The Cost of High-Rise Housing in Portland, OR

Research Paper for Housing Prototypes - ARCH 538
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Abstract

The actual cost of high-rise housing in comparison to its land use can be an obscure topic. Information may not be widely available to determine the benefits of constructing tall buildings. This research paper aimed to document three specific case study high-rise housing projects, then compare them to one small scale housing type. This helped in understanding the primary differences between tall and small construction, and hinted, in a minor sense, at the sustainable implications of each. It was found that high-rise housing can be two to four times more costly than low-rise housing types. However the value in high-rise housing may be found, not in up-front cost to developers and investors, but to the community at large, and the preservation of diminishing natural landscape. This paper shall not conclude which is a better choice - high-rise or low-rise construction. However it should provide some figures to help better understand the potential cost difference.

Research

Portland, Oregon as an in-demand city has a growing need for housing. Whether because of the popular "Keep Portland Weird" bumper stickers, Voodoo Donuts, the large number of

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micro-brewers, its mass transit system, or the lush landscape it maintains, young professionals want to live there (Mirviss, 2014). Recent projections from the City of Portland predict that 1.3 to 1.5 million households will need to be added in the Metro area by the year 2035 (City of Portland, Oregon, 2014). In response, the City of Portland has implemented new policies to offer incentives for current inner-city home owners. The plan is to provide up to $10,000 tax cuts to those who add an Accessory Dwelling Unit (ADU) to their property (The City of Portland, Oregon, 2014). By subsidizing this kind of housing, Portland should be able to maintain its reasonable height profile. But with increasing demand for housing, ADUs may not be enough to sustain the expected coming influx of young urban professionals, families, retirees, and everyone in-between. Portland is expected to see more apartment and condominium type housing added for the new wave of residents to be expected (Bureau of Planning and Sustainability, 2010). However, will this be enough? This research shall investigate the cost associated with high-rise housing construction. The costs presented here will be in terms of monetary value - to build, and to live in as a tenant.

To begin, this research will investigate monetary cost of development. It seems intuitive that constructing a tall building requires high investment, more so than single family housing for example. Whether this is true requires investigation however. Some examples of recent west-coast high-rise construction may shed some light on the cost. The matrix and chart of Figure 1 and 2 delineate three specific examples of concrete high-rise condominium housing construction costs in comparison to one relatively compact small-scale housing type. See Appendix A-1 for images of the case study buildings. The initial goal when setting out to collect this information was to compare three values:

1. Development Cost
2. Housing Units
3. Building Footprint

The other values were collected out of sheer curiosity. While collecting these data points there were some subjective interpretations needed in order to put them into a range of design quality types: high, mid, and low. This was performed by subjective evaluation of design aesthetic, image marketing effort by the building management, and cost of condominium units, all in comparison to construction cost. The following numbers were rough estimations, and should not be taken at face value. These calculations were merely an attempt to understand the monetary cost difference between specific case examples, which utilized vastly different material pallets and construction strategies.

1. Development Cost

What may be seen immediately in the F-2 chart as blue bars, was the high development cost of the Millennium Tower. It was calculated that the cost per square foot (sqft) for this development was $522/sqft. Comparatively the Ankeny Lofts, a rowhouse-like housing type, had a low cost of construction at $113/sqft. The difference in these two figures lies mostly in construction type, with the high-rise being of concrete structure, and the lofts of wood construction. From the pure development cost per square foot, it was determined that high-rise housing may typically be more expensive per square foot of occupiable area. For a developer to choose the right housing type to invest in is the basic reason for why the housing market exists at all, because investment is what these buildings mean for the developer. If the investment is too high cost, or will not produce a reasonable return, then the risk will not be worth it. The obvious choice for a developer is the low-rise construction.

However there are other factors to consider when searching for the best investment, and most cost effective housing type. This is particularly important because with the potential looming

housing crisis in Portland, investing for profit, and investing for supplying enough housing to a community, may be hard choices.

2. Housing Units

Efficiency may be a measure of cost. In deciding what to construct in Portland, which potentially faces a housing crises, building larger quantities of housing units may be more valuable for the metro area. With limited land, due to the Urban Growth Boundary (UGB), see A-2, options for where to place new units are few. F-3 shows the difference between constructing the equivalent amount of Ankeny Lofts as the Units provided in the Vantage Pointe Condominium. Vantage Pointe provided 679 condominium units, whereas the Ankeny Lofts provided four housing units. The delineation visually compared the land usage of each development, road area, units provided, cost of development and cost of road/infrastructure associated with that development. Road infrastructure cost was retrieved from a comprehensive report on single-family housing development (Najafi, et al., 2006).

The lessons learned from this comparison were striking. With the same monetary cost as building the Vantage Point Condos, a developer could choose to construct two and a half more developments similar to the "Ankeny Lofts x170" in F-3. In other words, for the same cost as Vantage Pointe, 1,810 housing units may be provided by developing the Ankeny Lofts model. And if each unit sold for $160,000, then the turnover profit would be almost $90mil. The benefits of constructing the Ankeny Loft model for a developer are clear, especially since the unit value above is assessed value, rather than market rate, which may be double. But when considering the profit turnaround for Vantage Pointe, although this project was unsuccessful at the time amidst the onset of the housing depression (Bennett, 2008), the average unit cost was $861,000. This being the case, a developer may be able to sell all of the units and still receive a profit of over $300mil. Although

at first, it appeared that the Ankeny Lofts were a better investment, the opposite seems to be true. Meaning that the Vantage Pointe Condos presented a more tantalizing opportunity for developers. Coincidentally, the amount of developed land required for the Ankeny Lofts was calculated to be 7% less area as compared to the Gross Square Area (GSA) of Vantage Pointe. Or stated another way, the floor plate area needed for both the Ankeny Lofts development model and Vantage Pointe are roughly the same.

3. Building Footprint

The UGB poses a particular constraint to the cost of development problem. A developer may be able to construct many more units for less investment and risk as mentioned in 2. Above. However that development type may cause the cost of housing to increase even faster. Hypothetically, the Ankeny Lofts model would use up land faster, increasing the value of land at a higher rate, which causes the price of units to rise, all the while spreading people further and further from amenities (i.e. the suburbs). Originally the UGB was set up as an attempt to preserve both the natural landscape from uncontrolled sprawl, and to maintain farm land within close proximity of urban centers. From what may be seen in aerial plan, the UGB is working, see A-2 (Metro, 2014). The question is, does this raise land value over time as developable land becomes scarce? Some would say yes, which is the logical assumption, as a simple function: available land to the land value would increase cost. However the implications are still unclear and debatable (Lang, 2010). What may be ascertained is a comparison between the units provided and the land used by the case study projects in A-1, which have been discussed.

Each case study evaluated two values to be analyzed: footprint, and units. By dividing the project Base Footprint area by the housing Units provided, an efficiency value may be obtained. These values may be seen in F-1, and as the orange line graph in F-2. The orange line shows a

high efficiency for the Millennium Tower at 34.1sqft per housing Unit. The Ankeny lofts have a low land-use efficiency value at 600sqft per Unit. These are useful numbers for city planners and developers. If the Portland Metro area is to expect roughly 1.4mil people in the next 20 years (70,000 per year), then they may be able to calculate for the needed accommodation. This is valuable in understanding what amount of the inner UGB will be developed. If for example, all 1.4mil people are to be accommodated with high-rise development similar in unit quantity to the Millennium Tower, then Portland will need to add 1,100 acres of these towers. As will be discussed later, the cost of such high-quality construction may be unreasonable for Portlanders. So for argument sake, let us assume a housing type similar to The Civic – low cost/square foot. This means that the cost in today's dollars to accommodate 1.4mil people would be around $175bil - whoa! By using the nifty tools in AutoCAD, this area is represented in A-3. The green circle does not include roads, infrastructure, or any other amenities required to satisfy this population increase.

In comparison to high-rise construction type, the opposite end of the spectrum was analyzed as well. The Ankeny Lofts as a housing type would require 19,280 acres. And to fund this effort, $168bil. Similarly, this value does not include infrastructure, etc.

Cost to Tenants

As shown by *2. Housing Units*, and may be seen in F-1, there is a tremendous cost offset for different kinds of construction. Although a developer may benefit from selling high-priced units, and receiving a high profit margin in comparison to low-rise development, the cost to tenants may be unreasonably high. This is particularly true for the Portland Metro Area, with average annual income at $73,500 (U.S. Census Bureau, 2013). The author's father is a real estate investor, Leland Wilson, and was able to provide rough estimation for how much this average income may afford. He suggested that $310,000 condo would be the maximum, or $2,000 per month rent. In

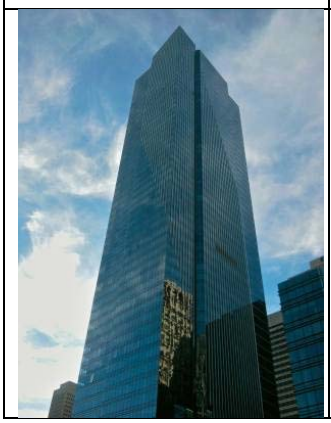
considering affordability of housing types with respect to income, the Vantage Pointe Condos as a model in Portland would cater to the higher tier of income, whereas the Ankeny Lofts would provide far more housing to a larger portion of the population with lower income.

Conclusion

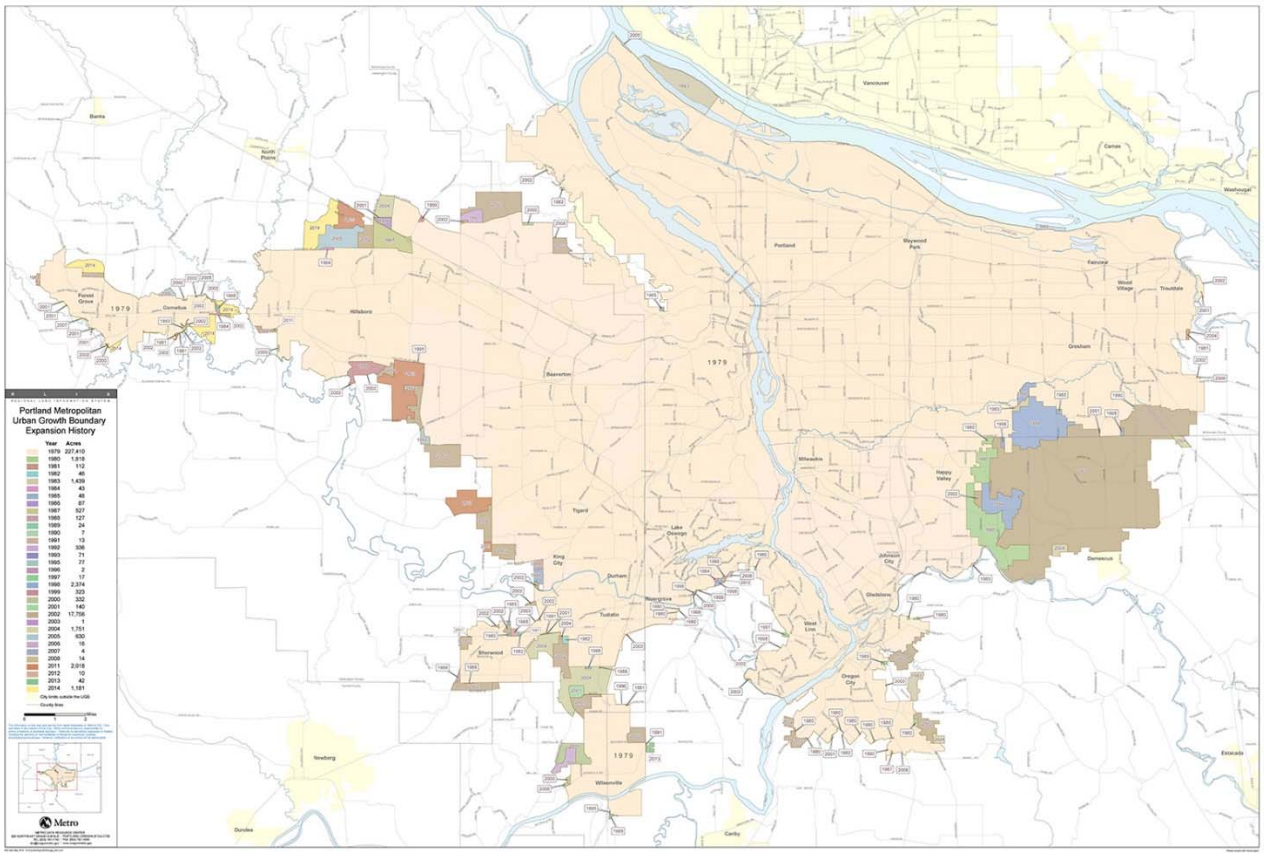
From these three case studies of high-rise housing types, and comparison of one small-scale housing type, the cost of each was uncovered. It was found that high-rise housing construction was monetarily more expensive than small scale. The examples showed that cost per square foot (sqft) of high-rise housing could be between $240/sqft and $520/sqft, depending on quality, and target market. Whereas comparatively, a small-scale development may only cost $110/sqft. However the cost to tenants may appear, up front, to be higher for high-rise construction, speculation indicated that the cost to tenants and developers over time may be much higher for small-scale development. This is because as buildable land becomes scarce, the value of greenfield sites goes up. As that value rises, the price for built units also rises, forcing low-income tenants out. This is a problem, because with the potential housing crises ahead, those who wish to move to Portland may not find living there an equitable choice, or within their income level. By analyzing the data documented in F-1, and understanding the metrics, the cost and land use of high-rise housing became clear for these specific examples.

Appendix

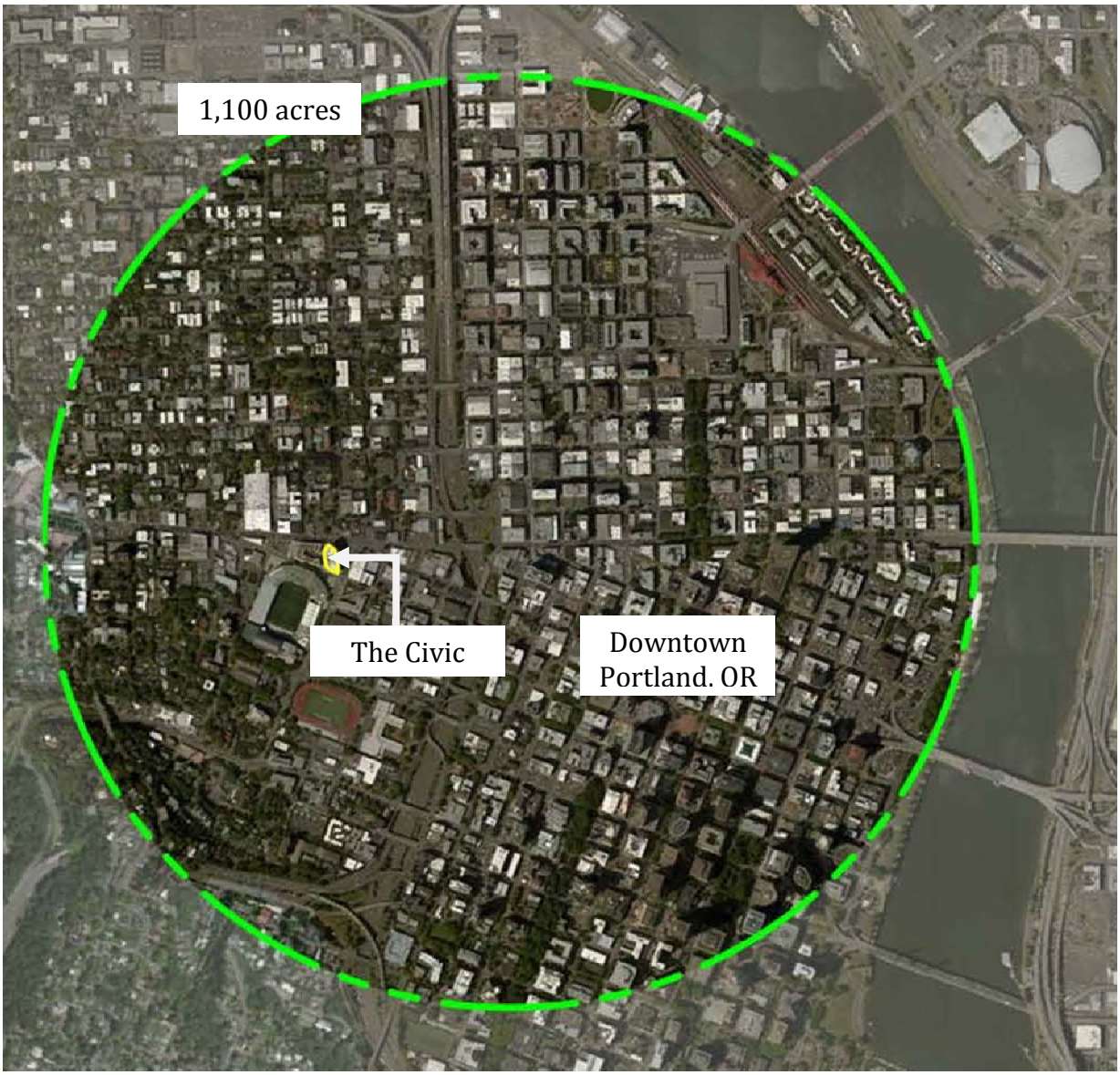
A-1: Three high-rise housing types, and one low-rise (Gimbel, 2011) (Nehrams2020, 2009) (The Civic Condos of Portland, 2014) (COLAB , 2011)

Millennium Tower (San Francisco, CA)	Vantage Pointe Condominium (San Diego, CA)	The Civic (Portland, OR)	Ankeny Lofts (Portland, OR)
			

A-2: Urban Growth Boundary (Metro, 2014)



A-3: 1,100 acres of high-rise development in Portland (Wilson, 1987-2014)

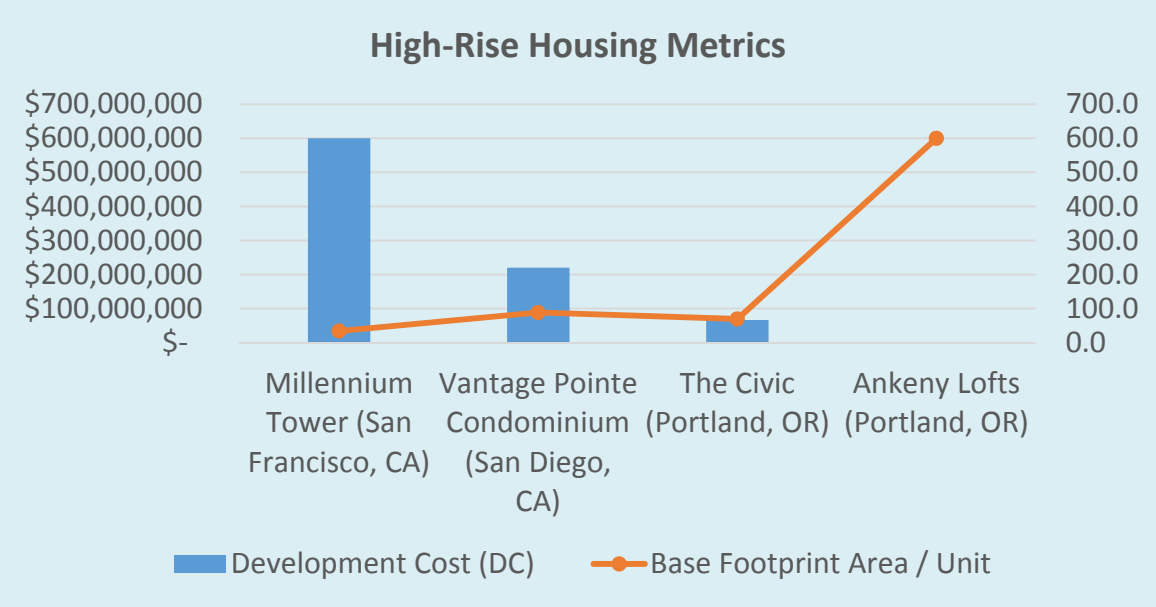

1,100 acres
The Civic
Downtown
Portland. OR

Figures

F-1 Comparison of three similar housing types, and one low-rise (Dineen, 2013) (Millennium Tower, n.d.) (City of Portland Green Investment Fund, 2008) (EMPORIS GMBH, 2014) (S2 Architecture, 2014) (COLAB , 2011) (Wilson, 1987-2014):

High-Rise Housing Metrics	High Quality Design	Mid-Level Design	Lower End	Example Small Scale Case
Name	Millennium Tower (San Francisco, CA)	Vantage Pointe Condominium (San Diego, CA)	The Civic (Portland, OR)	Ankeny Lofts (Portland, OR)
Development Cost (DC)	$ 600,000,000	$ 220,000,000	$ 66,266,200	$ 480,000
Gross Floor Area (GSA)	1150000	750000	279871	4250
Building Cost per GSA	$ 521.74	$ 293.33	$ 236.77	$ 112.94
Height (occupied) ft	593	420	185	35
Average Unit Cost	$ 1,800,000	$ 861,500	$ 250,000	$ 636,770
Units	440	679	261	4
Floors	58	41	16	2
Avg Units per Floor	8	17	16	2
Base Footprint Sqft	15000	60000	18086	2400
Base Footprint Area / Unit	34.1	88.4	69.3	600.0
Built	2009	2009	2007	2012
Construction Type	Concrete	Concrete	Concrete	Wood
DC/Footprint	$ 40,000	$ 3,667	$ 3,664	$ 200

F-2 High-rise housing graph (Wilson, 1987-2014)



F-3 Vantage Point Condos compared to the equivilant amount of Ankeny Loft developments (Wilson, 1987-2014):

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