big enough

Pioneering the Small Home Revolution in Western Mass



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Pioneer Valley Habitat for Humanity®

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Credits

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Any errors, misrepresentations or omissions in this report are accidental, and we appreciate your gracious understanding.

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Introduction



Executive Summary

As we begin the third year of our innovation grant implementation funding from the Community Foundation of Western Massachusetts, we wanted to look back at our original Big Enough Project report, reflect on our goals, and determine both our successes and failures to meet those goals. In the process, Habitat came away with some important lessons learned that we wanted to share with future small home advocates, builders, and policy makers.

In this report, you will find a summary of what we did during the first year of this project, in which we spent time engaging with the community, researching, and planning how to best implement our broader ideas on small homes into tangible, feasible pilot projects. Most of this report will focus on our work in 2019, when we constructed the first pilot houses as part of the Big Enough Project, and relate our lessons learned.

We hope this report will help other small home advocates to make affordable, simple, durable, energy-efficient homeownership a reality for a broader and more diverse range of community members in Hampshire and Franklin county and beyond.

Guiding principles

During the implementation process, five key findings emerged that have been guideposts as we innovate:

- 1. **Go local.** Building relationships and a network of innovators with local financial, municipal, design and construction connections is critical to moving the small home agenda forward.
- 2. **Community support = cost reduction**. Donations of land, labor and materials all help to lower the cost of building small homes but demand a creative approach for homeowner builders, such as engaging family and friends to help.
- 3. **Keep it simple.** Project and construction design need to be simple to meet affordability goals.
- 4. **Keep it real** (or at least realistic). Innovation is sometimes slow and cumbersome. Engaging stakeholders and sustaining a movement takes time! New obstacles will always arise, but so will new opportunities.
- 5. **Stay adaptable.** Achieving the balance of aesthetic vs. cost vs. buildability can be tricky, but creating a dialogue between builders and designers helps to find the best options.

Review: What is the Big Enough Project?

Pioneer Valley Habitat for Humanity (Habitat) spent over a year in 2017-2018 developing the "Big Enough" concept, an investigation into using small, simple, durable and energy-efficient homes as a way to launch more families into the middle class in Western Massachusetts. The bar we set for ourselves was to pilot construction of a prototype small home with a \$50,000 construction cost as an affordable homeownership option for individuals and families with low incomes, while simultaneously exploring other innovative techniques on other builds.

We worked with various partners to explore the **financial**, **regulatory**, **construction**, and **sociocultural** opportunities and constraints. We researched manufactured, modular and small footprint dwelling options. We sought a model that works for Habitat's end-user — earners at 60 percent of the area median income — as well as one that meets the needs of homebuyers with means to pay more, allowing for broader access than is currently available for smaller, greener homes.



Four areas of inquiry

Habitat took inspiration from existing small, affordable home building projects and adapted those ideas to the needs of homeowners in Western Mass. Four priorities emerged for research and development of our specific small home construction projects; we then assessed each and incorporated the considerations into our pilot implementation.

- **Zoning regulation and building codes:** What needs to be done for small homes to comply with Massachusetts zoning, building and health codes?
- **Ownership and finance:** What financing and ownership options work for first-time home buyers that will help them gain housing stability and modest equity-building in small homes?
- **Design and construction:** How can we reduce costs to increase affordability while still maintaining durability and energy efficiency?
- **Cultural expectations and social acceptability:** How can we design homes that include unique features, meet realistic priorities, and fit into local neighborhoods?

Check out the <u>2017 Big Enough report</u> for an in-depth background and analysis of these four priority areas of inquiry.

Seven areas of innovation

We determined seven areas of innovation, related to the four areas of inquiry, that we sought to implement and experiment with on pilot homes. Builds characterized by one or more of these innovations provide the real-world construction laboratories for testing our theories on building —and zoning for, financing and affording—right-sized, "big enough" homes:

- 1. Small footprint
- 2. Lower sales price
- 3. Use of innovative financing
- 4. Small lot zoning
- 5. Alternative land ownership structures
- 6. Zero net energy construction
- 7. Modular building techniques

Big Enough pilot homes

Since the launch of the project, Habitat has completed three small home projects: a singlefamily home in Greenfield, a one-bedroom small home on Garfield Avenue in Florence, and three single-family homes on Glendale Road in Northampton. Two of these projects, the 1 Garfield Ave. home and the two modular homes at the Glendale Road development, will be highlighted in this report as Big Enough pilot projects. These projects all combine various aspects of our research, prioritize different parts of the four areas of inquiry, and collectively address most of the seven areas of innovation.

These were experiments for Habitat and pushed the boundaries of our traditional model of single-family stick-built homes. We have learned different lessons and discovered new challenges with each home. The first project was a financial and aesthetic success, and has housed a single homeowner comfortably since the project's completion. The cluster model implemented on Glendale Road proved to be a community and publicity builder. Use of prefabricated structures revealed financial and logistical difficulties, but with some adjustments, could be a viable option for future builds.

This report will cover primarily our successes and challenges as an affordable home construction organization around these pilot projects. Lived experience is a valuable part of assessing any new homes, and while some informal interviews and discussions have happened, we hope to collect more information from homeowners through a spring 2020 survey.



1 Garfield Ave. Pilot Project



1 Garfield Avenue

The first of the Big Enough pilot homes, this exciting project is an approximately 650 sq. ft., one-bedroom home, built with a goal of making use of all that we learned in the research phase to construct an affordable, energy-efficient, and durable small home.

This is the last house to be built on Garfield Avenue, in a neighborhood surrounded by other Habitat homes. Situated on a small corner lot next to conservation land, it was initially envisioned to be around 600 sq. ft. with a single story and a simple design that could easily incorporate some unskilled labor. Habitat hoped to build this house for as close to \$50,000 as possible (excluding land and site costs) to see if it was an achievable price point in Franklin or Hampshire counties (see the 2017 Big Enough report for in-depth background information on the \$50,000 goal).

Of the seven areas of innovation, 1 Garfield Ave. targeted five: small footprint, lower sales price, innovative financing, small lot zoning, and zero net energy construction.

Financial support for this project was provided by People's Bank, Community Foundation of Western Massachusetts, the City of Northampton, and a generous anonymous individual. Additional fundraising came from the community at large. Financing was provided by Easthampton Savings Bank.

Architectural design work was done by Dorrie Brooks for Jones Whitsett Architects.

Landscape and civil design work was done by The Berkshire Design Group.



1 Garfield Ave. in the construction phase and complete, one year apart.

Zoning and building codes

The end of Garfield Ave. in Florence is now home to six Habitat-built homes, the latest of which is 1 Garfield. Habitat was fortunate to receive the 1 Garfield Ave. building lot as a donation from a generous individual, in addition to previously receiving the land for the first five homes from the city. A comprehensive permit for this development and a previous investment in extending the road and installing utilities to the lot resulted in reduced site costs for 1 Garfield Ave.



Original 1 Garfield Ave. site plan by Berkshire Design Group, with the road and driveway

Small lot zoning: In many towns in Western Mass., the smallest lot allowed is one acre, regardless of the footprint of the planned build. The Garfield Ave. homes were to be built on smaller lots than Northampton zoning allowed at the time, but Habitat and the city of Northampton were able to work around this by applying for a comprehensive permit for cluster development.

In Northampton, clusters with smaller lot size are normally allowed through a special permit from the Planning Board, but in this case, Habitat and the city needed to ask for reduced road frontage. This meant another special permit was needed from the Zoning Board, as they have the ability to waive the frontage requirement. The second permit allowed the driveway and house setbacks to be smaller in addition to the already small lot size, which may not be replicable elsewhere.

Small lots with small setbacks help promote housing in existing neighborhoods and keep costs for land low. The City of Northampton had an interest in demonstrating that even on small lots, quality affordable housing was still possible, and subsequently changed its zoning regulations to better accommodate small lots. As a result, this same cluster project today would require only

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Planning Board approval rather than a comprehensive permit. The same is not true in many other towns in the area, but by demonstrating the success of this project, Habitat hopes to inspire other towns to make similar changes to their zoning laws.

Ownership and finance

Our research had determined that, for someone living on a minimum wage salary, an affordable home would be around \$50,000. While people have built homes for less than that in other parts of the country, options for a home at that price are rather limited in Franklin and Hampshire counties. The goal for 1 Garfield Ave. was to build a small, affordable home that could be



replicated elsewhere, and to finish the project with a house building cost as close to \$50,000 as possible to see if that price tag was achievable in Western Mass. The house itself, excluding external costs, came in closer to \$50,000 than expected *and* under budget.

The most significant decreases came in the site construction and soft cost line items; in both cases, in-kind donations drastically reduced these costs (see below). Building on a smaller lot allowed for savings in the initial costs, while the lower energy and utility needs of a small house can contribute to ongoing savings for the owner.



In-kind: Habitat received a significant amount of donated materials from generous community members and thousands of hours of volunteer labor. Occasionally, contractors and product vendors will also provide discounts or extra hours without necessarily disclosing that information, so other unidentifiable discounts or lenience could be included in the cash

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amounts. If included, in-kind donations would have put the final totals significantly above budget.

In-kind donations are a key measurement of community support in projects like these, and 1 Garfield Ave. had support from local contractors, material suppliers, and vocational school students in addition to regular volunteers. By engaging locally, Habitat was able to increase interest and discussion among a wider circle of people.



Solar PV: The most significant material donation received for this build was the solar array from Pioneer Valley Photovoltaics (PV²). Massachusetts offers a number of rebate and tax-contingent discounts for solar installation that individuals without access to donated panels can pursue. Options for homebuyers with low incomes to finance solar panels exist and could be explored with companies like PV².

Land: The donation of the land itself greatly reduced the cost. Given that the lot is smaller than normal for Hampshire and Franklin counties, it was ideal to test small home design. The house may have felt cramped for Western Mass. with a 2-story home on either side (rather than bordering conservation land as this house does), so the benefit of buying a small property would have to be weighed against location and the potential for future construction in the neighborhood. In more urban environments, small lots are more common.

Habitat had also already gone through permitting to extend the road and utilities, and split that cost among the houses built. A similar location may be easiest to find in a subdivision where a developer has already installed utilities to the lot — but these kinds of ready-to-build lots are often more expensive than raw land.

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Unique features: Some of the features that give this house a distinctive and homey feel were donated as well — including the window in the living room/bedroom wall and the tile backsplash — so some of the aesthetic factor is also not included in the final cost and would have to be added for someone attempting to replicate the project results. These unique finishes may be found at reduced prices through shopping at surplus stores like a Habitat ReStore or salvage yard.



Lower sales price and innovative financing: By keeping construction costs as close to \$50,000 as possible, Habitat sold the house for a sales price lower than is typical for the area, affordable for a single person earning a 60 percent of the area median income. Habitat also built fruitful relationships with local financial institutions by working with banks in our area to finance the home through two affordable mortgages, one via Easthampton Savings Bank and a second deferred, forgivable mortgage via Habitat itself, a new strategy for Habitat that provides more flexibility and a lower monthly payment for the new homeowner than a typical mortgage.

SALE PRICE	120,000
Less down payment paid by buyer	(700)
Less Northampton down payment assistance grant	(4,000)
Less second mortgage from Habitat	(50,300)
FIRST MORTGAGE	65,000

Design and construction

In every Habitat house, homeownership begins with construction and design, as we seek homeowner input before even breaking ground. When building small and on a tight budget, it is necessary to find the line between a design and materials that ensures quality and durability, while building simply and inexpensively where possible. Building as close to a box shape as possible ensures that minimal materials are used or wasted, but building an interesting and aesthetically pleasing design contributes to a positive first impression.



While visitors overall appreciated 1 Garfield Ave., some aesthetic features were removed from the final design, as they added extra cost and difficulty for volunteers to build (see the architect's original design to the left). For example, it was suggested that the continuous roof from the house to the shed and the lofty porch roof, while convenient, were difficult to construct, costly, and not entirely necessary. While the shape followed our goals to "keep it simple," the roof contradicted our own lessons learned by adding complexity.

Architect's rendering of 1 Garfield Ave.

Small footprint: At 650 sq. ft., the house itself still feels "big enough," making the most of its small square footage with an open floor plan and comfortable arrangement of public and private spaces (see floorplan, right). There is also the possibility of adding a room on the back, given the existing setup. This house was built for a single occupant (the first of its kind for Habitat), as previous research determined that the \$50,000 price goal would only be achievable with either a studio or one-bedroom layout, immediately limiting potential homeowners to one or two people.

The interior of the house received a lot of praise from those who visited: the build team and guests all appreciated the layout, the washer/dryer hookups in the bathroom, and several of the homier or more practical interior features (the inset window, the kitchen backsplash, and the tile throughout the house). Habitat did choose to save time and money on construction costs by not including closet doors for the bedroom or utility space, which did inspire some criticism. The current homeowner has addressed the empty door frames by installing curtains on tension rods.



1 Garfield Pilot Home: Foundation to Finish

Our first pilot project was a small home experiment: how long did it take us to build big enough?



Zero net energy construction:

This home was built with tightly sealed and well-insulated walls, windows, and doors, enabling it to retain heat and control airflow better than many older, drafty New England homes. The small square footage also costs less to heat and cool, and with solar panels and highly efficient Energy Star appliances, a zero net energy home is possible. By making this home and other affordable housing developments energyefficient, homeowners save money and their homes have the built-in potential to remain affordable longterm.

The current homeowner shared with us that when the solar panels were performing at their best over the summer, utilities were covered by the energy generated. The first real utility bills came in late fall, when the solar panels could not make up the total energy needed for the house, but paid for themselves with the credits from the surplus energy generated over the summer. With six months in the house so far, things are looking good for reaching the zero energy goal.

More Energy

HERS[®] Index

Existing Homes

Reference

Zero Energy Home

Home

150

140

130

120

110

100

90 80

70

60

50

40

30 20 10

8

This Hom

Less Energy



Cultural expectations and social acceptability

Building this home in a neighborhood full of Habitat-built houses created a sense of surrounding community. Those around 1 Garfield Ave. were all familiar with Habitat's build process, and there is an opportunity for people to bond over and connect with the idea of small homes, which could apply to other neighborhoods as well.

While the lot size is small, the current homeowner says that there is more than enough space for his needs, and the small size makes maintenance much easier. With conservation land abutting the property, the view from the living room windows gives the distinct impression that the space the house occupies is larger than it is, and it is not crowded in by other houses on either side. The current homeowner has told us that multiple people have come by asking to see the house to get a sense of how it functions as word spread about the build.

The property's deed restriction, as designated affordable housing, will also keep it and the surrounding neighborhood affordable for future owners. While this does limit homeowners' capacity for profiting from making capital improvements, the purpose of this and similar homes is to enable people to build equity and move into the middle class, which could open the possibility of reselling and buying a new home to better suit their changing needs. The current homeowner expressed that the house works well for a single person, but added that a car port would be a useful addition to deal with the snowy Massachusetts winters.

Many people are interested in small homes or at least intrigued by the concept. On a few occasions, people on the street stopped to ask about the house at 1 Garfield Ave. Volunteers and other people who were in the house for the first time were excited to look around and understand the layout. In contrast to thinking about houses as a series of different rooms, people considered the house as a cohesive whole and occasionally asked how the homeowner would organize the space.

This house was the site of our Small Home Hero award ceremony, an event that drew a crowd of neighbors, volunteers, representatives of partner organizations, local politicians and more, further engaging the community in the project and bringing people together around the idea of building "big enough."

In the words of the current homeowner, "if more people built small, they would see that a small home is all the space they need." A house can be a home regardless of the size, and enabling people to see the inside, experience a right-sized living space, and understand how everything works is an important step in making homeownership more attainable and sustainable for everyone.

Glendale Road Pilot Project



Glendale Road Phase 1

Phase 1 of this project consists of three zero-net energy possible homes built on a shared driveway off Glendale Road. While each home has a nearly identical floorplan, two were built with modular construction techniques through an innovative partnership with the <u>Vermont Energy Investment Corporation</u> (VEIC), the <u>Massachusetts Department of Energy Resources</u>, and a modular home builder called <u>Vermod</u>, while the third is being built from the ground up on-site. All three homes utilized innovative financing options that will be described in detail later in this report.

After the success of VEIC's mobile home replacement program in Vermont — bringing zero net energy homes to residents with low incomes after disaster — they are piloting a program to bring zero net energy "vermodular" homes to Massachusetts (https://ze-mahi.com/). Based on our unique impact and community build model, Habitat was selected for the first test site. The Vermod factory built two insulated shells and roughed in the major mechanical systems, and local Habitat volunteers (alongside vocational tech school students and the future homeowners) completed the finish work on two homes in September 2019.

The third home on this common driveway is being built entirely on-site. For an accurate comparison of labor, cost, and efficiency, the design and floor plan were devised to be as similar to the modular homes as possible; the only major difference was the addition of an accessible first floor full bath. At the time of this report, this third home has not been finished, so the comparison study will not be included.

Of the seven areas of innovation, the Glendale Road cluster development targeted five: small footprint, lower sales price, innovative financing, zero net energy construction, and modular construction techniques.

These homes were supported with grant funding from the City of Northampton, the Federal Home Loan Bank of Boston, the Massachusetts Department of Energy Resources, and the Community Foundation of Western Massachusetts. Financing was provided by Easthampton Savings Bank and Greenfield Cooperative Bank.



Glendale modular home in the design phase (left) and nearly complete (right)

Zoning and building codes

Modular homes have the potential to simplify building code compliance, as the prefabricated structure of the house is built by the modular company to meet international building codes and modified in the design stages to meet state and local codes. This leaves less room for human error on the part of local construction teams.



Modular homes are on Lots 3 and 4, the site-built home is on Lot 2, and an additional site-built small Habitat home will be built on Lot 1

Small lot zoning: Similar to the Garfield Ave. development, the three homes off Glendale Road are part of a conservation limited development by the City of Northampton, as well as a cluster development. The City applied to the Planning Board for a special permit, under which Habitat could build on smaller lot sizes (each lot is under one acre) while preserving over 50 acres of conservation land. Northampton zoning is written so that lot size and frontage space minimums may be waived if the development protects a majority of the property.

As a cluster development, the Glendale homes make use of a shared driveway. Shared driveways with small or no frontage can reduce the infrastructure cost of developing multiple lots that otherwise would need individual driveways or a subdivision road. They also enable owners to split maintenance costs through a shared management contract, and present less of an up-front logistical and financial difficulty as extending a road, which would then need to meet public road standards (often including requirements for wide paved areas, curbs and sidewalks). A shared driveway at Glendale allowed Habitat to orient the three homes in such a way that saves space and money while creating a natural small community of Habitat homes.

Ownership and finance

Modular home construction offers an opportunity for Habitat to potentially increase the speed of construction, but does not provide much opportunity for the cost savings associated with

volunteer-driven construction. Modular homes may also allow more feasibility in financing and maintaining the home—they can cost less to buy than a market rate site-built home, and much of the structure has been expertly manufactured, making them both simple and durable.



	Lot #4	Lot #3
Greenfield Cooperative Bank Loan	\$95,000	\$68,000
Down payment	\$700	\$700
Down payment assistance grant	\$4,000	\$4,000
Habitat deferred, forgivable loan	<u>\$50,200</u>	<u>\$77,200</u>
Sale Price of Home	\$149,900	\$149,900
Monthly principal payments	\$400	\$286
Taxes (2018 tax rate x sale price)	\$213	\$213
Insurance (6 percent x sale price)	\$90	\$90
HOA dues	<u>\$167</u>	<u>\$167</u>
Total estimated monthly payment	\$870	\$756

making the sales price and monthly payments feasible for low-income, first-time homebuyers. The amount of the second mortgage from Habitat was calculated so that the total estimated housing costs for the homeowner would not exceed 28 percent of their monthly income. (The relatively large HOA dues are due to the cost of plowing and maintaining the long shared driveway.)

These prefabricated/volunteer constructed homes proved to cost more and require more work than anticipated. An accurate comparison of budget to actual cost was more difficult than with 1 Garfield Ave., where we had a very clear financial goal, whereas the goal of the modular homes was to experiment with the prefabricated process, not to meet strict financial goals. Much of the added cost was connected to Vermod's agreement to work outside its normal parameters as part of the partnership with Habitat, which will be discussed more in the following section of this report. The final comparison study between the modular homes and the site-built home at Glendale Road is not yet complete, but will offer a clearer picture of cost difference.

In-kind: Habitat received a significant amount of donated materials from generous community members and thousands of hours of volunteer labor. Occasionally, contractors and product vendors will also provide discounts or extra hours without necessarily disclosing that information, so other unidentifiable discounts or lenience could be included in the cash amounts. In-kind donations add a significant amount to the final totals if included.



Design and construction

For our local Habitat, using factory prefabrication was a first from a design and construction standpoint. The main project goals were to experiment with using modular building technologies and to analyze the project's success based on the following criteria:

- 1. The speed of a modular home construction process (the intent being to house more people faster than with site-built homes)
- 2. The cost of a modular home, including base and finish work
- 3. The feasibility of finishing a modular base with volunteer work

The modular home design was chosen because of its simplicity, small footprint, and ability to still house a family comfortably in three bedrooms (thank you to Simple City Studios for optimizing the design). While modular manufacturers generally have set floorplans, adjusting them is possible to suit the needs of the end user. Once the site-built house is complete, Habitat will be able to assess the differences in construction process, efficiency, and expense to determine if we will continue with modular construction going forward.

The site-built house at Glendale deviates in design from the others to prioritize accessibility. The modular homes were intended to be, at minimum, visitable by someone using a wheelchair, but the necessity of a raised foundation meant adding stairs to both the front and back entrances. A future design goal is to make all Habitat homes accessible for visitation by someone in a wheelchair.

The site-built house at Glendale also deviates from the modular homes in its utilization of construction techniques that make more sense on-site than in a factory. For example, the modular homes have an insulated floor system built in the factory for installation over a sealed crawlspace. For the on-site home it would be more difficult to build a well-sealed insulated floor system, so an insulated slab was used instead. The factory-built homes used SIPs panels for the roof, but the site built home used insulated trusses because we did not have a crane to lift the SIPs on site.





Lot 2 (site-built home) first and second floors: note the shower in the first floor bath Designs courtesy of Simple City Studio





Lot 3 & 4 (modular) first and second floors: note the first floor half bath and stacked washer/dryer Designs courtesy of Simple City Studio

Modular construction techniques: This project's modular home vendor, Vermod, specializes in completely finished modular homes. We requested instead for a partially finished shell and a simple design, which enabled Habitat volunteers and homeowners to complete the finish work in a way that felt more genuine to the Habitat process. However, this complicated the build because Vermod had to prepare these modular homes differently than its standard process. Construction mistakes may have been made because Vermod was unable to do its usual finishing checks, and costs increased because Habitat had to hire additional contractors to complete partially finished tasks.

Glendale Pilot Homes: Foundation to Finish

Our second project involved two modular homes: how did their construction timeline compare to a site-built, big enough house?



While major parts of the modular homes' construction were complete upon arrival, some aspects of construction still took a fair amount of time or required hiring outside contractors. On the other hand, simultaneous construction on two modular homes at the Glendale site did allow for more work to be completed by a larger group of people at one time, as volunteers could spread out and accomplish the same tasks in two different buildings. The prefabricated interiors and exteriors also afforded more work flexibility, as there was less urgency to complete tasks on a weather-based timeline. In comparing the timeline (left) of the Glendale built to the Garfield timeline, we can see that the time from ground breaking to home ownership is comparable; however, the Glendale project did complete two homes in that time frame rather than just one.

Given the many manufactured components, a modular build could limit a Habitat homeowners' knowledge of their home, which might be more extensive in a stickbuilt home. We believe that it is valuable for future homeowners to understand the core structure of their homes and how to maintain them. If modular homes are used in future Habitat builds, it may be beneficial to find a company that specializes in partially finished shells rather than complete builds, or to order a more finished product, which would simplify the process, cut down on additional costs, and allow homeowners to put in their sweat equity hours on other builds happening simultaneously.

Modular homes may also offer the benefit of volunteer convenience, especially in our climate: by working on mostly complete structures, volunteers may be able to do primarily indoor work during cold winter months, if the timing is right. This could alleviate the enforced winter pause in construction activity on sites that were not closed in before winter. If there were a large warehouse for Habitat volunteers or local vocational high school students to build modular homes indoor over the winter, this could provide an optimal arrangement for education. However, the start-up expenses for this sort of endeavor would be significant and it is unlikely that the income-generating production levels of a for-profit factory could be achieved.

Small footprint: Vermod's homes are designed to replace mobile homes and be transported in completed form on a flatbed truck, so they already take up only a small footprint. By stacking two units on top of each other, Habitat built three-bedroom homes within that small footprint, making "big enough" housing available to more than a single person.

Zero net energy construction: Well-manufactured modular homes should have exceptional insulation and minimal cracks or areas for air leakage, as is the case with the homes at Glendale. The energy efficient pre-manufactured structure of the modular homes is a good fit for the mini-splits that Habitat often uses, as the ductless systems minimize the amount of work in the walls that needs to be done for heating. When the energy needs of the house are reduced, it is straightforward to install simple mechanical systems like a single head mini-split. Meeting requirements upon first inspection will help Habitat to save time and money on bureaucratic processes.

The Glendale modular homes were rated at -20 and -19, making them even more efficient than our goal for a zero energy home.



Cultural expectations and social acceptability

In this neighborhood, there is an opportunity for people to bond over and connect with the idea of modular homes, which could apply to other neighborhoods or cluster builds as well. Building a small community of Habitat houses can create a sense of belonging and a friendly neighborhood culture. Factory construction makes it easier to begin multiple home projects at a time, which allows the opportunity for future homeowners to meet, build relationships, and experience the construction process together, bringing both the homeowners and the Habitat community closer. The volunteers and homeowners also can function as informal liaisons to the neighbors who may ask questions about their homes and Habitat.

Some initial qualms about these modular homes revolved around the assumption that they would look and function like cookie-cutter glorified mobile homes, and that they would not fit in with the architecture of the rest of a neighborhood. Modular homes do not have to all look the same and can be designed with distinguishing features. The simple two-box design for our project was used to increase affordability and energy efficiency, but we were still able to incorporate features such as different colors, accent siding panels, and small porches. These particular modular homes have a modern look because of the low-pitch roof but do not look like "mobile homes" because of the second floor. The rest of the neighborhood is not densely developed, and the shared driveway conceals the modular development from the main road.

We also built relationships with neighbors and other groups interested in the modular homes through events held on site, including our traditional Habitat home dedications and International Women Build Week. These events enabled us to highlight both the modular homes and the next small home project on Glendale Road, bring together diverse groups of people interested in small or modular builds, and connect with new organizations and neighbors.

In trying to make the modular homes fit the Habitat model, we strayed from our own lessons learned about building simply, and ended up complicating our own process. However, pursuing more complete modular homes would enable us to house more individuals and families more quickly, and encourage partner families to get to know one another and build community as the future Glendale homeowners have. As the cost of living rises, people will continue to look for ways to save money and become more self-reliant; modular homes may be one answer to that.

Broad Lessons Learned

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Broad lessons learned and remaining questions

Zoning and building codes

The **cost of land** is one of the biggest challenges of turning low-cost new construction into lowcost affordable homes. Land is a limited resource, and demand drives up its price in more desirable locations. Habitat has been fortunate to receive donated land in excellent locations as part of initiatives to construct more affordable housing, and community support can be crucial when challenging zoning restrictions or searching for affordable building lots.

We encourage local communities to adopt zoning that makes land for housing more accessible such as allowing detached accessory dwelling units, small infill lots, 40R starter-home overlay districts and cluster developments. While zoning and building codes may be confusing to the general public, there is an opportunity to advance the discussion about regulations around smaller home construction as Habitat and local governments learn together. By demonstrating that smaller homes and net zero homes are a viable and attractive option for affordable homeownership, Habitat and its partners have been able to lead by example to enact local change.

Being able to **publicize expert guidance** on the code requirements of houses and highlighting metrics demonstrating how small, efficient homes exceed requirements build significant awareness and support for small homes. We worked with a local videographer to shoot an explanatory video of the blower door test with Adin Maynard of HIS & HERS, which provided people with a straightforward explanation of energy efficiency requirements. Other organizations or building code groups can work to help demystify these rules and regulations.

By advocating for and constructing small homes, Habitat has **built relationships** with local government and non-government organizations experienced in housing, construction, and related fields. These relationships allow Habitat and other entities to develop an **improved mutual understanding of housing and homeownership needs in the community** and how and where Habitat as both a first-time homebuyer program and construction partner fits within a larger housing framework.

Ownership and finance

Financing and maintaining a smaller home rather than a larger one is easier, as smaller homes cost less to build or buy and the owner will be familiar with every inch. The current housing stock consists of many houses much larger than people want, with a dearth of "starter" or downsized retirement homes, making it increasingly difficult for individuals to purchase, own_., and maintain a home for themselves. This is especially applicable to people with disabilities, the elderly, and those living on low or fixed income. **Small homes can be more affordable and accessible**, allowing individuals the chance for self-reliant, stable homeownership.

As part of our goal of pursuing **innovative financing techniques**, the dual mortgage method Habitat is employing involves partnering with a local bank to offer a first mortgage to a potential homeowner coupled with a second deferred forgivable mortgage offered by Habitat or other

non-profits, making the final house price affordable for someone living on minimum wage up to 60 percent of the area median income. This strategy allows the bank to maintain a good loan-tovalue ratio, which helps with regulatory compliance. However, small value loans can be difficult for banks because of the high ratio of fixed closing costs to the total loan. Affordability restrictions required for subsidized affordable housing often add complexity to the closing process on a house, as well as increased costs for closing. The tight regulatory environment along with current software limitations make it difficult for banks to innovate. While nonprofits or individuals can advocate for change or create exceptions to rules as Habitat has done, this localized change is generally restricted to small institutions or local services.

Question: How can we increase financing opportunities for those who may not have the benefit of a second Habitat mortgage?

The answer requires banks and other lending institutions to change their practices to accommodate for more low-income individuals who would like to take out loans or get second mortgages, but this is generally not profitable for these institutions. The fact that Habitat mortgages are interest-free also helps to make them affordable, which is also not cost-effective for any for-profit institution. First-time homebuyer grant programs and other loans can help close that gap, but these are often smaller than the large second mortgage Habitat provided.

As an example, the town of Leverett developed a down payment assistance program offering \$50,000 grants for first time homebuyers, which is closer to the scale needed for low-income people to afford homeownership. Technical assistance or regulatory changes at the state level from organizations like MassHousing may be needed for local institutions to make small loans a more equitable norm rather than exceptions to the rule.

Question: How can we increase access to land?

This was covered extensively in our 2017 report, which offered ideas on Community Land Trusts, mobile home parks, etc.

Design and construction

The small home is a symbol of both sustainability and an inclusive housing future. The size and appearance are the first impression many people get of a small home — an interesting or pleasing design can create a positive first impression of small homes that in turn can open people up to the idea of living in one. Smaller lots also mean lower initial land costs. **Positive first impressions and low costs can further larger sustainability goals** by encouraging people to consider building or living smaller, and broadening the housing market to a wider range of incomes.

Small homes cost less to heat and cool, and the lower energy and utility needs of the house allow homeowners to use efficient appliances, which can provide rebates or tax credits in addition to long-term savings. Utilities can put an additional burden on homeowners with low income, on

top of a mortgage and maintenance costs, and **minimizing monthly utility payments** when possible with solar or efficient appliances helps to make a home affordable long-term.

In the Habitat model, future homeowners know how their home was built and how to maintain it through the sweat equity they put in during construction, and this knowledge can contribute to future savings during homeownership. Despite their size, small homes can still take a long time to build even with a team of committed volunteers, and coordinating volunteers and subcontractors with limited space can prove challenging. In approaching a learning curve like the ones presented by the modular homes, volunteers had to buy in to the project itself; while building the homes may have presented new and different challenges, the process also became a learning opportunity for even our most seasoned volunteers and team members.

Much of the goal of our pilot homes was also to find a **balance between quality and cost**. While cutting back on construction materials, interior features, and unique aspects could have brought us closer to or under our budget goals, it may have made the homes less durable and sustainable long-term, further decreasing the quality of affordable housing stock in an area already suffering from that lack. In the future, creating a better dialogue between builders and designers on these projects could help both reach an agreeable balance. We hope to demonstrate (in these and all Habitat builds) that building affordable housing does not mean sacrificing quality of construction materials or features that made these homes unique.

Question: Does building prefabricated homes fit with the Habitat model of using local volunteers and homeowner sweat equity to build houses?

This remains a question we have yet to answer. As an organization that makes use of local volunteer labor and knowledge to build affordable homes, the modular project was further afield from Habitat's traditional model of home-building than anything else we have undertaken. Certainly, part of the benefit of a Habitat build and partnership is that volunteers and future homeowners know how everything was built and by whom; the same could not be said for the prefabricated shells.

If Habitat continues to use prefabricated models, it would be useful to work with a manufacturer (ideally based in Western Mass.) who could offer the build team and future homeowners a look inside the factory at the production process to gain a better understanding of the home's construction. Because in theory a partially fabricated home might take less time to build out, making it more difficult for future homeowners to contribute their required sweat equity hours, another option is to use modular construction but allow homeowners to put in sweat equity hours on an identical site-built house.

However, our mission is not only about volunteer and homeowner labor: it is also to provide a greater number of safe, durable, and affordable homeownership opportunities to those who are ready for them. To that end, using prefabricated structures to offer more families with lower incomes first-time homeowning opportunities on a faster timeline is a considerable benefit that needs to be considered.

Cultural expectations and social acceptability

Building in a neighborhood full of Habitat houses, both on Garfield Ave. and on Glendale Road, created a sense of surrounding community. In these neighborhoods, there is an opportunity for people to bond over and connect with the idea of small, affordable homes and innovative housing construction that could apply elsewhere as well. Through hosting events that highlight the houses and the movement itself, we demonstrate that **spreading the word about small homes is a critical grassroots approach**, through something as simple as casual neighborly encounters or large enough as our planned Small Home Forum. Tiny homes have faced more scrutiny than small homes, which means Habitat faces less of a challenge on this front. Nonetheless, representation in the region and building connections with the community can contribute further to fighting assumptions about and stigmas against small, affordable homes.

The tiny home movement, while not quite the same as small homes, has built up a significant interest in building smaller through news stories and popular TV shows, and to an extent our small home project has been timed well to work in tandem with these new ideas. Volunteers and visitors were also intrigued by the modular experiment at Glendale, and expressed interest in seeing our final comparison. A house can be a home regardless of its size and shape, and **exposing people to new ideas of what a house can be** is an important step forward for innovative and affordable design in the area.

In building a movement around small homes, nonprofits like Habitat and individuals can make change by working in their own properties or neighborhoods, participating in larger projects, or simply by attending events and advocating for small homes.

Question: Can prefabricated or small homes be designed to fit into surrounding neighborhoods (and how important is that fit)?

A more traditional build like that at 1 Garfield Ave. faced concerns about its size but rarely its outward appearance. Less traditional builds like the modular homes faced more criticism based on looks, with some visitors expressing relief that the cluster development was somewhat hidden, as their modern aesthetic doesn't match that of the surrounding neighborhood. However, added features like porches or specific landscaping choices could help these homes blend in, and there are a variety of designs and manufacturers available to choose from.

While the modular design we went with was more modern (in keeping with our desire to build simply), many prefabricated home companies offer "traditional" designs and allow extensive customizations. Deviating from standard plans can add expense and put these builds out of the price range for someone in search of an affordable home, but can still be done less expensively than buying an existing house in many areas.

Learning from other Small Home Heroes

As part of increasing visibility and awareness around other organizations or individuals already working to champion small homes, Pioneer Valley Habitat for Humanity has established a Small Home Hero Award. The award recognizes those who have made consistent efforts to increase access to small home ownership through policy, advocacy, building, financing, design, or zoning of affordable small homes. In 2019, Habitat recognized its first two awardees: **The City of Northampton** has been at the forefront of small home development in the Pioneer Valley. In a place already challenged by a housing shortage and where the median housing price is unattainable for anyone earning less than 60 percent of the area median income, it is especially vital to both increase the number of affordable housing opportunities and pave the way for easier affordable housing development. The City of Northampton has worked with Habitat to highlight small lot zoning regulations, and held its own "Just Big Enough" green home design contest in 2018 to encourage architecture firms to envision small, energy-efficient homes for future development.

Janet Obermann, a resident of Greenfield, Mass., built her own accessible small home as a recent retiree. She envisioned a small, energy-efficient, and durable home in which she could age comfortably in place, and fulfilled that dream with a modular home shell from Unity Homes, volunteer labor from family and friends, and largely salvaged materials. Since completing her home, she has invited others to see what is possible with a small space and small budget, and has encouraged other retirees, especially women, to pursue this style of living simply and sustainably.

Our two 2019 awardees are very different, but demonstrate what is possible when working at an individual level or a city level to make change in a community. We as an organization can learn from their efforts, and hope that other towns, organizations, or individuals will be inspired by their stories.

Future Initiatives

115 Glendale Road, Northampton

The first round of pilot homes may be complete, but Habitat plans to build a second round of affordable small homes in Franklin and Hampshire counties. Our first is again on Glendale Road in Northampton (on Lot 1, referenced in the Glendale portion of this report), envisioned to be an energy-efficient two-bedroom home. Site clearing has been done, framing is set to start Spring 2020, and construction expected to be complete by Spring 2021.

Burt's Pit Road, Northampton

Just Big Enough – Green housing for ALL Architectural Design Competition

In partnership with the Big Enough small house project, AIA Western Massachusetts held a small house design contest, with an exhibition in early 2018 at APE Gallery in Northampton.

Architectural firms from around New England were asked to design three different units for a site on Burt's Pit Road in Northampton: a one-bedroom, two-bedroom, and three-bedroom home, ranging from 500-800 sq. ft. for the smallest and 800-1000 sq. ft. for the largest unit. The design contest was part of a city-sponsored limited development project whose goal is to build three affordable single-family homes in a development of 12 total units near conservation land and a future bike path. Go to http://www.northamptonma.gov/1834/Just-Big-Enough-competition to check out the City of Northampton's contest winners and to see all of the different small home designs.

Plans for the Burt's Pit Road site are still in the works with the City of Northampton, and the start date for development is unknown at the time of this report. Once begun, the three affordable small homes will become part of the next stage of the Big Enough Project.

Integrating lessons learned

As we continue to innovate and construction begins on new projects, it is important that we implement those lessons from the construction process of the homes in progress and breaking ground in the near future. Both our staff and our build teams have newfound experience dealing with the many facets of building small, from working with town zoning laws, to utilizing prefabricated homebuilding technologies, to designing and building the house itself. With every small home build, our staff, partner organizations, and volunteers become more familiar with the process and subsequently educate others, exemplifying the Habitat model of homebuilding. By continuing to integrate lessons learned, we hope to avoid some of the pitfalls from our earliest projects while continuing to experiment with new and creative solutions to building small, durable, and energy-efficient.

Homeowner engagement

Habitat homeowners are naturally engaged in the process through their inclusion in the construction and development stages of the project, but we also wanted to engage them further in the larger goals of the small home movement. These individuals and families understood that they were moving into small homes, but learning the background of Habitat's small home development was critical to explaining the reasoning behind using small or modular construction techniques.

On the construction site, Habitat homeowners put in their sweat equity hours and were asked questions by volunteers or other interested parties about the house development or how they would organize their "big enough" homes. Being able to explain why a ~650 square foot home like 1 Garfield Ave. was suitable for a single homeowner, or why the modular homes were able to go up so quickly was crucial to advancing volunteer knowledge as well as homeowner investment in both their own houses and the movement.

Future homeowners frequently engage families, friends, faith communities, and other groups from their own lives to help build their homes, and those people in turn are able to encourage others (or themselves) to explore Habitat homes as homeownership options. Homeowners will be surveyed in the spring of 2020 to collect feedback on their homes and the Habitat process to improve the experience for future partner families.

Habitat's reach is also expanding: our interested homeowner database is growing along with our influence in the community, as people become interested in the work we're doing or the specific impact our homes are having on the affordable home market in Western Mass. Habitat is looking to engage neighbors for the Burt's Pit Road project as well, and hopes to increase community input and support of the project by hosting information and design sessions when possible.

Building a movement

Others in our area and beyond are interested in small home initiatives, and one goal of this project has always been to harness that interest to inspire change. In addition to continuing the Small Home Hero award and hosting another community forum focusing on small homes in 2020, we are looking at expanding the visibility of both this project and those of other local groups or individuals. Especially in an area where some towns and developers (including this Habitat affiliate) have faced opposition to building houses or developments that may not be typical to a neighborhood, cultivating "yes in my backyard" attitudes in our communities is key to a future of inclusive housing.

Beyond Habitat, there are organizations working to design, finance, and zone for backyard ADUs, organizations seeking to build small home cluster developments to house veterans, and other Habitat affiliates looking to begin their own small home projects or work with prefabricated modular homes to replace aging mobile homes in their areas. This work, which aligns so well with our own goals, is one sign of an emerging larger movement to build "big enough" that we hope to continue to encourage as a solution to our area's larger affordable home shortage.

Conclusion

The need and desire for more affordable homeownership opportunities in Western Mass and beyond is palpable. While home construction projects are complex, this region has an abundance of people who care about creating affordable, energy-efficient, well-made homes. It will take a village, but building more affordable small homes is possible with the focused expertise and effort of interested residents, municipalities, non-profit and for-profit affordable housing developers. If we are able to work both individually and in partnership to prioritize the development of small homes of many styles and building types, we can help to meet the need and desire for more affordable small homes in Western Mass.

The Big Enough Project has allowed us to pursue goals beyond Habitat for Humanity's usual parameters, including putting emphasis on sustainability and energy efficiency, attempting new construction techniques, and engaging with local partners in new ways. We were able to draw more attention to Habitat's work and the need for diverse housing opportunities, especially through focused events that brought our community together and both spurred new partnerships and revitalized old ones. We have also demonstrated that building small, durable and energy-efficient can be both possible and desirable, and can successfully contribute to the affordable housing stock of an area.

While some of our solutions are localized, many are applicable to other affordable housing developers or Habitat affiliates. It's also important to keep a realistic perspective — sometimes innovation and movement building is slow! But by working in community with local groups and more broadly with other affiliates, we can encourage and enact change on a larger scale than we would independently.

There will not be just one solution through one large project — it will involve many creative solutions spearheaded by many different individuals, companies, organizations and municipalities. As we move forward, we hope to see an increase in partnerships interested in relaying the torch for the small home revolution in Western Mass. including zoning updates, planning priorities and financial incentives. It will take leadership, innovation and focused effort to advance the realization of a small affordable home revolution in Western Mass., but our own efforts have demonstrated that through the best efforts of many, we have already started building our future one house at a time.



Additional Resources

You will find the following additional resources posted at www.pvhabitat.org/big-enough

- 1. 2017's Big Enough Report
- 2. 1 Garfield and Glendale Rd shareable floor plans (with architect disclaimers)
- 3. Small home case studies
 - a. Brattleboro Vermont Tiny Infill House
 - b. <u>Rural Design Studio Case Study</u>
 - c. <u>Worcester Tiny House Contractor Built Case Study</u>
 - d. Burlington VT, Zero Energy Modular (ZEM) Cottage
 - e. Laurel Park Cottage Community Case Study
 - f. Noble Kit Home Case Study
 - g. <u>Yestermorrow VT Bump House Case Study</u>
 - h. Yale First Year Building Project Affordable Duplex
 - i. <u>Chattahoochee Hills GA Nest Cottage</u>
 - j. Unity Homes Small House in Greenfield, Mass.
- 4. Glossary of Terms (also included in the 2017 Big Enough Report)
- 5. FAQ
- 6. Facebook discussion group: <u>https://www.facebook.com/groups/BigEnough/</u>
- 7. Franklin Regional Council of Governments: Summary of Franklin County research findings
- 8. What is big enough? Overview presentation for DIY'ers 9-1-17
- 9. 2017 Potential Home Buyer Survey Report
- 10. Summary of September 22, 2017 Solutions Lab
- 11. Summary of the Fall 2018 Regional Small Home Forum
- 12. Videos from the Big Enough Project