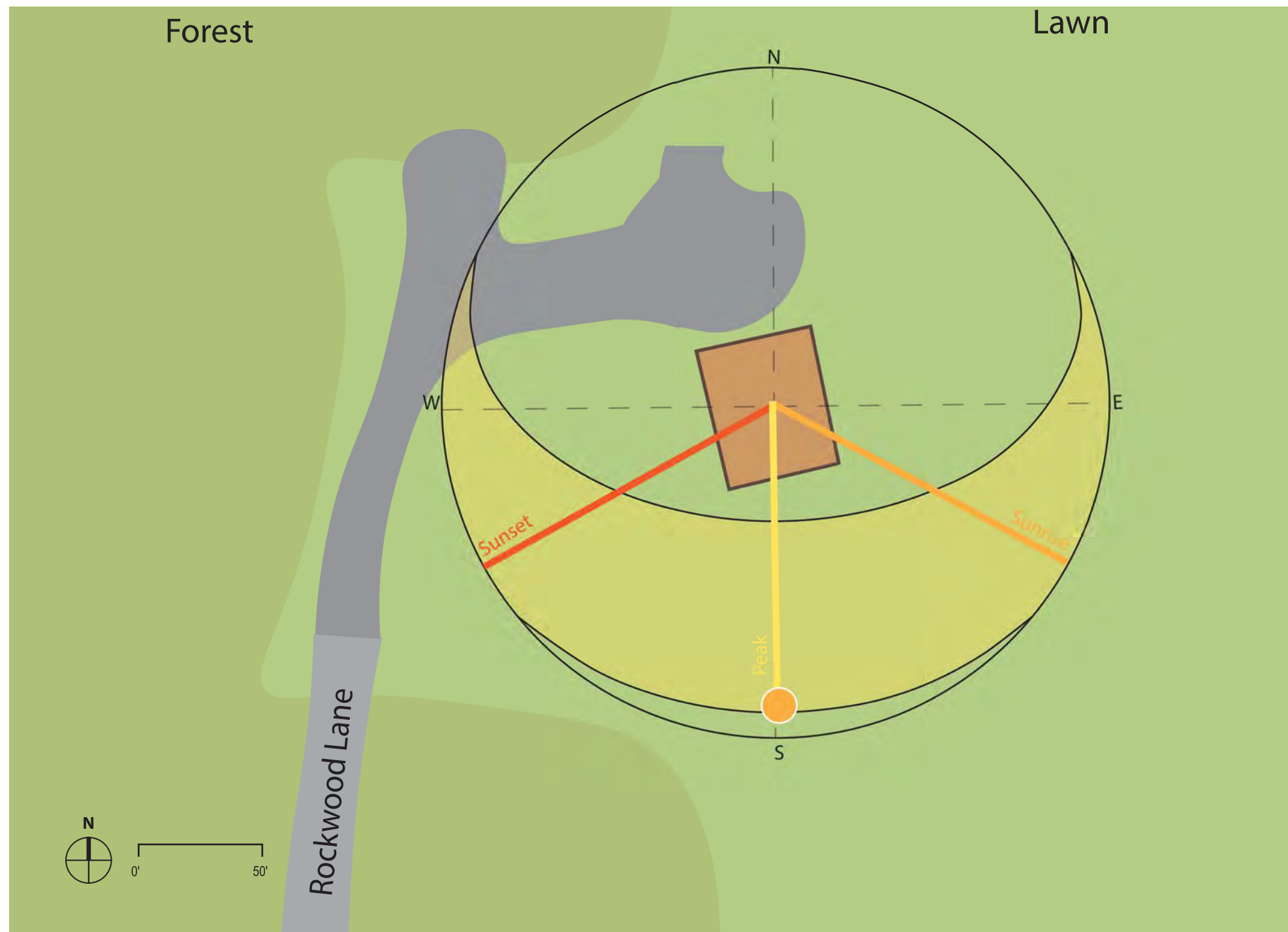
Surrounding Land



Garden Beds

66 Rockwood Lane House #8

House Specifications



- Built 2016
- 3 BR
- 1.5 BTH
- 1,472 SF
- Lot Size
- Vinyl siding, cedar shingled roof
- Gable roof with dormer
- 2 stories

66 Rockwood Lane House #8

Evaluation

Drainage

Site Observations:

- House is situated on a plateau on a slope that feeds into a wetland
- Appears to drain well

Building Design

Site Observations:

- House reflects the design language of surrounding neighborhood but is older and lacking some features: porch, solar panels, etc.

Passive Solar

Site Observations:

- 4 windows to take in sunlight on southside
- Southside receives unobstructed sunlight in morning and afternoon

Comfort Level

Site Observations:

- Very quiet location
- Not isolated from Middlebury

Utility Performance

Site Observations:

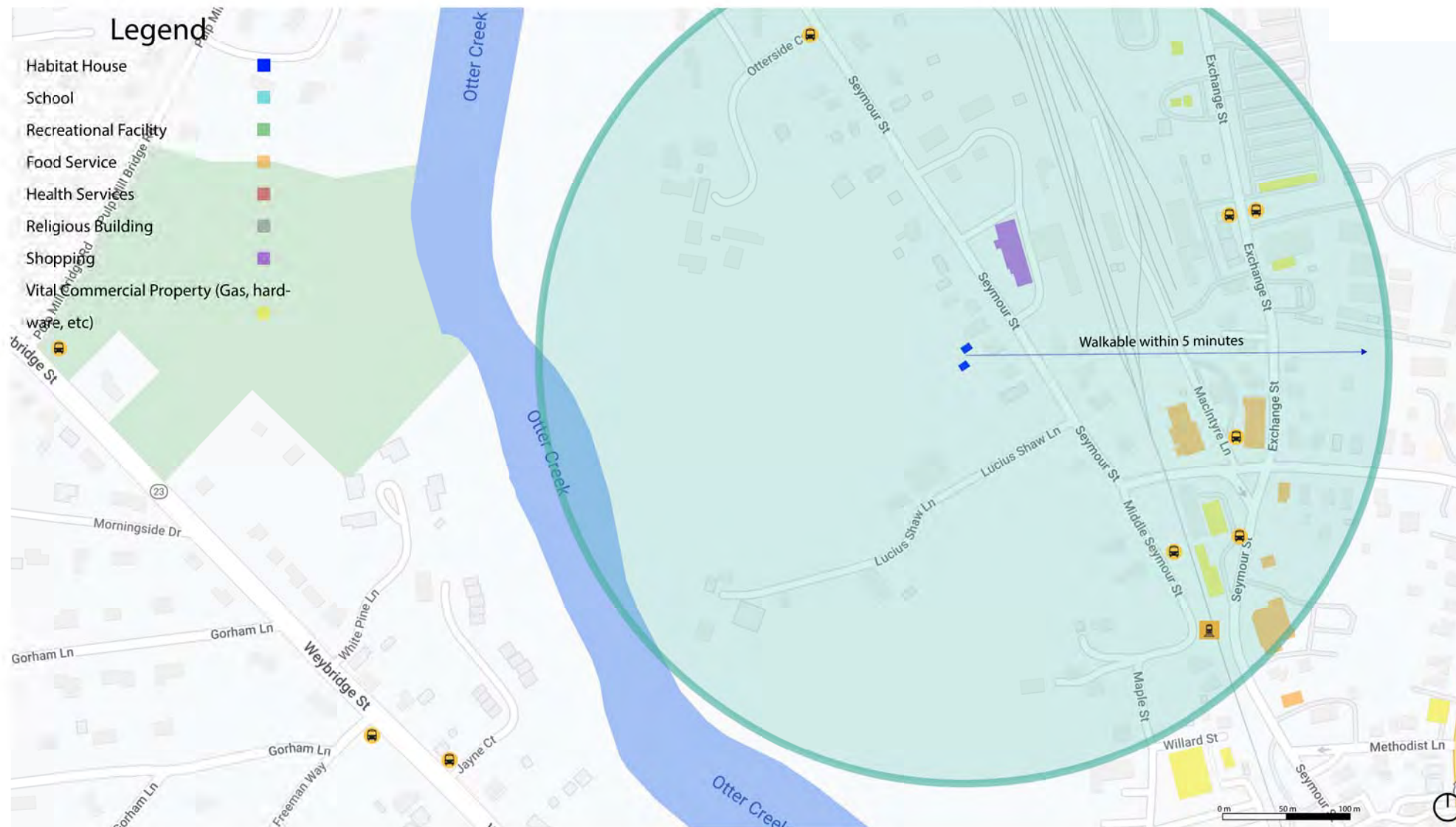
- No obvious signs of utility failure or poor design

General Opinion

No interview

51 Seymour St., Unit 1 House #11

Neighborhood Context



- Set on the north-western edge of Middlebury town sprawl
- Bus stop, grocery stores, liquor store, church, bank, train stop (access to Burlington, other Vermont towns, NYC) all within 5-10 minutes walking distance
- Hospital, primary and secondary schools within 5 minutes driving, accessible by bus
- 5 minutes walk west from Otter Creek

51 Seymour St., Unit 1 House #11

Photos



South Elevation



North Elevation



East Elevation



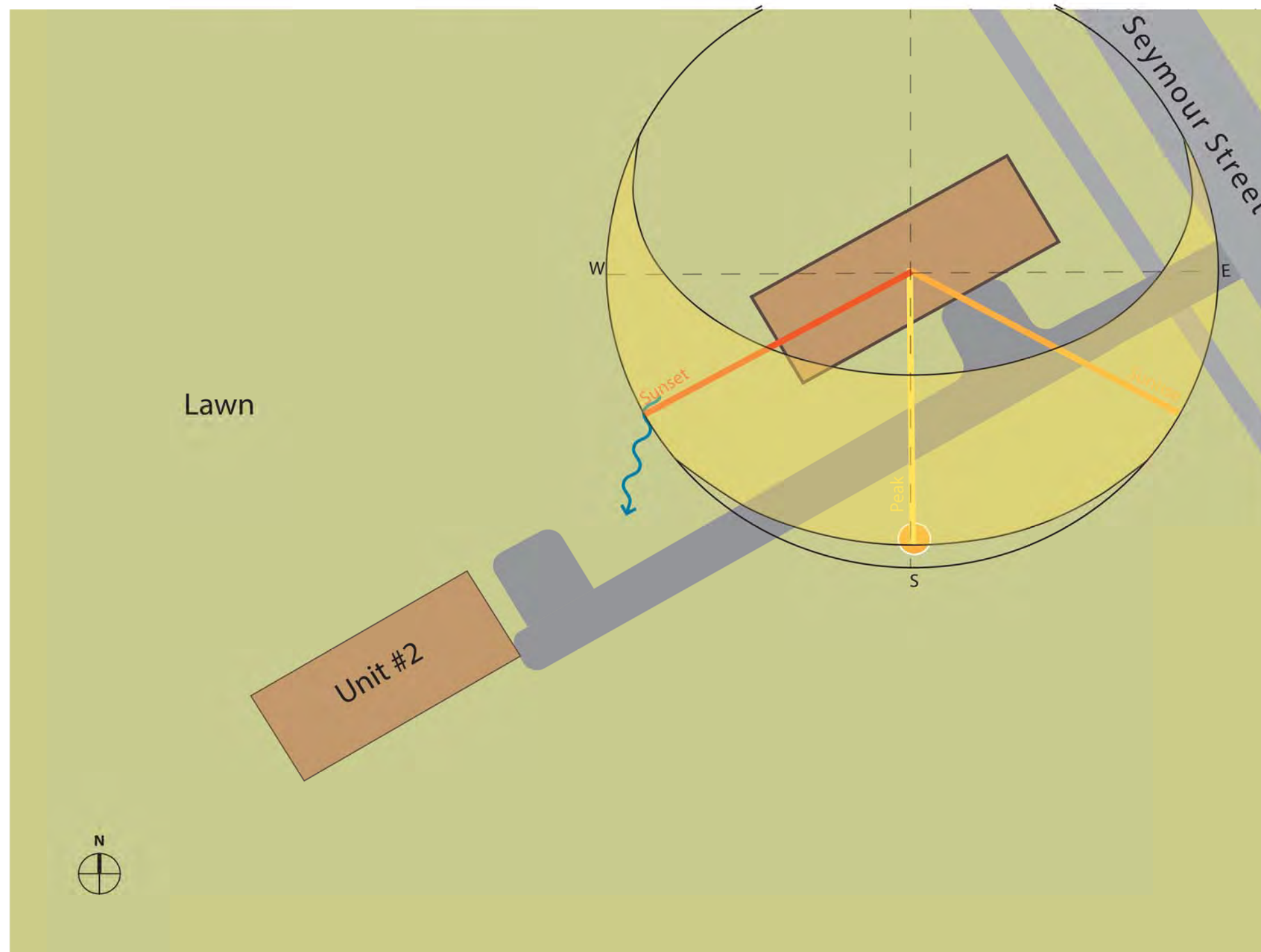
Southeast Elevation



Northeast Elevation

51 Seymour St., Unit 1 House #11

House Specifications



- Built 2020
- 3 BR
- # BTH
- 1,173 SF
- 10,000 SF
- Cedar and Corrugated metal
- Gable roof
- Single story

51 Seymour St., Unit 1

House #11

Evaluation

Drainage

Site Observations:

- House is situated in a “seasonal wetland”; water runs off nature preserve and collects in backyard
- Drainage infrastructure along adjacent sidewalks

Passive Solar

Site Observations:

- Large window on southside brings a lot of sunlight into open living/kitchen area

Utility Performance

Site Observations:

- No obvious signs of utility failure or poor design

Building Design

Site Observations:

- Although vastly different in style, a clear effort has been made to unify design with neighborhood

Comfort Level

Site Observations:

- Very walkable and highly connected to downtown Middlebury
- Potential noise pollution from nearby factory

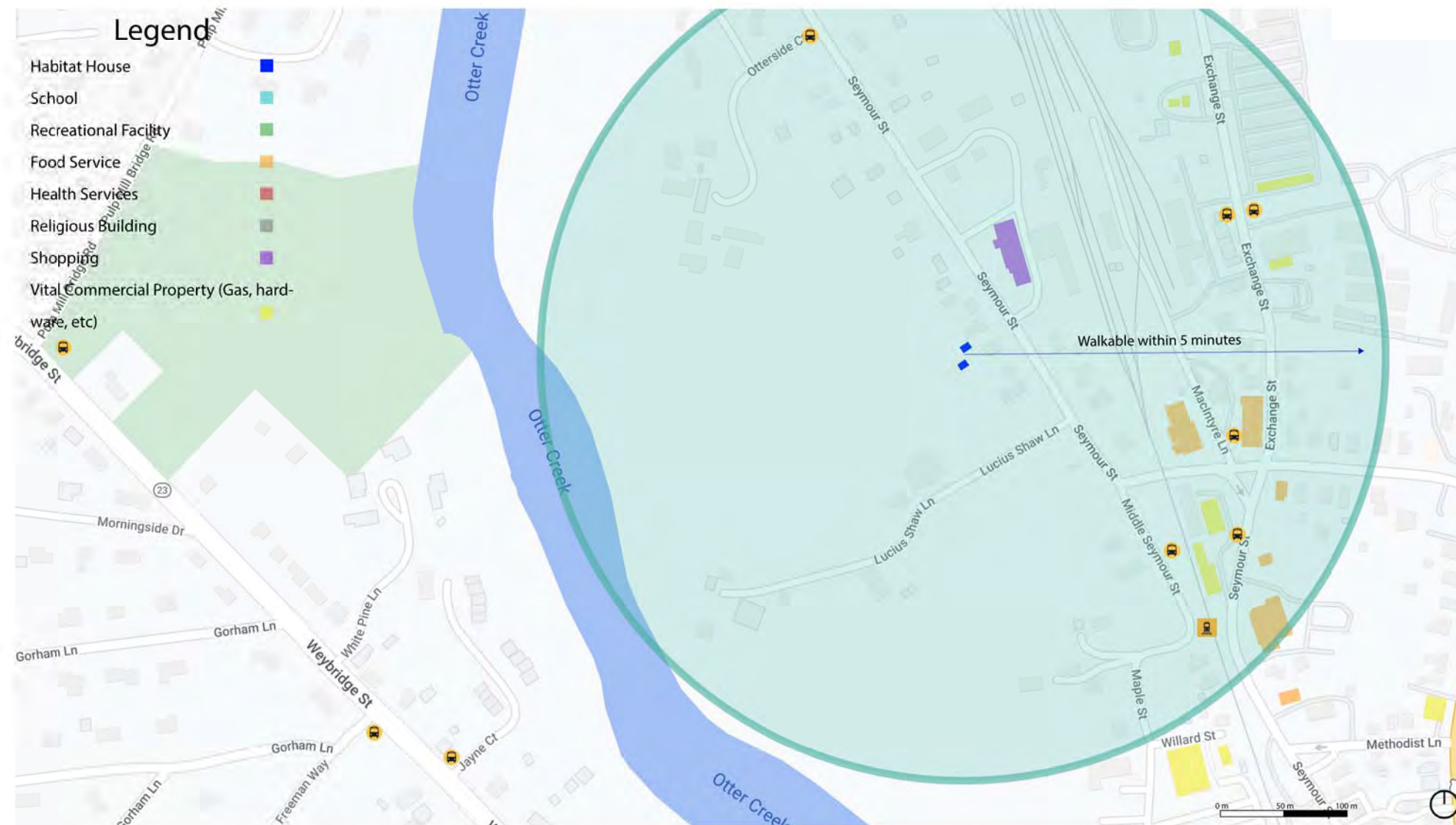
General Opinion

Site Observations:

- Family is very happy with their home and the Habitat application process.

51 Seymour St., Unit 2 House #12

Neighborhood Context



- Set on the north-western edge of Middlebury town sprawl
- Bus stop, grocery stores, liquor store, church, bank, train stop (access to Burlington, other Vermont towns, NYC) all within 5-10 minutes walking distance
- Hospital, primary and secondary schools within 5 minutes driving, accessible by bus
- 5 minutes walk west from Otter Creek

51 Seymour St., Unit 2 House #12

Photos



East Elevation



West Elevation



Northeast Elevation



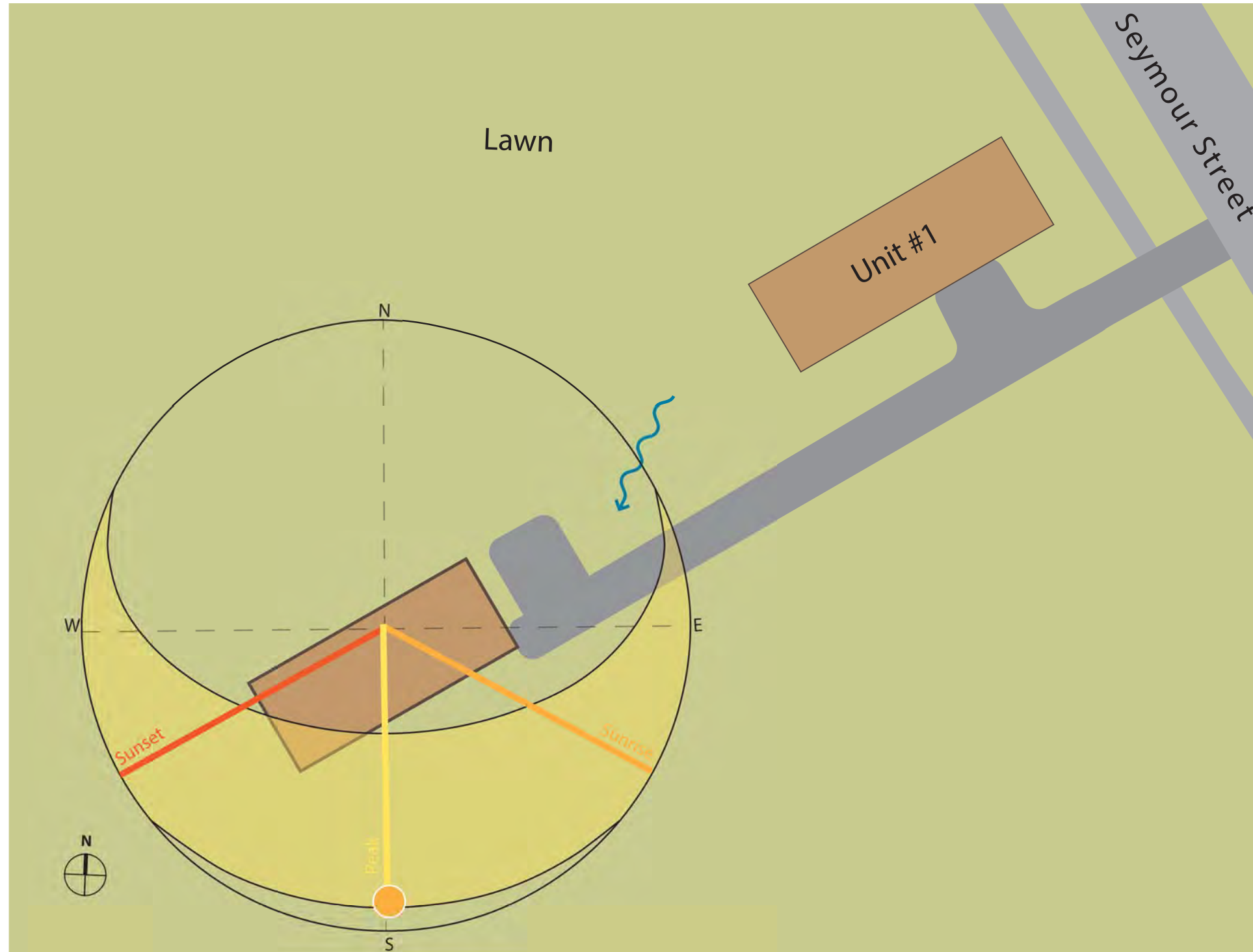
House 11 & 12



Southeast Elevation

51 Seymour St., Unit 2 House #12

House Specifications



- Built 2020
- 2 BR
- 1 BTH
- 986 SF
- 10,000 SF
- Cedar and corrugated metal
- Gable roof
- Single Story

Evaluation

Drainage

Site Observations:

- House is situated in a “seasonal wetland”; water runs off nature preserve and collects in backyard
- Drainage infrastructure along adjacent sidewalks

Building Design

Owners’ Feedback:

- Attic storage is difficult to access
- Heat pump location makes maintenance difficult
- Air vents are placed very close together and often interfere with one another
- Filtration system above the bedroom is very loud, although the homeowner does appreciate having filtered air
- Homeowner loves the large windows and abundance of natural light

Passive Solar

Site Observations:

- Solar energy has significantly reduced electricity bills
- Large window on southside brings a lot of sunlight into open living/kitchen area

Comfort Level

Owners’ Feedback:

- House location is convenient (within walking distance to work), but neighborhood is very loud due to the nearby mill which often runs at night
- Homeowner feels the window placement allows for a lot of privacy even in close quarters

Utility Performance

Site Observations:

- Utility bills are more affordable than previous housing

Owners’ Feedback:

- Homeowner has encountered issues with heat pump maintenance
- Air filters have to be replaced every few months and are fairly expensive

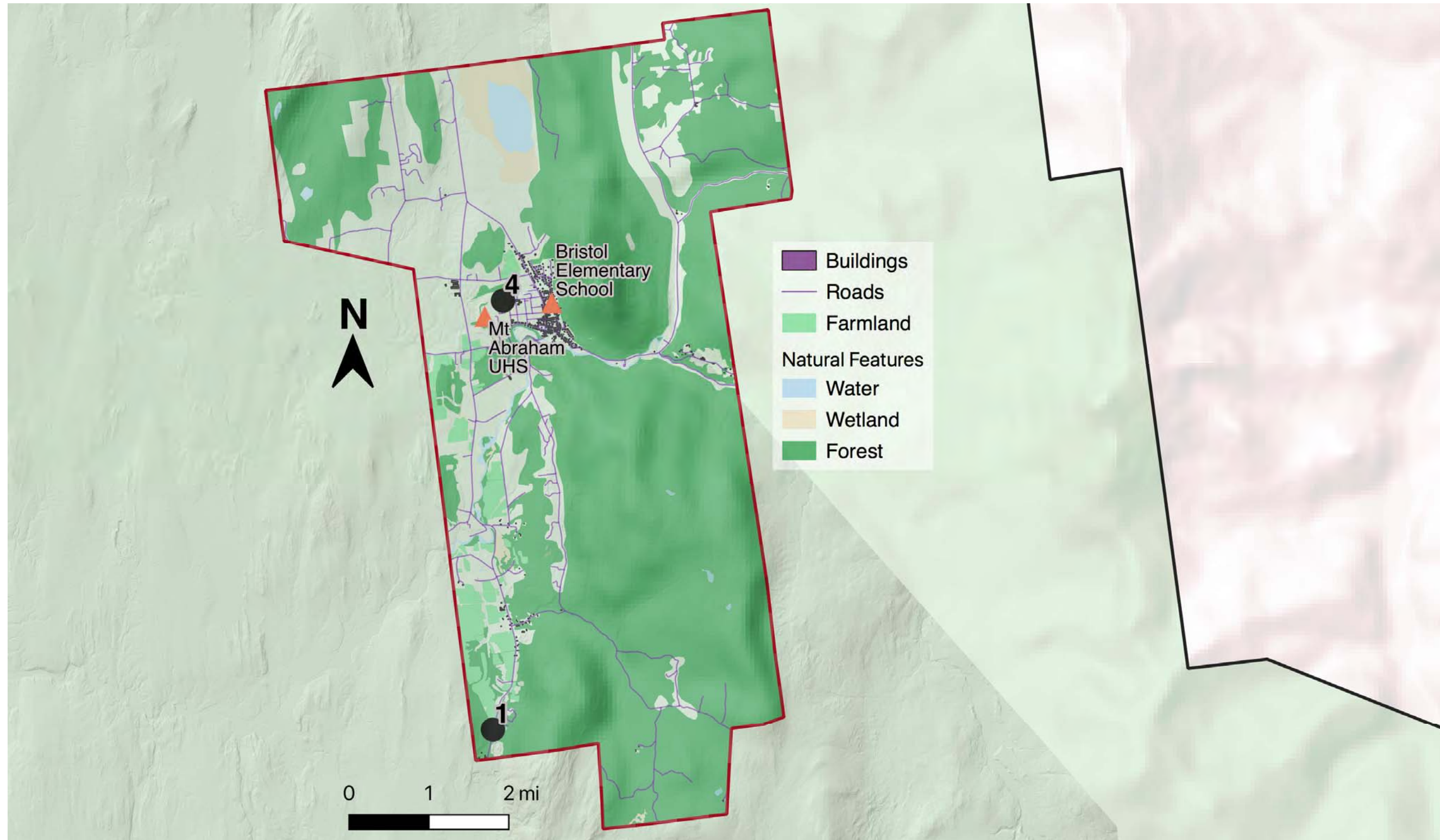
General Opinion

Owners’ Feedback:

- Family loves their home and are very proud to live in it.

Section C: Bristol

Town of Bristol



Town Demographic



Total Population:
1,909

Median Age:
47.3

Racial Makeup:
White (93.65%)

Population Density:
897 per square mile



Housing Units:
958

Owner-Occupied
Housing Unit Rate:
69.0%

Persons per
Household:
2.1



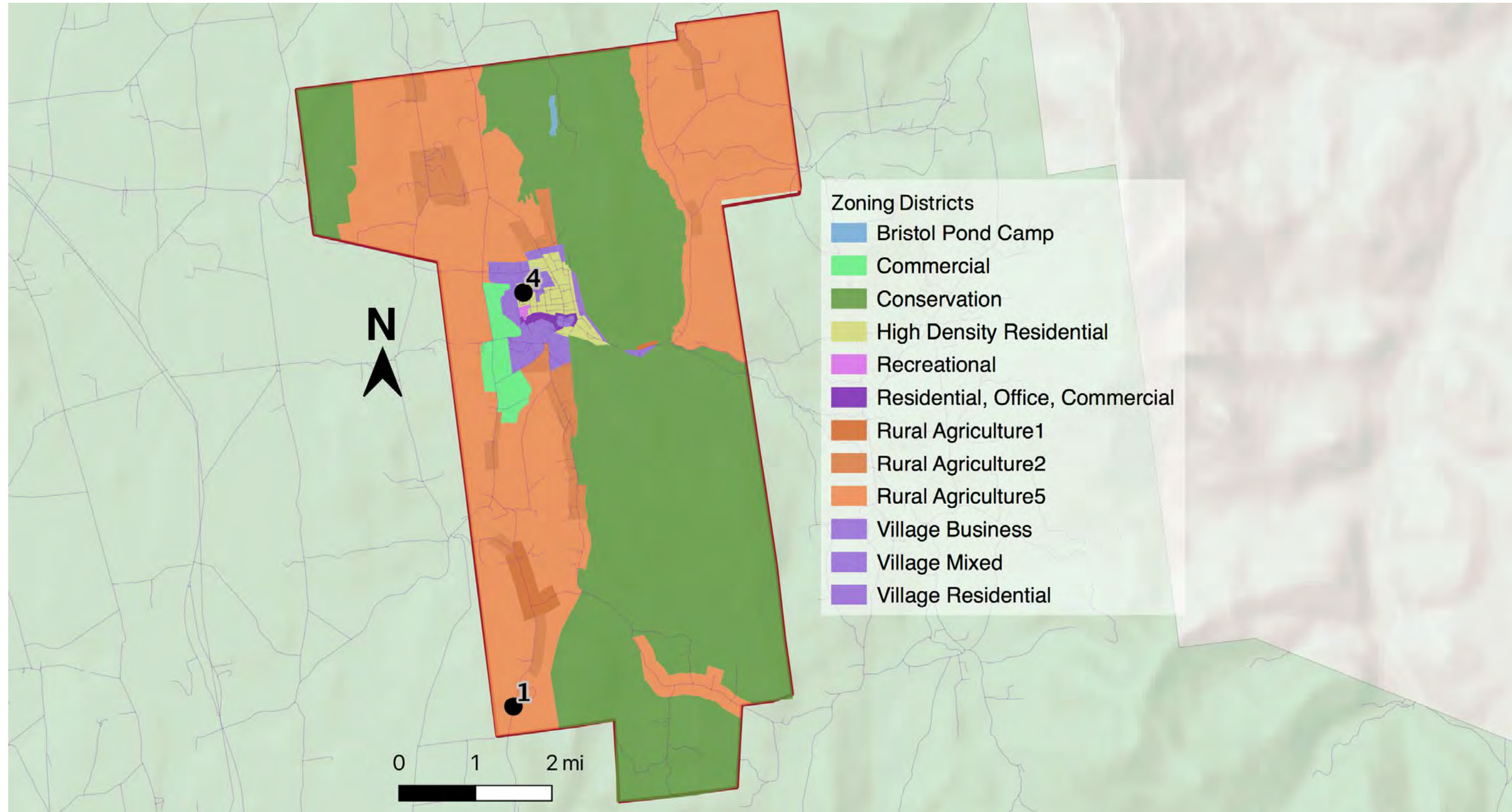
Median Household
Income:
\$62,840

Median Value
of Home:
\$246,800

Poverty
Rate:
12.22%

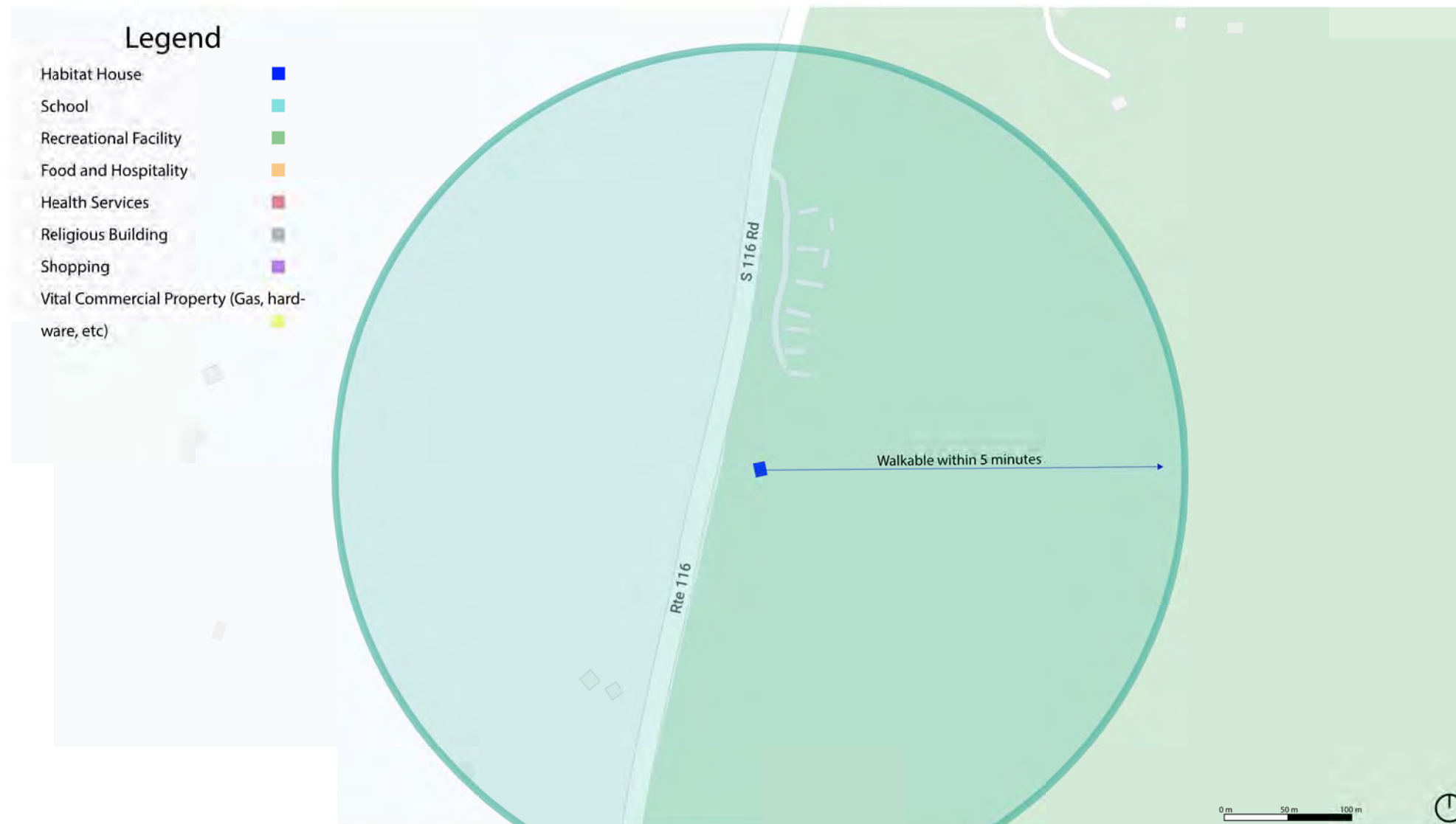
*Bristol's population has decreased by 8.88%
since the most recent census in 2020.*

Bristol Zoning Maps



5300 S. 116 Road House #1

Neighborhood Context



- Rural setting
- Scattered, sparse neighborhood with large plots
- Bordered by trailer park and open rock quarry
- Closest available services 10 minutes away by car (Bristol)
- No nearby public transport

5300 S. 116 Road House #1

Photos



East Elevation



North Elevation



Weathering on Window



South Elevation



Quarry Abutting Property



West Elevation

5300 S. 116 Road House #1

House Specifications



- Built 2001
- 4 BR
- # BTH
- 1,748 SF
- Lot Size
- Vinyl siding w/ wooden window frames
- Gable Roof
- 2 Stories

5300 S. 116 Road House #1

Evaluation

Drainage

Site Observations:

- Steep pitch of terrain facilitates drainage.

Owners' Feedback:

- No significant drainage issues reported

Building Design

Site Observations:

- Large deck has been added to property

Passive Solar

Site Observations:

- 4 south-facing windows
- Eave prevents summer sunlight from over-heating living spaces

Comfort Level

Site Observations:

- Nearby quarry might cause noise issues

Utility Performance

Site Observations:

- No obvious signs of utility failure or poor design

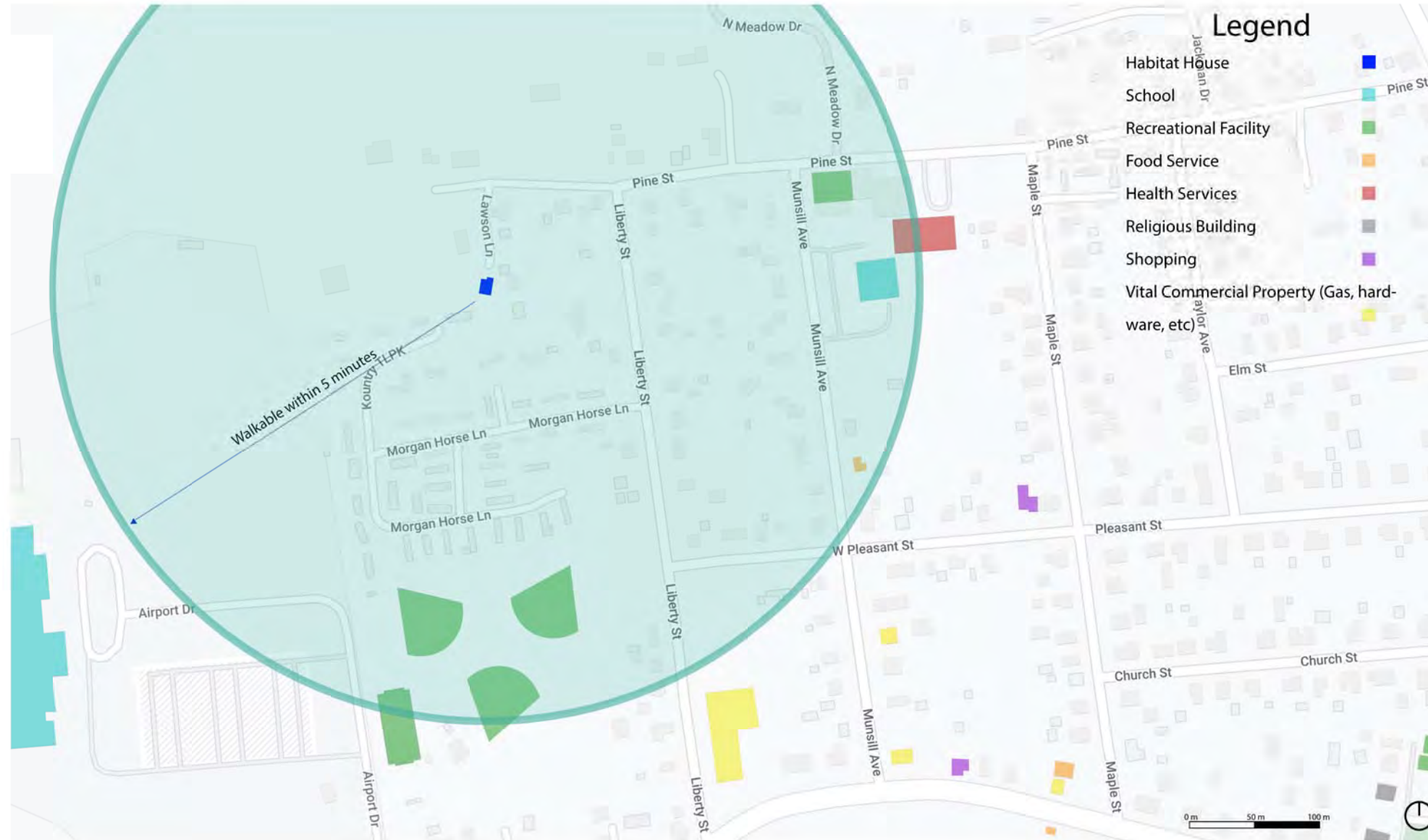
General Opinion

Owners' Feedback:

- “Our experience in this house has been amazing. Without this opportunity, we may not have owned a home of our own.”

10 Lawson Lane House #4

Neighborhood Context



- Semi-dense neighborhood at western end of Bristol Town sprawl
- 5 minute walk to high school, playing fields, doctor
- 10 minute walk to town center
- Bordered to the west by large construction/quarry site that creates a lot of noise

10 Lawson Lane House #4

Photos



East Elevation



North Elevation



West Elevation



South Elevation



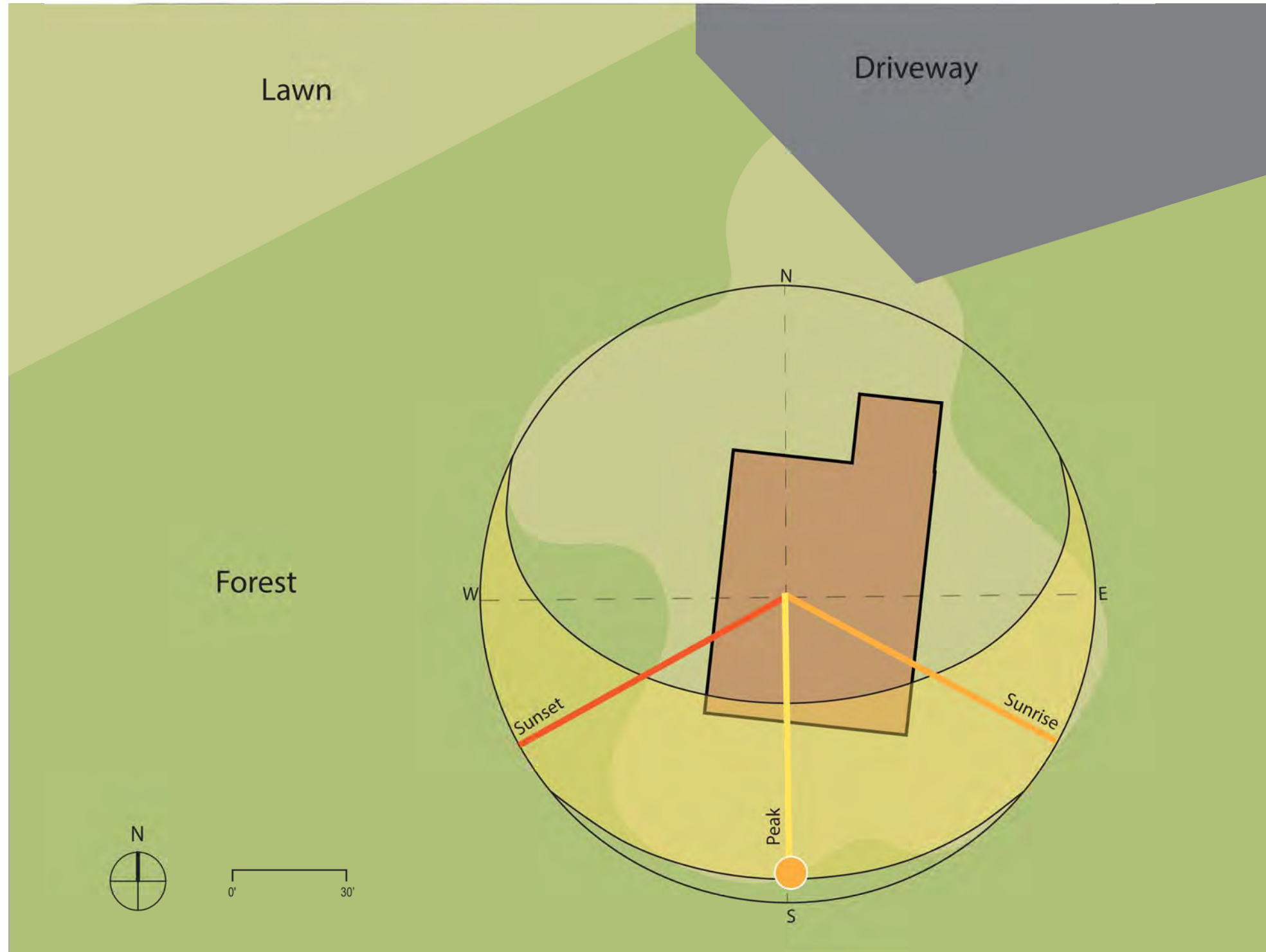
Driveway



Street View

10 Lawson Lane House #4

House Specifications



- Built 2008
- 3 BR
- # BTH
- 1,300 SF
- 0.5 acre lot
- Vinyl siding, single pane windows
- Gable roof
- 2 stories

10 Lawson Lane House #4

Evaluation

Drainage

Site Observations:

- Yard space is slightly concave, thus water collects very easily

Owners' Feedback:

- Has not experienced significant drainage issues

Passive Solar

Site Observations:

- Access to sunlight on the south side is highly obstructed
- Small windows are not conducive to passive solar gain

Utility Performance

Site Observations:

- Some municipal services provided
Propane heating

Building Design

Site Observations:

- Design fits in with the neighborhood very well: gable roof, similar coloration and distance from the road

Comfort Level

Site Observations:

- Noise pollution from nearby quarry

Owners' Feedback:

- Love the walkability to town and local high school
- Good neighborhood dynamic

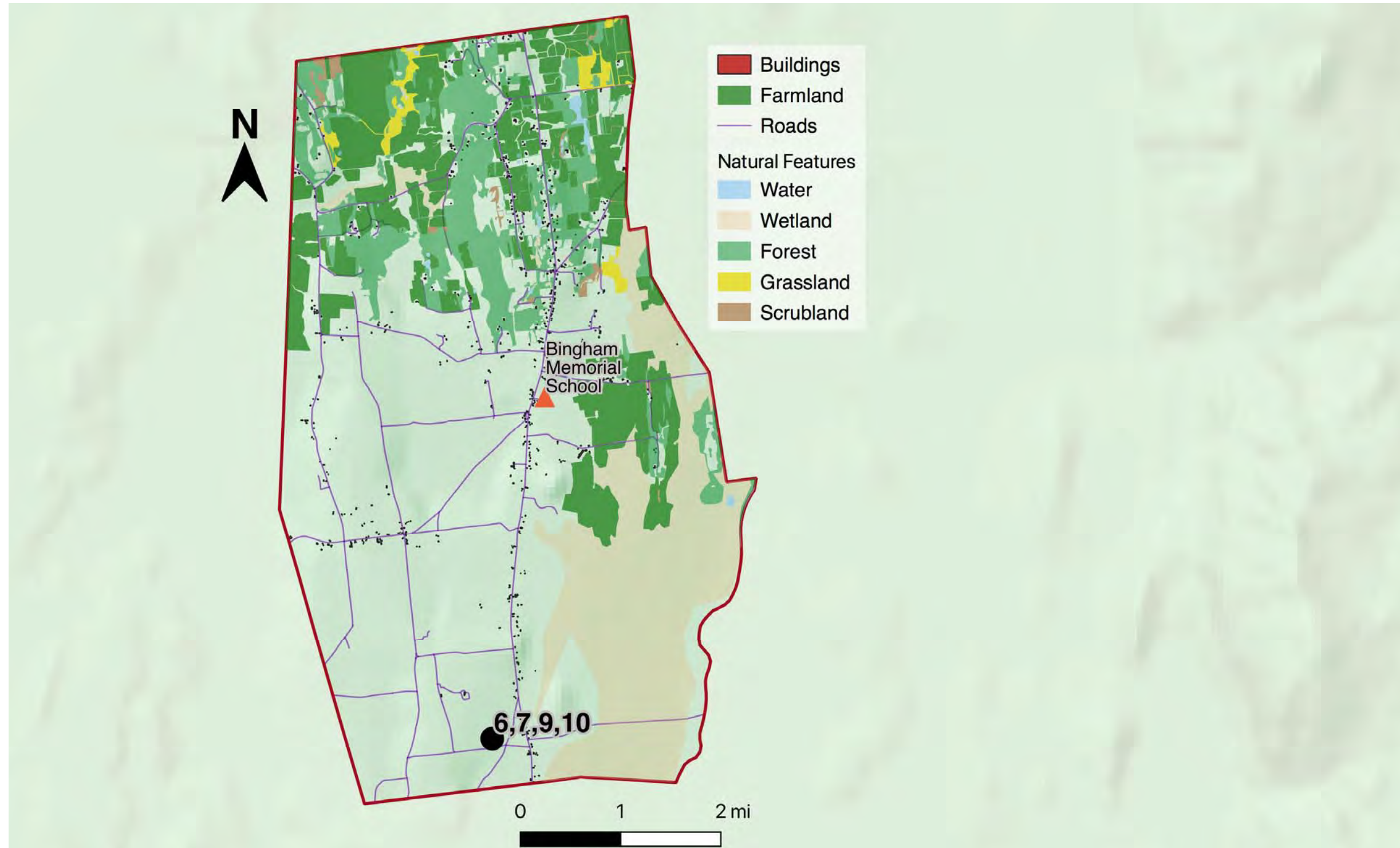
General Opinion

Owners' Feedback:

- Has lived there 15 years. Generally a positive experience, although they experienced some initial pushback from neighbors.

Section D: Cornwall

Town of Cornwall



Cornwall Demographic



Total Population:
1,073

Median Age:
46

Racial Makeup:
White (97.0%)

Population Density:
37 per square mile



Housing Units:
464

Owner-Occupied
Housing Unit
Rate:
83%

Persons per
Household:
2.66



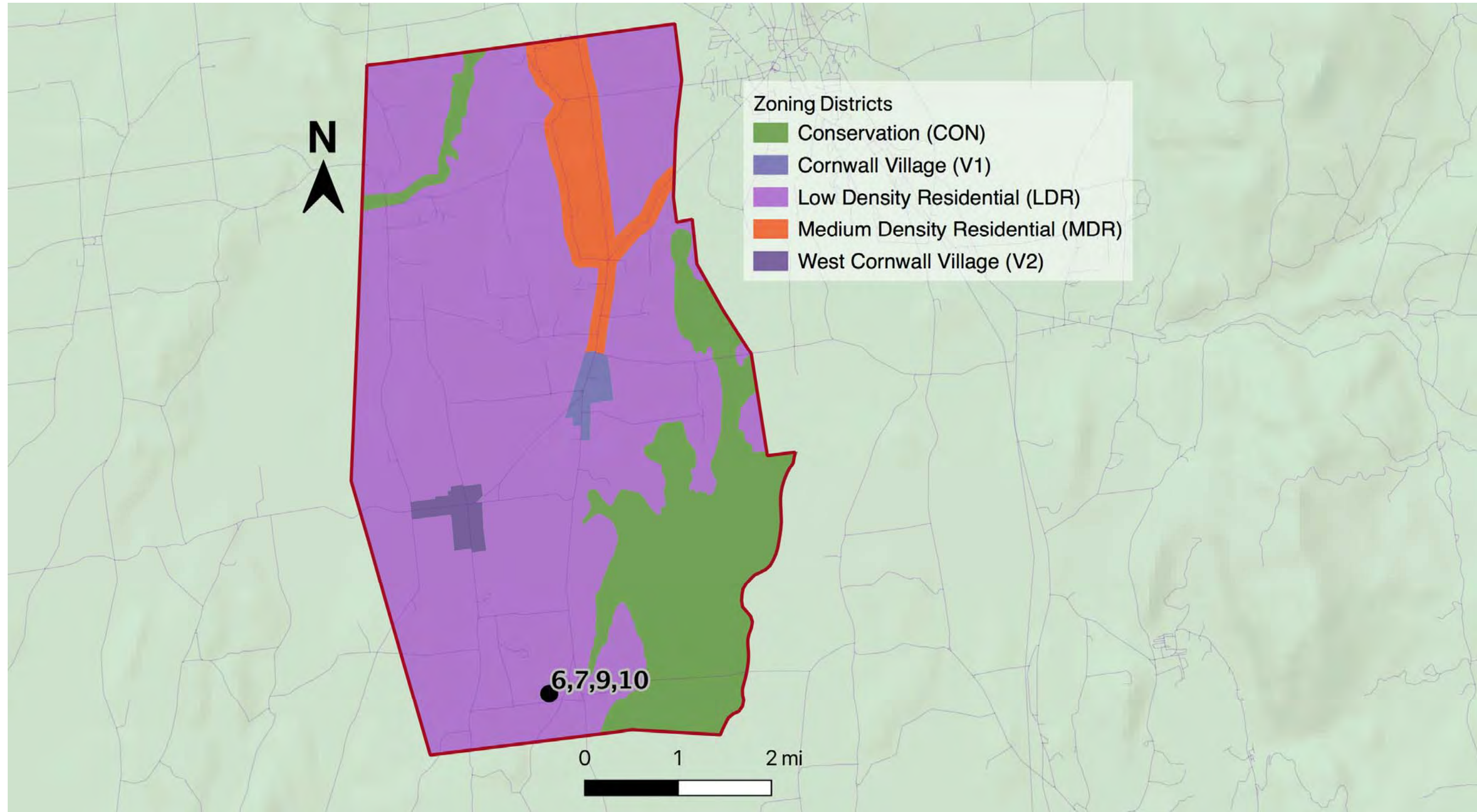
Median Household
Income:
\$90,417

Median Value
of Home:
\$316,200

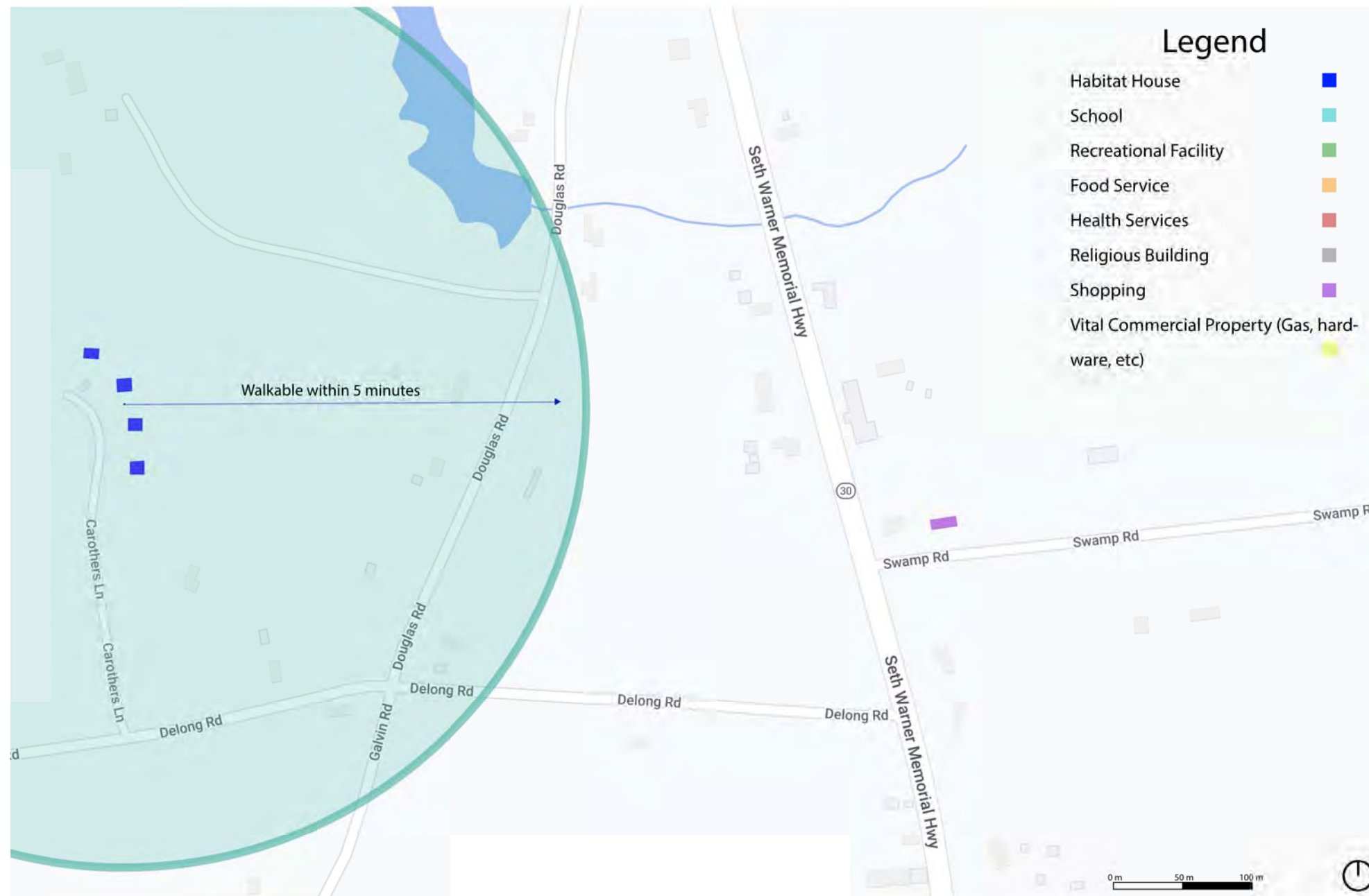
Poverty
Rate:
1.1%

Since 2020, Cornwall has had a population decline of 5.1%.

Cornwall Zoning Maps



All Corwall Houses Neighborhood Context



- Rural setting
- Group of 4 Habitat houses near each other, large swathes of open land surrounding them
- No services walkable, no public transportation
- Closest services 20 minutes by car (Middlebury)
- Elementary school 10 minutes by car

116 Carothers Lane House #6

Photos



West Elevation



South Elevation



Road off Driveway



East Elevation

116 Carothers Lane House #6

House Specifications



- Built 2013
- 3 BR
- 2 BTH
- 1,200 SF
- Lot Size
- Hardie-Board clapboard siding
- Gable roof
- 2 stories

116 Carothers Lane House #6

Evaluation

Drainage

Site Observations:

- Slight slope to terrain to facilitate drainage, but flatter than neighboring houses
- Drainage pipe underneath driveway is exposed and damaged

Passive Solar

Site Observations:

- Southside has 11 windows to take in sunlight
- During winter, the trees to the south block a fair amount of sunlight
- Eave protects upper level from overheating due to summer sunlight

Utility Performance

Site Observations:

- No municipal utilities

Building Design

Site Observations:

- Design is consistent with neighboring Habitat houses
- Homeowners have added an additional storage shed and large, fenced-in yard

Comfort Level

Site Observations:

- Very quiet neighborhood, but also isolated from services/facilities
- Abundance of green space surrounding property

General Opinion

No interview

118 Carothers Lane House #7

Photos



South Elevation



West Elevation



House #7 & 8



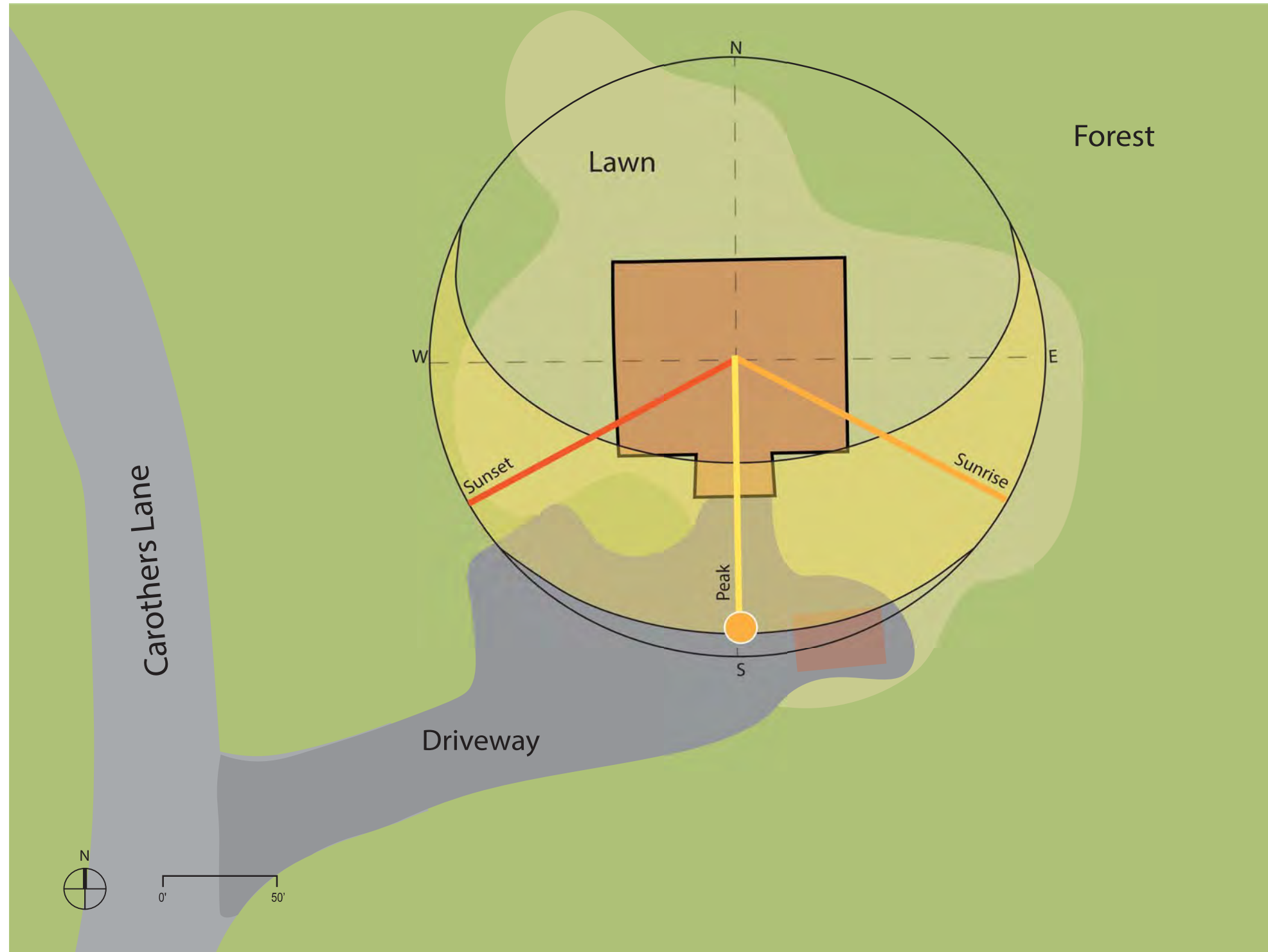
Southwest View



Backyard Hill & Landscaping

118 Carothers Lane House #7

House Specifications



- Built 2014
- 4 BR
- 2 BTH
- 1,456 SF
- Lot Size
- Hardie-board clapboard siding
- Gable roof
- 2 stories

118 Carothers Lane House #7

Evaluation

Drainage

Site Observations:

- Sloped terrain facilitates drainage: water flows down from the driveway to garden beds at the base

Owners' Feedback:

- Has not experienced significant drainage issues

Building Design

Site Observations:

- Storage shed insufficient for family's needs

Owners' Feedback:

- Would add a vestibule or mudroom to accommodate for winter clothing storage
- Appreciate the 12 in. thick walls for extra insulation in the winter
- Would change laundry room location; upstairs toilet has to be removed in order to service the washer and dryer

Passive Solar

Site Observations:

- 9 windows on the southside to take in sunlight
- During winter, sunlight is completely unobstructed and able to warm the house
- Eave does not seem to provide sufficient cover from the summer sun

Comfort Level

Site Observations:

- Very quiet neighborhood, but also isolated from services/facilities
- Abundance of green space surrounding property

Owners' Feedback:

- Feel safe and have common ground with fellow Habitat neighbors
- Neighborhood kids interact and enjoy the amount of land to play on; are able to bike to their friends' houses

Utility Performance

Site Observations:

- No municipal utilities

Owners' Feedback:

- Wished they had known more about the house's interior systems prior to move-in
- Originally only one heat pump for the entire house; this was insufficient and homeowners had to install a second as well as replace the first after only 3 years
- Whole house runs on electric; homeowners appreciate having only one bill but expect power outages with every major storm

General Opinion

Owners' Feedback:

- Family considers the house to be a worthwhile investment. It is the longest they have lived in one place.

148 Carothers Lane House #9

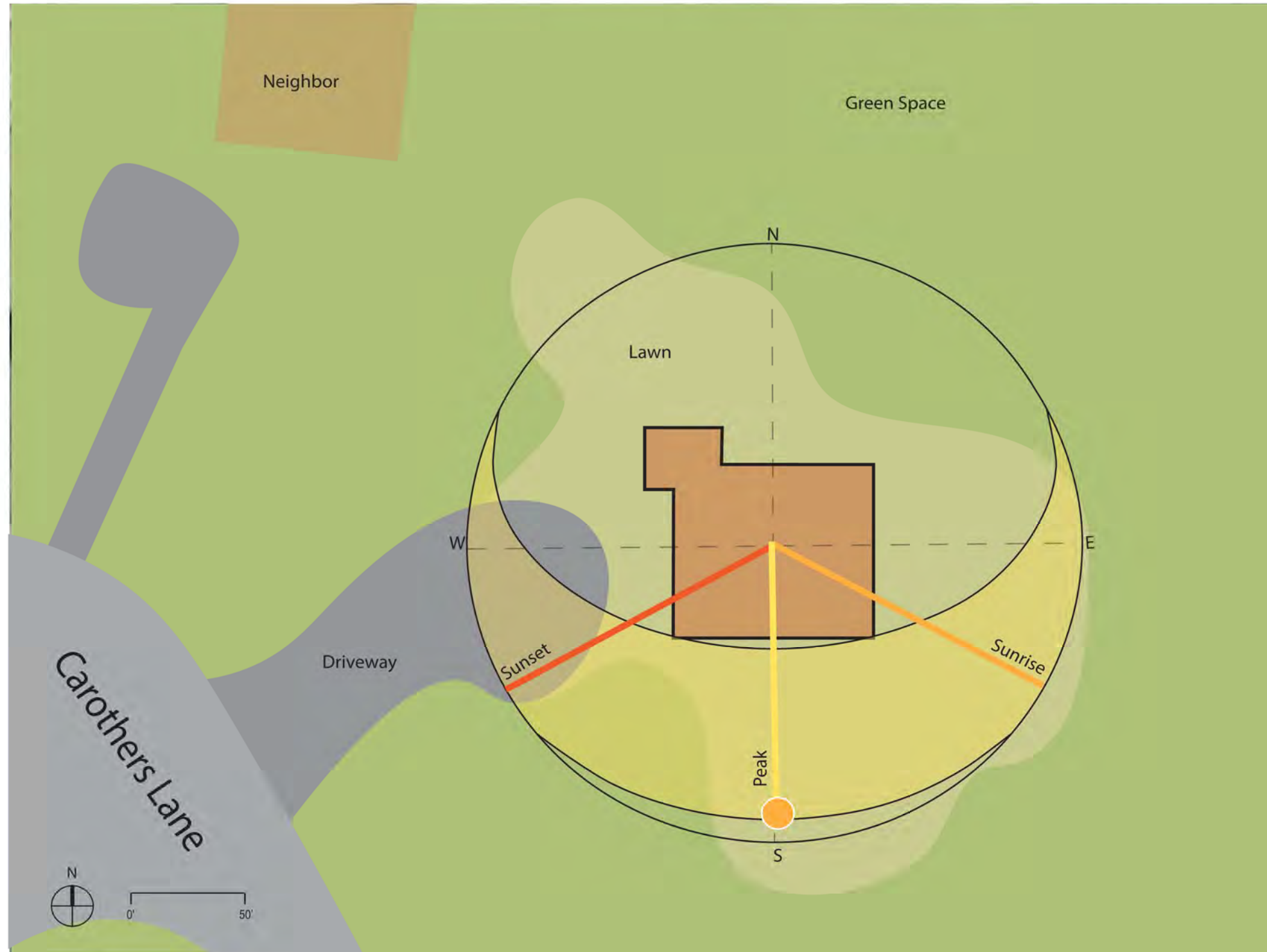
Photos



South West Elevation

148 Carothers Lane House #9

House Specifications



- Built 2017
- 3 BR
- 2 BTH
- 1,575 SF
- Lot Size
- Hardie-board clapboard siding
- Gable Roof
- 2 stories

148 Carothers Lane House #9

Evaluation

Drainage

Site Observations:

- Sloped terrain facilitates drainage
- Drainage trench on eastern side where water has visibly collected, suggesting that drainage systems are in working order

Passive Solar

Site Observations:

- Southside receives a lot of sunlight and has no visible obstructions regardless of season
- 9 windows on the southside to take in sunlight
- Largest window is in living area, suggesting sun successfully warms largest spaces in the house in the winter

Utility Performance

Site Observations:

- No municipal utilities

Building Design

Site Observations:

- The 4 houses in the neighborhood all adhere to a similar style and layout: two stories, gable roof, 120 sq. ft. storage sheds

Comfort Level

Site Observations:

- Neighborhood is very quiet with an abundance of surrounding green space

General Opinion

No Interview

150 Carothers Lane House #10

Photos



East Elevation



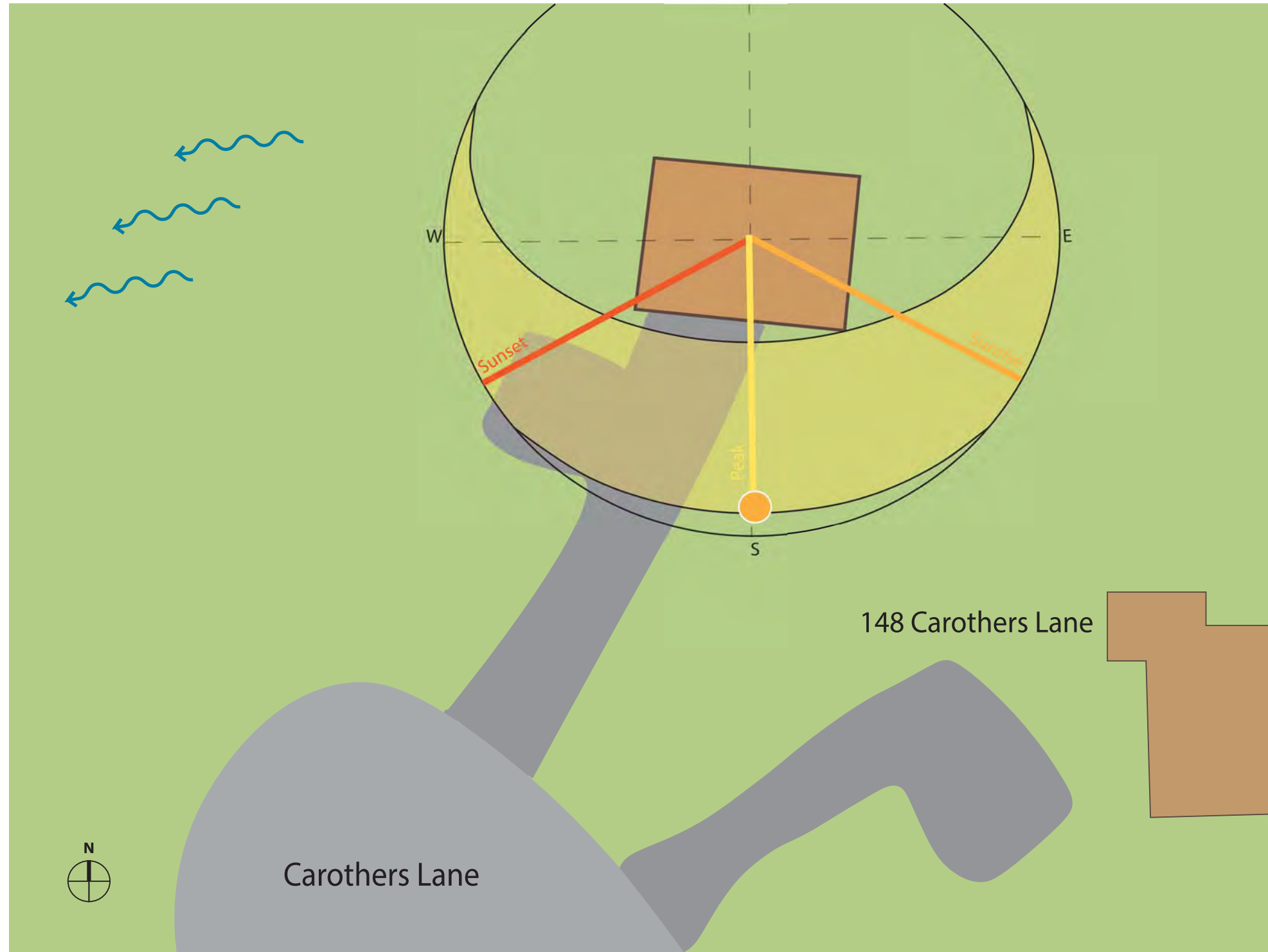
Northeast Elevation



Surrounding Plot

150 Carothers Lane House #10

House Specifications



- Built 2018
- 5 BR
- # BTH
- 1,615 SF
- Lot Size
- Hardie-board clapboard siding
- Gable roof
- 2 Stories

150 Carothers Lane House #10

Evaluation

Drainage

Site Observations:

- Relatively flat terrain
- Drainage trench underneath driveway

Passive Solar

Site Observations:

- Southside receives a lot of sunlight and has
- no visible obstructions regardless of season
- 8 windows on southside to take in sunlight
- Eave to shade upper level from summer sun

Utility Performance

Site Observations:

- No municipal utilities

Owners' Feedback:

- Have encountered several 'fluke' septic and water issues that required repairs; were ultimately covered by Habitat
- Much lower utility and maintenance costs than their previous subsidized housing in Middlebury
- Homeowners appreciate the 12in. thick walls; has reduced their heating bill and served to be very effective in winter

Building Design

Site Observations:

- Design is consistent with neighboring Habitat houses

Owners' Feedback:

- Family had a say in about 60% of the final aesthetic choices (colors, interior materials, etc.) which they greatly appreciated
- Appreciate the 12 in. thick walls for extra insulation in the winter

Comfort Level

Site Observations:

- Lots of neighboring green space for children to play
- Small neighborhood suggests safer roads for children

Owners' Feedback:

- Homeowners love the neighborhood; their children play with the neighbors' children and the community is very tight-knit.
- Children did have to transfer from Middlebury schools to Cornwall, but love their new, smaller classes

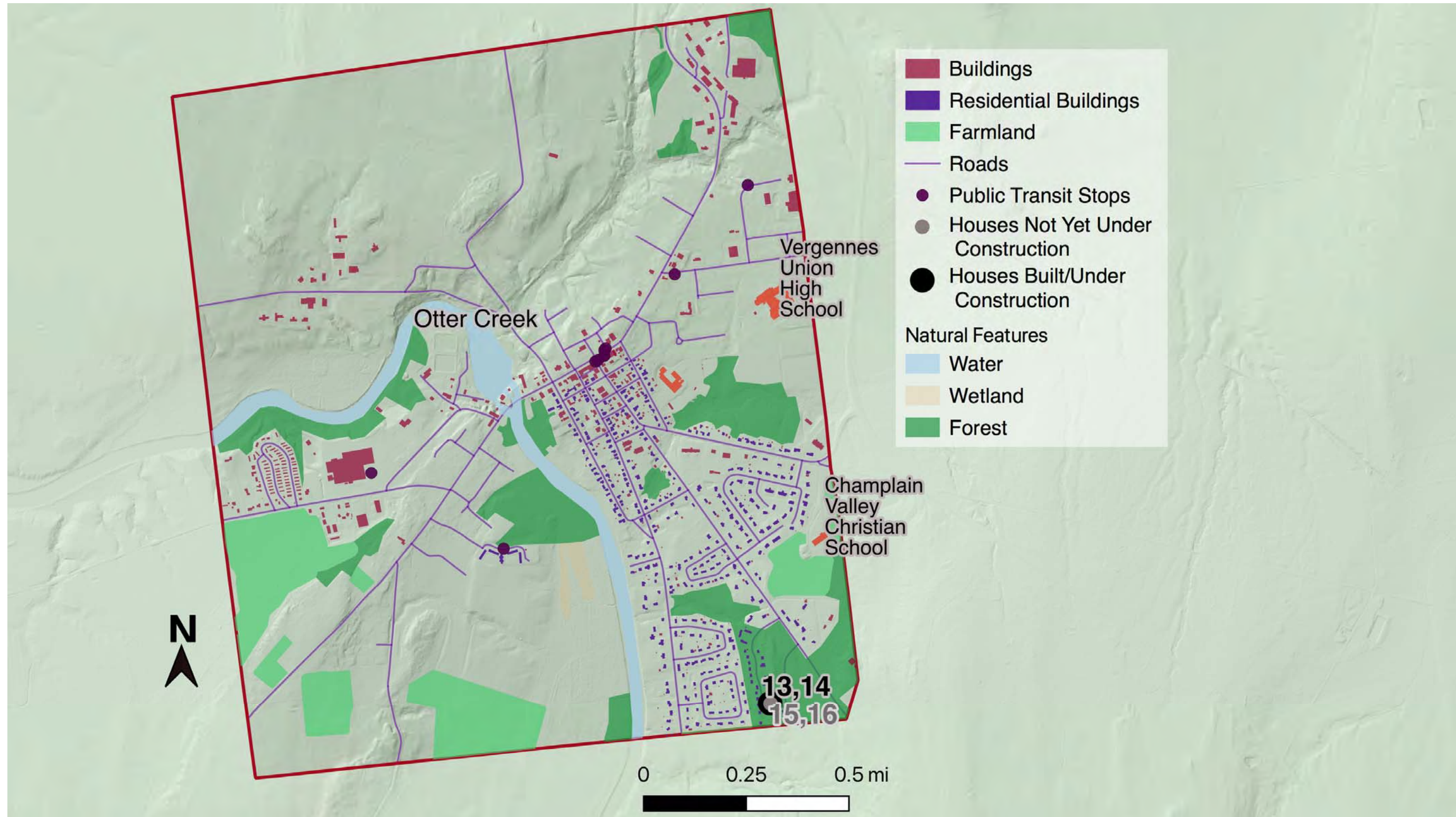
General Opinion

Owners' Feedback:

- Overall, homeowners are very happy and proud to live in the house; would highly encourage others to apply for a Habitat home.

Section E: Vergennes

Town of Vergennes



Town Demographic



Total Population:
2,541

Median Age:
44.4

Racial Makeup:
White (97.85%)

Population Density:
1,026 per square mile



Housing Units:
1,192

Owner-Occupied
Housing Unit Rate:
59.1%

Persons per
Household:
2.23



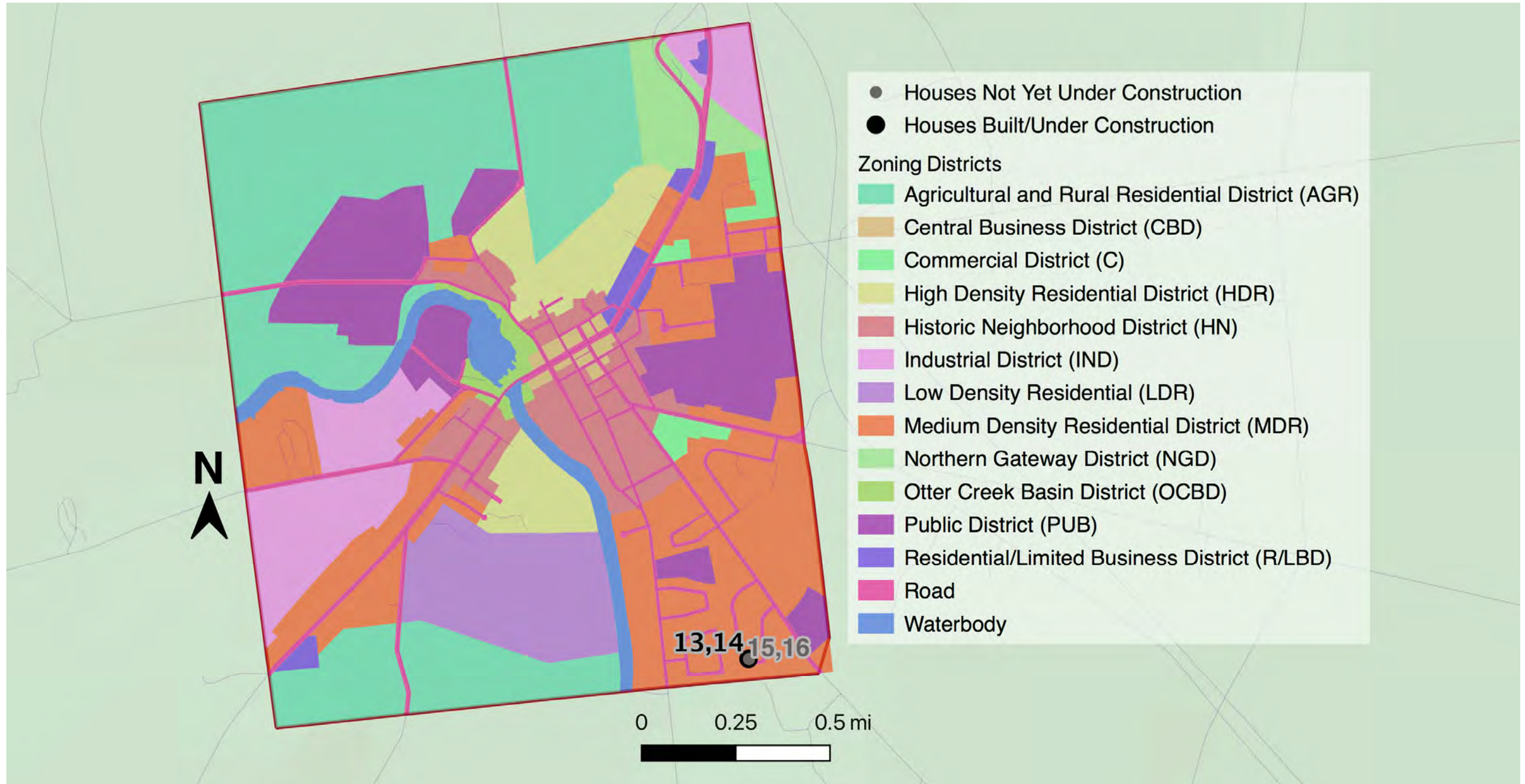
Median Household
Income:
\$70,905

Median Value
of Home:
\$229,000

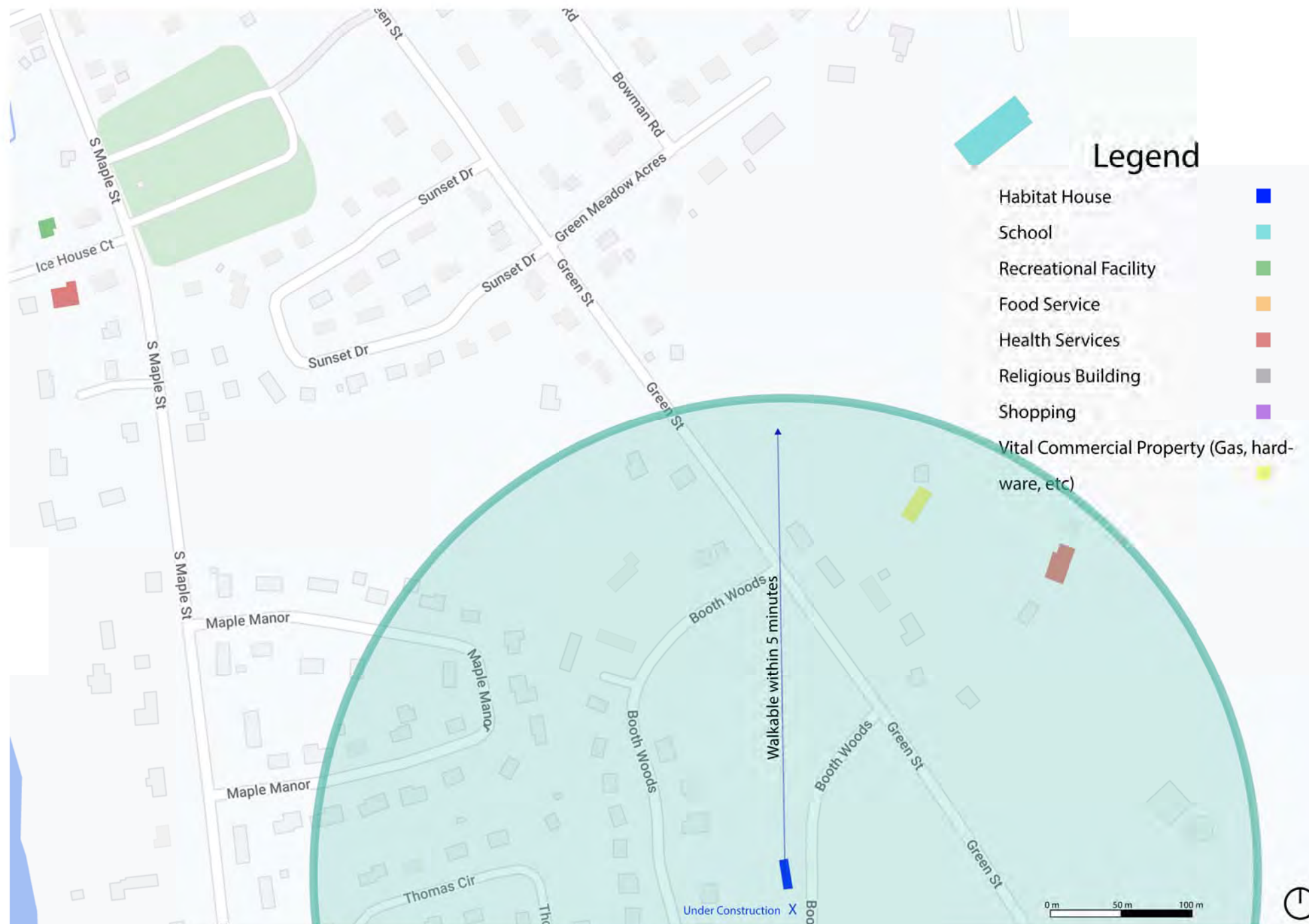
Poverty
Rate:
10.7%

*Vergennes's population has decreased by 2.53%
since the most recent census in 2020*

Vergennes Zoning Maps



All Booth Woods Houses Neighborhood Context



- Semi-dense neighborhood at south end of Vergennes town sprawl
- 10 minute walk, 3 minute drive to downtown
- No public transportation immediately walkable

14 Booth Woods House #13 Photos



East Elevation



West Elevation



House #13 & 14



Overhead View



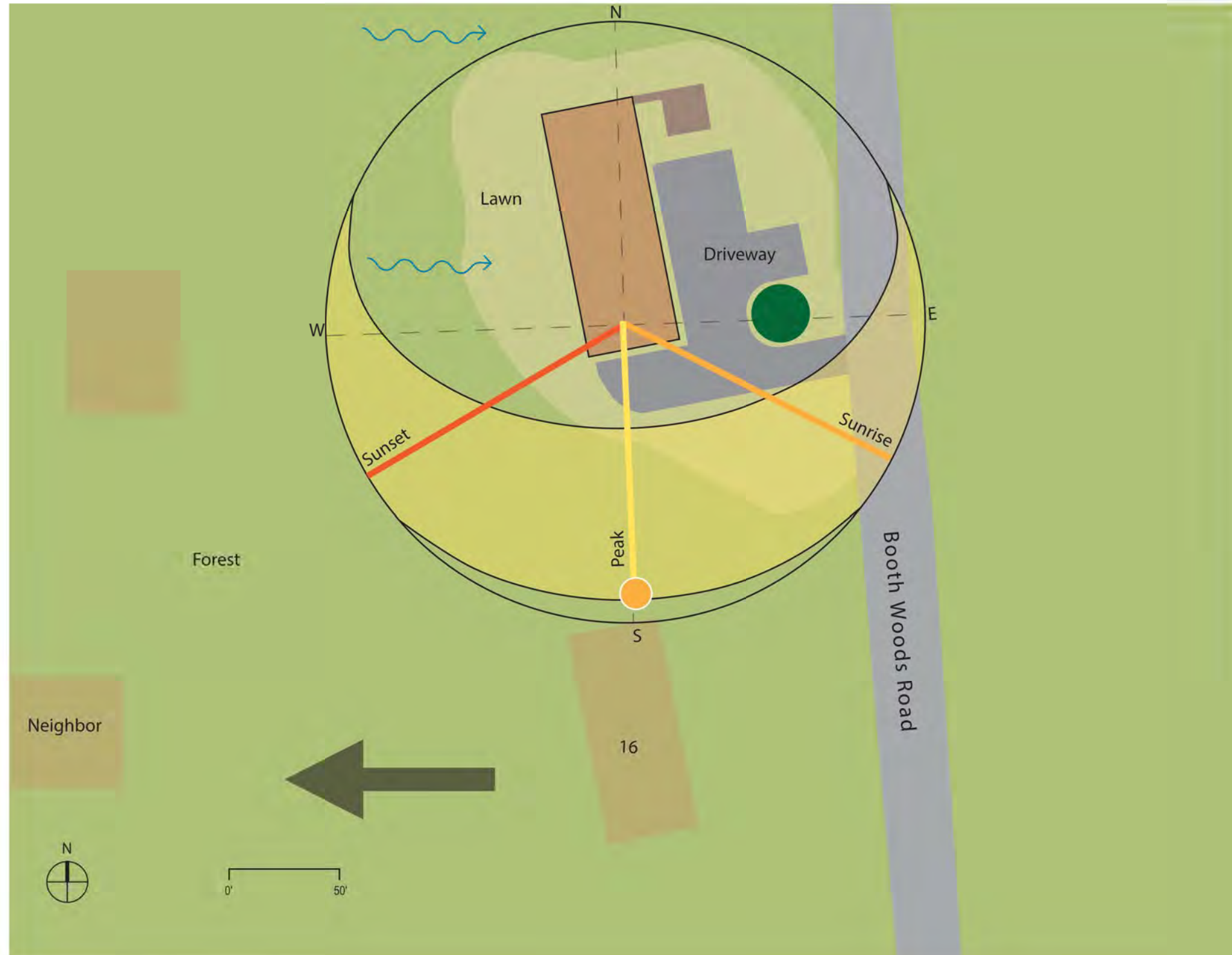
South Elevation



Street View

14 Booth Woods House #13

House Specifications



- Built 2022
- 3 BR
- 1 BTH
- 1,300 sq. ft.
- Lot Size
- White cedar and industrial metal
- Flat roof
- Single story

14 Booth Woods

House #13

Evaluation

Drainage

Site Observations:

- Pitched terrain; water drains into a ditch in the front of the house

Passive Solar

Site Observations:

- Solar panels installed flat on the roof, which produces enough energy for the house to maintain a net negative balance for utilities

Utility Performance

Site Observations:

- No obvious signs of utility failure or poor design

Building Design

Site Observations:

- Roof is actually slanted to allow water drainage and prevent snow accumulation, but curb maintains the flat roof 'look'

Comfort Level

Site Observations:

- Relatively walkable/bikeable to downtown Vergennes
- Semi-dense, new construction neighborhood; safe for children

General Opinion

No interview

16 Booth Woods House #14

(Under Construction)

Photos



North Elevation with Shed



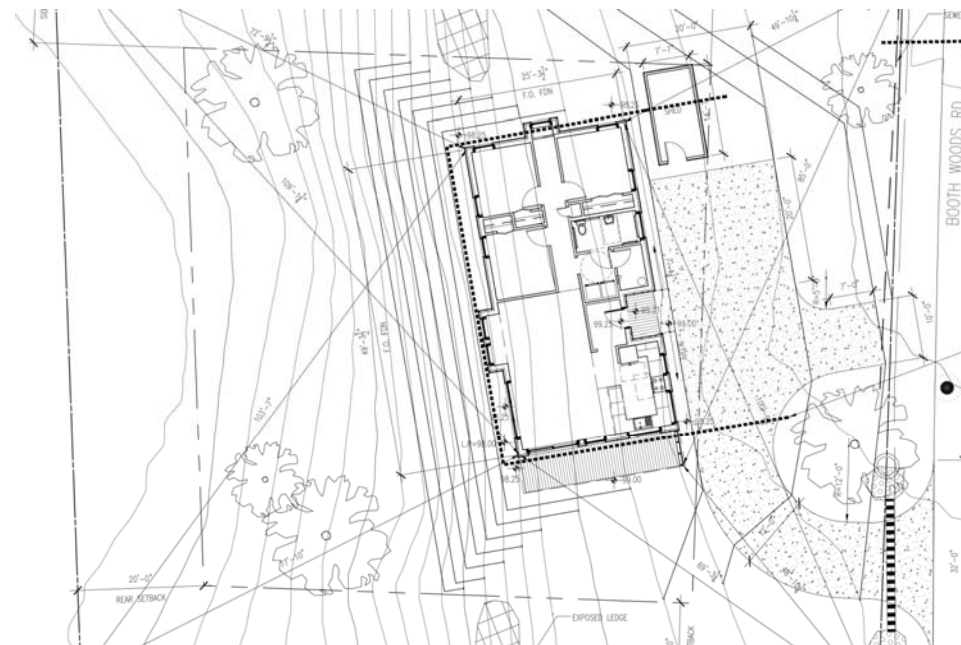
Roof



House #13 & 14



Overhead View



Floor Plan



Interior Framing

16 Booth Woods House #14 (Under Construction)

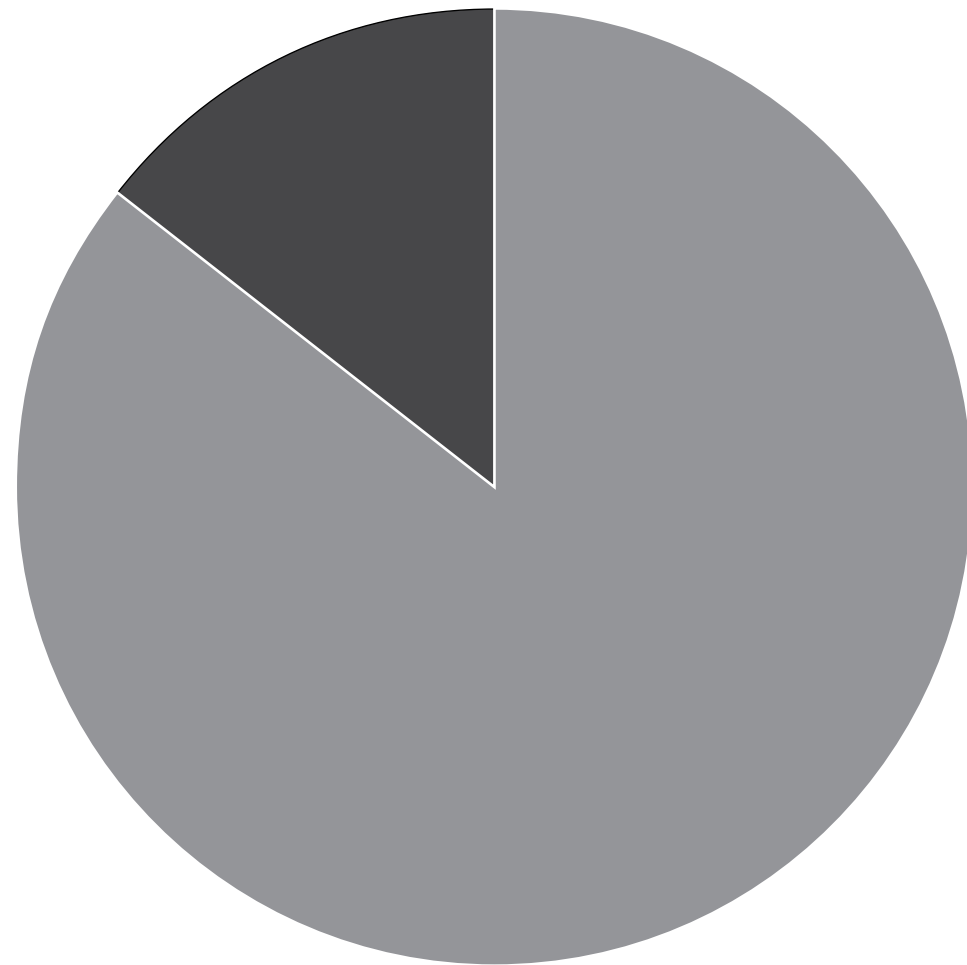
House Specifications



- Under construction, expected finish date May 2023
- 3 BR
- 1 BTH
- 1,206 sq. ft.
- Lot Size
- Black metal siding and plywood siding
- Flat roof
- Single story

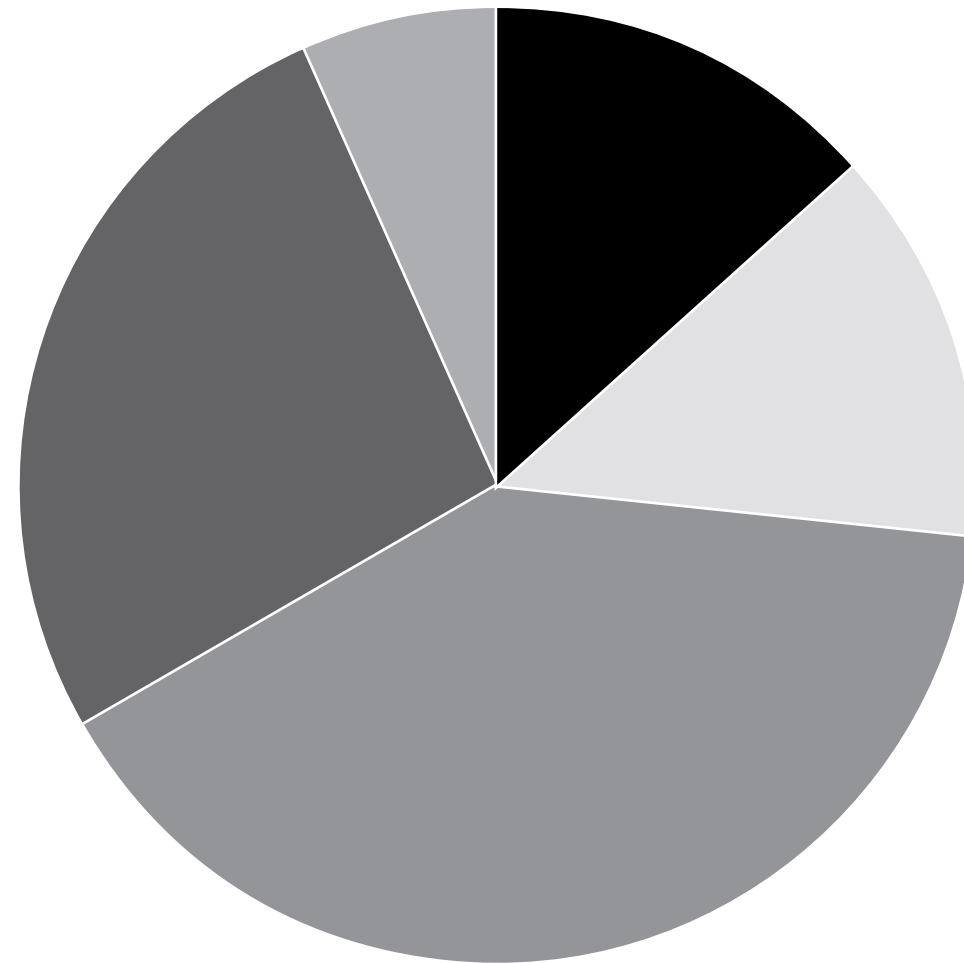
Section F: Analysis

House Specifications Trends



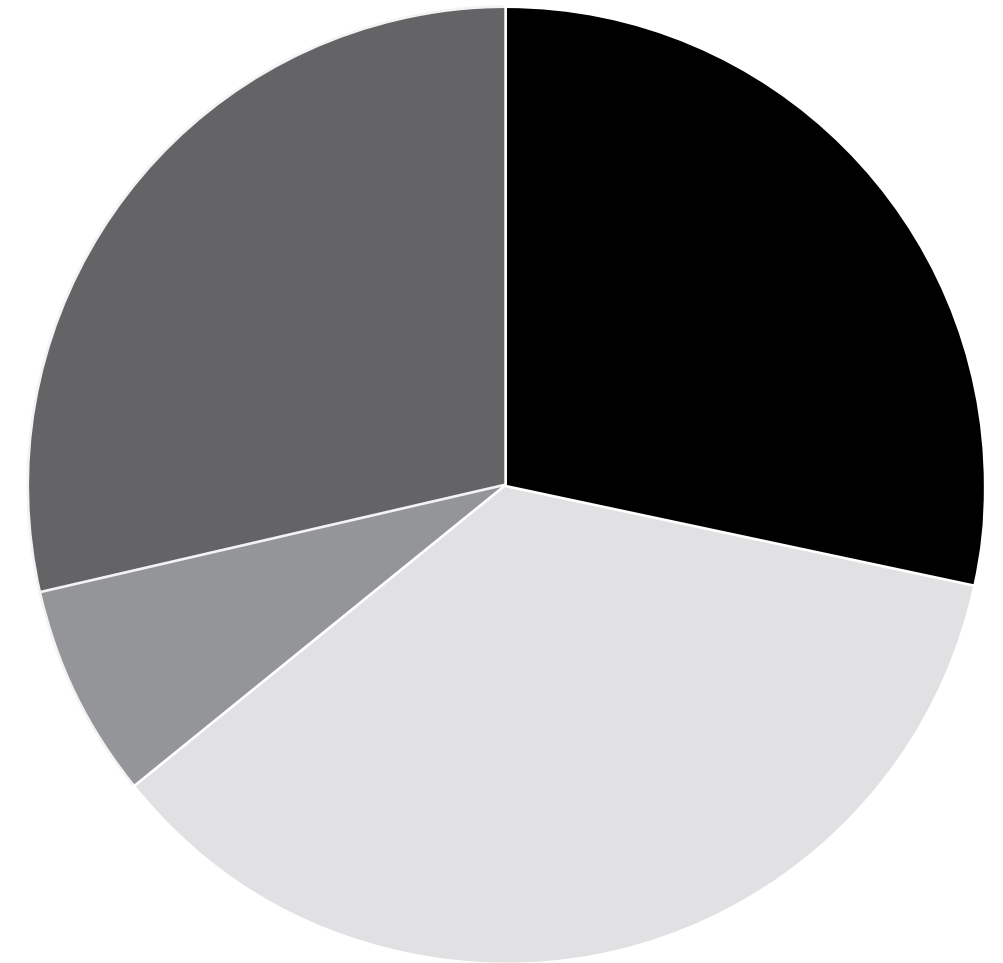
Roof Types

- Flat
- Gable



Siding and Roofing Materials

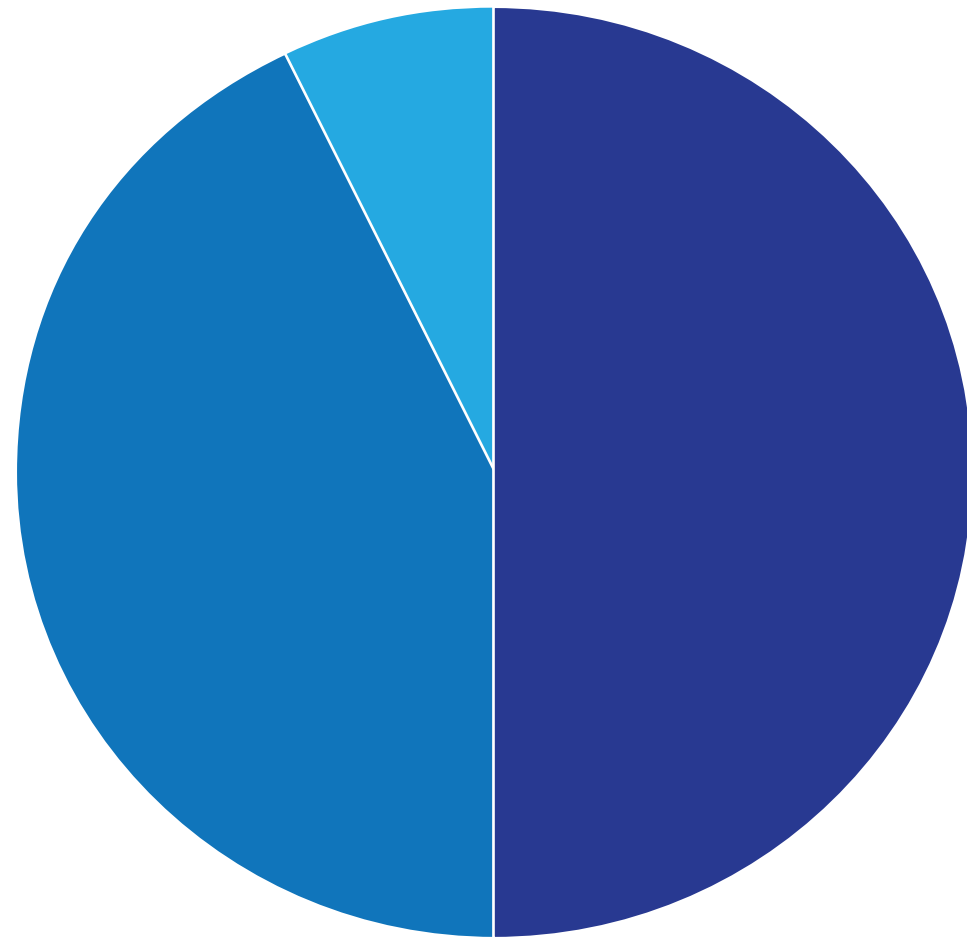
- Vinyl Siding & Cedar Shingles
- Vinyl Siding & Asphalt Shingles
- Hardie Siding & Asphalt Shingles
- Cedar & Corrugated Metal
- Metal & Plywood



Distance to Services (eg. Food, Hospital)

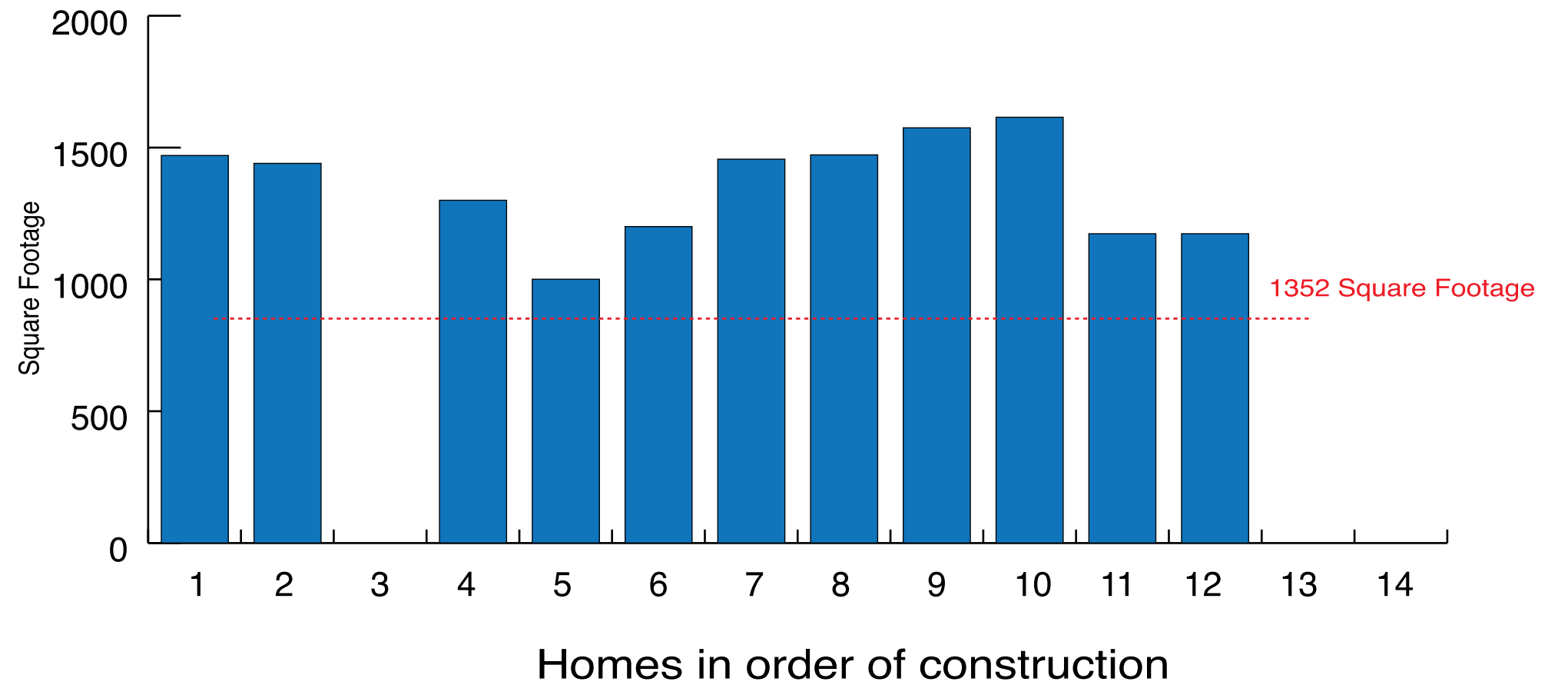
- Walk >10
- Unknown
- Drive >10
- Drive <10

House Specifications Trends



Distance to Public Transportation

- Unknown
- Walk >10 min
- Walk <10 min



AVERAGES

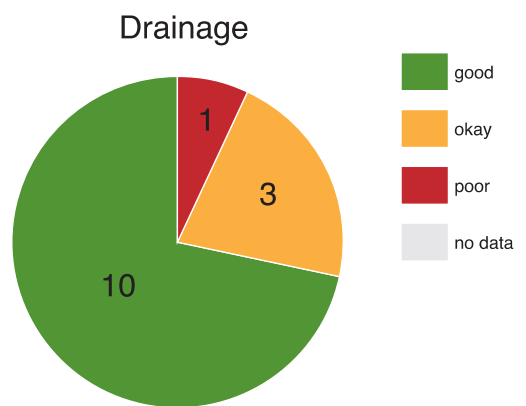
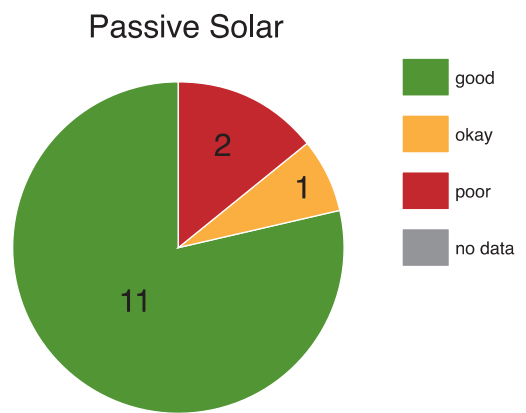
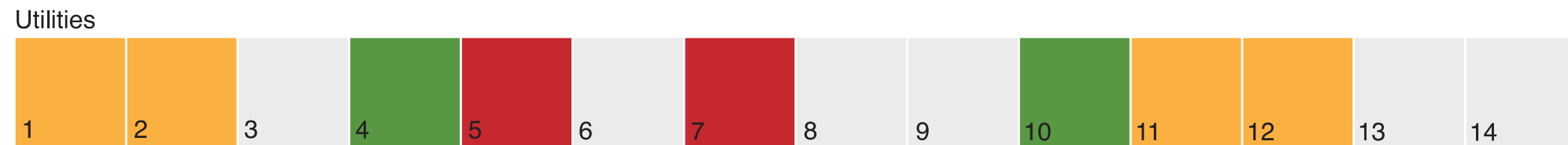
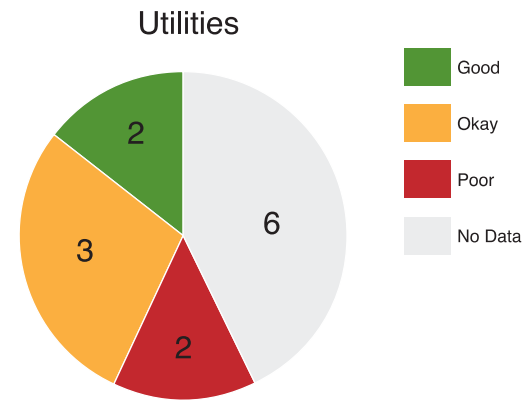
Grading Rubric

	Poor	Okay	Good
Passive Solar	House orientation and/or number of windows is not conducive to capturing natural light and making use of its heating properties	House orientation and/or window placement takes some advantage of natural light and its heating properties	House orientation and number of windows successfully utilizes natural light and its heating properties
Drainage	Site has experienced major drainage issues and/or deterioration as a result of soil type, site slope and/or building design	Site has experienced some drainage issues and/or deterioration as a result of soil type, site slope and/or building design	Site has experienced little to no drainage issues and/or deterioration as a result of soil type, site slope and/or building design
Utilities	Multiple utilities have proven faulty, unreliable or unaffordable to maintain	Utilities work but occasionally have issues, or are quickly becoming obsolete as a result of changes in technology and/or homeowner needs	All utilities are performing efficiently and affordably, only requiring routine checks
Building Design	Building design (ie. layout, structural elements, aesthetics) has not met family's needs and many improvements are necessary	Building design (ie. layout, structural elements, aesthetics) has mostly met family's needs, but some improvements are necessary	Building design (ie. layout, structural elements, aesthetics) has met almost all of family's needs, with only minor suggestions for improvement
Site Satisfaction	There have been major issues with one or more of these factors: lot size, neighborhood, noise pollution, safety, privacy, and community reception	There are minor issues or infrequent issues with one or more of these factors: lot size, neighborhood, noise pollution, safety, privacy, and community reception	There have been almost no issues to date with any of these factors: lot size, neighborhood, noise pollution, safety, privacy, and community reception
General Opinion	Family is unhappy with their home and Habitat experience, and is considering other options if possible	Family is mostly satisfied with their home and Habitat experience, but must cope with numerous issues	Family is satisfied with their home and Habitat experience, with little to no suggestions for improvement

This Rubric utilizes the ratings of Poor, Okay, and Good to measure a number of research focus areas using information from our site visits and conversations with homeowners.

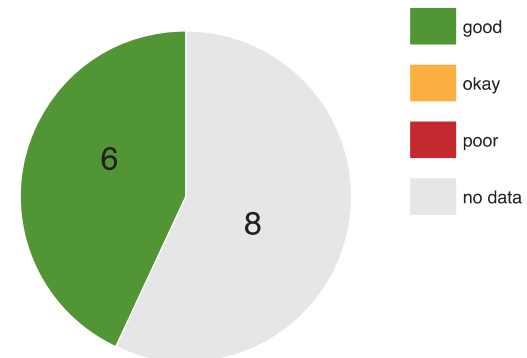
This system enables one to see approximate trends between homes.

Home Performance Trends

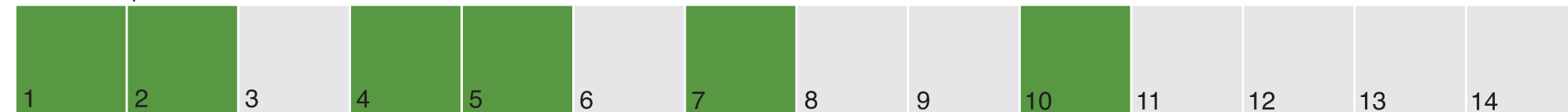


Home Performance Trends

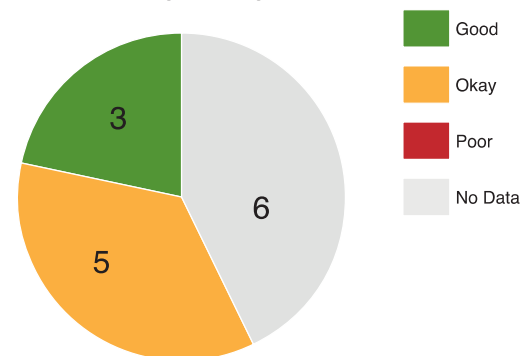
General Opinion



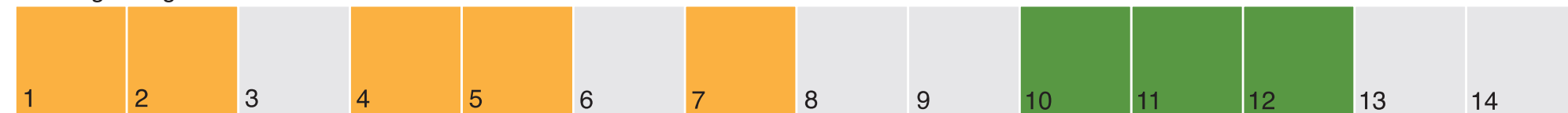
General Opinion



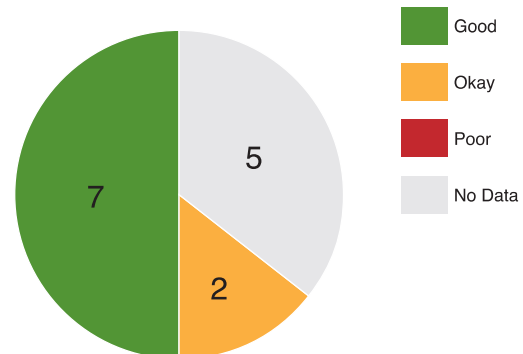
Building Design



Building Design



Site Satisfaction



Site Satisfaction



Conclusion

Trends:

- The design language shifted with the Middlebury partnership; homes diverged from traditional design language and materials in the neighborhood.
- The homes became increasingly energy efficient. Homes from 2017 onwards adhere to Efficiency Vermont's highest tier of high performance housing, and homes from 2020 onwards have their own solar panels.
- The newer, more energy efficient homes rely heavily on new technologies, which could create issues if they fail.

Critiques:

- Heat pumps posed an issue for homeowners. This was a particularly large issue in Cornwall when the heat pump technology was new and failed.
- Driveways have been difficult to traverse for some homeowners and have posed inconveniences to visitors.
- Several homeowners wish that their homes included a porch. Some built a porch later, while others expressed plans to build a porch in the future.
- Some of the earlier homes did not heat well or were costly to heat.

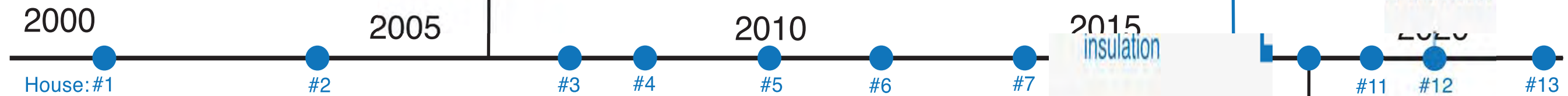
Suggestions:

- Complete further research when implementing new technologies like heat pumps. When new technologies are implemented, follow up on the home to ensure that they are working properly.
- Continue to build houses with solar panels. The panels lowered costs a lot for owners.
- Continue to meet Efficiency Vermont's highest tier of high performance housing.

Section G: Appendix

Building Standards Timeline

2006, US EPA revised Energy Star Standard
Habitat for Humanity Affiliates required to meet or exceed this standard



^ Building to minimum Energy Star and indoor air quality standards saves partner far least \$300 per year in utility bills (base 2007 energy prices).

2017, triple-glazed windows added to constructions for insulation



2020, Cellulose Insulation added to constructions, used in the all of House #9 and House #10



2018, Top Tier High Performance Efficiency Vermont Standards
House #10 paved the way for Net 0 construction in all Addison County Habitat Houses.

High Performance Standards

Requirement & Incentives	Base Level	High Performance Level
Appliances	ENERGY STAR® certified (refrigerator, dishwasher, and clothes washer)	ENERGY STAR® certified (refrigerator, dishwasher, and clothes washer)
Slab Edge Insulation	R-15, 4 ft.	R-30 (slab on grade); R-20 (unheated, below grade)
Insulation under Slab	R-15 under heated slab only	R-30 (slab on grade); R-20 (unheated, below grade)
Foundation Wall Insulation	R-15 Continuous or R-20 Cavity	R-30
Floor Insulation	R-38 cavity or R-30+5 (cavity + continuous)	R-40
Ceiling Insulation	R-49 sloped or R-60 flat	R-60
Insulation Installation	Grade II or better	Grade I
Wall Insulation and Band Joist	R-20 cavity or R-13+10 (cavity + continuous)	R-40
Air Leakage	≤ 3 ACH50	≤ 1 ACH50
Ventillation	Whole house system, per code	Balanced whole house ventilation
Lighting	80% ENERGY STAR certified bulbs/fixtures	95% ENERGY STAR certified bulbs/fixtures
Windows	U-0.28 or less	U-0.21 or less
Doors	U-0.28 or less	U-0.21 or less
Heating and Cooling Equipment	ENERGY STAR certified; Ducts fully in conditioned space; Programmable thermostat	ENERGY STAR certified; Ducts fully in conditioned space; Programmable thermostat ³
Water Heating	Federal minimum standard	ENERGY STAR certified; Ducts fully in conditioned space; Programmable thermostat

SUMMARY

- Meeting requirements set by Efficiency Vermont qualifies the project for a \$2,000 incentive
- Requirements include standards for appliances, slab, insulation, lighting, heating and cooling systems, and ventilation.
- Certification requires on-site visits from Efficiency Vermont

COMPLIANCE ADVANTAGES

Building in compliance with Efficiency Vermont's High Performance Home Standards ensures high quality, energy efficient homes and provides additional monetary incentives. Builders must enroll their projects with Efficiency Vermont and pass site visits in order to qualify for certification and incentives. Requirements include standards for appliances, slab, insulation, lighting, heating and cooling systems, and ventilation. Meeting these requirements qualifies the project for a \$2,000 incentive.

Organization Partners

Lumber

A Johnson Lumber Co.
Goodro Lumber

Metal

Murphy's Metals, Ltd.
Nop's Metal Works

Insulation

Urethane Foam Operations
Vermont Insulated Concrete Forms

Concrete

J.P Carrara & Sons

Interiors

Countryside Carpet & Paint
Vermont Carpet Gallery

Appliances

Whirlpool Corporation

Equipment

Taylor Rental

General Materials

Lowe's
Home Depot
Dow Chemical Company
Harvey Building Products
Martin's Hardware
Sear's (Middlebury)
Yale Locks & Hardware
r k Miles
Waste Management
Casella Waste Management

Efficiency

475 High Performance Building Supply
Efficiency Vermont
Maine Green Building Supply
Structural Energy Corporation
Harveststar Sustainable Energy Solutions
Vermont Low Income Trust for Electricity

Electric/Power

Champlain Valley Electric Supply
Green Mountain Power
McCluskey Electric
Spitzner Electric Inc
Square D
John Laframboise

Contractors

The Buckley Co., LLC
Northern Timbers Construction
Silver Maple Construction
Friends Construction
Bilt-Well Construction
Lanpher Construction, LLC
LeBoeuf Construction Co.
Pike Industries
Harold Strassner
Alex Carver - Northern Timbers Construction

Subcontractors

Dundon Plumbing & Heating
Joe Miller, Plumber
MacIntyre Services
Smokey Lyons dba The Invincible Hok
East Shore Drywall
Tom Call Excavation
Jeff Carter Concrete Services
Masterson Excavation LLC
S.G. Giard Construction
Multy Builders
J.W. & D.E. Ryan
Debisschop Excavating LLC

Organization Partners

Specialty Services

Penrod Stairways

Design

Jean Terwilliger, AIA

Middlebury College Students, Faculty, and Staff

Otter Creek Engineering

McLeod Architects

Connor Building Co. aka Connor Homes

Legal

Langrock, Sperry & Wool, LLP

Neuse, Duprey & Putnam, PC

Real Estate

Middle Road Ventures, LLC

Michael Johnston, Coldwell Banker -
Hickock & Boardman

Banks

National Bank of Middlebury

M&T Bank

Drilling/Water Wells

Spafford & Sons

Equipment

Taylor Rental

Government

Vermont Housing & Conservation Board

Town of Cornwall, VT

Town of Middlebury, VT

City of Vergennes, VT

Town of Bristol, VT

Town of Weybridge, VT

General Partners

John Derick

Matt Zambrano

Michael Ringey

Nancy Ewen

Robert Burton, MD

Habitat for Humanity International

Middlebury College Partnership

