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# **Building the American Dream: First-Time Homeownership for Middle-Income Bostonians**

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# **Building the American Dream: First-Time Homeownership for Middle-Income Bostonians**

*A Policy Analysis Exercise for*  
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Boston Housing Innovation Lab

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Candidates for Masters in Public Policy, 2019

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This PAE reflects the views of the author(s) and should not be viewed as representing the views of the PAE's external client(s), nor those of Harvard University or any of its faculty.

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## **Part I: Challenges with housing the middle class**

### **A. Analysis of middle-income housing gap in Boston**

When someone mentions affordable housing, one often thinks of units built to serve households at the lowest rung of the income ladder. After all, these individuals have lower earnings to put towards their monthly rent or mortgage payment. While creating affordable housing for this segment is and should remain a critical priority, policymakers risk overlooking the middle-income housing gap. In cities across the United States, individuals and families earning between 80% and 120% of area median income (AMI) struggle to find housing at prices they can afford.

Construction of units for lower-income households is often supported by federal funds. For example, the Low-Income Housing Tax Credit (LIHTC), which encourages private equity investments into the development of affordable rental housing, has helped finance more than 2.4 million rental units in the 30 years since its inception.<sup>1</sup> However, these units are typically targeted at households earning less than 60% of AMI. Few federal or state sources support the middle-income band. Moreover, government housing assistance programs strongly preference renting over homeownership. While there are some supports for homeowners earning up to 100% of AMI, they are generally very shallow or small-scale.

In many urban areas, the population is growing faster than the housing supply, leaving many individuals and families looking to buy their first home with few options. Boston has gained more than 17,000 households since 2010, outpacing the growth of the local housing supply, which has grown by only roughly 15,000 units.<sup>2</sup> This contributes to an ever-increasing gap between supply and demand, exacerbating the need for affordable housing for Bostonians. Even those who are lucky enough to own a home may struggle. As it stands, 24.5% of Boston homeowners are “severely cost-burdened,” meaning they spend more than 50% of their income on housing.<sup>3</sup> Ultimately, Boston’s homeownership rate of 35% is much lower than that of peer cities; 52% of Philadelphians, 45% of Chicagoans, and even 37% of San Franciscans own their own home.<sup>4</sup>

Boston’s government understands that housing unaffordability is a threat to its competitiveness. In 2014, a Task Force focused on housing policy in the wake of Mayor Walsh’s election called for the construction of 53,000 new units by 2030, with 20,000 dedicated to the middle-income housing gap.<sup>5</sup> While Boston made impressive strides towards this goal by 2018, with 27,000 new units either completed or permitted, the city realized that Boston’s population was growing faster

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<sup>1</sup> “Low-Income Housing Tax Credits: Affordable Housing Investment Opportunities for Banks.”

<sup>2</sup> U. S. Census Bureau, “Table B25077 - Median Value (Dollars).”

<sup>3</sup> Acitelli, “Rent-Burdened in Boston.”

<sup>4</sup> U. S. Census Bureau, “U.S. Census Bureau QuickFacts.”

<sup>5</sup> City of Boston, “Housing a Changing City: Boston 2030 (Update 2018).”

than previously projected. Middle-income homeowners are projected to make up 29% of the expected increase from 2011-2030.<sup>6</sup> As a result, the goal for new units by 2030 has been increased to 69,000.

While Boston's goals cover both rental and homeownership opportunities, the Mayor's 2018 update established homeownership as its own initiative. This paper is situated in this context and seeks to inform the City as it builds out specific goals for homeownership growth over the next decade.

## **B. Rationale for supporting homeownership**

Evidence shows that homeownership remains a powerful way for individuals and families to build wealth. This is achieved through a few key mechanisms. First, given that most first-time homebuyers take out a mortgage to finance their purchase, homeownership introduces a mechanism of forced savings. If the household is renting, its monthly housing outlay does not yield a return. However, if this expenditure goes towards a mortgage, every payment will increase the household's ownership stake in a significant asset. In other words, a mortgage obliges a household to save part of its monthly income and contribute to securing a real asset that can be resold in the future. This forced savings benefit assumes that the household would not achieve superior returns by investing the difference (if any) between its counterfactual rent payment and its mortgage payment through another higher yield investment vehicle. Indeed, panel studies show that ownership is consistently correlated with greater increases in wealth than renting.<sup>7</sup> Moreover, while rent prices fluctuate with market dynamics, typical monthly mortgage payments are fixed, locking in a stable monthly housing cost.

The second mechanism of wealth accumulation is the simple increase in property values over the period of ownership. This benefit accrues to households that can hold their property over time, riding out short-term reductions in housing prices. Of course, in the worst-case scenario of foreclosure, when liquidity constraints force households to give up their asset at a fire-sale value, any property value appreciation will typically be wiped out, simultaneously reducing the accumulated forced savings benefit. However, assuming a household purchases a home in an economically healthy geography and has the financial security to sustain ownership through market or personal downturns, they will capture the appreciation in property values.

Third, with a mortgage comes the possibility of magnifying the homebuyer's returns on equity through positive financial leverage. If the expected return on the home is higher than the interest rate on the mortgage, the household amplifies the returns on what it initially invested as equity. While the benefits of financial leverage apply to other financial instruments, such as buying

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<sup>6</sup> City of Boston.

<sup>7</sup> Herbert, McCue, and Sanchez-Moyano, "Is Homeownership Still an Effective Means of Building Wealth for Low-Income and Minority Households? (Was It Ever?)."

stocks on margin, these alternatives are not typically used by retail investors and are considered very high risk. Purchasing a home with a mortgage is the most common way to take advantage of positive financial leverage for middle-income consumers.

Beyond the financial benefits, homeownership may also yield a range of personal and societal benefits. Studies have shown homeownership can give an individual an increased sense of control over and satisfaction with her living situation.<sup>8</sup> Homeowners are also more likely than renters to contribute to their communities through participation in local elections, civic groups, and other neighborhood associations, perhaps because homeownership is correlated with increased geographic stability.<sup>9</sup> Children who grow up in families that own homes can experience a range of beneficial educational, behavioral, and social benefits like reduced delinquency.

Most studies examining these patterns establish correlation, not causation, between homeownership and these positive benefits. It's quite likely that people who are interested in buying a home are also interested in settling down and investing in their communities; it is extremely difficult to eliminate this selection bias. Indeed, when one researcher employed an instrumental variable approach to estimate the social benefits of homeownership, she found some of the differences between renters and homeowners inconclusive.<sup>10</sup>

However, even if homeownership does not itself cause these personal and social benefits, helping those individuals who are prepared to invest in their communities is still a worthy goal for policymakers. Homeownership is considered a milestone achievement and remains an important goal for a large portion of individuals. If a city doesn't offer chances for middle-income residents to own their own home, many will move away to pursue this opportunity elsewhere.

Thus, for the City of Boston, increasing affordable homeownership is a priority. Mayor Marty Walsh has repeatedly called it out as one of his top housing goals. In his 2019 State of the City address, the Mayor said, "We're serious about growing our middle class. We'll create 1,000 new homeowners in the next five years, by building more affordable homes and providing more financial help. I've seen this work change lives."<sup>11</sup>

Of the many agencies and departments across the City of Boston that deal with this issue of affordable housing, the Housing Innovation Lab (iLab) plays a special role. It focuses on identifying, piloting, and helping to scale out-of-the-box housing solutions. The iLab's methodology, based on user-centered design, moves through phases of Explore, Experiment, and

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<sup>8</sup> Rohe and Lindblad, "Reexamining the Social Benefits of Homeownership after the Housing Crisis."

<sup>9</sup> Evangelou, "Highlights from 'Social Benefits of Homeownership and Stable Housing.'"

<sup>10</sup> Engelhardt et al., "What Are the Social Benefits of Homeownership?"

<sup>11</sup> Walsh, "State of the City 2019."

Expand. It explores a range of options that might be effective in increasing housing affordability, experiments with the most promising ones on a small scale to understand their fit with Boston and expands a solution's diffusion if deemed a good fit.

For example, in 2010, the iLab was introduced to the idea of compact living: small, efficiently designed housing units that, in Boston's case, were not yet allowed by the building code. These smaller units were meant to reduce housing costs and address a shortage of supply for singles and couples while still satisfying consumer needs. After researching, the iLab and a partner architect moved into the experimentation phase by building out a demonstration house. Touring the house through Boston, they gathered valuable information about consumer reactions and preferences to shape the City's first Housing Innovation Competition.<sup>12</sup> From there, the iLab developed a formal set of guidelines alongside partner agencies including the Department of Neighborhood Development (DND) and the Boston Planning & Development Agency (BPDA). The resulting Compact Living Policy allows developers to build units smaller than previously allowed by the building code, provided they maintain the unit's livability, offer common areas for residents, and provide access to transit.

Our Policy Analysis Exercise focuses on the first lever, Explore. We aim to identify promising ideas to radically reduce the cost of construction for middle-income housing in Boston, setting the iLab up for the Experiment phase with the aim of bringing these ideas to life for future Bostonian homeowners.

### **C. Methodology**

To identify policies to make entry-level housing units more affordable for middle-income buyers in Boston, we took a three-part approach to our research, which corresponds to Parts II, III, and IV of this paper. First, in Part II, we analyze the origins of the middle-income homeownership gap by reviewing the academic literature on demand- and supply-based housing interventions. With an understanding of the full range of policy options available to the City of Boston, we identified the gap in the research that we aimed to fill: methods to reduce the cost of development through innovations in design and construction. We then calculated the target range of home prices that would be affordable for middle-income Bostonians. This placed constraints on the solutions we would propose to the iLab. Lastly, we established a framework to break down the key drivers of housing development costs. This allowed us to highlight when and where the City might be justified in providing development subsidies to enable construction.

Next, in Part III, we delved into lessons from existing efforts to increase homeownership unit supply in Boston. These learnings came primarily from two sources: staff at the Boston Home Center and developers focused on middle-income housing in Boston or peer cities.

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<sup>12</sup> "Compact Living Pilot."

Our final stage in the research process, detailed in Part IV, was an extensive set of interviews with developers and architects working on housing designs affordable to middle-income buyers. The iLab was especially curious about what they called a “white box” approach, in which the unit would have minimal finishings and involve the owner in a do-it-yourself (DIY) build-out over time. We agreed to expand the scope of our research to explore other creative designs as well. These interviews served as the basis for our case studies, which present solutions from around the world, ranging from Chile to London. See Appendix B for a full list of interviewees.

This series of academic literature, practitioner interviews, and case studies prepared us to evaluate potential housing designs relative to Boston’s needs. Our recommendations in Part V take the form of (A) a description of the key decisions and trade-offs the City will face when shaping its homeownership strategy; (B) an explanation of the cost reduction drivers that the City may influence or has within its direct control; (C) the application of our learnings to sample City-owned parcels in Boston; and (D) a list of next steps for the iLab to move into the Experiment phase.

## **Part II: Analysis of housing gap**

### **A. Demand dynamics**

At its most basic level, the difference between middle-class incomes and affordable home prices in Boston represents a gap between housing supply and demand. When addressing affordable homeownership, policymakers have mainly focused on demand-side tools. These seek to increase the number of low- and middle-income households who can afford homes by increasing their purchasing power via direct subsidies.<sup>13</sup> The mortgage interest tax deduction is the most significant demand-side subsidy in terms of overall expenditure, though its regressive nature provides few benefits to low- and middle-income buyers. Households earning above \$50,000 receive an average of roughly \$600 in tax benefits while those earning above \$50,000 receive nearly \$2,200.<sup>14</sup> More progressive demand-side interventions can take the form of financial benefits like down payment assistance grants and subsidized mortgages, or non-financial benefits like homebuyer counseling.

Many of the benefits of demand-side policies in the rental market, embodied in the Housing Choice Voucher program – which offers rental subsidies for tenants to find their own unit – also appear to be applicable to the owner-occupied market. Because these interventions are not site based, but rather follow housing consumers, they are touted for maximizing the locational choice of households.<sup>15</sup> If this geographic mobility achieves improved job access, school quality, and

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<sup>13</sup> Apgar, “Which Housing Policy Is Best?”

<sup>14</sup> Joint Committee on Taxation, “Estimates of Federal Tax Expenditures for Fiscal Years 2012-2017.”

<sup>15</sup> Galster, “Comparing Demand-side and Supply-side Housing Policies: Sub-market and Spatial Perspectives:”

safety, such interventions may also be associated with greater chances for upward social mobility.<sup>16</sup> Similarly, demand-side policies may minimize any stigma related with high concentrations of subsidized households and are most likely to achieve economic, racial, and ethnic integration.<sup>17</sup>

The Boston Home Center (BHC), the City of Boston’s “one-stop shop for homebuyers and homeowners,” centralizes the City’s demand-side offerings.<sup>18</sup> Its subsidized down payment assistance program offers interest-free loans for first-time homebuyers (who have a household income below 120% of AMI and assets of no more than \$75,000) for up to 3-5% of a property’s purchase price. To help with the ongoing costs of maintenance, the BHC’s HomeWorks Home Equity Loan Program provides interest-free loans and contractor management assistance for home repairs. Finally, the BHC offers foreclosure prevention and intervention counseling to keep financially distressed homeowners in their homes. Boston has extensive experience and a strong understanding of demand-side policies, so they will not be the focus of this paper.

## **B. Supply dynamics**

On the other side of the equation, supply-side housing tools seek to increase the supply of homes affordable to middle-income households, by stimulating housing production itself. There are three primary ways to increase the number of affordable homeownership units:<sup>19</sup>

1. Filtering: deteriorating unit or neighborhood conditions, or changes in supply and/or demand, lead existing units to decline in value
2. Conversion: rental units are converted to homeownership units at affordable price levels
3. Construction: new units are built at affordable prices (with or without subsidy) or existing units are subdivided into affordable ownership units

### *Filtering and conversion*

We will briefly examine the first and second approaches: filtering and conversion. In the rental unit market, economists posit that a net increase in the existing rental stock will enhance the affordability of the rest of the rental stock due to downward filtering. This filtering dynamic assumes that older units become accessible to lower-income households over time, as higher-income households opt for newer units and prices decline with the increase in supply. Yet this only functions in areas where new housing units outnumber new households.<sup>20</sup> High levels of code regulation and enforcement further interrupt the filtering of older units by imposing a higher minimum level of housing quality.<sup>21</sup>

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<sup>16</sup> Galster.

<sup>17</sup> Galster.

<sup>18</sup> “Boston Home Center.”

<sup>19</sup> Retsinas and Belsky, *Low-Income Homeownership*.

<sup>20</sup> Retsinas and Belsky.

<sup>21</sup> Retsinas and Belsky.

These same limitations to filtering apply to the ownership market as well but are exacerbated by the constraints of the homeownership market relative to the rental market. We can assume that higher transaction costs and lower turnover rates further reduce the effect of filtering. When it comes to addressing affordability, relying on filtering as a passive means of achieving affordability is unrealistic.

The second approach, conversion, involves a change in the tenure of an existing structure from a rental to an owner-occupied property. Recently, net conversions have gone in the opposite direction. From 2003 to 2013, a net increase of 3.8 million rental units across the U.S. resulted from the conversion of owner-occupied to rental stock.<sup>22</sup> The flow of conversions fluctuates with market conditions, and the increasingly tight rental market has made these properties more valuable in relative terms as rentals than for-sale units.

In general, low-cost single-family homes tend to convert to rental properties because low-income potential owners struggle to gain advantageous financing. With owners facing constrained savings, higher interest rates, and a limited ability to benefit from the mortgage interest tax deduction, these homes fall into the control of rental landlords. Conversely, Boston's multifamily market shows promise for net conversions to favor for-sale units. Nonetheless, while many new condominium units have been created in Boston from the adaptive reuse of non-residential buildings or conversion of rental stock, their sales prices remain out of reach for middle class families.<sup>23</sup> As a result, we cannot assume that conversions will supply sufficient homeownership opportunities for Boston's middle class.

### *Spurring new construction*

The third approach listed above – construction of units that are affordable to begin with – is our primary focus. Low-cost construction can be achieved either by subsidizing development or reducing the input costs of construction. First, we'll examine the mixed results of supply-side subsidies.

The U.S. has a complex history with subsidies oriented towards new construction. Most have been applied to rental, not homeownership, construction, mainly in the form of capital and operating cost grants. They were initially popular during the heyday of public housing from the end of World War II to the 1970s. In the subsequent decades, evaluations of the federal programs dedicated to rental production, including the Section 8, Section 236, and public housing programs, revealed that subsidizing new construction was costlier on a per-unit basis than providing rental vouchers for existing units.<sup>24</sup>

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<sup>22</sup> Joint Center for Housing Studies of Harvard University, "America's Rental Housing: Expanding Options for Diverse and Growing Demand."

<sup>23</sup> HUD Office of Policy Development and Research, "Boston, Massachusetts: Comprehensive Housing Market Analysis."

<sup>24</sup> Apgar, "Which Housing Policy Is Best?"

Nevertheless, there is reason to believe that supply-side subsidies deserve a more nuanced look for both the rental and owner-occupied markets. Some housing economists argue that the studies about the relative cost effectiveness of vouchers and other demand-side tools were done during a depressed rental market, with subsequent increases in rents reducing the cost advantage of rental subsidies.<sup>25</sup> This would appear to be true in a costly market like Boston's. Indeed, supply-side subsidies remain critical for rental housing production in Massachusetts. The most widely used development subsidy is LIHTC, which has placed into service more than 100,000 affordable rental units nationally per year since 1995.<sup>26</sup> In Massachusetts, 67,000 units have been created over the program's 30-year history.<sup>27</sup>

No equivalent program to LIHTC in terms of scale or scope exists to subsidize the supply of ownership units. The biggest source of supply-side subsidies focused on homeownership come from the HOME Investment Partnerships program (HOME), which provides development subsidies to produce homebuyer units for resale to low-income buyers. HOME funds are typically used to acquire units and rehabilitate them prior to resale or to build new homebuyer units that achieve a lower purchase price.<sup>28</sup> But like the programs of the 1970s and 1980s, HOME has not escaped critique. A 2007 Urban Institute report has concluded that homeownership production programs including HOME have resulted in excessive costs when sale prices are not capped, and inferior materials when they are.<sup>29</sup> These economic efficiency arguments – along with widespread dissatisfaction with the state of public housing and fears of crowding out private development – lead policy to favor demand-side interventions.

Outside of HOME, state and local governments may have funds set aside for limited numbers of homeownership units, but there is no systematic financing mechanism. For example, in 2018, the Federal Home Loan Bank of Boston awarded grants of approximately \$390,000 for the construction of 15 homeownership units across Massachusetts – none of which were in the City of Boston. The most reliable source of funds for affordable housing development in Massachusetts comes from the state's Department of Housing and Community Development (DHCD), which puts out annual rounds of competitive funds for affordable housing development. Since the financial crisis, they haven't made these funds available to the production of for-sale units.<sup>30</sup> This has left the City of Boston with the burden of funding homeownership units without state subsidy.

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<sup>25</sup> Apgar.

<sup>26</sup> Scally et al., "The Low-Income Housing Tax Credit."

<sup>27</sup> Department of Housing and Community Development, "Low Income Housing Tax Credit Program 2017 Qualified Allocation Plan."

<sup>28</sup> Turnham et al., "Study of Homebuyer Activity through the HOME Investment Partnerships Program."

<sup>29</sup> Olsen, "Promoting Homeownership among Low-Income Households."

<sup>30</sup> Feuerbach, Interview with City of Boston.

There is no reason to expect that state or city homeownership development subsidies will increase in the foreseeable future. But subsidies are not the only way to spur construction. As mentioned above, lower sales prices can also be achieved through cost-saving construction innovations. Having traditionally long left these innovations to the private sector, today cities like Boston are shifting to foster low-cost designs and construction techniques. The remainder of this report will explore innovations in housing development that may aid the City of Boston in spurring the construction of low-cost homeownership units with minimal subsidies.

**C. Homebuyer affordability analysis**

Before exploring best practices in development cost reductions, we sought to determine a target range of home prices appropriate for our target population of households earning between 80 and 120% of AMI. To understand the range of financially viable home prices for these middle-income families in Boston, we determined their maximum housing spend. The traditional rule-of-thumb for housing affordability is that households should spend no more than 30% of their gross income on rent, though mortgage underwriting standards allow for a total debt-to-income ratio of 43%.<sup>31</sup> Because the debt-to-income ratio includes all loans, including auto and student loans and credit card debt, we have chosen the more conservative 30% figure to not make assumptions about household indebtedness.

Table 1 shows the maximum affordable housing expenditure for households of various sizes earning 80-120% of Boston’s AMI, assuming 30% of income is spent on housing. These expenditure limits apply for both rental and ownership units.

**Table 1: Maximum affordable housing expenditure**

	Household Size			
	1 Person	2 Persons	3 Persons	4 Persons
<b>80% AMI</b>	\$1,509	\$1,725	\$1,940	\$2,156
<b>100% AMI</b>	\$1,887	\$2,156	\$2,426	\$2,695
<b>120% AMI</b>	\$2,264	\$2,587	\$2,911	\$3,234

Using these maximum housing expenditures, we calculated a household’s monthly mortgage payment and maximum mortgage value, assuming a 5% down payment and standard homeowners and private mortgage insurance terms. Table 2 shows the resulting home prices for a four-person household (see Appendix A for the analysis of maximum home prices for 1- to 3-person households). Table 3 shows the summary of maximum home prices for all studied household sizes.

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<sup>31</sup> “What Is a Debt-to-Income Ratio?”

**Table 2: Maximum mortgage and home value calculation for 4-person household**

	80% AMI	100% AMI	120% AMI
Real Estate Taxes <sup>32</sup>	\$288	\$360	\$433
Homeowners Insurance <sup>33</sup>	141	176	211
Private Mortgage Insurance <sup>34</sup>	138	172	206
Monthly Mortgage Payment	1,589	1,987	2,384
<b>Total Housing Expenses</b>	<b>2,156</b>	<b>2,695</b>	<b>3,234</b>
Maximum Mortgage	313,692	392,114	470,537
Down payment	16,510	20,638	24,765
<b>Maximum Home Value</b>	<b>\$330,202</b>	<b>\$412,752</b>	<b>\$495,302</b>

**Table 3: Maximum affordable home prices for households of various sizes**

Size of Household	80% AMI	100% AMI	120% AMI
1-Person	\$231,141	\$288,926	\$346,712
2-Person	\$264,161	\$330,202	\$396,242
3-Person	\$297,181	\$371,477	\$445,772
4-Person	\$330,202	\$412,752	\$495,302

On the high end, a 4-person household earning 120% of AMI can affordably spend \$495,302 on a home. At the other end of our middle-income market – a single-person household at 80% of AMI – the maximum affordable home value is \$231,141. Thus, the range of target housing prices for middle-income households in Boston is roughly \$230,000 to \$500,000.

#### **D. Breakdown of housing development costs**

In order to reach the target housing prices calculated above, it is important to understand the key cost components involved in building a house. Costs can vary widely by location, materials, use of subsidies, type of financing, local fees, and other factors. Table 4 describes the basic categories of development costs.

<sup>32</sup> Based on \$10.48 per \$1,000 in assessed value, per City of Boston’s previous financial models

<sup>33</sup> Based on \$5.11 per \$1,000 in assessed value, per City of Boston’s previous financial models

<sup>34</sup> Based on a private mortgage insurance rate of 0.5%

**Table 4: Housing development costs**

<b>Component</b>	<b>Description</b>	<b>Examples</b>
Land	Finished lot costs	Land acquisition, entitlements, site studies, rough site preparation
Construction	Costs to construct building / units	<ul style="list-style-type: none"> <li>• Hard costs: Foundation, exterior and interior finishes, utility systems, landscaping</li> <li>• Soft costs: Permitting fees, architecture, engineering</li> </ul>
Financing	Construction loans	Upfront fees and any interest or principal payments during construction

Some of these costs fall under the developer’s control, while other costs are determined by government regulations. For example, a developer may wish to build a 10-story building, decreasing her per-unit land costs relative to a 5-story building, but city codes may define a height limit that prohibits the taller building. On the other hand, a developer may employ an expensive architect – directly raising her soft costs – that might produce plans with higher-end amenities and finishings – increasing her hard costs – than the city or state governments would mandate or even suggest.

The National Association of Home Builders (NAHB) conducts periodic surveys on construction costs. In their 2017 survey, they found that on average, 55.6% of a home’s final sales price is attributable to construction costs, 21.5% to land costs, and 10.7% to builder profit.<sup>35</sup> Only 1.8% goes to financing costs.<sup>36</sup> Given that financing costs makes up a small portion of the overall costs, our research focused on reducing land and construction costs.

NAHB’s figures represent a nationwide average for constructing a typical single-family home on a lot of more than 11,000 square feet and finished area of 2,776.<sup>37</sup> These estimates are a poor approximation for construction costs in Boston, where the median lot size for a single-family home is 4,899 square feet with a finished area of 1,767.<sup>38</sup> In Boston, and many other urban centers, land values have consistently been higher than the value of the structure. This indicates that land costs make up a higher proportion of total development costs in Boston compared to the nationwide average (see Figure 1). Of comparable cities, only San Francisco – the quintessential example of a land-constrained area – has higher land value as a share of home value than does Boston.

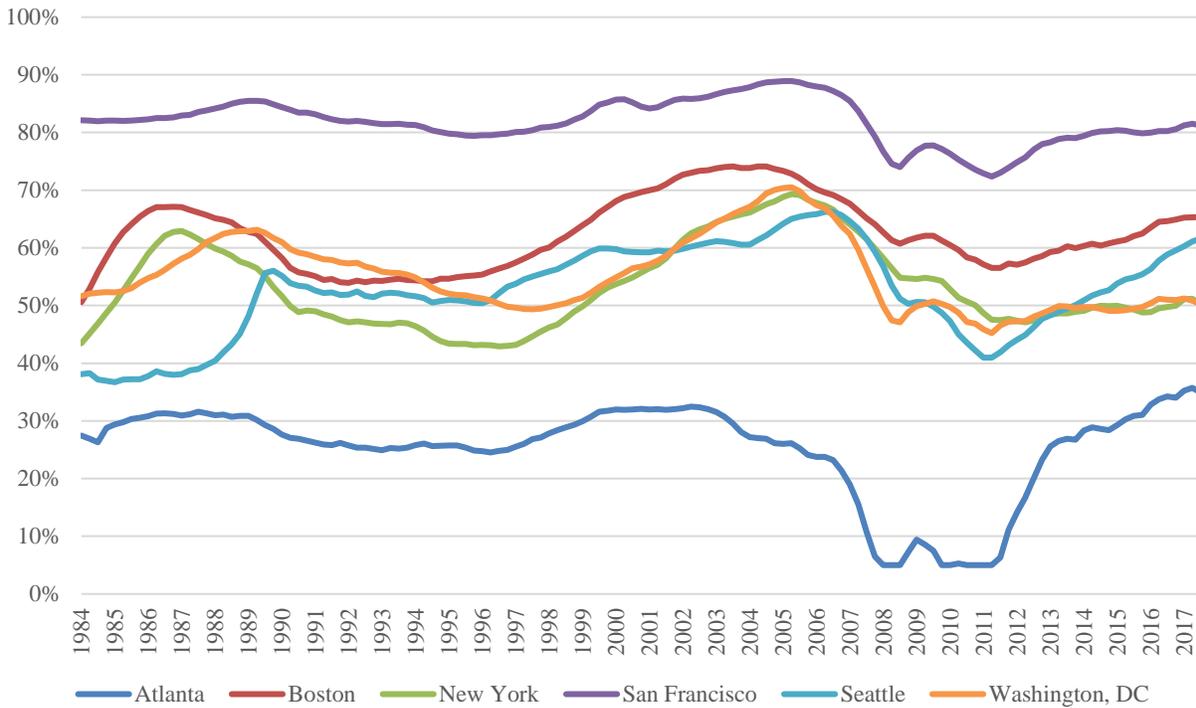
<sup>35</sup> Ford, “Cost of Constructing a Home.”

<sup>36</sup> Ford.

<sup>37</sup> Ford.

<sup>38</sup> Ford.; Dooley, “Study Ranks Boston 9th for Biggest Homes in America.”

**Figure 1: Land as a share of home value**



Source: Davis, Morris A. 2018. “Quarterly MSA Dataset, 1984:Q1-2018:Q2.” Land Price Indicators. AEI.

To determine the dollar amount of land costs in Boston, we used 2019 data on the price of residential land at the zip code level.<sup>39</sup> Table 5 shows the wide variation in land prices across Boston’s neighborhoods, ranging from less than \$900,000 per acre in Mattapan and Hyde Park to more than \$43 million in Central Boston.<sup>40</sup>

**Table 5: Residential land price by neighborhood**

Neighborhood	Price Per Acre	Neighborhood	Price Per Acre
Allston/Brighton	\$2,949,700	Jamaica Plain	\$3,835,400
Back Bay/Beacon Hill	\$30,089,300	Mattapan	\$875,500
Central*	\$43,325,400	Roslindale	\$1,550,100
Charlestown	\$10,513,300	Roxbury	\$1,446,500
Dorchester	\$917,400	South Boston	\$6,653,300
East Boston	\$3,081,600	South End	\$26,149,000
Fenway/Kenmore	\$1,794,200	West Roxbury	\$1,586,900
Hyde Park	\$884,400		

\*Proxy for Central is the West End (02114)

<sup>39</sup> Larson et al., “The Price of Residential Land for Counties, ZIP Codes, and Census Tracts in the United States.”

<sup>40</sup> Larson et al.

While lot sizes in Boston are smaller than the national average, they are large for an urban context, creating Boston's predominantly residential look and feel. Boston's neighborhoods differ in their character and associated density, with lot sizes for single-family homes ranging from 6,000 square feet in Roxbury to 909 square feet in Central Boston.<sup>41</sup> As a result, housing prices can still be prohibitively high even in neighborhoods with the lowest land prices.

Assuming that Boston's neighborhoods would not dramatically increase their densities, we derived the hypothetical maximum construction cost per housing type by neighborhood. First, using median lot sizes for single-family, two-family, three-family, and condo units across neighborhoods, we estimated the cost of land for each housing type. By subtracting this from the maximum affordable housing values from Table 3, we derived the maximum allowable construction cost per unit. This residual value assumes no change in density (i.e., a two-family lot can only have two units on it) and a developer profit margin of 10%.

We have calculated these maximum construction costs for single- to four-person households earning 80-120% of AMI.<sup>42</sup> To illustrate, Table 6 shows the land and construction costs for a two-person household earning 100% of AMI. We earlier estimated that this household would be able to afford a home worth approximately \$330,000. For a single-family property in Mattapan, the cost of land would be about \$96,474. For this unit to be affordable to this household, the developer would have roughly \$200,708 available for construction per unit after the developer profit. We can also see that the high land costs in Back Bay/Beacon Hill would make it impossible to construct a unit of any type affordable to this household without significant land subsidies.

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<sup>41</sup> Perez, Avault, and Vrabel, "Residential Land Use in Boston."

<sup>42</sup> We have provided the City of Boston with the model for all permutations of household size and AMI level.

**Table 6: Construction costs as a residual by neighborhood and family size**

100% AMI, 2-Person	Single-Family			Two-Family			Three-Family			Condo Unit		
	Median Lot Size (sf)	Lot Cost	Maximum Construction Cost (per unit)	Median Lot Size (sf)	Lot Cost	Maximum Construction Cost (per unit)	Median Lot Size (sf)	Lot Cost	Maximum Construction Cost (per unit)	Median Lot Size (sf)	Lot Cost	Maximum Construction Cost (per unit)
Allston/Brighton	4,227	\$286,235	\$10,947	4,989	\$337,834	\$128,264	4,206	\$284,813	\$202,244	703	\$47,604	\$249,577
Back Bay/Beacon Hill	1,363	\$941,499	(\$644,318)	1,536	\$1,061,000	(\$233,319)	1,577	\$1,089,321	(\$65,926)	785	\$542,243	(\$245,061)
Central	909	\$904,104	(\$606,923)	820	\$815,584	(\$110,610)	906	\$901,121	(\$3,192)	862	\$857,358	(\$560,176)
Charlestown	1,190	\$287,209	\$9,972	1,477	\$356,477	\$118,943	1,506	\$363,476	\$176,023	988	\$238,456	\$58,726
Dorchester	4,320	\$90,982	\$206,200	4,444	\$93,593	\$250,385	3,519	\$74,112	\$272,477	835	\$17,586	\$279,596
East Boston	2,500	\$176,860	\$120,322	2,500	\$176,860	\$208,752	2,187	\$154,717	\$245,609	845	\$59,779	\$237,403
Fenway/Kenmore	1,805	\$74,346	\$222,835	N/A	N/A	N/A	1,854	\$76,365	\$271,727	595	\$24,508	\$272,674
Hyde Park	5,706	\$115,849	\$181,332	6,000	\$121,818	\$236,272	5,963	\$121,067	\$256,826	822	\$16,689	\$280,492
Jamaica Plain	6,000	\$528,292	(\$231,111)	4,382	\$385,829	\$104,267	3,440	\$302,887	\$196,219	1,035	\$91,130	\$206,051
Mattapan	4,800	\$96,474	\$200,708	5,065	\$101,800	\$246,281	4,256	\$85,540	\$268,668	1,066	\$21,425	\$275,756
Roslindale	5,000	\$177,927	\$119,254	5,000	\$177,927	\$208,218	4,608	\$163,978	\$242,522	980	\$34,874	\$262,308
Roxbury	3,600	\$119,545	\$177,636	4,381	\$145,480	\$224,441	3,528	\$117,155	\$258,130	1,036	\$34,403	\$262,779
South Boston	1,389	\$212,154	\$85,027	1,389	\$212,154	\$191,104	1,846	\$281,956	\$203,196	873	\$133,341	\$163,841
South End	1,095	\$657,327	(\$360,145)	1,379	\$827,812	(\$116,724)	1,553	\$932,263	(\$13,573)	818	\$491,044	(\$193,863)
West Roxbury	5,663	\$206,304	\$90,877	5,500	\$200,366	\$196,998	5,056	\$184,191	\$235,784	780	\$28,416	\$268,766

This analysis gives a sense of the neighborhoods where unsubsidized homeownership units are most promising for various incomes and household sizes. It can give the City an approximate upper limit on construction costs needed to attain affordable homes across Boston's neighborhoods and help to direct where and when it provides land subsidies.

### **Part III: Lessons from recent homeownership efforts**

#### **A. Consumer preferences from Boston's Neighborhood Homes Initiative**

The BHC, as described above, is perhaps the branch of the City of Boston closest to the target population. BHC staff deals with the people-side, so to speak, of the Neighborhood Homes Initiative (NHI), a program that uses city-owned land to produce homeownership opportunities for middle-income buyers. They income-certify potential buyers, run a lottery to determine which applicants are paired with new units, and host open houses. BHC staff members, as well as other city workers involved in the Increasing Home Ownership Working Group, offer insights into the priorities and concerns of potential middle-income homebuyers.

BHC staff noted that families are generally interested in finding a property in a safe neighborhood.<sup>43</sup> They are especially excited about units that have unfinished space, such as attics or basements, that would allow them to expand their home in the future. Similarly, homebuyers also appreciate open floor plans.

A significant challenge the BHC staff noted was the limited opportunities for single homebuyers. They see many single, young individuals interested in homeownership, but recognize that NHI does not serve them well. Its housing lottery approach disadvantages single homebuyers, as the program has produced few one-bedroom units and singles are disqualified for larger units by not meeting the required people-to-bedroom ratio. Because household size requirements don't apply to resale of NHI units, single-person households do have a chance to buy units in the resale lottery.

Potential homebuyers are often wary of hidden ongoing costs that might constrain their ability to maintain or rehabilitate their units properly. This is especially the case with condos, which they assume require significant fees on top of their mortgage payment. In addition, potential homeowners tend to dislike the deed covenants that restrict their homes' resale value. Finally, in seeking stability, homebuyers appreciate the opportunity to buy a multi-family property, such as a duplex, to enable them to apply rental income towards their mortgage payments.

In considering potential homeowners' preferences, it's important to keep in mind that there may be a large difference between a buyer's wish list of what a perfect "forever home" would include and what a buyer would be happy to purchase if it meant owning a home sooner.

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<sup>43</sup> Flynn, Interview with Boston Home Center; Correia, Interview with Boston Home Center.

## **B. Barriers for private developers**

In speaking with private developers focused on affordable ownership units, we learned about the barriers, both real and perceived, to bringing their designs to Boston. Many developers shared the belief that the BPDA has excessively high design standards that add to costs, especially to low-margin workforce housing. Similarly, several developers spoke of the difficulty in building their projects as-of-right. Patrick Quinton, the CEO of Dweller, a company that designs affordable accessory dwelling units (ADUs), described Portland as having the “perfect regulatory environment.”<sup>44</sup> With no parking requirements and waived development impact fees for their ADUs, Dweller has been able to easily design an ADU to fit into Portland’s zoning code. Quinton noted that “not many cities are here.”

In addition, some developers see regulations that require buildings above a certain unit threshold to provide affordable housing as a challenge to producing middle-class housing. Some developers spoke of inclusionary zoning essentially as a tax that drove up the cost of market rate units to cross-subsidize affordable units.

In our conversations, several design regulations stood out as posing especially significant barriers to lowering the cost of housing. First, minimum size requirements penalize developers who have efficiently designed their units to provide a basic home within a smaller footprint. Second, Marc Vlessing, CEO of Pocket Living (Pocket), emphasized that branding these units as “microunits” is damaging because it conditions buyers to expect less comfort.<sup>45</sup> The City of Boston has addressed this issue for large developments through its Compact Living Policy – which uses the term compact rather than micro – as noted above. Third, local requirements for two- and three-bedroom units are challenging to achieve while maintaining affordable prices because they produce lower profit margins than one-bedroom units. While building family units is often a political requirement, developers see young, professional singles and couples as attractive potential buyers as well.

Smaller developers also noted the high cost of expansion into new cities. Understanding on-the-ground conditions might lead to designs with varying density, height, and amenities that reflect the character of that city; it is not enough to simply replicate what has been successful in other geographies. Modular builders, who manufacture portions of their units off-site in a factory setting, pay attention to the potential for the high volumes critical to achieving economies of scale. This is important because modular construction requires high fixed-costs, so spreading these over more units is necessary to make their business model profitable. The choice to enter a market like Boston’s would require significant market research and confidence in the ability to build large numbers of units.

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<sup>44</sup> Quinton, Interview with Dweller.

<sup>45</sup> Vlessing, Interview with Pocket Living.

## **Part IV: Findings and evaluation of alternatives**

### **A. General opportunities for development cost reductions**

Through conversations with local developers and case studies, which are described in the following section, we synthesized a range of actions that cities and developers can employ to reduce costs across the major cost buckets. This list is not exhaustive, but rather representative of the mechanisms highlighted by developers as the most effective or feasible. Many of them involve local government action (e.g., selling land at below the market rate price), while others are more squarely the responsibility of the developer (e.g., building minimal interior finishings).

Whether or not Boston chooses to partner with any of the developers we interviewed, we recommend the City consider these tangible steps as actions they may directly take, or encourage developers to take, to reduce the cost of construction. Table 7 summarizes these options. Our recommendations will focus on opportunities in the land and construction categories.

**Table 7: Cost reduction opportunities**

	<b>City</b>	<b>Developer</b>
<b>Land</b>	C(1): Sell land below market rate C(2): Allow increased density	D(1): Build on non-prime locations or irregularly-sized lots
<b>Construction</b>	C(3): Allow building code exemptions C(4): Streamline permitting processes	D(2): Construct units of smaller sizes D(3): Build minimal interior finishings D(4): Use modular construction D(5): Eliminate certain amenities D(6): Build with innovative materials
<b>Financing</b>	<ul style="list-style-type: none"><li>● Award grants or soft / below-market-rate financing</li></ul>	<ul style="list-style-type: none"><li>● Secure tax credits</li><li>● Allow deferred developer fees</li></ul>

### **B. Case studies**

In order to better understand how developers are bringing new, innovative approaches to more cheaply construct units, we contacted eight organizations who are doing this work today. Speaking with them enabled us to better understand their approaches, cost structures, design choices, and pros and cons, as well as determine how well the approach might fit Boston's needs.

**Pocket Living** – Pocket Living (Designer & Developer)

Location: London, UK  
Estimated cost per unit: proprietary data, but units are consistently sold at a 20% discount to market prices  
Unit size: ~400 sqft

Pocket Living (Pocket) provides affordable one-bedroom homes to first-time buyers. Buyers must earn less than £90,000 (the Mayor’s cap for affordable/intermediate housing), but on average have an income of £42,000 (our calculations show this is roughly equivalent to 85% of AMI). Their properties are typically located on infill sites and are sold at a discount of 20% to market rate. The London government has granted Pocket exemptions from parking and offered expedited permitting in exchange for income eligibility requirements for buyers and caps on resale value. The units are beautifully designed, with no wasted space, high ceilings, and large windows. Pocket encourages a strong community feel with shared roof spaces.



**Primary drivers of cost savings:**

- C(3): City granted parking exemptions
- D(2): ~400 sqft units, with no wasted space and sufficient light to feel spacious
- D(4): Modular construction of meticulously designed units, at scale
- D(5): No balconies, washing machines, closet doors, etc.

**Key Learnings from Interviews & Site Visit:<sup>46</sup>**

- Related Beal, which has extensive local experience, is already interested in bringing this model to Boston
- Modular construction can yield significant cost savings, but is only economically feasible when done at scale
- Primarily market rate solutions, that still maintain long-term affordability, are possible without large city subsidies
- London has high demand for one-bedroom units without parking, which may be true in Boston despite historic hesitation around both

<sup>46</sup> Vlessing; Anson, Interview and Site Tour with Pocket Living; Kiristy, Interview with Related Beal.

**“100K House”** – Postgreen Homes (Developer) / ISA (Architect)

Location: Philadelphia, PA  
 Estimated cost per unit: \$100K (without land)  
 Unit size: 1000 sqft

Postgreen Homes has piloted some of Philadelphia’s most affordable, environmentally sustainable, and design-forward homeownership units. Their projects, notably the 100K Home, have won national acclaim for achieving a development cost of \$100 per square foot and low operating costs through their energy efficient, LEED Platinum-certified design.

While Postgreen is no longer operating as a developer, their projects offer best practices for Boston given the firm’s experience building on infill sites, compact and vertical design, comparable weatherization needs, and expansion into small condo buildings when faced with rising land costs.



**Primary drivers of cost savings:**

- D(1): Location in “fringe” neighborhoods in Philadelphia
- D(2): Elimination of extraneous hallways and bathrooms
- D(5): No parking; few light fixtures, doors; no window trim; simple kitchen
- D(6): Stacked mechanics; energy efficient heating and appliances

**Key Learnings from Interviews:<sup>47</sup>**

- The neighborhood was supportive beyond concerns around no parking; educating the Zoning Board was more challenging
- Architects like Postgreen won't win on price, so will need a City government that is sensitive to its other merits
- As land costs rose, they were pushed to “fringe” neighborhoods and had to shift to multi-family condos instead of single-family homes
- Their wish list for Boston would be to incentivize green development by allowing density bonuses when certain LEED standards are met

<sup>47</sup> Ludeman, Interview with Postgreen; Phillips, Interview with ISA; Phillips, Interview and Site Tour with ISA.

**Artist Live/Work Space** – Various Boston Artists & Private Developers

Location: Boston, MA  
 Estimated cost per unit: expected to cost ~20% less than traditional construction  
 Unit size: ~1500 sqft (with additional common space)

A group of Boston-based artists, property owners, developers, and City officials have collaborated on creating and maintaining living and working space for local artists. They have focused on creating flexible, affordable units that artists can outfit themselves to meet their needs. These units contain the essentials (kitchen & bathroom) but have no interior walls or separate bedrooms, and only include code-required lighting.

This is an interesting example of what the “white box” approach can look like, and how affordable it can be, in the Boston context. While non-artists may not be as willing to engage in DIY, it’s a useful look at what a “minimum viable unit” could be at the extreme, especially for singles looking for a starter home.



**Primary drivers of cost savings:**

- C(3): City allows these units to be built in light industrial zones
- D(3): Units have extremely minimal finishings; owners build out space themselves
- D(5): No amenities beyond common space

**Key Learnings from Interviews:<sup>48</sup>**

- “White box” is feasible and accepted in the Boston context for a certain willing population
- Building a “minimum viable” unit allows residents high degree of agency to spend only on what they deem essential
- Certain interior changes (like interior walls) can be complex as they may require City inspection
- Benevolent private owner or communal equity model may be necessary to ensure long-term affordability of units

<sup>48</sup> Umphenour, Katajamaki, and Sherman, Interview with Artist Live/Work Advocates.

**Dweller ADU – Dweller (Designer), Champion Home Builders (Manufacturer)**

Location: Portland, OR  
 Estimated cost per unit: starting from \$125,000  
 Unit size: 450 sqft

Dweller offers an “affordable, turnkey approach” to homeowners to build and rent ADUs on their property. It works with Champion Home Builders, an experienced manufactured home builder, to build the homes off-site. Dweller arranges the ADU placement and financing; under their 25-year lease option, Dweller also manages and maintains the ADU and collects rent (approximately \$1,500 per month), which is shared with the homeowner.

Their ability to quickly and reliably construct affordable units and make single-family lots denser has resulted from low regulatory barriers in Portland, and they offered insights on what ADUs might require in Boston.



**Primary drivers of cost savings:**

- C(2): The ADU footprint fits as-of-right in Portland’s standardized lot sizes
- D(2): The unit keeps most amenities (e.g., washer and dryer) with less material used for the building envelope
- D(4): Standardized off-site construction by partner manufactured home builder; Dweller offers only one floor plan with no customization

**Key Learnings from Interviews:<sup>49</sup>**

- Pre-fabricated approach is key to affordability, so manufacturing off-site must have local support
- Working with an experienced manufactured home builder has helped reduce the company’s upfront costs and reduced the scale needed to make the business viable
- Portland’s regulatory environment allows as-of-right ADUs and waives impact fees (\$15,000 per unit)
- ADUs do not create new ownership opportunities, but like duplexes, can make homeownership more affordable by providing rental income

<sup>49</sup> Quinton, Interview with Dweller.

**Module Home** – Module (Designer & Developer)

Location: Pittsburgh, PA  
Estimated cost per unit: ~\$200,000 (1 bedroom) - \$348,000 (duplex)  
(excluding land)  
Unit size: 640 sqft (1 bedroom) – 1,600 sqft (duplex)

Module helps homeowners with the end-to-end process of manufacturing a flexible, affordable home that allows for upgrades over time as their needs change. They manufacture their resource-conscious units off-site and provide both the starter unit and modules that can be easily added on. Module helps the owner find land, secure a mortgage, and navigate permitting, and manages the construction.

Module offers Boston an example of an approach that could fit in to neighborhoods that have majority single-family lots, reducing the up-front purchase price without increasing density. It also serves as a different take on the “white box” solution, since a household can build out its house over time, though this addition is fully managed by Module.



**Primary drivers of cost savings:**

- C(4): Pittsburgh allowed Module expedited permitting since Module promised to reduce blight and promote mixed-income housing
- D(2): Starter units are smaller in size than other apartments on the market
- D(4): All starter and add-on units are manufactured off-site, with tight quality control and quicker build times

**Key Learnings from Interviews:**

- Allowing a homeowner to significantly expand their starter home gives them the ability to stay in their home over the long-term, but works against preserving an affordable purchase price for future owners
- Modular construction only yields significant savings when done at scale
- For this model to work at scale, Module would need a city to allow smaller minimum lot sizes

**“Half-Built Home”** – Elemental (Architect)

Location: Chile, Mexico  
 Estimated cost per unit: \$25,000  
 Unit size: 615 sqft initially, 915 sqft when fully built-out

Architect Alejandro Aravena and his firm, Elemental, have designed and constructed half-built homes that allow the occupant to build out the second half of the home as their resources allow. This represents an extreme “white box” approach. In addition, their community workshops are a model for homebuyer education.

Elemental’s designs are designed for buyers with a lower than that of our target population in Boston, but their experience offers insights on possible similarities (e.g., need for cheap housing, openness to “white box” solutions) and differences (e.g., more limited DIY culture, more extreme weather, different levels of subsidies) between Boston and Latin America.



**Primary drivers of cost savings:**

- C(1): Developments have been done in partnership with the Chilean government, often replacing informal settlements
- D(3): Focus on “difficult half” for homeowner to build, including structural shell, electric wiring, plumbing, roof
- D(6): Homeowner decides on materials for second half of house, resulting in a range of materials depending on a household’s aesthetic and priorities

**Key Learnings from Interviews:<sup>50</sup>**

- The minimalist design allows construction of greater number of units and gives residents agency in their own housing provision
- Costs are very sensitive to local building code (e.g., building in Mexico was twice as expensive as Chile due to stricter standards)
- The design is best suited for moderate climates; weatherization would increase costs
- The design has been carried out in greenfield contexts; sporadic construction would be more disruptive in Boston’s urban infill context

<sup>50</sup> Martinez, Interview with Elemental.

**“Sustainable Housing (SH) Prototype” – Tatiana Bilbao Studio (Architect)**

Location: Mexico  
 Estimated cost per unit: \$8,000 - \$14,000  
 Unit size: 400 sqft minimum

Tatiana Bilbao’s studio has created a housing prototype to address the needs of families seeking homes in Mexico given the country’s critical housing shortage. The housing solution is spatially flexible and minimizes the cost of materials. Similar to Elemental’s model, the residents are expected to improve their unit as they are financially able, in this case, by adding on lightweight modules. However, the design is meant to appear finished from initial occupancy.

Their experience offers insights on possible similarities (e.g., need for cheap housing, openness to “white box” solutions) and differences (e.g., more limited DIY culture, winter weather, potentially different levels of subsidies) between Boston and Mexico.



**Primary drivers of cost savings:**

- C(1): Relies on government land and funds
- D(3): Families to decide what elements are most important; most households start by dividing the double-height house to make two floors
- D(6): Materials are chosen because of geographic availability (e.g., adobe bricks in one part of the country, wood in another)

**Key Learnings from Interviews:<sup>51</sup>**

- Bilbao conducted extensive interviews with locals to determine what components should be fixed and what should be left to them; residents were concerned with their homes appearing finished, resulting in a compact, extensible design
- The expandable design builds off a central, concrete core with surrounding modules of lighter materials (e.g., wood pallets) appropriate for each geography

<sup>51</sup> Bilbao, Interview with Tatiana Bilbao Estudio.

**CITYSPACES – Panoramic Interests (Designer & Developer)**

Location: San Francisco and Berkeley, CA  
 Estimated cost per unit: \$150,000-215,000 (may decline with scale)  
 Unit size: 295+ sqft (varies by building/room typology)

Panoramic Interests (Panoramic) has a large portfolio of high-density infill projects in the Bay Area, mainly for student housing. CITYSPACES is their suite of stylish urban housing; the buildings are car-free and energy-efficient. The design emerged from an effort to quickly and cheaply house the homeless but was quickly applied to the Bay Area’s broader housing crisis. Depending on the building, Panoramic builds a range of designs, from studios to 4-bedroom suites. Their innovative building techniques, such as using steel shipping containers, yield cost savings.

Panoramic pushes the envelope far beyond what is being built in Boston today. While its units are thus far geared towards students, these designs could be attractive for singles, young couples, or even elderly individuals needing less space.



**Primary drivers of cost savings:**

- D(2): Units are dramatically smaller than most, enabled by multi-purpose, built-in furniture
- D(4): Many of Panoramic’s projects use modular construction
- D(5): Buildings have no parking, elevator, gym, but do sometimes have lounges, cafes, etc.
- D(6): Unorthodox materials like used steel shipping container modules

**Key Learnings:<sup>52</sup>**

- Using innovative building materials and modular construction can make units with varying numbers of bedrooms economically feasible to build
- Including built-in furniture and smaller appliances can allow owners to access amenities within a reduced footprint

<sup>52</sup> We were unable to interview Panoramic Interests, so these learnings are based on information from the company website.

## C. Criteria and Evaluation of Options

In order to determine which of the above approaches could make most sense for Boston, we established the following criteria for evaluation in conjunction with the iLab and other City government officials:

1. **Target market:** Different approaches of design and construction will cater to different types of consumers. For example, a development of one-bedroom units with no parking may be less attractive to families but may fit the needs of singles or young couples if located near transit. Because the Mayor's goals for housing are not delineated by type of household, we did not value one target market above another, and are instead giving the iLab this information to incorporate into their decision-making process.
2. **Density:** Given Boston's constrained space, high land prices, and the need for developers to make sufficient profit margins to pursue this type of development, we looked for approaches that maximized the efficiency of land via increased density. This may, of course, not fit in with the character of neighborhoods that are primarily comprised of single-family homes, but we believe it is a critical consideration in producing meaningful opportunities for affordable homeownership. For this criterion, "high" was used for large multi-family buildings, "low" for single-family construction approaches, and "moderate" indicates those in between.
3. **Fit with Boston regulations:** While some approaches would be feasible under current Boston regulations, others would require variances or exemptions from the building and zoning codes. The fewer changes required, the faster adoption and roll-out could be. Since the City of Boston seems willing to grant various exemptions for compelling, creative projects, this criterion is not intended to preclude promising options but rather give a sense of fit with the status quo. It should give the City of Boston an idea of what actions they could take to ease the way to more innovative approaches. For this criterion, "high" indicates approaches that could likely be easily built today without much involvement from the city, "low" indicates approaches that would likely need a range of exemptions, and "moderate" indicates those in between.
4. **Availability of partners:** Because many of these models are specific to the architect or developer who designed them, Boston would need a local partner to bring this vision to life. We thus considered whether a partner was already present locally or likely to be present in the near future. For this criterion, "high" indicates approaches where a partner is already present in Boston, "moderate" indicates approaches where a partner is in the Northeast and appears willing to work in Boston, and "low" indicates there is no partner in the East Coast or even the United States.

**Table 8: Evaluation of case study models for Boston**

<b>Model</b>	<b>Target Market</b>	<b>Density</b>	<b>Fit with Boston regulations</b>	<b>Availability of partners</b>
Pocket Living	Young singles	High	Moderate	High
100K House	Young couples	Moderate	Moderate	Moderate
Artist Live/Work Space	Full-time artists	Moderate	High	High
Dweller ADU	Couples, families	Moderate	High	Low
Module Home	Young families	Low	Moderate	Moderate
Half-Built Home	Young families	Low	Low	Low
SH Prototype	Young families	Low	Low	Low
CITYSPACES	Students	High	Moderate	Low

We also recognize that iLab and the relevant Boston authorities will have to take the political context into consideration in moving forward with any approach. Some of these options are more likely to be welcomed by communities, unions, and potential homebuyers than others. The more palatable a solution, the easier and faster the adoption. However, we elected to not apply this lens as a criterion for a few reasons. Primarily, the iLab is meant to focus on out-of-the-box solutions that may not be initially popular, so we did not want to exclude a solution that experiments might later prove feasible. Further, the stakeholders we have worked with within the City of Boston are committed to solving this intractable problem and seem willing to overcome political barriers to do so.

## **Part V: Recommendations**

### **A. Shaping the City’s homeownership strategy**

As the City of Boston moves forward to define its strategy around increasing middle-income homeownership, it will need to articulate what it aims to achieve. In maximizing the impact of its limited resources, the City will need to negotiate key trade-offs in the types of households prioritized, the level of price appreciation permitted, and the types of housing produced.

First, the city must decide who they wish to serve with their homeownership efforts. From what we’ve heard from City officials and developers, Boston – as well as many other cities – often prioritizes family housing. This requires building homes with two or more bedrooms. However, this can leave singles and young couples with fewer options than might be produced by an unconstrained market. They may opt to live with roommates, occupying units that were intended for families. Thus, encouraging the development of larger units may lead to second-order effects that do not strictly help families.

We also learned from developers that building a one-bedroom unit is more profitable than a two- or three-bedroom unit. Price per square foot tends to decrease with size, so producing more units per building allows them to capture more value per bedroom. Beyond the number of bedrooms, it is likely singles and young couples might be more willing to live in smaller spaces with fewer amenities. Thus, focusing on families vs. singles or young couples will lead the city to focus on distinct solutions, with significantly different economics for the developers and differing levels of subsidies from the government as a result.

Second, the City will have to decide whether and how to preserve affordability in a context of increasing market prices. Even if units were to be built at a price that is affordable to a first-time, middle-income homebuyer, the continued supply-and-demand gap in Boston means upon resale, these units would revert to a higher market price. In this case, only the first owner would benefit from the affordable price, perhaps even gaining a windfall. One workaround already used in the NHI program is a cap on resale price, which ensures the unit stays affordable to the next owner and beyond. However, as we have mentioned, one of the most compelling aspects of homeownership relative to renting is that the individual owns a sizeable asset that tends to appreciate in value over time. A cap on the resale price limits the ability of this owner to fully capture the value appreciation. This leads to a fundamental trade-off between helping multiple middle-income families secure affordable housing over the long-term and helping a single-family benefit fully from homeownership.

Even if Boston prefers to preserve affordability over the long-term through mechanisms like capping resale value, most units fall out of the City's direct control. The City can institute long-term income eligibility restrictions or maximum resale prices for developments for which they sell publicly-owned land or grant exemptions. However, given the sizable housing gap Boston faces, the City must also encourage market-rate solutions that involve little to no City involvement. For these approaches, the City has little leverage to govern resale details. There is a trade-off between scale the private sector can achieve and the control the City has over guaranteed affordability.

Third, the City has to grapple with what it, and the public, is willing to accept as a "minimum viable unit." This, of course, depends on the type of consumer, as we outlined above. But even within a group of consumers, our sense is that the city may be anchoring its approaches on the perceived ideal state for a potential homeowner. For example, a young couple's "ideal" unit may be a single-family home on their own lot, with three bedrooms and an unfinished and basement that they can finish over time. This home would not fall in a middle-income price range, resulting the need for a large government subsidy. However, that same young couple's "minimum viable" unit might be a small one-bedroom unit with minimal amenities in a multi-family building. This lower initial purchase price would make homeownership accessible,

allowing them to build equity so they might purchase a larger home in future years. Currently, NHI's pre-approved designs, as illustrated by the City's presentation for the Dale, Circuit and Alpine Street Parcels seem closer to an "ideal," not "minimum viable" unit for a family, likely shaping what developers propose to the City.<sup>53</sup>

Fourth, the Mayor and City must decide which political challenges it is willing to take on. Some of the most innovative approaches we've come across would likely elicit resistance from local communities. For example, while modular construction was consistently named by developers as one of the biggest cost reduction drivers, its use will reduce the need for union labor at the construction site. Unions wishing to protect the status quo of construction timelines and their associated labor needs may thus protest the expansion of modular construction. Similarly, high-density approaches may be the most cost-effective, but are simultaneously the most likely to provoke resistance from neighboring residents. Finally, increased attention to one- and two-person households at the expense families, as noted above may also be a political non-starter. The issues the City considers most sensitive will shape the specific goals, approaches, and partners used moving forward.

## **B. Cost reduction drivers**

As noted earlier, several cost reduction drivers are the exclusive jurisdiction of public agencies within the City of Boston and the BPDA. In addition to making construction more economically feasible for developers, these actions also preserve the City's leverage in controlling the affordability of units beyond the initial occupancy. We more fully describe these opportunities below:

- **C(1): Sell land below market rate**

Given Boston's high land costs, this lever is especially powerful. As illustrated in Table 6, there are many neighborhoods where building affordable homeownership units is impossible without concessionary prices on land. Conversely, there are neighborhoods in which developers should be able to purchase land at a value closer to market rate and still build middle-income for-sale units. City-owned land is a finite resource, so its sale should incorporate this dynamic. The City of Boston already engages in land disposition for affordable development through programs including NHI, and it remains the most meaningful way to reduce total development costs.

- **C(2): Allow increased density**

Because of Boston's high land costs, total development costs per unit decline quickly as more units are added to a parcel. While the City is well-aware of frequent community resistance to increased density, it remains a critical tool especially in locations near transit and other public amenities. It is impossible to ignore the benefits of increased density in a tight housing market; more affordable units mean more households can benefit.

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<sup>53</sup> City of Boston, "Dale, Circuit and Alpine Street Parcels Community Meeting."

- **C(3): Allow zoning and building code exemptions (e.g., parking)**

In addition to height, building bulk, and setback regulations, the zoning code has parking requirements that are perceived as onerous by infill developers and prevent efficient use of small lots. Developers praised the 2012 revision of Philadelphia’s zoning code that made most projects developable as-of-right; in contrast, Boston’s process was described as excruciating and risky.

- **C(4): Streamline permitting processes**

Similarly, when developments require exemptions or further review, timeline certainty is critical to making affordable projects with low profit margins financially feasible. Many developers believed that design standards imposed by the BPDA were onerous relative to those in other cities. The cost of permitting delays is especially difficult for smaller developers, who must spend down investor capital as they wait. DND’s creation of pre-approved designs for the NHI program attempted to streamline approvals, but our interviewees suggested that developers seldom use them.

As supply-side innovations, most cost reduction opportunities rely on developers. While the City of Boston cannot directly control whether a specific developer chooses to use these drivers, it should position itself as open and encouraging of experimentation that aims to reduce costs. The City can also go further by requiring that developers use one or more of these drivers when purchasing land from the City or in exchange for certain exemptions.

- **D(1): Build on non-prime locations or irregularly-sized lots**

Boston faces severe space constraints, so any remaining lots may be in fringe locations or have unusual dimensions. While challenging, we have seen examples of innovative construction on these types of parcels in Philadelphia. For example, what was once an 11-foot deep, two-car parking lot was developed into a seven-unit building with just 5,000 sqft of floor space.<sup>54</sup> The City should encourage similar creative uses; see our final recommendations for the iLab below for more detail.

- **D(2): Construct units of smaller sizes**

With the Compact Living Policy, Boston has made significant progress on allowing smaller units to be built. As it progresses through the pilot phase of the policy, the City should consider expanding eligibility to developments smaller than 10 units, as well as the possibility of easing the community shared space requirement. These changes might help match supply – the smaller size of available lots in Boston’s most urban neighborhoods – with demand for compact, urban living.

- **D(3): Build minimal interior finishings**

Housing stakeholders in Boston were intrigued by the “white box” approach. While this approach reduces the upfront costs for homeowner, the lack of a strong DIY culture in Boston when it comes to housing suggests that only minor improvements should be left

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<sup>54</sup> Saffron, “This Could Be the Skinniest New Apartment Building in Philadelphia.”

to the homeowner. In addition, architects we interviewed noted that residents might be less willing to build out a starter home than something they consider their “forever home.” With these constraints, Artist Live/Work space in Boston serves as a good model for a “white box” approach in Boston. Tenants either build out their space themselves with furniture or simple DIY efforts, or hire a contractor for more substantial work.

- **D(4): Use modular construction**

The most consistent cost reduction solution proposed by developers we interviewed was modular construction. Pre-fabricating portions of a unit in a factory setting yields speed, quality, and scale advantages that reduce theoretical costs. However, as noted above, modular construction has faced political opposition in Boston and beyond, especially from labor unions. Building a Massachusetts-based modular factory and staffing it, at least partially, with union labor could reduce resistance. Of course, there would need to be sufficient development opportunities for modular construction in Greater Boston to justify the high capital costs associated with a local factory. This solution would likely require significant collaboration with neighboring communities and/or the Massachusetts state government.

- **D(5): Eliminate amenities**

Many of our case studies achieved cost savings by stripping away certain unnecessary unit amenities including parking spots, balconies, kitchen islands, closet doors, window trim, hallways, and excessive light fixtures. To be clear, eliminating amenities does not mean reducing the quality of the unit, but rather only including essential elements. Because reducing amenities in government-subsidized units tends to be perceived negatively, this strategy is especially relevant for market-rate, unsubsidized developments.

- **D(6): Build with innovative materials**

Several developers we interviewed mentioned the use of new materials, including steel frame technology that allowed them to efficiently build vertically, as critical to reducing their costs. Other examples included non-traditional windows and donated material. Because the BPDA reviews such a large portion of Boston’s developments, increasing the flexibility of acceptable building materials – with exceptions in cases of historic preservation – would allow for reduced construction costs.

### **C. Boston-based parcel analysis**

The following analysis, shown in Table 9, looks at an existing set of six adjacent parcels in Roxbury owned by the BPDA, all categorized as housing sites. Through an analysis of the site’s physical and socioeconomic context, we examine the suitability of some of the case study models for the site. Each model exhibit some of the trade-offs we described above. For example, implementing a Pocket Living development would trade density for neighborhood character. We also lay out the potential permissions or exemptions the developer might need from the City to

realize construction. This analysis is meant to highlight that while each model offers benefits and drawbacks, publicly-owned land can be used to experiment with new housing models.

**Table 9: Parcel analysis**

Name	Alpine Street Cluster (4 Alpine Pl; 52, 54, 65, 58 Alpine St; Alpine Pl) Roxbury	
Parcel IDs	1201374000, 1201378000, 1201377000, 1201376000, 1201375000, 1201373000	
Urban Renewal Area	Washington Park	
Site type	Housing Site	
Lot Size	9,214 square feet	
Zoning <sup>55</sup>	Three-Family Residential	
Demographic characteristics	<ul style="list-style-type: none"> <li>● 34.4% female householder, no male present (Boston: 16.9%)<sup>56</sup></li> <li>● Population grew by 20% from 2000 to 2015 (Boston: 10%)<sup>57</sup></li> </ul>	
Socioeconomic characteristics	<ul style="list-style-type: none"> <li>● \$30,663 median household income (Boston: \$62,021)<sup>58</sup></li> <li>● 19.6% owner-occupied units in 2016, down from 30.3% in 2000<sup>59</sup></li> <li>● 46.3% households with 0 vehicles (Boston: 35.2%)<sup>60</sup></li> </ul>	
Community assets	Yawkey Boys & Girls Club of Roxbury - 0.3 mi Dudley Branch of the BPL - 0.4 mi City on a Hill Charter Public School - 0.2 mi Nathan Hale School - 0.6 mi	
Neighborhood character	Medium lot coverage, 2-3 story units Moderate setbacks and open space	
Transit Access	10, 14, 19, 23, 28, 42, 44 Buses - 0.2 mi Roxbury Crossing T-Stop - 0.8 mi	
Potential Housing Solutions	Model	Needs from City
	<i>Pocket Living</i> The large size of the combined parcels and their proximity to transit offers a rare opportunity	<ul style="list-style-type: none"> <li>● Upzoning to higher density</li> <li>● Sale of adjacent sites to single developer</li> <li>● Potentially more significant</li> </ul>

<sup>55</sup> Zoning Viewer

<sup>56</sup> BPDA Research Division, “Boston in Context: Neighborhoods.”

<sup>57</sup> BPDA Research Division, “Neighborhood Profiles.”

<sup>58</sup> U. S. Census Bureau, “Table S1903 - Median Income in the Last 12 Months.”

<sup>59</sup> BPDA Research Division, “Boston by the Numbers: 2018.”

<sup>60</sup> BPDA Research Division, “Boston in Context: Neighborhoods.”

	<p>for a large, multi-family building with a high density of units. However, the aesthetic would not fit in with current neighborhood character.</p>	<p>parking exemptions than allowed by Compact Living Policy</p>
	<p><i>Module</i>          Relatively low land costs in Roxbury could make Module units an affordable market-rate option. Standalone, expandable homes would be an easy fit with the 2-3 story homes in surrounding neighborhood but would not create additional units / maximize density.</p>	<ul style="list-style-type: none"> <li>● Keep existing subdivision of single-family lots (or divide even smaller)</li> <li>● Acceptance of modular construction</li> <li>● Acceptance that affordability will not be preserved in long-term, as family expands home</li> </ul>

**D. Next steps for the iLab**

As the iLab takes these findings from the “Explore” phase and moves into the “Experiment” phase, we recommend the following focus areas:

1. **Explore consumer openness to DIY approach:** The presence of Artist Live/Work spaces in Boston gives the iLab an opportunity to test non-artist consumers’ reactions to a “white box” approach. The iLab could work with the artists managing this type of housing to run tours through existing spaces and conduct focus groups to gauge the reaction from middle-income homebuyers. Midway Studios, Boston’s largest affordable live/work building for artists, could be a good location. While it offers only rental units, the diversity of designs achieved by the residents of its 89 live/work studios would provide physical examples of how to subdivide and enhance flexible spaces. Further, the iLab could design a survey to understand consumers’ ability and willingness to take part in building out part of their unit. The survey should explore the following factors:
  - The amenities that should be built out by the developer
  - Length of time a homebuyer would expect to stay in a “white box” home
  - Need for subsidized loans or other City resources to support home improvement
  
2. **Meet with Interface Studio Architects (ISA):** ISA has offices in both Boston and Philadelphia and participated in the City of Boston’s Energy Plus (E+) Green Building Program with their Highland Street Townhouses in Roxbury. However, their urban infill work in Philadelphia is much more extensive. This is largely because of the as-of-right development environment in Philadelphia. ISA often works with developers aiming to build high quality, compact homes on irregularly sized lots. A meeting with ISA could be useful in understanding the architecture firm’s point of view on developing in Boston, including:

- Changes to the zoning and permitting process that would enable or attract them to design more homes on Boston’s available parcels;
  - The ways NHI pre-approved designs could be altered to incentivize cheaper construction (e.g., exterior siding materials, exterior ornamentation, placement of plumbing systems);
  - Designing an experimental request for information (RFI) (see below).
3. **Pick 1-2 city-owned lots and issue more experimental RFIs:** In order to gain a deeper understanding of what truly innovative, cost-reducing construction projects could look like in the Boston context, the iLab could work with the relevant officials to develop an RFI seeking experimental designs for one or two city lots. The City could choose lots that are irregularly sized and thus difficult to sell, or ones that are representative of a high proportion of City-owned land and can serve as case studies for future construction. An RFI could build on the insights derived from a parcel-level analysis like those for Roxbury’s Alpine Cluster by eliciting site-specific designs. The iLab could also connect with New York City’s Department of Housing Development and Preservation (HPD) to understand their efforts to incentivize creative construction through development challenges like the *Big Ideas for Small Lots* competition. This could inform Boston’s efforts to surface innovations that could be replicated on lots across the city.
  4. **Meet with Related Beal / Pocket Living:** Over the course of our research, Pocket Living emerged as one of the most promising approaches to middle-income homeownership in urban areas. Its success in London, coupled with the fact that Related Beal is a ready and willing local partner, makes Pocket all the more attractive for Boston. The Compact Living Policy has eased the way for Related Beal to expand the Pocket model into Boston, but the City will need to consider Pocket’s model of building almost exclusively one-bedroom units. In addition, Pocket’s business model relies on the expansion of modular construction. While Pocket could be a market-based approach to middle-income housing, the City would need to intervene to guarantee ongoing affordability through income requirements and a cap on resale values. A meeting with Related Beal would be a first step to ensure the developer’s vision aligns with that of the City and begin discussing any concessions.
  5. **Connect with Philadelphia’s housing officials:** Our meeting with Philadelphia’s Director of Planning & Development revealed insights relevant to Boston’s homeownership efforts.<sup>61</sup> If Boston wishes to explore the “white box” approach, Philadelphia offers a model for supporting homeowners’ rehabilitation efforts through grants and zero-interest loans. Philadelphia’s zoning code also serves as a case study for how to facilitate as-of-right development. Finally, Philadelphia’s 2018 update to their

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<sup>61</sup> Fadullon and Long, Interview with City of Philadelphia.

housing plan includes tiered union wage rates, that set lower rates for labor used to build publicly subsidized affordable housing.<sup>62</sup> This precedent could be interesting for Boston to explore as it seeks to reduce the cost of development on parcels receiving some amount of financial support from the City.

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<sup>62</sup> Department of Planning and Development, “Housing for Equity.”

## **Appendix A: Maximum home price calculations by household size**

**Table 1: Maximum home prices for 1-person households**

	80% AMI	100% AMI	120% AMI
Real Estate Taxes	\$202	\$252	\$303
Homeowners Insurance	98	123	148
Private Mortgage Insurance	96	120	144
Monthly Mortgage Payment	1,113	1,391	1,669
Total Housing Expenses	1,509	1,887	2,264
Maximum Mortgage	219,584	274,480	329,376
Down payment	11,557	14,446	17,336
<b>Maximum Home Value</b>	<b>\$231,141</b>	<b>\$288,926</b>	<b>\$346,712</b>

**Table 2: Maximum home prices for 2-person households**

	80% AMI	100% AMI	120% AMI
Real Estate Taxes	\$231	\$288	\$346
Homeowners Insurance	112	141	169
Private Mortgage Insurance	110	138	165
Monthly Mortgage Payment	1,272	1,589	1,907
Total Housing Expenses	1,725	2,156	2,587
Maximum Mortgage	250,953	313,692	376,430
Down payment	13,208	16,510	19,812
<b>Maximum Home Value</b>	<b>\$264,161</b>	<b>\$330,202</b>	<b>\$396,242</b>

**Table 3: Maximum home prices for 3-person households**

	80% AMI	100% AMI	120% AMI
Real Estate Taxes	\$260	\$324	\$389
Homeowners Insurance	127	158	190
Private Mortgage Insurance	124	155	186
Monthly Mortgage Payment	1,430	1,788	2,146
Total Housing Expenses	1,940	2,426	2,911
Maximum Mortgage	282,322	352,903	423,484
Down payment	14,859	18,574	22,289
<b>Maximum Home Value</b>	<b>\$297,181</b>	<b>\$371,477</b>	<b>\$445,772</b>

## **Appendix B: List of Interviews**

<b>Organization</b>	<b>Interviewee(s)</b>	<b>Title(s)</b>
Affordable Homes Program at McGill University	Avi Friedman	Professor & Co-Founder
Artist Live/Work Space advocates	Raber Umphenour, Jenni Katajamaki, Stephanie Sherman	N/A
Boston Home Center	Maureen Flynn	Deputy Director
Boston Home Center	Sandra Correia	Program Manager
Boston's Department of Neighborhood Development	John Feuerbach	Senior Development Officer
Boston's Neighborhood Housing Division	Jessica Boatright	Deputy Director
Dweller	Patrick Quinton	Co-Founder & CEO
Elemental	Cristian Martinez	Architect
Fannie Mae	Dan McPheeters	Product Development Manager
Interface Studio Architects (ISA)	Brian Phillips	CEO
Module	Brian Gaudio	CEO
Philadelphia's Department of Planning & Development	Anne Fadullon	Director
Philadelphia's Department of Planning & Development	Melissa Long	Director of Housing & Community Development
Pocket Living	Marc Vlessing	CEO
Pocket Living	Jenny Anson	Senior Sales Consultant
Postgreen	Chad Ludeman	Co-Founder &
Related Beal	David Chattman	Vice President
Related Beal	Zak Kristy	Associate
Tatiana Bilbao Estudio	Tatiana Bilbao	Founder
Toll Brothers	Fred Cooper	Senior Vice President

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