Upzoning With Strings Attached: Evidence From Seattle's Affordable Housing Mandate

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Abstract

This article analyzes the effects of a major municipal residential land use reform on new home construction and developer behavior. It examines Seattle's Mandatory Housing Affordability (MHA) program, which relaxed zoning regulations while encouraging affordable housing construction in 33 neighborhoods in 2017 and 2019. The reforms allowed for more dense new development, or "upzoning," but they also required developers to either reserve some units of each project at below market rates or pay into a citywide affordable housing fund. Using a difference-in-differences estimation comparing areas the reforms affected versus those not affected, the authors show that new construction fell in the upzoned, affordability-mandated census blocks. The quasi-experimental border design finds strong evidence of developers strategically siting projects away from MHA-zoned plots—despite their upzoning—and instead to nearby blocks and parcels not subject to the program's affordability requirements. Lowrise multifamily and mixed-use development drive these effects. The findings speak to the mixed results of allowing for more density while simultaneously mandating affordable housing for the same project.

Introduction

The broad academic consensus is that stringent land use regulations are behind many major sociopolitical issues facing cities today, including housing unaffordability, residential segregation,

and lagging economic growth.[1] Among the most common forms of regulation are limits to urban density that may restrict the size or height of multifamily residences or ban multiunit buildings outright. Such low-density zoning is viewed as the root cause of affordability issues for many in-demand cities (Glaeser and Gyourko, 2018). For instance, land zoned for single-family detached homes accounts for 94 percent of all land zoned for residential use in San Jose, 75 percent in Los Angeles, and 70 percent in Minneapolis.[2]

Although the ill effects of tightening land use controls are well established, far less practical knowledge is available on how to ameliorate the situation. It is not clear to academics or policymakers exactly how existing zoning codes and regulations should be changed to spur new construction where housing shortages are most acute; nor is it straightforward to enact such reforms, even if consensus existed. At present, state and local policymakers around the country are implementing or discussing a wide range of housing affordability reforms, from changing zoning codes to enacting rent controls.[3]

A key challenge facing policymakers seeking to boost supply and lower housing costs, in the long run, is finding a suite of reforms that are politically feasible in the short run. For example, although agreement is widespread among economists that allowing more dense construction will, in theory, boost supply and bring down prices, voters and politicians remain wary. A prominent concern is that upzoning leads only to constructing expensive units that would not directly alleviate affordability issues among rent-burdened existing residents. However, empirical evidence on the effects of upzoning is scarce, mainly because these policy changes are rare, especially at larger geographic scales.

This article analyzes Seattle's Mandatory Housing Affordability (MHA) reform, one of the largest citywide density and affordable housing reforms in the United States. Seattle presents an ideal setting to answer the question of how to tackle housing shortfalls and affordability issues. The city's population has boomed, and house prices have soared in recent years. Although the metropolitan area population has grown 30 percent during the past 2 decades, Seattle is building fewer new units per year than when it had 1 million fewer inhabitants. As a result, since 2000, median house prices have nearly tripled; one in seven residents is severely rent burdened. Although a growing political will is for large-scale housing reform, much of Seattle's land remains zoned only for detached single-family residences.[4]

[1] Although all cities in the United States have some form of land use regulatory rules, restrictiveness, and corresponding housing shortages vary widely across metropolitan areas. See Gyourko, Hartley, and Krimmel (2021) for variation in land use restrictions across metropolitan areas.

[2] A small number of cities also adopt urban growth boundary lines to limit the extensive margin along which cities could grow (most notably, Portland, Oregon).

[3] These reforms include, for example, sweeping accessory dwelling unit reforms in California and Oregon (https://www.hcd.ca.gov/policy-and-research/accessory-dwelling-units/), rent control proposals in Boston (https://www.boston.com/real-estate/real-estate-news/2023/01/18/boston-rent-control-michelle-wu-plan/), a ban on single-family zoning in Minneapolis (https://www.planning.org/blog/9219556/measuring-the-early-impact-of-eliminating-single-family-zoning-on-minneapolis-property-values/), and inclusionary zoning in Washington, D.C. (https://dhcd.dc.gov/service/inclusionary-zoning-iz-affordable-housing-program/).

[4] The authors' conversations with officials from the city of Seattle, community groups, and developers indicate that pro-density and pro-affordability reforms have been discussed for at least the past 10 years. The authors also note that Seattle recently adopted reforms to boost accessory dwelling unit production in single-family neighborhoods.

The MHA reform presents a case study of how one high-cost city struck a balance between its efforts to alleviate affordability issues and local political opposition from both single-family homeowners resistant to change and rent-burdened households fearing displacement. The MHA program upzoned 33 noncontiguous neighborhoods between 2017 and 2019. In these areas, MHA allowed for greater density while mandating that all new commercial and multifamily residential construction contributes to affordable housing. The reform combines two policy levers that some economists consider to conflict with one another: Increasing development capacity through upzoning and requiring private development to create income-restricted affordable housing. Geographically, the MHA touches very little single-family zoned land, thus making minimal alterations to the city's landscape while attempting to increase overall housing production. MHA is applied almost exclusively to areas already zoned for multifamily, commercial, or high-density single-family homes (for example, townhomes and rowhouses)—an important factor for MHA's political feasibility.

Seattle is one of the first large cities to adopt this "upzoning with strings attached" model, a prominent policy vehicle being discussed across the county. Thus, Seattle's MHA represents an interesting example for other cities considering density reforms to alleviate affordability issues. Whether (and when) such a policy would spur or stifle housing development, especially affordable housing development, remains an empirical question. What is the "right mix" of sticks (requiring affordability contribution) and carrots (allowing more development capacity and density) for the developers?

This article first presents empirical evidence on the quantity response to the regulatory changes: Are more housing units permitted and built following the rezoning? The main empirical finding suggests strategic developer behavior following the reform at selected zones, guided by a cost-benefit tradeoff. Using a differences-in-differences analysis on a quasi-random sample of geographic areas that straddle the boundary of MHA zones, the results show no overall supply decline but strong *strategic substitution* of new construction away from blocks and parcels subject to the MHA. It is worth noting that the substitution is more likely for lowrise residential zones than highrise residential zones. This strategic substitution is a mixed result, because supply increases but not in all MHA zones as intended. In particular, the article finds that conditional on a permit being issued. It is more likely to be issued to a non-MHA block zone after the policy took effect in April 2019. Looking at the number of units, this study finds that differentially fewer units are added to MHA lowrise zones after the reform. Worryingly, most of the drop in the number of units in MHA zones is coming from the multifamily segment of the market, where most of the housing products are three- and four-story townhomes and duplexes. The multifamily segment is of particular note because lowrise and small multifamily homes are seen as more affordable alternatives to luxury apartments for low- and moderate-income renters.

Overall, this study's findings suggest preliminary mixed results for the MHA. Although upzoning allows for the construction of larger, taller multifamily buildings, it appears that MHA's affordability requirements act as a tax on some additional development. Importantly, any project on an MHA-zoned parcel was subject to the affordability requirement, regardless of whether the project was

"taking advantage" of the upzoning reform.[5] On balance, it appears that the cost of the affordability requirement to developers outweighed the benefit of additional units via upzoning, especially in lowrise zones.

Institutional Background

Seattle has experienced an intensifying housing affordability crisis during the past 2 decades, driven in part by the growth of big technology companies like Microsoft Corporation and Amazon.com, Inc., which have boosted labor demand and, therefore, housing demand. The median home price has tripled since 2000, and rental rates for a one-bedroom have increased 35 percent during the past 5 years. Also, a large racial gap exists in rent burdens: 35 percent of the city's African-American renter households are severely rent burdened compared with 19 percent of White renter households. Seattle's population grew 15.7 percent between July 2010 and July 2016, faster than almost any other large city in the country. In the city's 2035 Comprehensive Plan, Seattle housing officials identified that 20-year growth estimates would require the production of an additional 27,500 to 36,500 units, not including existing unmet needs. The shortage was anticipated to be particularly severe for units restricted to 30 and 50 percent of area median income. At this time, approximately 65 percent of the city's land was zoned for exclusively single-family usage.

The MHA reform allows for greater building heights and higher floor area ratio (FAR) limits in designated MHA zones. It also requires a developer contribution in exchange for the density bonus. The contribution comes in two forms that the developer could choose: "Payment" or "performance." Payment, a one-time monetary payment based on a predetermined schedule, goes directly into the city's affordable housing fund; performance requires developers to build rent- and income-restricted units on site. The contributions are designed to mitigate the perceived negative effects of new development.

The MHA reform upzoned 33 neighborhoods, allowing taller buildings and denser construction in three major types of buildings: Commercial, multifamily, and mixed-use. Any project in an MHA-rezoned area may choose between payment or performance. This program exempts single-family zones, but every project in an MHA rezone triggers the affordability requirement. This program design would ideally provide a distribution of mixed-income housing and a source of public revenue that the city housing agency could leverage toward more private funding for targeted development. The level of developer contribution required ("M," "M1," or "M2"), measured either through units built (performance option) or dollars contributed to the affordable housing fund (payment option), is determined by the extent to which the zone has changed from its prior classification. The program generated $68 million (and roughly 850 affordable units) in its first full year in 2020, with most developers taking the payment option.

One key thing to note is that this MHA program is not an unexpected "shock." Two years of community engagement and policy analysis informed the program's details. The guiding principles generated from that process for the MHA program include creating more rent-restricted affordable housing for low-income people; minimizing displacement and the effects on neighborhood

[5] For instance, it does not matter if a developer built a duplex that would have been allowed under pre-MHA zoning rules or a triplex that would have been only allowed under post-MHA zoning.

character; increasing the variety of housing choices, including homeownership and family-size housing; developing additional housing opportunities near schools, transit, and jobs; and coordinating growth with infrastructure investments.

In fact, the current program is an expansion of the city's preexisting voluntary Incentive Zoning program. The biggest difference from Incentive Zoning to MHA was that it became *mandatory* in designated geographies, in that it applies to all new permits issued within MHA zones after the reform. MHA was initially rolled out in 6 "urban villages" between 2015 and 2017 before being expanded on the same terms citywide in an additional 27 urban villages in April 2019.[6] This article uses April 2019 as the "post" period, because the overwhelming majority of neighborhoods affected and permits issued occurred after this wave of the reform. Importantly, the designers of MHA see the program as a necessary steppingstone for more ambitious future upzonings, both in terms of increases in allowable density and geographic scope.

Neighborhood assessments, completed as the city's comprehensive planning process, informed the geographic design of the MHA rezonings. The demographic and neighborhood trends of each urban village were examined to determine whether the area has a low or high "risk of displacement" and "access to opportunity."[7, 8] The architects of MHA intended to spur the most housing production in areas with a low risk of displacement and high access to opportunity.

Exhibit 1 shows that MHA rezonings affect quite a wide geography of neighborhoods. The left panel of exhibit 1 shows all MHA rezonings. The right panel breaks the rezoning down into three tiers based on the intensity of the zoning change. In the majority of cases, called the "M tier," the zoning code did not change, but taller buildings or higher FAR, or both, were allowed. A suffix was added to the zoning code after MHA took effect for these cases. For example, a lowrise 3, or LR3, becomes LR3(M). These rezones allow for roughly one story of additional development capacity. As a percentage of developable land in MHA rezoned areas, 78 percent of land falls under this mild change. The other 22 percent of land falls under M1 and M2 tiers, providing for more significant changes than the M tier.[9] The right panel shows the three color shadings corresponding to the three tiers. The most moderate M tier is the lightest shade. Housing officials carefully choose to map M tiers, opposed to M1 or M2 tiers, in high-risk or low-opportunity areas to minimize displacement risk and avoid hurting access to opportunity. The aim was to ensure that affordable units were added in lowrise multifamily zones rather than allowing for highrise luxury apartments. However, this modest upzoning, paired with MHA's affordability mandate, did leave M-tier areas at particular risk of lower supply responses.

[6] An urban village is the city's inventive term for certain mixed-use neighborhoods designated to accommodate common housing and business growth.

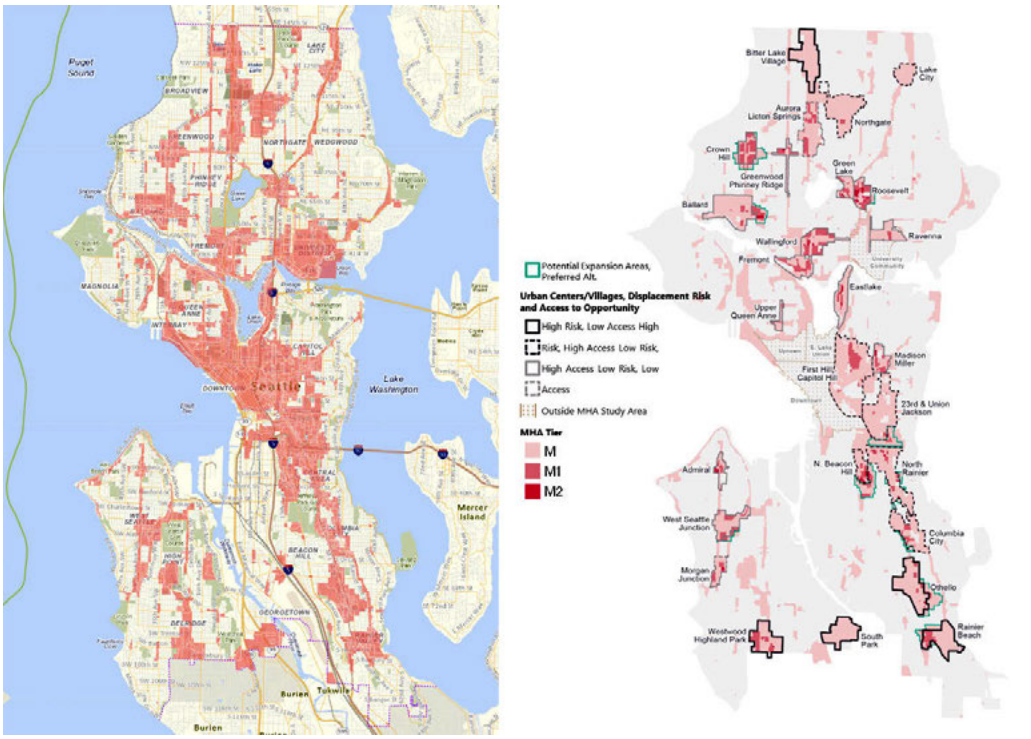
[7] Risk of displacement is determined by 14 indicators, including the racial composition of a neighborhood's residents, their educational attainment, its proximity to high-income neighborhoods, and development capacity.

[8] Access to opportunity includes factors such as local educational outcomes, property value appreciation, and proximity to resources such as parks, healthcare facilities, or public transit.

[9] Seattle classified its zones into five broad categories based on the density of permitted development. The M1 tier, which accounts for 20 percent of MHA rezoned areas, includes rezonings that moved the land up an entire category. The M2 tier, which accounts for only 2 percent of rezoned areas, involves upzones that shifted the land by two or more categories.

Exhibit 1

Mandatory Housing Affordability Areas and the Intensity of Upzoning



M = tier indicating zoning code did not change. M1 = tier including rezonings that moved the land up an entire category. M2 = tier involving upzones that shifted the land by two or more categories.

Source: Seattle GeoData and Department of Construction & Inspections zoning map, City of Seattle, 2017

To understand the size of the MHA rezoning treatment effect, this article looks at the actual permitting activities following MHA rezones. At the permit level, 75 percent of all permits issued in MHA-rezoned areas between April 2019 and July 2022 occurred in areas subject to the four most common zoning changes. Exhibit 2 summarizes these four changes. These four types of rezoning were also the most common when ranked by the total square footage of the lots on which new buildings were permitted, although their ranking differed across the two measures. For example, although the fourth largest number of permits were issued in places that changed from the LR3 zone to LR3(M), those permits accounted for the largest area on which new development occurred. Of all 34 million square feet of MHA-rezoned land on which new development occurred, 52.3 percent belongs to one rezone of LR3 to LR3(M).

Exhibit 2

Most Commonly Observed Four Rezones by Number of Building Permits and Lot Size

Rezone	Rezone Full Name	Count of Permits	Percent (%) of Total Permits	Lot Size (sq. ft.)	Percent (%)
RSL to RSL(M)	Residential Small Lot	418	18.4	3,169,433	9.1
LR1 to LR1(M)	Lowrise 1	386	17.5	2,302,597	6.6
LR2 to LR2(M)	Lowrise 2	329	14.9	2,373,404	6.8
LR3 to LR3(M)	Lowrise 3	271	12.3	18,243,500	52.3
All others		803	36.3	8,787,566	25.2
Total		2,207	100	34,876,500	100

LR = lowrise. M = tier indicating zoning code did not change. RSL = residential small lot.
Note: Percentages may not total 100 percent due to rounding.
Source: City of Seattle, Mandatory Housing Affordability Director's Report 2018

Exhibit 3 shows the four types of rezoning in which the largest number of net units were created. Here, a partial overlap exists with the earlier set, but certain commercial areas also appear due to the permitting of especially large developments in these areas.

Exhibit 3

Most Commonly Observed Four Rezones by Number of Net Units Created

Rezone	Rezone Full Name	Count of Permits	Percent (%)
DMC 240/290-400 to DMC 240/290-440	Downtown Mixed Commercial	3,188	12.0
LR3 to LR3(M)	Lowrise 3	1,887	7.1
LR2 to LR2(M)	Lowrise 2	1,301	4.9
C1-655 to NC3-75(M)	Commercial to Commercial/ Mixed use	1,142	4.3
All others (all fewer than 1,000 permits for one type of rezone)		18,996	71.1
Total		26,514	100

C = commercial. DMC = downtown mixed commercial. LR = lowrise. M = tier indicating zoning code did not change. NC = commercial/mixed use.
Note: Percentages may not total 100 percent due to rounding.
Source: authors' calculations.

The key takeaway is that the increased development capacity that most MHA rezonings created was relatively limited. Hence the "carrots" for developers—the development capacity increase—might not be big enough to outweigh their costs from the affordability payment or performance requirement.[10] The allowable FAR increases from 2.0 to 2.2 after MHA took effect, which means the height limit increases from 40 to 50 feet, adding another floor.[11] Other zoning code changes generally enjoy similar magnitude as LR3 does.

With a relatively modest density bonus, the "affordability tax" on developers is comparatively high. Housing officials estimate that the legislation will result in 17,000 more total housing units for 20 years than would be generated by development in its absence; 5,600 of those would be

[10] Appendix exhibit A2 shows an example of the specific building prototype for the most prevalent rezone change, LR3 to LR3(M) (Assefa et al., 2018).

[11] For LR3 inside Urban Villages.

rent- and income-restricted units. Importantly, estimates operated on the assumption that one-half of developers would choose to build affordable units on site, and one-half would choose to contribute to the affordable housing fund. However, in the first year that MHA was in full swing, an overwhelming majority of developers (98 percent) chose the payment option. This response suggests either that the performance option constitutes a large "affordability tax" on the developers or that the payment option levels were set too low.

Data and Analysis

To examine the effect of the MHA reforms on new home permitting and construction, two publicly available maps from Seattle GeoData (part of Open Data Seattle) are merged: the map of Residential Building Permits Issued and Final since 1990 and the city's MHA Zones map. The permit data are address-level geocoded and include information on the development site, permitting stage, plans for units created and demolished (by unit type), and other geographic data.

Then a panel dataset is constructed at the census block level over time. MHA zones do not always perfectly overlap with census block polygons, so a census block is categorized as an MHA block if at least 50 percent of its area falls within an MHA zone. Under this definition, only 11 percent (3,960 out of 35,279) of census blocks are within the MHA. MHA zones account for a very small share of census blocks, but many more blocks are geographically proximate to an MHA zone. Although slightly more than 1 in 10 census blocks has at least 50 percent of its area in an MHA zone, more than 31 percent are within a census tract that overlaps with an MHA zone somewhere within its boundaries. In this way, many census blocks are not upzoned, but they are in the neighborhood (census tract) of somewhere that *is* upzoned.[12]

Exhibit 4 presents population and socioeconomic summary statistics. The first three columns are block groups that were completely rezoned under MHA, those partially rezoned under MHA, and those that are fully non-MHA.[13] These block groups correspond roughly to the preexisting-built environment of Seattle neighborhoods, with MHA zones being in the most densely developed areas. The summary statistics change monotonically across all socioeconomic variables. Moving from the fully MHA block groups to fully non-MHA ones, people are fewer, housing units are fewer, incomes are higher, poverty is lower, and the percentage of owner-occupied housing is higher. Put differently, the fully MHA block groups—with a poorer population of more renters located around major commute lines—are precisely where housing affordability and displacement concerns are the greatest.

[12] The appendix has more details on the construction of the dataset.

[13] Note that no summary statistics by census block exist because population, income, and demographic variables at the block level are not available in 5-year ACS samples.

Exhibit 4

Summary Statistics by Census Block Group Mandatory Housing Affordability Status

	Fully MHA	Border MHA/ Non-MHA	Fully Non-MHA	All
Population	1,627.34	1,395.45	1,513.35	1,491.63
	(615.13)	(405.84)	(614.88)	(571.77)
Housing Units	867.31	601.72	568.19	599.35
	(420.51)	(215.70)	(243.76)	(266.20)
Median Income (2017 dollars)	66,810.58	93,625.62	96,007.03	93,320.46
	(26,051.03)	(37,717.84)	(41,502.25)	(40,300.85)
Median House Value (Thousands of 2017 dollars)	464.16	567.94	450.99	482.63
	(157.12)	(232.88)	(245.52)	(242.58)
Share College+	0.59	0.6	0.44	0.49
	(0.19)	(0.19)	(0.22)	(0.22)
Share in Poverty	0.17	0.1	0.08	0.09
	(0.16)	(0.09)	(0.08)	(0.10)
Share Owner-Occupied	0.23	0.59	0.68	0.63
	(0.15)	(0.21)	(0.26)	(0.27)
Share White	0.6	0.67	0.62	0.63
	(0.21)	(0.23)	(0.20)	(0.21)
Observations	107	365	948	1,420

MHA = Mandatory Housing Affordability.

Notes: Summary statistics at census block group (CBG) level, according to 2013–17 American Community Survey 5-year estimates. Means of CBG listed for each column (for example, mean of CBG median income) and standard deviation in parentheses.

Source: Authors' analysis via 2013–17 American Community Survey 5-year data

Fully non-MHA block groups are not a suitable control group for fully MHA block groups. As such, analysis is limited to the partial MHA block groups, which are defined as "border" MHA blocks for identification. One drawback of the border analysis is that although fully MHA block groups (column 1) do not have an adequate non-MHA comparison, these areas saw the most intense upzoning (the M1 and M2 zones). In effect, the 'treatment' is stronger in areas that lack a good control group and weaker in areas where an adequate control exists.

Empirical Findings

Consider two hypothetical outcomes of the policy change. The "first best" outcome is an increase in overall supply in the MHA zones. With the mandatory affordability requirements, this increase in overall supply also means an increase in affordable units. At the other extreme, if the reform is not designed correctly, the change in developer incentives could deter new construction both inside and outside MHA zones. The success of MHA rests on developers' response to a cost-benefit tradeoff. On the one hand, MHA allows developers to build and sell more units; on the other hand, each MHA-zoned project comes with a "developer tax" from the affordable housing requirement (either payment or performance).

The main empirical finding suggests that developers behaved strategically after the reform took effect, which this tradeoff guides.[14] In particular, while housing production did not decline overall, there was strong *strategic substitution* of new construction away from MHA zones. This policy outcome can be considered a middle ground between the initial hypothetical outcomes: MHA enactment did not halt all new development, but new units were not built where intended.

A difference-in-differences regression is estimated at the census block level to quantify the substitution effect. Exhibits 5 through 7 show the generalized difference-in-differences result on different dependent variables. Estimates for key coefficient β_3 are on the first row.[15]

Exhibit 5

Extensive Margin: At Least One Permit Is Issued, Block by Month

	(1)	(2)	(3)	(4)	(5)	(6)
Post X MHA	– 0.004***	– 0.004***	– 0.004***	– 0.005***	– 0.005***	– 0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Post	– 0.000	– 0.000				
	(0.000)	(0.000)				
MHA Block	0.009***	0.005***		0.005***		
	(0.001)	(0.001)		(0.001)		
R–squared	0.002	0.007	0.028	0.003	0.023	0.022
DV Mean	0.002	0.002	0.002	0.007	0.007	0.007
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3527900	3527900	3527900	1049600	1049600	862700

****p < .01.*

BlkGrp = block group. DV = dependent variable—in this table, whether at least one permit is issued at the block-month level. FE = fixed effects. Geo. FE = geographic fixed effects. Geo. Sample = geographic sample. MHA = Mandatory Housing Affordability. Mo = month.

Notes: Standard errors are in parentheses. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.

Source: Authors' analysis

Exhibit 6

Number of Permits, Block by Month (1 of 2)

	(1)	(2)	(3)	(4)	(5)	(6)
Post X MHA	– 0.007***	– 0.007***	– 0.007***	– 0.009***	– 0.009***	– 0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Post	0.000*	0.000*				
	(0.000)	(0.000)				
MHA Block	0.015***	0.011***		0.012***		
	(0.002)	(0.002)		(0.002)		
R–squared	0.002	0.005	0.025	0.002	0.022	0.020
DV Mean	0.003	0.003	0.003	0.011	0.011	0.010

[14] Appendix exhibits A4 and A5 present summary statistics on the average monthly number of net units and value in MHA versus non-MHA zones *in aggregate*, before and after the policy change.

[15] See the appendix for the formal difference-in-differences equation 1.

Exhibit 6

Number of Permits, Block by Month (2 of 2)

	(1)	(2)	(3)	(4)	(5)	(6)
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3527900	3527900	3527900	1049600	1049600	862700

**p < .10. ***p < .01.*

BlkGrp = block group. DV = dependent variable—in this table, the number of permits at the block-month level. FE = fixed effects. Geo. Sample = geographic sample. Geo. FE = geographic fixed effects. MHA = Mandatory Housing Affordability. Mo = month.

Notes: Standard errors are in parentheses. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.

Source: Authors' analysis

Exhibit 7

Number of New Units, Block by Month

	(1)	(2)	(3)	(4)	(5)	(6)
Post X MHA	– 0.069**	– 0.069**	– 0.069**	– 0.057***	– 0.057***	– 0.065***
	(0.030)	(0.030)	(0.030)	(0.018)	(0.018)	(0.016)
Post	– 0.000	– 0.000				
	(0.001)	(0.001)				
MHA Block	0.189***	0.120***		0.119***		
	(0.026)	(0.016)		(0.013)		
R–squared	0.001	0.001	0.014	0.001	0.016	0.015
DV Mean	0.023	0.023	0.023	0.052	0.052	0.041
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3527900	3527900	3527900	1049600	1049600	862700

*** p < .05. ***p < .01.*

BlkGrp = block group. DV = dependent variable, in this table it is the number of new units at the block-month level as indicated in the title of the table. FE = fixed effects. Geo. FE = geographic fixed effects. Geo. Sample = geographic sample. MHA = Mandatory Housing Affordability. Mo = month.

Notes: Standard errors are in parenthesis. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.

Source: Authors' analysis

Exhibits 5 through 7 tables are organized in six columns. The first three columns use the sample of all census tracts, with no fixed effects (column 1), tract fixed effects (column 2), and year-month and block fixed effects (column 3). To get to the causal effect of MHA, the analysis is limited to a quasi-experimental sample in columns 4 through 6 for estimating equation 1.[16] In particular, the sample of "Border Tracts," is used, which are tracts that straddle an MHA boundary. This sample eliminates tracts that are entirely within MHA zones and entirely outside of MHA zones. A total 397 tracts exist, and 118 are border tracts by this study's definition. The estimation is at the census block level, which is a finer geography than census tracts. All the variation in the "Post X MHA" coefficients comes from the comparison within neighborhoods, where some blocks in that neighborhood are upzoned and others are not.

[16] See the appendix for details regarding equation 1.

If the MHA upzoning program worked as hypothesized, much more permitting activity would transpire, and more new supply would exist in the upzoned blocks within a border tract. However, the opposite occurs—the development is happening more in blocks not upzoned within the same neighborhood.

The identifying assumption is that, within a tract, the growth potential of housing demand is the same whether the housing project falls onto either side of the MHA line. A tract is a fine geographic level that makes this assumption reasonable. Columns 4 and 5 use the quasi-random sample of border tracts, with tract and year-month fixed effects (column 4) and block and year-month fixed effects (column 5). Column 6 zooms into the finer geographic level of block groups and uses the finer block groups at the border (partially MHA), with year-month and block-fixed effects.

The three variables that measure quantity response are whether a permit was issued at all (exhibit 5), the number of permits issued (exhibit 6), and the net units permitted (exhibit 7). These three exhibits examine housing supply activity in Seattle's census blocks from 5 years prior to Mandatory Housing Affordability through the most recent data (April 2022). All three exhibits are set up the same way: Columns 1, 2, and 3 examine effects for all Seattle, adding fixed effects across the columns, and columns 4 through 6 limit the sample to areas on the MHA borders.

The analysis finds quantitatively strong and consistent empirical evidence for substitution of supply away from MHA zones. Across all specifications on all three quantity-dependent variables, the number of permits and the number of units permitted per month decreases in MHA blocks after the reform takes effect.

Exhibit 5 examines whether at least one permit was issued in a census block, finding that MHA rezonings decreased the likelihood of a permit being issued, particularly at the border tracts. The dependent variable is defined as an indicator variable that equals 1 if at least one permit is issued in that block-month or 0 if none are issued. The estimate of -.004 on "Post X MHA" is very consistent across all specifications and the two geographic samples. The magnitude is economically meaningful. It is twice as large as the dependent variable mean in the full sample of all tracts (the first three columns).[17]

Interestingly, as the analysis moves to the finer geography of border tracts, the (absolute) magnitudes are bigger, which suggests that the substitution action is happening in the border tracts. That is, permitting activity is switching *within* and not *across* neighborhoods. Notice also that the dependent variable means an increase from 0.002 in columns 1 through 3 (the all tracts sample) to 0.007 in columns 4 through 6 (the border tract sample). One could interpret this increase as an annual likelihood of receiving a permit increasing from 2.4 percent overall to 8.4 percent for border-MHA neighborhoods, indicating that throughout this period (including 5 years before MHA), much more housing is permitted in these MHA-border neighborhoods than in either fully non-MHA or fully MHA areas. These results are consistent with developers deciding first to build in a certain neighborhood, then strategically choosing to build on parcels in that

[17] Put differently, this magnitude means that after MHA goes into effect, an MHA block is differentially 4.8 percent less likely to receive a permit in a given year (-0.004 x 12 months) than a non-MHA block in that same timeframe. On average, the likelihood a block receives a permit on an annual basis is about 2.4 percent (0.002 x 12 months), which is why this magnitude could be described as both large and economically meaningful.

neighborhood not subject to the MHA's affordability requirements. This strategic behavior [suggests that the potential benefits accruing to developers from the MHAs upzoning component failed to outweigh the costs to developers of the affordability requirements.

Exhibit 6 looks at the number of permits issued, again finding a reduction driven by MHA rezonings. The magnitudes are small (-0.007 per month), but the base is also very small (0.003), so economically, the effect is quite large. Columns 1 and 2 show that MHA blocks generally see more permitting activity throughout the sample period. Column 3 adds block and month-fixed effects, and the point estimate is unchanged, meaning that permitting differentially decreases in MHA zones. The final column limits the sample only to those *census tracts* that at least partially intersect an MHA zone. Because tracts are much larger than blocks, this specification removes all control census blocks that are far from an MHA zone, thus potentially differing unobservably from treatment areas. The point estimate is unchanged and even a bit stronger, but it remains statistically significant. The overall permitting activity tended to move across MHA boundaries after the policy took effect.

The results for the number of new units created is very similar and robust. This evidence implies that substituting behavior occurs along the border of MHA zones, which suggests strategic developer behavior is at play. Developers want to profit from the growing demand in these MHA zones, but the construction cost is too high after the reform. By moving to the bordering blocks, they avoid those costs but still enjoy the spillover from in-demand neighborhoods.

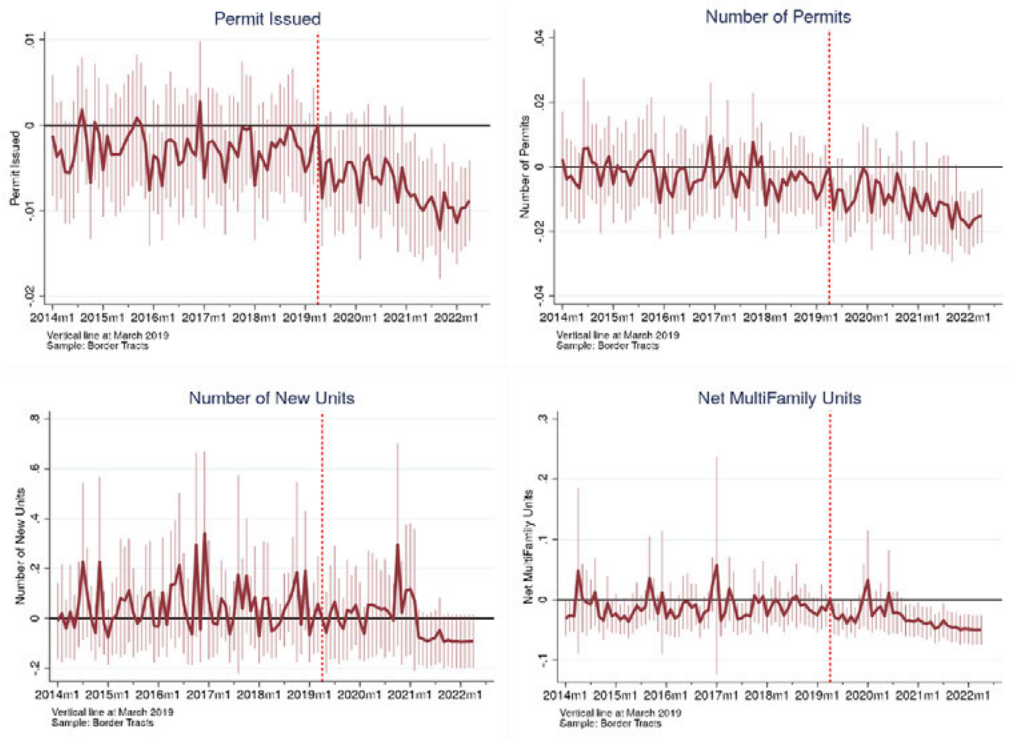
Event Study Plots

The four event study plots use the three variables previously discussed and the net change in multifamily units to illustrate these findings visually (exhibit 8). Column 5 from the three quantity tables in exhibits 5 through 7 is regarded as the preferred estimates for the event study plots. Even though column 6 arguably represents the finest geography, column 5 provides the finest data for the socioeconomic variables. However, these plots should tell the same story using either of the estimates. The coefficient estimates are similar across columns 5 and 6; if anything, column 5 underestimates the true effect. Exhibit 8 plots the relative treatment effect of MHA zones, because the non-MHA areas are normalized to 0.[18]

[18] The red bands are 95-percent confidence intervals around the point estimates. The x-axis is recentered around the "event date" of April 2019, with the green vertical line as the partition for pre and post-reform.

Exhibit 8

Event Study Results



Source: Authors' analysis based on Seattle permits data

These plots show that MHA enactment in April 2019 was associated with a lower likelihood of permit issuance in MHA zones (top left), fewer permits being issued per block (top right), slightly fewer units permitted overall (bottom left), and significantly fewer multifamily units permitted (bottom right). This final result of fewer multifamily units is particularly worrying, considering that a major goal of MHA was to encourage dense multifamily development.

Common striking patterns emerge from comparing the four plots. For all four event studies, housing production activity gradually declines in the treated MHA zones after the reform. The substitution is expected to continue, as the authors obtain more data for newer months (currently, the data are updated until April 2022).

Conclusion

This article provides empirical evidence on whether upzoning leads to new home construction if strings are attached to affordable housing. A difference-in-differences estimation is performed using a within-neighborhood variation, where some census blocks in that neighborhood are upzoned—and subject to affordable housing requirements—whereas others are not. The hypothesis was that much more permitting activity would occur in the upzoned blocks, because the benefits of

being able to build more densely was intended to outweigh the costs of any inclusionary zoning requirements. However, the opposite is observed in the data. A differentially larger supply response is found in blocks where the zoning has not actually changed and where affordable housing has not been mandated. Unfortunately, this result runs contrary to the program's dual goals of increasing overall housing supply in general and affordable housing units in particular.

Examining the locations of permitting activity, this article finds new construction is sited just across MHA lines at very fine geographies. Developers appear to be strategically substituting away from plots and parcels subject to the MHA. This result is interpreted as evidence of the MHA's cost to developers outweighing its benefits, especially in MHA border neighborhoods. Specifically, the MHA's affordability requirements act as a "tax" on developers, which appears to dominate potential gains from higher-density projects.

However, several caveats must be mentioned. First, the program is in its infancy. These data allow for examining only the first 3 years of MHA, 2 years of which were affected by COVID-19. The pandemic likely negatively affected both the demand for multifamily housing and the speed of the city's housing permitting process. It may also have shifted the demand for housing across Seattle's geography, given changing patterns of working from home—and here in Seattle, perhaps for the 5 to 10 years or even longer. Certainly, policymakers did not account for the pandemic in their initial efforts to pair the amount of MHA's upzoning with the number of its affordability requirements. Second, the MHA border block design has drawbacks. By design, MHA blocks near the border were zoned for smaller increases in density than areas farther away from an MHA boundary. This design necessitates a tradeoff between examining where the reform's treatment is more powerful (the interior, fully MHA neighborhoods) versus where its effects can be more precisely estimated (the border, partial MHA neighborhoods). In choosing the latter, the authors acknowledge that the estimates are potentially downward biased; MHA's effects may be more positive in the interior areas. Regardless, although the results do not speak to how MHA affected the interior, fully MHA and higher-density neighborhoods compared with a counterfactual, it is worth noting that permitting did continue in these areas in an absolute sense. Third, MHA may have large noneconomic or difficult-to-quantify benefits. For example, given the size of the reform and the consensus it took to implement it, MHA has provided Seattle a potential springboard to expand upzoning in magnitude and geography—one that policymakers hope to use. These benefits may be institutional or political in nature. Although such institutional and political benefits are outside the scope of this economic analysis, they may be quite significant.

How similar inclusionary housing programs will function outside Seattle remains ambiguous. The findings are a function not only of the size of the density bonus provided and the affordability mandate Seattle imposed but also the shape of housing demand in Seattle and the city's room for development outside the rezoned areas. Each of these factors will vary across different cities and across time. Even so, the findings point to the potential for unintended consequences when density bonuses are too small, or affordability mandates are too onerous. In the future, policymakers are recommending that pursuing similar inclusionary housing strategies implement stronger upzonings (larger density bonuses) and lighter, more flexible affordability mandates.

Appendix

Data and Econometrics

To examine the effect of the Mandatory Housing Affordability (MHA) reforms on new home permitting and construction, this analysis merges two publicly available maps from Seattle GeoData (part of Open Data Seattle): The map of Residential Building Permits Issued and Final since 1990 and the city's MHA Zones map. The permit data are address-level geocoded and include information on the development site, permitting stage, plans for units created and demolished (by type of unit), and other geographic data. The permitting data also include information on the lot size and the estimated value of the project, from which one can infer the density of the final project (on a units per acre basis) and obtain a proxy of the overall market value. The MHA map contains MHA zone polygons, with their pre and post zoning designation.

The authors then construct a panel dataset at the census block level over time. MHA zones do not always perfectly overlap with census block polygons, so a census block is categorized as an MHA block if at least 50 percent of its area falls within an MHA zone. Only 11 percent (3,960 out of 35,279 census blocks) are within the MHA.[19] MHA zones account for a very small share of census blocks, but many more blocks are geographically proximate to an MHA zone. Whereas slightly more than 1 in 10 census blocks have at least 50 percent of its area in an MHA zone, more than 31 percent of census blocks are within a census tract that overlaps with an MHA zone somewhere within its boundaries. In this way, many blocks are not upzoned, but somewhere in their neighborhood will be.

Regression Equation

Equation 1 in our econometric analysis is estimated, where t is month, i is MHA status of the census block (or block group in column 6 specification across all results tables from exhibits 5 through 7), and γ and δ are, respectively, month and block (or tract) fixed effects.

Equation 1

$$Y_{i,t} = \alpha + \beta_1 \cdot post_t \times MHA_i + \beta_2 \cdot post_t + \beta_3 \cdot MHA_i + \gamma_t + \delta_i + \varepsilon_{i,t} \quad (1)$$

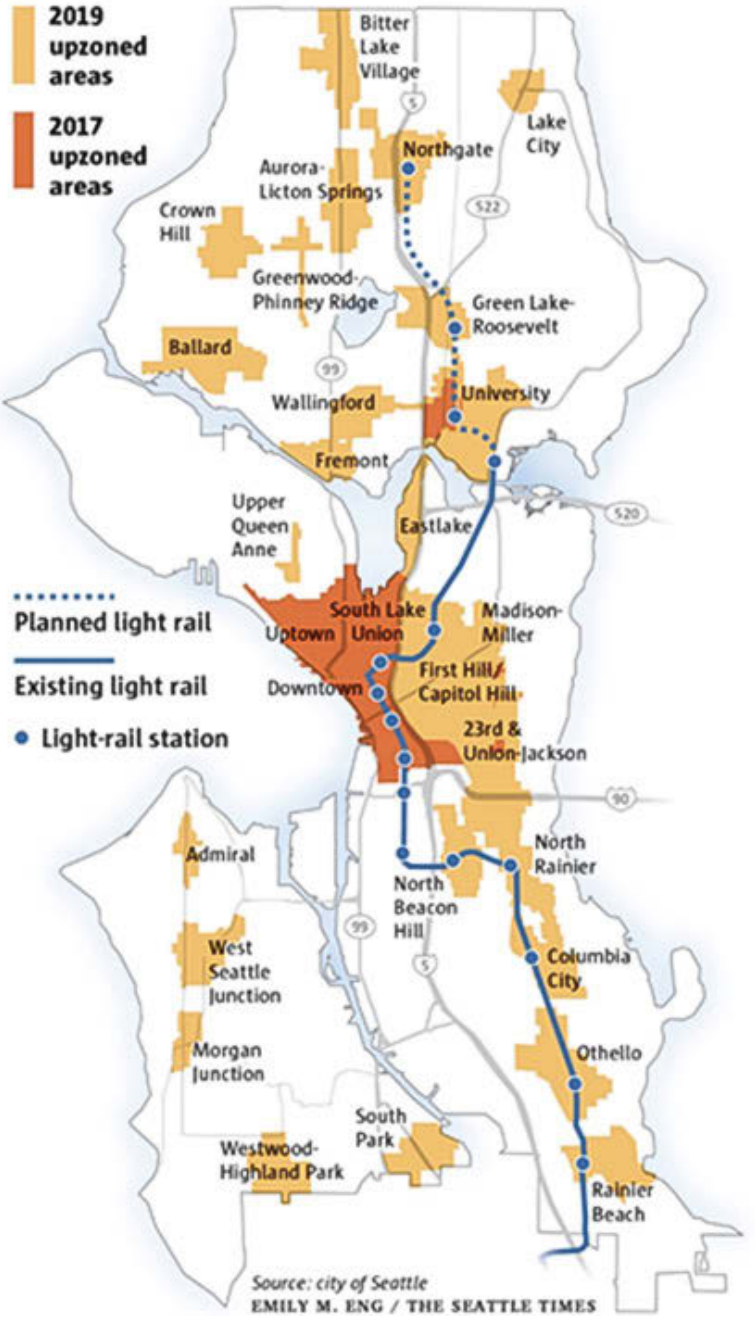
The analysis is limited to 5 years of preperiod (January 2014 to March 2019) and 3.5 years of post-period (April 2019 to April 2022). Using the full preperiod back to January 2010 gives similar results, as appendix exhibit A3 shows. A block is "Treated" if it is in the designated MHA zone, whether entirely or partially. "Post" is a dummy variable that equals to 1 if it is after April 2019. The key coefficient of interest is β_3.

Exhibit A1 shows the map of MHA zones in two waves. Exhibit A2 provides a visual illustration of MHA change for one of the most commonly observed zone changes in a lowrise 3 zone.

[19] For reference, 84 percent of blocks do not overlap with the MHA zones at all, whereas about 4 percent of blocks have between 0 and 50 percent MHA coverage (and are, thus, categorized as non-MHA under this definition). Of the blocks that are categorized as MHA, more than 80 percent are entirely contained within an MHA. This categorization of MHA blocks is conservative so as to limit false positives of permits popping up near, but not within, MHA designated areas.

Exhibit A1

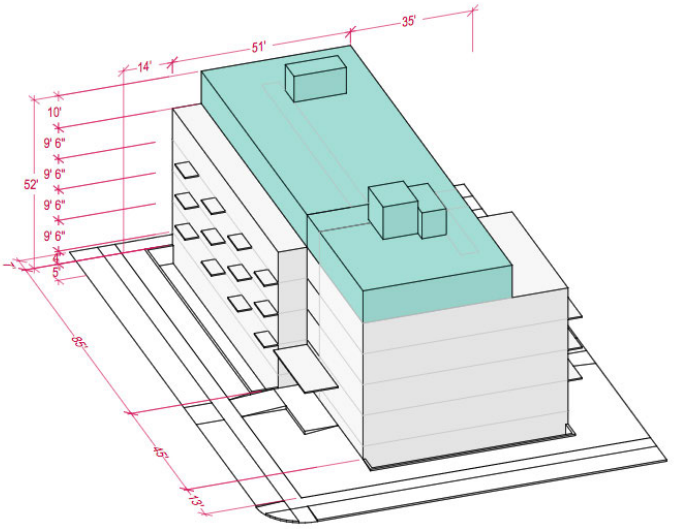
Map of Mandatory Housing Affordability Zones



Source: City of Seattle

Exhibit A2

Illustration of Lowrise 3 Zoning in a Large Site Under Mandatory Housing Affordability

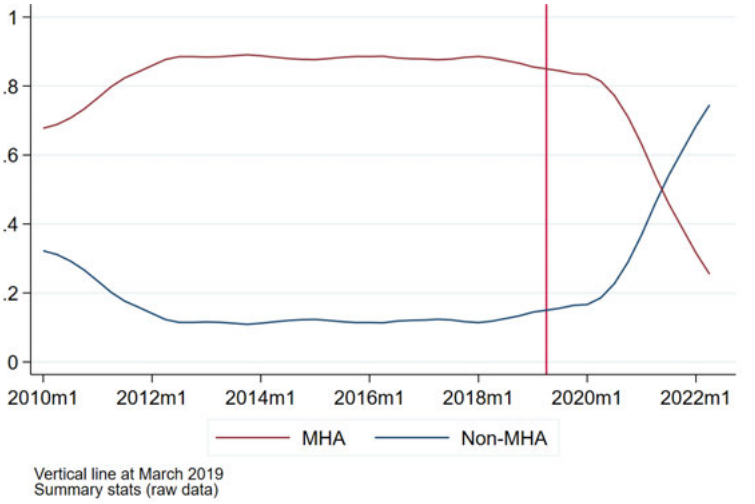


Source: City of Seattle, Office of Planning and Community Development

Exhibit A3 plots the share of net units per month by MHA status. It shows preliminary evidence that construction of new units is slowing down in MHA areas after the mandate went into effect. Exhibits A4 and A5 provide summary statistics on the number of net units and values of permits pre- and post-MHA, in MHA versus non-MHA areas.

Exhibit A3

Share of Net Units per Month, by Block Mandatory Housing Affordability Status



MHA = Mandatory Housing Affordability.
Source: Authors' analysis

Exhibit A4

Number of Net Units, Mean, and Standard Deviation

	Jan 2010–Apr 2019	After Apr 2019
Non-MHA	85.4	104.2
	(82.8)	(98.8)
MHA	670.6	466.6
	(508.0)	(495.9)

MHA = Mandatory Housing Affordability.

Source: Authors' analysis

Exhibit A5

Value (in $1,000), Mean, and Standard Deviation

(In $1,000)	Jan 2010–Apr 2019	After Apr 2019
Non-MHA	22,433	28,895
	(19,401)	(20,300)
MHA	121,538	89,217
	(123,860)	(110,165)

MHA = Mandatory Housing Affordability.

Source: Authors' analysis

Appendix exhibits A6 and A7 show the specific height, density, and floor area ratio limit changes for commonly observed types of rezones.

Exhibit A6

Mandatory Housing Affordability Development Capacity Change in Lowrise Zones

Zone			FAR Limit		Height Limit		Density Limit	
Pre MHA	Post MHA	Housing Type	Pre MHA	Post MHA	Pre MHA	Post MHA	Pre MHA	Post MHA
Lowrise 1	Lowrise 1 (M)	Cottage	1.1	1.1	18	22	1/1,600	No Limit
		Townhouse	1.2	1.1	30	30	1/1,600	1/1,350
		Rowhouse	1.1	1.1	30	30	1/1,600	1/1,350
		Apartment	1.0	1.1	30	30	1/2,000	No Limit
Lowrise 2	Lowrise 2 (M)	Cottage	1.1	1.3	18	22	1/1600	No Limit
		Townhouse	1.3	1.3	30	40	No Limit	No Limit
		Rowhouse	1.2	1.3	30	40	No Limit	No Limit
		Apartment	1.3	1.3	30	40	No Limit	No Limit
Lowrise 3	Lowrise 3 (M)	Cottage	1.1	1.8	18	22	1/1,600	No Limit
		Townhouse	1.4	1.8	30	40	No Limit	No Limit
		Rowhouse	1.3	1.8	30	40	No Limit	No Limit
		Apartment	1.5	1.8	30	40	No Limit	No Limit

FAR = floor area ratio. M = tier indicating zoning code did not change. MHA = Mandatory Housing Affordability.

Source: Policy Proposal Director's Report, City of Seattle

Exhibit A7

Mandatory Housing Affordability Development Capacity Change in Residential Small Lot Zones

Zone			FAR Limit		Height Limit		Density Limit	
Pre MHA	Post MHA	Housing Type	Pre MHA	Post MHA	Pre MHA	Post MHA	Pre MHA	Post MHA
Residential small lot (RSL)	RSL (M)	RSL	None	0.75	25	30	1/2,500	1/2,000
		Tandem RSL	None	0.75	18	30	1/2,500	1/2,000
		Cottage RSL	None	0.75	18	30	1/1,600	1/2,000

FAR = floor area ratio. M = tier indicating zoning code did not change. MHA = Mandatory Housing Affordability.
Source: Policy Proposal Director's Report, City of Seattle

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