The Nature of Neighborhoods: a Housing Crisis Deconstructed

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Synopsis

What is the relationship between neighborhoods and the cities they form? This study looks at correlations between demographics and housing development trends in Vancouver to build a case for its neighborhoods being measurably unique statistical entities. Every neighborhood is classified using several measures of density. Parallels are then drawn between neighborhood-level densification and city-wide trends in housing prices over the last decade, as well as results from the 2022 municipal election. With a link formed between densification, housing supply, and affordability, I close with a brief discussion of paths forward, including an endorsement of the nascent Vancouver Plan.

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Preamble

It takes every neighborhood to raise a city.

Central to Jane Jacobs' *The Death and Life of Great American Cities* is the notion that successful neighborhoods are characterized by a healthy amount of density, sidewalks over streets, and mixed-use spaces (Jacobs, 1961).

Img 1. *The West End (left) and Mount Pleasant (right) have some great examples of mixed-use spaces, where mid-rise apartments greet local shops. Photos by author for joined space.*

One modern hindrance to accessible housing is density-averse NIMBY-ism, which can render large geographical pockets of cities closed off and stagnant. This has far reaching consequences on population density and displacement, akin to the act of forcing water out of a clogged faucet. Jacobs' resistance to Robert Moses' 5th Ave Extension, this brand of outrage is not.

City planning should not be top down. It needs to be somewhat granularized for perspective. Otherwise, what results is symptomatic treatment, not fundamental healing.

A City in Prolonged Bloom

One of the most fascinating examples of urban transformation in the 21st century can be found in Vancouver, Canada.

Vancouver has over the last two decades come to embrace its status as a leader in green development, opting for bike lane expansions and greenways over street widening and highway projects (C.O.V, n.d.). Despite such forward thinking, the city has continued to suffer from growing pains that stem from concurrent population growth and plummeting housing affordability.

Vancouver's population grew from 545,671 in 2001 to 662,248 in 2021, a 21% increase (Macrotrends, 2022).

Meanwhile, the average apartment and single detached home prices grossly outpaced population growth at $158,690 and $353,230 in June of 2001 to $737,600 and $1,801,100 in June of 2021, a 365% and 410% increase respectively (REBGV, 2022). Apartment and detached home sales went from 841 and 1554 in June of 2001 to 1774 and 1262 in June of 2021, a 111% increase and 19% decrease respectively (REBGV, 2022).

Of course, this is a condensing of that twenty year period, but in essence, the following occurred simultaneously:

1. As average *apartment* prices climbed, an increasing number of them changed hands.
2. As average *detached home* prices climbed, a decreasing number of them changed hands.

These trends point to what likely is and was the most egregious bottle neck in housing supply: single detached homes with their large footprint and inherent unscalability.

Are these homes in particular neighborhoods or dispersed across the city? How have they defied change and created artificial scarcity, and what impact does this have on the bigger picture?

Img 2. *A detached home in Shaughnessy prepping for a luxury makeover. Photo by author for joined space.*

This article will be a stroll through Vancouver's neighborhood-level data in order to see what role demographic attributes and temporal trends play in the ongoing housing crisis.

Prompts & Posits

Propping up the quantitative end of this study were several datasets from the City of Vancouver's Open Data Portal (C.O.V, n.d.). All final datasets in CSV form, SQL source files, and the master Python Notebook are accessible from the project repository on GitHub.

A few important notes on dataset quirks before proceeding:

- The *census-profiles* and secondary demographic datasets were built from 2016 Vancouver census data. At the time, this was the most recent census report publicly available.
- The *issued-building-permits* dataset included data from 2017 through 10/31/2022, when a final copy was downloaded from the data portal.
- The *neighborhood_population_densities* dataset was created using 2020 data from the City of Vancouver's community profiles (C.O.V, 2020).
- Lastly, the *2022_voting_results* dataset pulled the 2022 election results on the day that all counting had ended and the full report was made public (C.O.V, 2022).

These discrepancies in time range and recency were not roadblocks. They simply directed variables from each dataset to be tagged as either indicators of a trend (e.g. in the case of permits) or baseline attributes (e.g. in the case of census data).

This study's central hypotheses were as follows:

1. Neighborhoods that had lower housing density (more single detached homes) per the 2016 census did not densify to any significant degree in the years following (***resistance to change***).
2. Neighborhoods that had the most single dwelling permits approved (as opposed to multi dwelling permits) through 2022 comprised (as of the 2016 census) residents with higher average age, lower average household size, higher incomes, shorter commutes, healthier commute methods, more homeowners than renters, better housing suitability, higher educational level, and a more homogeneous racial demographic (***sequestered privilege***).

Support for these hypotheses would indicate a quantifiable gap in wealth, opportunity, and growth across Vancouver's neighborhoods. This would in turn make room for postulates around the ramifications of such gaps on city-wide housing affordability.

Statistical Soup

From here on out, *multi type* will act as shorthand for a residential development project that houses multiple families, and *single type* as shorthand for single detached dwellings.

Before digging into demographics, I wanted to examine the number of permits (and units therein) granted yearly by neighborhood, in order to get a broad snapshot of the most up-to-date development trends. To reduce the complexities of permit types and property uses, I focused solely on permits granted for new developments, where the property use included *dwelling* (some properties were zoned for multi-use, and had a list of other property uses in addition to *dwelling*, such as *retail*).

An initial hurdle was getting a read on how many prospective dwelling units (or living spaces) belonged to each approved permit. The raw data from the City of Vancouver did not have a dedicated field with this number. Single dwelling type projects followed a trivial 1:1 ratio, but it took breaking apart the full permit text of every multi type proposal to extract how many units it comprised. I parsed this data in an automated fashion by searching for keywords, then vetted it manually.

A handful of projects didn't list a specified number of units, even in the full permit text. In these cases, I approximated the unit count as six times the number of storeys, six chosen by averaging across a sample of multi type developments of various scales.

The transformed data, now including a unit count per permit, was saved as a new dataset.

Defining Densification

At first, I graphed a yearly time series of total permit counts segmented by neighborhood, but year over year trends pointed neither at marked acceleration nor deceleration in growth.

Taking the liberty of reducing dimensionality, I aggregated permit counts across the full 2017–2022 range. This allowed the neighborhood variable to occupy an axis.

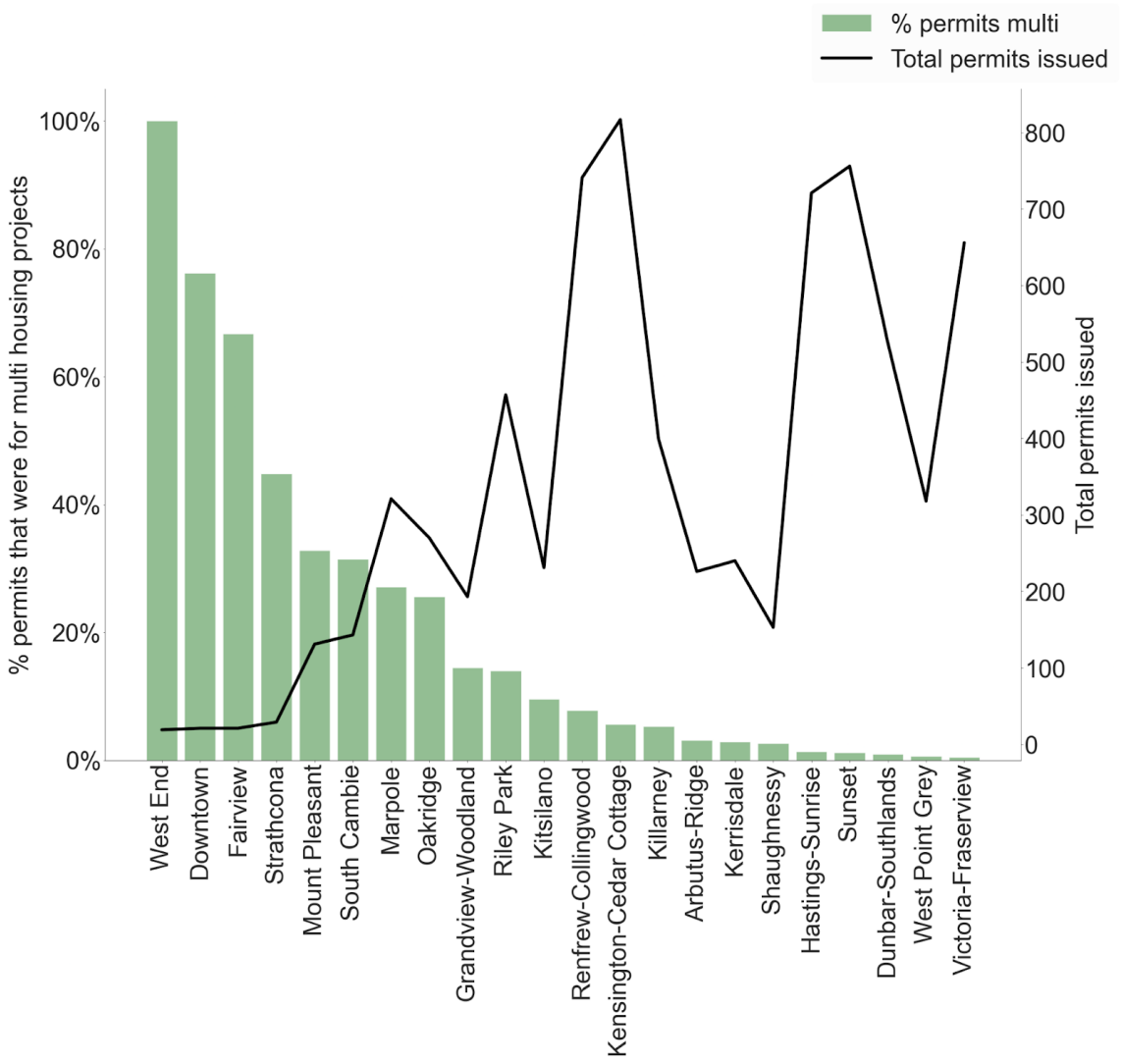

Fig 1. *Total permits issued from 2017–2022, with the % that were of multi type, across neighborhoods. Figure made with seaborn by author for joined space.*

The above dual-axis graph sorts neighborhoods in descending order by the percentage of total issued permits that were of multi type. Let's call this percentage the *densification* of the neighborhood. This term will show up frequently moving forward, so keep it close by!

Interestingly, the total number of issued permits (superimposed line) showed a nearly inverse relationship to densification. Neighborhoods with higher densification, like Downtown, were issued fewer permits overall.

On the other hand, the rightmost 10 neighborhoods contained some of the highest volume peaks in the entire graph. For instance, in Dunbar-Southlands, over 700 permits were issued, but fewer than 1% of them were of multi type!

Any income disparity across neighborhoods would have been a contributing factor. An area with higher earning individuals on average would have had more means to build or rebuild, thus potentially skewing its permit volume higher.

Four Categories

What emerged from this first graph were four neighborhood categories, which will be referred to a great deal:

1. Neighborhoods with higher densification and lower approved permit volume. The four leftmost neighborhoods in the graph were in this group.
2. Neighborhoods with moderate densification and approved permit volume. One might call these neighborhoods *in transition*. This captured Mount Pleasant through Riley Park on the graph (Kitsilano being on the fence).
3. Neighborhoods with lower densification and approved permit volume. This captured Arbutus Ridge through Shaughnessy, and West Point Grey.
4. Neighborhoods with lower densification and higher approved permit volume. This captured all remaining neighborhoods.

To flatten some of the variance caused by wildly ranging counts of dwelling units (or living spaces) per permit, I generated a sibling distribution to Figure 1.

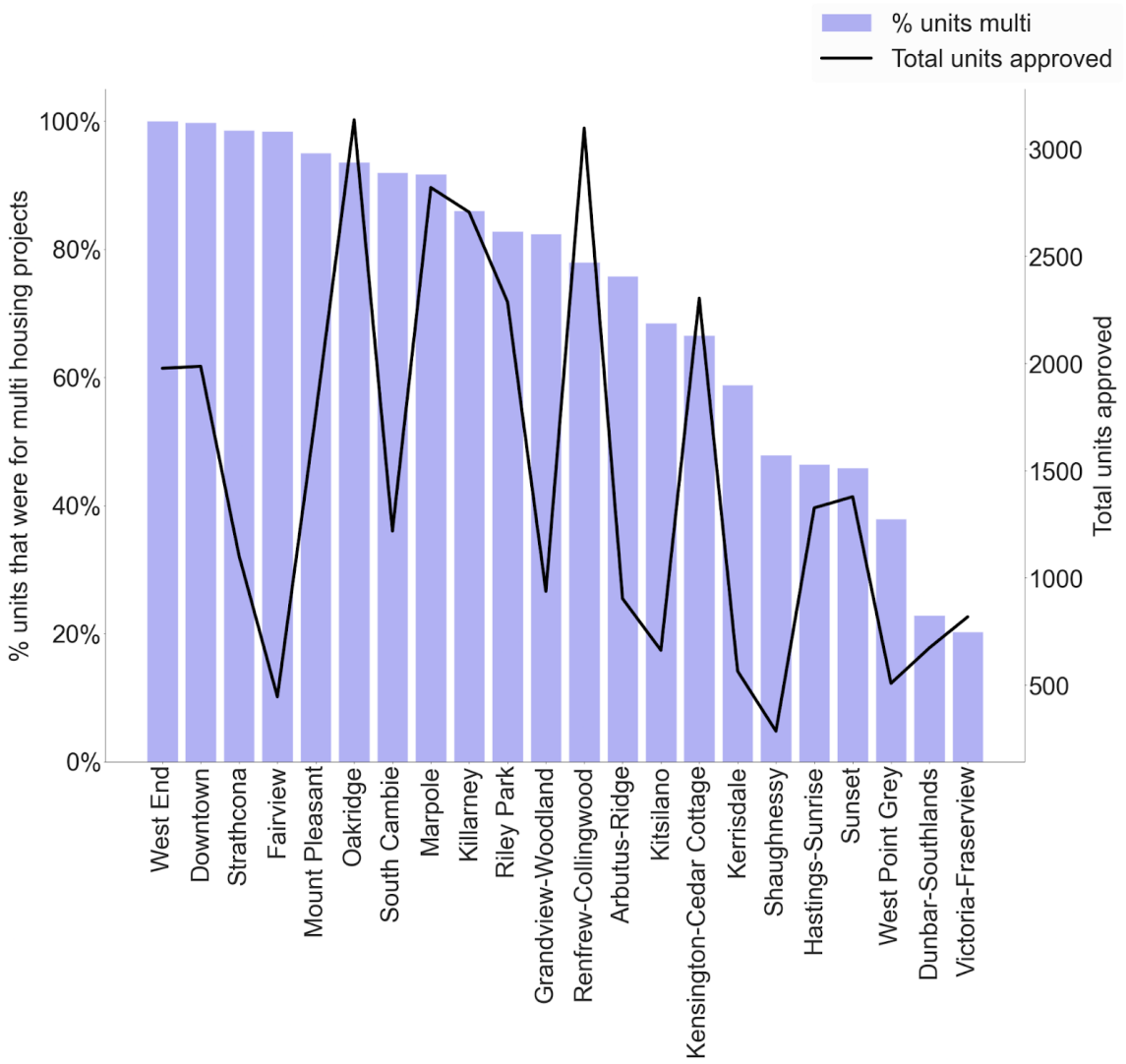

Fig 2. *Total units approved from 2017–2022, and the % that were of multi type, across neighborhoods. Figure made with seaborn by author for joined space.*

Figure 2 above reports on the aggregated number of dwelling units specified per permit. As stated before, this made no difference to single type developments which were by definition a unique detached domicile. On the other hand, multi type developments scaled non-trivially, from low rises with a dozen units to high rises encompassing hundreds.

With all multi type projects now representing their fair share of the housing pie, the unit-based densification was naturally higher across the board.

This evening of the playing field helped give a better idea of which neighborhoods had faster growing populations. A leftward shift along the x-axis from Figure 1 to 2 would suggest that the

multi type permits approved in that neighborhood represented a larger proportion of high occupancy projects like high rises.

Corroborating Densities

With evidence that neighborhoods were unique data points when examined through the lens of densification, I wanted to corroborate with the static population densities across the four proposed neighborhood categories. Consider the following box plot showing population density by neighborhood category, based on the 2020 community profiles data.

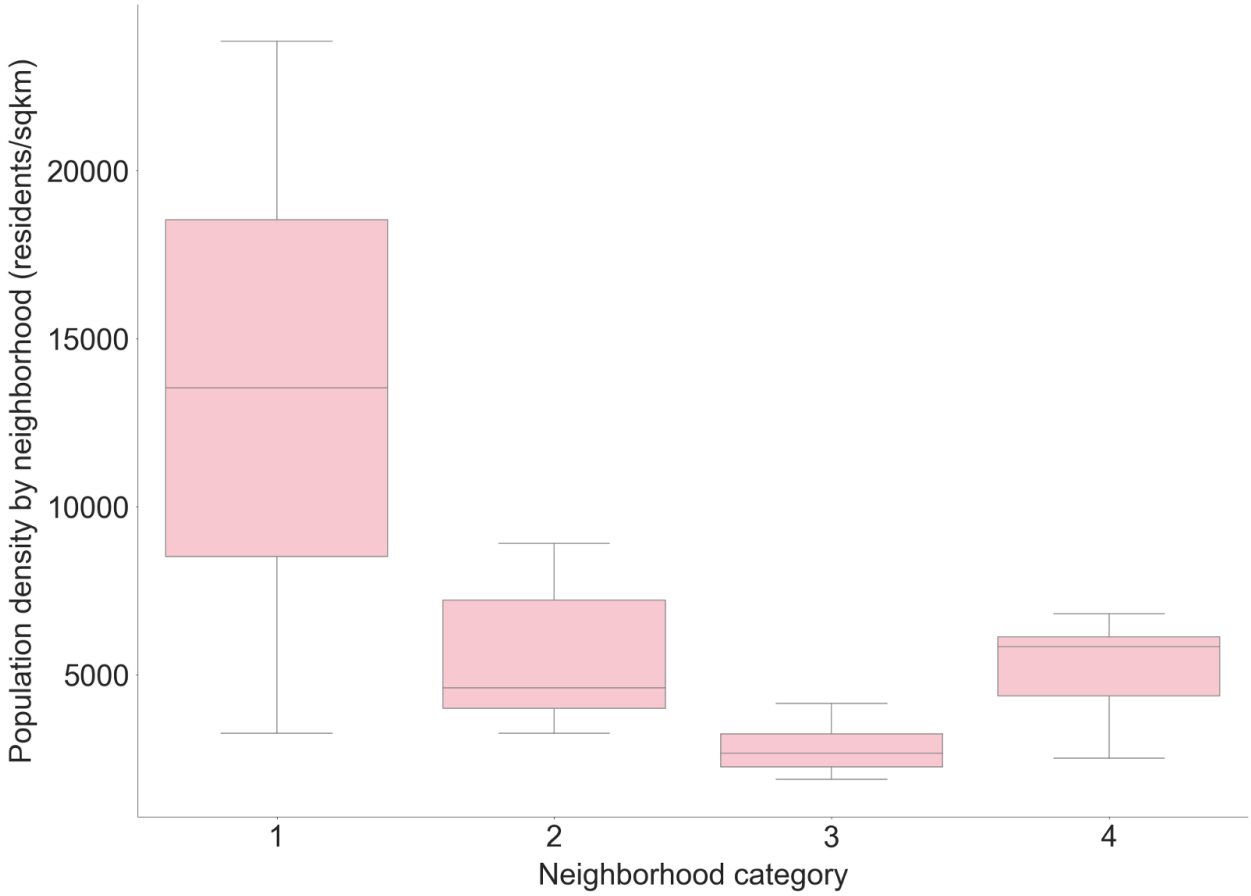

Fig 3. *Population density across neighborhoods, as categorized above. Figure made with seaborn by author for joined space.*

Category 1 neighborhoods had the largest variance, but also the dominant population densities. Category 2 and 4 neighborhoods were quite similar, while category 3 neighborhoods had the lowest population densities. Each category only contained a handful of neighborhoods, so doing rigorous statistical comparisons of population densities was a non-starter. However, later in this article, a comparison across density measures will re-emerge with more quantitative backing.

Since each neighborhood category accounted for a different amount of total land, I calculated the relative percentages of land and population. The ratio between relative land and population was much higher in denser areas than sparser ones. Again, not a statistical assertion, but rather a quick glimpse into the disparity between categories.

Category	% land	% population	pop:land ratio
1	11.46%	24.50%	2.14
2	27.24%	27.52%	1.01
3	16.57%	8.00%	0.48
4	44.72%	39.98%	0.89

category_population_densities.txt hosted with ❤️ by GitHub view raw

Tbl 1. *Population density data across neighborhood categories.*

The results from Table 1 point to population density and densification being segmenting factors. They also show category 2's sustainable normalized population to land ratio, a stark contrast to the more crowded category 1 and sparser categories 3 and 4.

Dicing Demographics

Without further ado, let's dive into demographics.

The goal here was to garner support for the idea that neighborhoods were statistically unique enough to form defined demographic clusters. I first picked out a list of demographic variables from the 2016 census that seemed like plausible distinguishing factors. In addition to the census data, I added a column from the 2017–22 granted permits dataset in order to have a major variable representing densification.

The word *feature* is used here to represent a demographic trait or variable that had a non-null distribution across neighborhoods (in other words, something neighborhood-agnostic).

The final dataframe of selected potential features took the following form:

```
Neighborhood (removed before calculations)
% permits of single dwelling type
% residents who live in a single detached home
Average population age
Average household size
Average total individual income
Average total household income
Average commute time
% commuters that drive or are driven
% commuters that take transit
% commuters that walk or bike
% residents who are homeowners
Average monthly rent costs
% residents who are in suitable housing
% residents without any diploma
% residents with only high school diploma
% residents with a post-secondary diploma/degree
% residents who are a visible minority
```

features_table.txt hosted with ❤️ by GitHub view raw

Tbl 2. *Feature set used for the correlation analysis.*

These features were chosen to get representation in the topics of housing, income, education, and commute.

Commute times were binned to 15 minute intervals in the original dataset, so the midpoint of each bin was taken. For the 60+ commute time group, 67 minutes was used as an approximation.

Sklearn's MinMaxScaler was used to normalize the range of each feature from 0 to 1. I then took the cleaned up table and calculated Spearman's correlation coefficient for every pair of features across (now obfuscated) neighborhoods. Spearman's correlation was chosen over the Pearson correlation as it would identify all monotonic relationships, not just linear ones. There was no guarantee that correlating features would relate strictly linearly.

Correlation Results

From the hundreds of outputs, all pairs except those with strong correlation ($r_s > 0.7$) were eliminated (Cohen et al, 1998). Since mirrored permutations were non-unique (A correlating to B was equivalent to B correlating to A), all these duplicates were removed. What remained was a set of 20 unique pairs of features exhibiting strong correlation. The p-values of all 20 correlations were well below the acceptable threshold of 0.05.

Sample sizes were limited to 22 due to quantization at the neighborhood level. However, using a standard sample size calculator with $\alpha = 0.05$, $\beta = 0.1$, and expected (strong) correlation coefficient $r = 0.7$, the suggested minimum sample size was 17, which was surpassed.

Figure 4 below helps visually separate very obvious linear relationships from cases with stranded outliers or exhibiting nonlinear behavior.

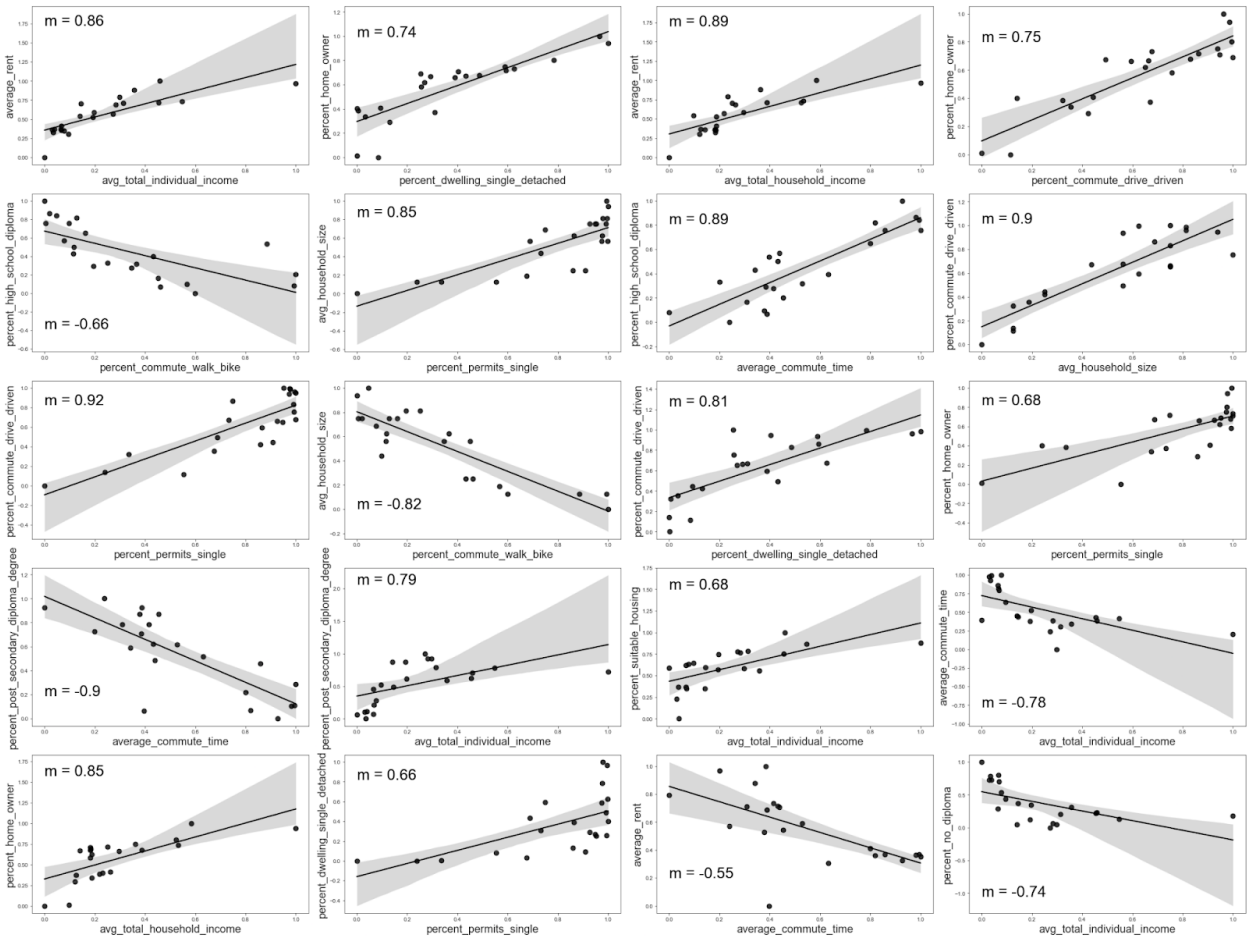

Fig 4. *All 20 strongly correlated pairs of demographic features with linear regression and slope superimposed. Figure made with seaborn by author for joined space.*

Above, all of these correlating pairs are plotted in a grid. Notice how six of them have a negative relationship and fourteen have a positive relationship. Linear regression was done on every set of features to give a rough idea of slope.

Sorting these twenty pairs into their respective topics yielded ten features related to commute, five to education, seven to income, and fourteen to housing. Housing topics were slightly overrepresented in the original feature set, but not by much; it's still noteworthy that they dominated the result topics.

To make Figure 4 more digestible, I'll go through its major findings below in more detail.

Findings

Housing Density

We've talked about densification (a neighborhood's propensity to densify according to permit data from 2017–22) and population density (as reported in 2020). Consider a third relative: housing density. This constituted the percentage of residents in a neighborhood who lived in a single detached home, according to 2016 census data.

The first significant correlation from Figure 4 was between housing density and ownership ($r_s[22] = 0.88$, $p < 0.001$). Neighborhoods with lower housing density had a higher proportion of homeowners. Here's a visual representation of housing density by neighborhood.

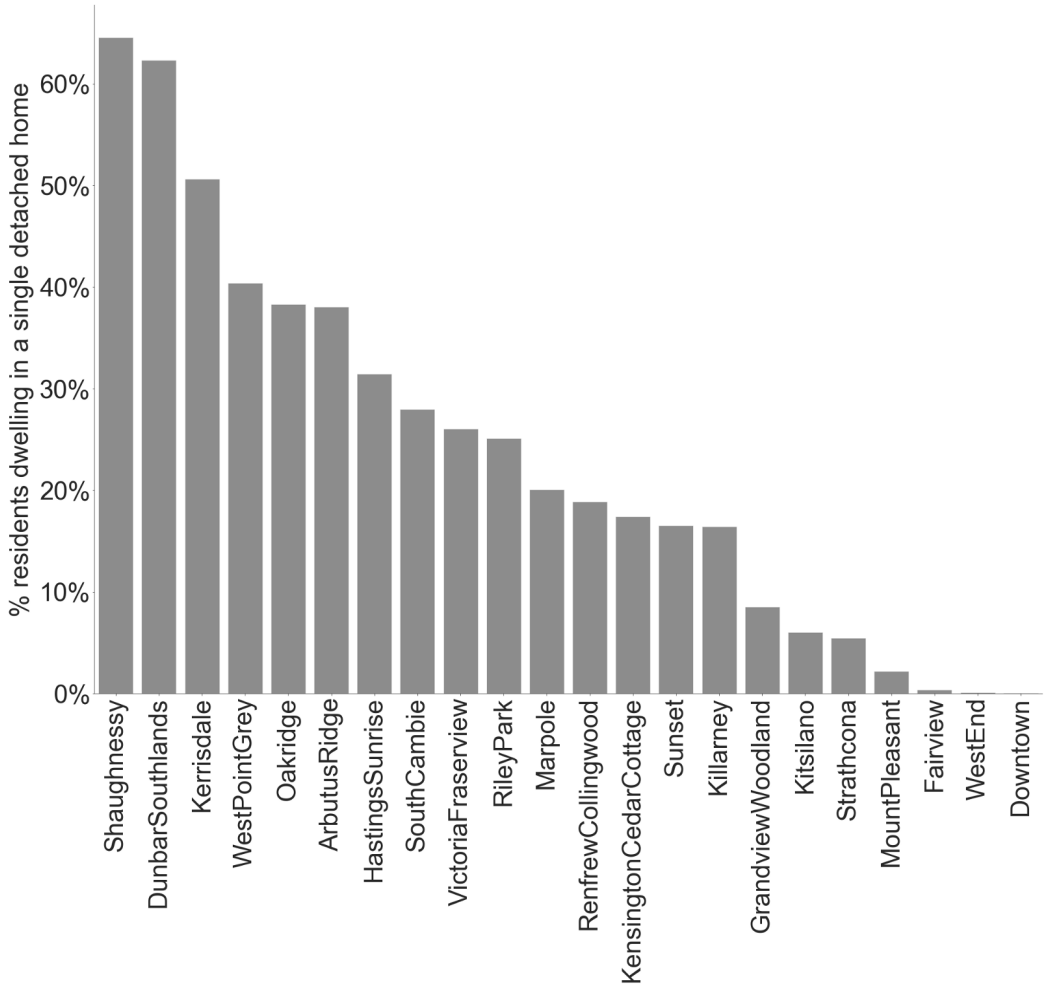

Fig 5. *The % of residents dwelling in a single detached home (housing density) per nbhood, as reported in the 2016 census. Figure made with seaborn by author for joined space.*

This housing density data aligned well with the findings presented in Figure 2 (unit-based densification). It therefore tied densification, population density, and housing density together nicely. It also added a layer of depth to the proposed neighborhood categories without contradicting them.

This was made evident in the correlation coefficient between housing density and densification ($r_s[22] = 0.71$, $p < 0.001$); a bridge supporting the theory that traditionally low density neighborhoods were and are correlated to an aversion to growth (the skewing of rightmost data points on the graph above the regression line reinforced this).

Returning to Hypothesis 1 (the *resistance to change* hypothesis), the null was satisfactorily rejected.

Commuting

The correlation between housing density and commute method is a nice segue ($r_s[22] = 0.79$, $p < 0.001$). Residents of neighborhoods with lower housing density drove or were driven to work more than using alternative methods.

How did individuals outside of these low housing density areas fare? The answer was in the negative correlation between rent price and commute time ($r_s[22] = -0.71$, $p < 0.001$). Those unable to afford high rent prices were likely displaced to areas outside of their work neighborhood or even city (Housing Vancouver, 2021). This would have led to more required time in getting to their place of work and back.

Outside the scope of this study, but worth mentioning briefly, is the variable of whether or not a neighborhood contained a Canada Line station. Residents living along this major transit corridor would have had access to a more reliable and efficient method of transit, at least compared to city buses.

This convenience in turn would have increased demand and driven up rent prices in those neighborhoods (Moranis, 2019).

At the same time, it should be pointed out that only category 1 and 2 neighborhoods (specifically Downtown, Fairview, Mount Pleasant, South Cambie, Riley Park, Oakridge, and Marpole) had an embedded Canada Line station. The fact that these pro-densification categories had better access to transit is noteworthy, and perhaps something to investigate more fully in the future.

Opportunity

We now reach the final topics: education and income. A strong correlation was found between commute time and level of education. Neighborhoods with a higher percentage of residents with at most a high school diploma had higher commute times on aggregate ($r_s[22] = 0.81$, $p < 0.001$).

The inverse was also evident. Neighborhoods with more post-secondary degree holders had shorter commutes on aggregate ($rs[22] = -0.75$, $p < 0.001$).

To no surprise, neighborhoods with more post-secondary degree holders also reported higher incomes, both at the household and individual levels ($rs[22] = 0.74$, $p < 0.001$). The income related correlations had perhaps the least linear behavior, as well as a particularly obvious outlier, but even humoring nonlinear parametrization, the correlation checked out.

The correlation between household income and home ownership ($rs[22] = 0.73$, $p < 0.001$) closed the loop that started in the first section on housing density.

Summary

The string of cross-feature correlations has for the most part detangled itself. Let's now address Hypothesis 2.

Hypothesis 2 consisted of a list of predictions around which demographic features would correlate most strongly. I'll through each item chronologically.

In the results, there were no strong correlations found between densification and average age, racial diversity, commute times, or educational level. These relationships were inconclusive.

Correlations between densification and income, home ownership, and housing suitability were supported by a statistically significant rejection of the nulls.

Correlation between densification and average household size turned out to be the opposite of what was anticipated. In the hypothesis, it was posited that low density neighborhoods would have smaller average household sizes, a thought that followed the prediction that average age would skew higher, and thus cause an overrepresentation of retired folk.

Larger average detached domicile sizes in lower density areas were likely a factor, along with the paradigmatic migration outward of young families struggling with affordability.

Additionally, in multigenerational households with both younger and older inhabitants, the average age would be deceptively close to many of the smaller households comprising single individuals or couples. This would corroborate the inconclusive relationship between densification and average age.

Correlation between densification and commute method also turned out to be different from what was predicted. Low density neighborhood residents commuted more by driving, rather than by taking transit, walking, or biking. It was initially thought that the proximity of these neighborhoods to greenways and quieter streets would increase access and incentivize the use of alternative commute methods, decreasing car usage. However, this wasn't supported by the data.

One culprit may have been the sheer distance between the city center and some of the lower density neighborhoods at the outskirts of the city, where transit infrastructure was lacking. This would have rendered all non-car commute methods toward Downtown impractical.

On the whole, these correlative results validated the notion that there is a demographic and quality of life separation across neighborhoods. They also demonstrated how measures of urban density, both present and future, connect many of these differentiating features.

In neighborhoods where residents were more educated, commutes were shorter and incomes were higher, but so were rents. There was no consistent tie to home ownership either.

In neighborhoods with lower housing density, ownership and household income was higher, but most notably, the status quo was more vehemently propped up, as reflected in the aversion these areas had to densification.

Closed Loops

Armed with a fuller picture of neighborhood-level disparities, let's discuss the consequences on housing supply and affordability that continue to unravel.

This last section will cover potential causalities. Without running controlled experiments, many of the conclusions below are based solely on circumstantial evidence.

The first causal quandary is whether a low housing density neighborhood's particular demographic fights for their area to remain sparse, or whether they are attracted to the area because of its sparseness.

It has probably been bidirectional to some capacity, at least over decades-long trajectories; a self-propagating pattern, if you will. The economic ramifications of rapidly increasing home values certainly gave momentum to the snowball, as fewer people were able to afford properties in low density neighborhoods, and individuals already living there were incentivized to hold onto their appreciating assets. Recall data shared in the preamble showing that over the last two decades, average detached housing prices increased by 410% while sales volume decreased by 19%.

Riding the real estate wave has become an increasingly exclusive game. Due to artificial scarcity and lack of affordability, it's probable that in recent years, the causal relationship favored the first direction: demographics trying to preserve low density in a favorable (to them) housing stalemate.

To examine this suspicion more quantifiably, I'll share voting data from the 2022 municipal election, as this has been perhaps the clearest indicator of aggregated opinion in recent years.

How We Voted

From the full set of election results, I called a vote for Kennedy Stewart a *positive* vote for densification (Forward Together, 2022), a vote for Ken Sim a *neutral* vote (The Globe & Mail, 2022), and a vote for Colleen Hardwick a *negative* vote (McElroy, 2022).

I specifically reference voting records in the case of Hardwick, since quite a bit of the material listed on her campaign site sounds deceptively pro-density. However, her voting record is explicitly anti-progressive, especially with regards to the low rise Kits and Shaughnessy rezoning proposals, which were examples of endeavors she all but pledged to be for.

Stewart, Sim, and Hardwick were the top three candidates at almost every polling station, so all other candidates were excluded for simplicity. I also ignored mail-in results as they wouldn't be spatially segmentable.

It's worth noting that this particular election had many contentious topics not strictly limited to the purview of housing, such as crime and homelessness. Stewart leaned more toward compassionate treatment, while Sim and Hardwick leaned more tough-on-crime, with Sim being the more centrist of the two (Ali, 2022).

Grouping all the polling stations by neighborhood, I assigned a blended score based on the distribution of votes. This was done by weighting votes for Stewart by 1, votes for Sim by 0.5, and votes for Hardwick by -0.5. The sums of these weighted values were then divided by the total vote counts. These weightings weren't rigorously justified; they were simply an approximation of overall stance.

The graph below also includes an overlay of Figure 5's data in the form of a line.

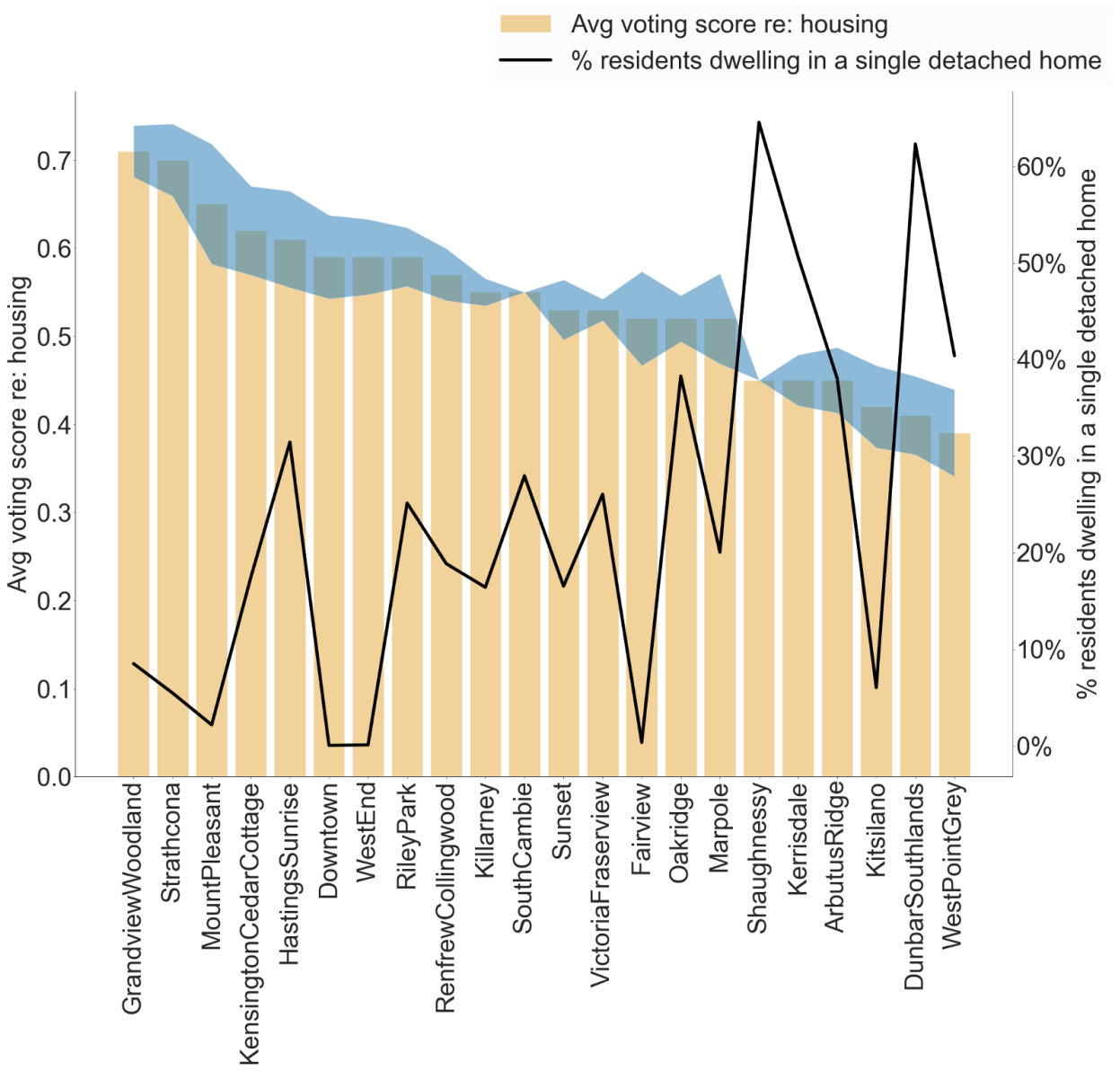

Fig 6. *Voting score versus housing density, with standard deviations of the voting scores in blue. Figure made with seaborn by author for joined space.*

Figure 6 proposes a loosely inverse relationship between voting record and housing density. In many neighborhoods with lower housing density according to the 2016 census, residents tended to vote more in favor of preservation than development in 2022.

I calculated Spearman's correlation coefficient to quantify the significance of this inverse relationship. What resulted was a correlation of ($r_s[22] = -0.584$, $p = 0.004$) between housing density in 2016 and the voting score in 2022. The correlation of -0.584 was moderate, not strong.

The link between housing density and voting record, while not overtly contradictory to any of the findings from earlier on, was not a smoking gun.

Beyond inexactness inherent to the voting score, other conflating factors might have muddied the correlation. There were obvious outliers in Figure 6, such as Kitsilano, where densification was high but the voting results were not in agreement with those trends. This may have been due to an overrepresented minority of voters.

Individuals might also have crossed lines from home when voting at polling stations that existed on the boundary of neighborhoods. Many ballots were mailed in, and only about 36% of all eligible residents voted.

Residents of Downtown and the West End had been disproportionately affected by rising crime, and were probably more concerned with each candidate's action plan surrounding this topic (Howell, 2022).

Nonetheless, some neighborhoods stood out as being very well aligned between their density measures and voting scores. Mount Pleasant was one such place.

Img 3. *A 3 story walk up apartment building (top), community tiny library (bottom left), and bike-share rack (bottom right), all within a block of each other in Mount Pleasant. Photos by author for joined space.*

The reason we should care about continued resistance to densification in low density neighborhoods is the impact of this stagnation on city-wide housing supply and affordability.

An Invisible String

Oftentimes, low density neighborhoods succeed in flying under the radar because they face fewer pressing social issues. They have the highest concentrations of homeowners, so increases in

property values are attractive to a higher percentage of their residents. Household income is higher. Crime and homelessness impact these areas less (VPD, n.d.).

Img 4. *A 5br house worth $5M sits among tree lined streets in Kerrisdale. Photo by author for joined space.*

However, the artificial scarcity that is exacerbated by these neighborhoods (think back to their disproportionate amounts of land from Table 1) (Francis, 2005) has driven up housing prices year over year, not just for detached homes, but apartment units and attached properties as well.

Recall from the introduction that from 2001 to 2021, average apartment and detached home prices increased by 365% and 410% respectively. Looking just at the last five years of this range (2016 to 2021) and anchoring to June again, the price increases were 47.2% and 15.3% respectively. That's a huge shift in pricing inflation toward apartments and away from detached homes (again, forgive me for the crude condensing of time periods to make a general point).

Given how closely rent cost trends follow real estate price trends (Evans, 2022), this paradigm affects not only would-be homeowners, but renters as well.

As discovered in one of the correlation findings, lower rents were associated with longer commute times, arguably caused by displacement to neighborhoods further from the city center

with less accessibility to fast transit. Over the last decade, residents have been displaced from their former neighborhoods due to gentrification (Hundal & Wang, n.d.).

Young families looking for housing have moved eastward and outward upon getting priced out of the affluent west side.

In more recent times, neighborhoods like Downtown with fragmented single use areas for business, nightlife, and big box shopping were left vulnerable to the impacts of the pandemic, where a shift to working from home decimated office occupancy and daytime worker volume (Roffel, 2021).

This in turn spurred on a mass exodus of businesses who could no longer sustain themselves due to plummeting patronage and a lack of government intervention. It is no surprise therefore that Downtown's moribund blocks lining long and lonely streets heralded an acceleration in crime when left deserted (Jacobs, 1961).

Img 5. *Despite successful green initiatives, the downtown core still suffers from incessant car traffic (bottom right), a disheartening exodus of local shops (top right), and centralized blocks of skyscrapers (left), where empty night streets are left to their own devices. Photos by author for joined space.*

Vancouver needs a unified effort in smart densification and the refashioning of neighborhoods to be more multi-purpose. Simply clustering high rise developments at the outer edges of the city and into adjacent municipalities is not a solution: it's a bandaid.

This is not to say that high rises are themselves an issue, but rather that monotonously separated clusters of building types and purposes are rarely a good idea (Jacobs, 1958).

Onward

The Vancouver Plan (C.O.V, 2022) holds a wealth of promise when it comes to housing solutions. The plan's focus on normalizing density across the city by placing multi dwelling apartment buildings strategically in sparser areas draws a direct parallel to the findings of this study.

The plan (or lack thereof) to decentralize single use centers is still a little muddy, but placing emphasis on rapid transit and multiplexes is largely a step in the right direction. The process of transformation is arduous however, and the road is long. The hardest pushbacks to any motion can be expected from the very neighborhoods that need to evolve the most.

Below is some commentary to supplement the Vancouver Plan, consisting of corollaries and personal thoughts.

Upzoning is a popular concept among progressive circles that is intimately tied to densification. Concerns around upzoning induced gentrification have been raised (Davis, 2021), but that doesn't fully discredit the approach.

Carefully distributed upzoning efforts can take place in small pockets of neighborhoods across the city, allowing for controlled densification from within.

Upzoning could also make way for more multi-use permitting, allowing local businesses to embed themselves in a living community, rather than only seeing viability in high-traffic shopping areas. The Vancouver Plan makes reference to this by way of the *15 minute city* concept (Moreno et al, 2021).

Below market-rate, or BMR housing is a key component of first time buyer programs in cities like San Francisco and New York City that could have positive impacts on housing affordability in Vancouver (Kaysen & Tomi, 2022). This is an initiative that wasn't explicitly covered in the Vancouver Plan. While below market-rate rentals were clearly addressed, I believe it's equally important to initiate policies around BMR ownership.

There have been some complaints, for example with the San Francisco implementation (Eskenazi, 2022), but they were mostly misguided. In one example, the individual in question

was irked that after paying off his BMR property over a fourteen year span, its resale value had only gone up by $30,000.

Ignoring for a moment that price stability is exactly the expected behavior for BMR properties, this individual failed to recognize that over this fourteen year span, he had likely saved around a quarter of a million dollars in rent (rough math tallying the average rent in San Francisco over that time period, and generously subtracting any HOA fees and interest).

The sliding scale should be just as fair for long term residents wanting to settle into a permanent home, as it is for temporary residents wanting to rent.

A well thought out plan around qualifying thresholds for such a program would be imperative. If done properly, I believe it could go as far as to combat spiraling free market prices and predatory investment behaviors therein.

No singular solution can be totally comprehensive. Cities and the neighborhoods within them are far too complex to be reduced to a monolithic entity. Directed but diverse initiatives like the Vancouver Plan have the best chance of making a difference.

Affordable and appropriate housing in all of Vancouver's neighborhoods is a must, not a nice-to-have. Fostering increased density and multi-purpose planning, especially in staunchly sparse neighborhoods, will prove crucial in increasing not just the amount of housing, but the quality too.

Neighborhoods are the organs of a healthy city. The failure of one affects the well-being of all.

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