MIT
CENTER FOR
REAL ESTATE
HOUSING AFFORDABILITY INITIATIVE

EFFECTS OF MIXED-INCOME, MULTI-FAMILY RENTAL HOUSING DEVELOPMENTS ON SINGLE-FAMILY HOUSING VALUES

Henry O. Pollakowski
David Ritchay
Zoe Weinrobe

April 2005

Center for Real Estate
Massachusetts Institute of Technology
77 Massachusetts Avenue
Building W31-310
Cambridge, MA 02139

Exhibit 8

Acknowledgments

We would like to thank the Housing Affordability Initiative at the MIT Center for Real Estate, Mass Housing, and Joe Mullins for financial support. We also thank Lynn Fisher, David Geltner, Andrew Jakabovics, Langley C. Keyes, and W. Tod McGrath for helpful suggestions and comments. Karl "Chip" Case, Aaron Gornstein, and Clark Ziegler provided useful comments on an earlier version. We are, however, solely responsible for the contents.

Contents

Exhibit 8

EXECUTIVE SUMMARY

Do mixed-income, high-density rental developments negatively impact nearby single-family property values? This question has been at the core of the controversies surrounding mixed-income housing in suburban Boston communities. Chapter 40B, enacted through the Comprehensive Permit Law and Anti-Snob Zoning Act, is a Massachusetts statute that enables developers to obtain state-authorized comprehensive permits in municipalities that are not in compliance with state affordability criteria: If less than ten percent of a municipality's housing stock is defined as affordable, developers with comprehensive permits can build developments that override local zoning regulations. Because zoning rules are viewed by some as regulatory mechanisms that protect property values by controlling local land use, the ability of developers to circumvent such regulations has given rise to fears that the values of homes surrounding these mixed-income, multi-family developments will decline. These fears are considered one of the strongest motives for residents' opposition to proposed 40B developments. But are such fears justified by the facts?

We designed a rigorous research methodology to examine the impact over time of introducing a large-scale, mixed-income, multi-family rental development into a neighborhood of single-family houses. We developed strict selection criteria that identified seven 40B developments located in six communities in the Boston metropolitan area—Littleton, Mansfield, Norwood, Randolph, Wilmington, and Woburn. These case studies represent some of the most dense and controversial Chapter 40B developments in Greater Boston, in other words, a suburban homeowner's worst nightmare.

After selecting the cases, we conservatively established impact areas, taking care to include only the single-family homes mostly likely to be affected by each respective 40B development. Our process for identifying impact areas essentially restricted the boundaries to abutters and immediate neighbors of each of the seven developments. The purpose of establishing such impact areas was to objectively measure single-family home price changes over time as 40B developments were

Exhibit 8

announced, approved, constructed, occupied, and integrated into the resident communities.

We then examined the relationship between the large-scale, high-density, mixed-income rental developments and single-family home values. Using hedonic modeling to create comparative house price indexes for each impact area and an appropriate control area (the remainder of the host community) determined how home values had changed over time within the impact and control areas. As will be demonstrated in the report, the results in all seven case study towns lead us to conclude that the introduction of large-scale, high-density mixed-income rental developments in single-family neighborhoods *does not* affect the value of surrounding homes. The fear of potential asset-value loss among suburban homeowners is misplaced.

CASE SELECTION

Our methodology was designed to ensure that our study would identify any relationship between the introduction of a large rental development and single-family house prices. First, we chose to limit our selection to projects within the Greater Boston region. Second, the projects were required to have received their comprehensive permit and have been fully developed between the mid-1980s and 2000. Third, we limited the selection to multi-family, mixed-income rental developments. Last, we generally selected larger developments that were very dissimilar in size, bulk, form, and density from the surrounding community. Our hypothesis was that these types of developments would be the most likely to impact the values of neighboring single-family houses. Two of the most controversial 40B projects in the study, Olde Derby Village and Kimball Court, are shown below (Figure 1).

Given that we wished to test whether these projects would adversely impact neighboring property values, it was necessary to construct detailed maps of the projects and their surroundings. For this step, we built digital maps that identified streets, rivers, open space, zoning, and land use designations. We analyzed these maps using Geographic Information Systems (GIS) technology to assure that the developments were not located at the edge of the town and were sited in residential neighborhoods. Additionally, we evaluated the siting of potential projects using aerial photographs in order to obtain a better sense of the degree to which projects were integrated into residential neighborhoods. The results of this analysis were striking: We found the overwhelming majority of potential case studies were either sited at the edges of towns or cut off from the nearest

Exhibit 8

community by large amounts of open space, interstate highways, rail corridors, or industrial and manufacturing uses. This step considerably reduced the number of potential case studies appropriate for more rigorous analysis.

Finally, we made site visits to each of the remaining potential projects. This exercise was instrumental in determining whether a project was actually integrated with the community. We also met with planners, building inspectors, assessors, and GIS specialists in order to obtain a better sense of the neighborhood context for each of the developments.

SELECTED SITES

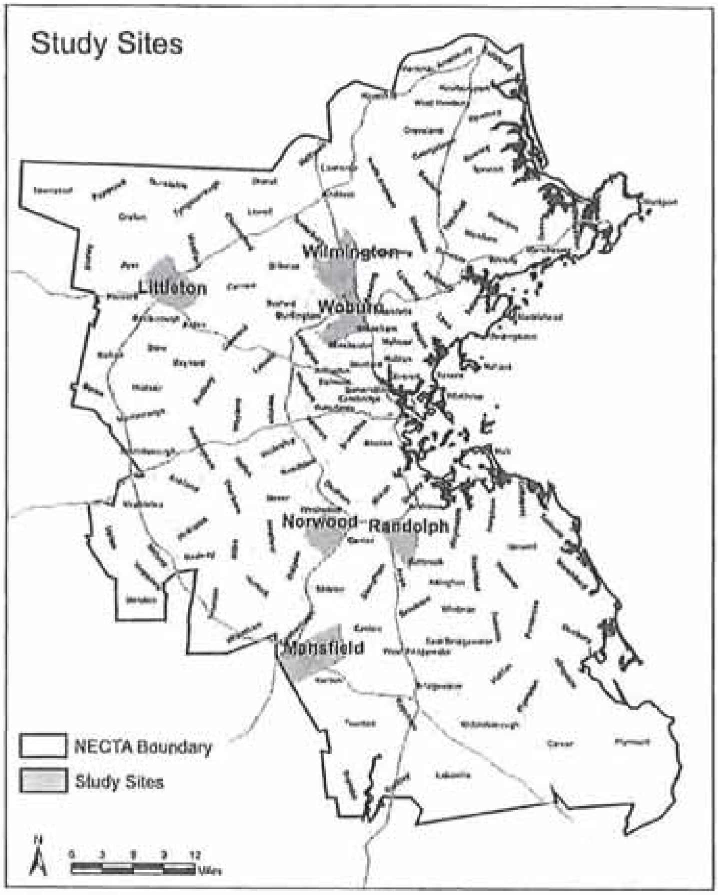
The selection process identified seven projects that are, in most cases, larger and denser than the typical 40B development. Our intention in choosing large multi-family rental projects was to find developments with the highest likelihood of creating negative impacts on the surrounding neighborhood. It could be argued that the projects selected as case studies are the types of developments that suburbanites fear most. If there were ever a development that would cause a negative impact on surrounding property values, it would be one of the large, dense developments examined in this study.

Figure 1. Two Controversial 40B Projects

Olde Derby Village, Norwood (top) and Kimball Court, Woburn (bottom)

Exhibit 8

Figure 2. Towns with Study Sites



As can be seen by Figure 2, the seven developments in the study are dispersed throughout the greater Boston metropolitan area. Woburn is bisected by Route 125/Interstate 95 northwest of Boston. Wilmington borders Woburn to the north along I-93. Littleton is further northwest of the city at the junction of Route 2 and I-495. Norwood and Randolph are south of Boston along the southern section of I-128. Finally, Mansfield is on the southwest edge of the region at the junction of I-95 and I-495.

Table 1 details the characteristics of each project including its location, developer, size, the number and percentage of affordable units, density, year permitted and completed, and comprehensive permit approval body.

IMPACT AREA DESIGNATION

The impact area for each case study is intended to represent the neighborhood within which the development is located. The single-family houses within this designation are the homes that can most likely be expected to be impacted by a large, dense development. For properties to be included in the impact area they must be either (1) direct abutters, (2) part of a contiguous network of streets radiating from the site, (3) in the direct line-of-sight of the development, or (4) adjacent to open space connections, via playing fields and dedicated walking or bike paths.

Exhibit 8

Table 1. Study Sites—Detailed Statistics

Development	Location	Developer	Total Units	Affordable Units	% Afford-able	Density (units/ acre)	Year Permit-ted	Year Com-pleted	Approval Body
Littleton Green	Littleton	Dementian Guschov	24	24	100%	10.0	1986	1987	Board of Appeals
Pond Side at Littleton	Littleton	First Littleton LP/State Street Development	90	32	35.6%	9.0	1987	1989	Mediation: ZBA, HAC, Developer
Mansfield Depot I/II	Mansfield	Keith Development	245	71	29.0%	16.6	1986 1987	1988 1989	Mediation: ZBA, HAC, Developer
Olde Derby Village	Norwood	Wilson Street Trust	193	35	25.2%	15.4	1985	1986	Superior Court
Liberty Place	Randolph	Liberty Place Associates	107	27	25.2%	9.2	1987	1989	Board of Appeals
Avalon Oaks	Wilmington	AvalonBay[1]	204	41	20.1%	9.1	1997	1999	MA Appeals Court
Kimball Court Apartments (I, II, III)	Woburn	Joseph Mullins	525	127	24.2%	19.3	1985 1989 1999	1988 1990 2002	MA Appeals Court

1. Initial permit request initiated by Wilmington Arboretum.

Exhibit 8

These criteria define an area where houses are more likely to be negatively impacted from the development than the municipality at large.

Ultimately, impact areas were determined on a case-by-case basis. It would have been inappropriate to apply a generic test such as drawing an arbitrary distance radius around the development capturing all the homes in the area. Our decisions were informed by analyses of zoning and land use maps, aerial photographs, road atlases, and site visits. Most importantly, we held discussions with town planners, building inspectors, tax assessors, GIS specialists, and town managers in order to gain their perspective of neighborhood impact of each development. In almost every case, these discussions reduced the size of our preliminary impact area. This study's careful and conservative treatment of each impact area limited its boundary to just slightly beyond the direct abutters of each development. Figure 3 shows photographs of the impact areas for three of the case studies. The top left, top right, and bottom right photographs were taken from the developments looking out to abutting properties. The bottom left photo was taken from an adjacent street looking into the development from the surrounding neighborhood. As can be seen below, all of these homes have direct sight lines into the developments and the projects are truly embedded in their neighborhoods. The houses deemed to be at the greatest risk of being affected by the mixed-income, multi-family development were included in the defined impact area for each

Figure 3. Impact Area Photographs

Kimball Court Apartments (Top Left), and Avalon Oaks (Top Right and Bottom)

Exhibit 8

development. The balance of the single-family houses in each town formed the control group.

The few related studies examining the relationship between affordable housing and residential property value that have been conducted in other parts of the US often define their impact areas as contiguous neighborhood areas extending between one-quarter mile and one-half mile from the site in question. This convention is not readily adaptable to our study or Boston's suburban metropolitan area. The former studies examined much more densely developed neighborhood areas comprised of a continuous urban fabric. In suburban Boston, however, an impact area dissolves quickly due to the large lot sizes and irregular street grids.

In addition, previous studies have typically not been longitudinal. That is, they attempt to discern property value effects at a single point in time. Following neighborhood property values over time is a much more powerful tool.

HEDONIC METHODOLOGY

Our methodology draws from the considerable body of spatial and longitudinal research in urban and housing economics. We used hedonic modeling techniques to create quality-controlled sales price indexes for both the impact area and control area (the remainder of single-family homes in that town). Hedonic modeling is based on the assumption that home buyers assign quantifiable values to the individual characteristics that make up a house (e.g., size, bathrooms, lot size). Our models estimate both the contributions to value of the characteristics of a house and the variations in value that occur over time. This allows us to "price" a typical house over time. We have isolated time in the equation to see how house prices within the impact areas move as affordable housing developments are announced, built, and occupied. That is, we build and compare house price indexes for the impact and control areas to determine if house prices within the impact areas were affected by the introduction of large, dense rental housing developments. By considering both spatial and longitudinal house price variation, we provide a comprehensive look at the micro-level valuation impacts associated with such development.

DATA AND MODEL SPECIFICATION

This study used sales transaction data for single-family houses. We obtained records for about 36,000 transactions between 1982 and 2003. In order to use transaction data in hedonic

Exhibit 8

modeling, the records must contain structural attributes of the house in addition to the sales price and the sale date. All the requisite information is not compiled by one agency in a uniform format. Transaction data including address, sales price, date, buyer, seller, and mortgage amount are collected by the Registries of Deeds in Massachusetts. Records containing information pertaining to property attributes are maintained by local municipal assessors. We purchased data from a third party vender, The Warren Group, to bridge the gap between registries' and assessors' records.

Drawing on the relevant economic literature, and guided by the availability of transaction data for individual houses, appropriate hedonic models were constructed for each case. In particular, thorough analyses of descriptive statistics were undertaken to construct appropriate explanatory variables.

The variables we included are all considered to be strong determinants of price. All of our models contain a combination of the following explanatory variables: house size, lot size, number of bedrooms, number of bathrooms, and the year the house was built. Our hedonic models also include explanatory variables to represent time. These allow us to measure the "effect" of the passage of time, while holding constant the characteristics of the house.[2]

For each of our seven cases, separate hedonic equations were constructed and estimated for both the control area and impact area. Using these results, we were able to "price" a typical house in each group over time. Comparisons of these price paths allowed us to see whether prices in an impact area deviated from those in a control area.

ANALYSIS PERIOD

Housing markets are very complex and information is absorbed differentially over time. As such, it is difficult to isolate the impact any one event has on sales price. The best way to capture the influence of an event is to observe impact area price paths or trends before, during, and after the event and look for substantial variations from a control path. We created house sales price indexes that begin before comprehensive permit approval and that extend beyond the initial occupancy of the projects. The twenty-year length of this study (1983-2003) provided a continuous time path that included cyclical changes in the larger market.

The analysis period for each development is designed to include the years in which the influence of the development was strongest. There are many competing factors affecting

Exhibit 8

sales price of single-family homes, and as time passes after the introduction of a large, dense development, other factors may dilute its influence. The length of each analysis period varies slightly as a function of the development process. Generally, the analysis period is three years long, beginning with comprehensive permit approval and ending the year the project was placed in service.

EMPIRICAL RESULTS—KIMBALL COURT APARTMENTS, WOBURN

For the purposes of this Executive Summary, we will give a thorough description of only one of the case studies, Kimball Court Apartments in Woburn. It is the largest development in our study and it is remarkably different from, and out of scale with, the surrounding neighborhood. As such, we might expect this development to be the most likely to affect single-family house prices.

The City of Woburn has seen not one but *three* phases of the Kimball Court housing development. All phases were permitted using Chapter 40B, and each phase has a separate analysis period. The three analysis periods are not all the same length (differences are related to the construction and development timeline of each phase) but the impact area and the control area are the same for all phases.

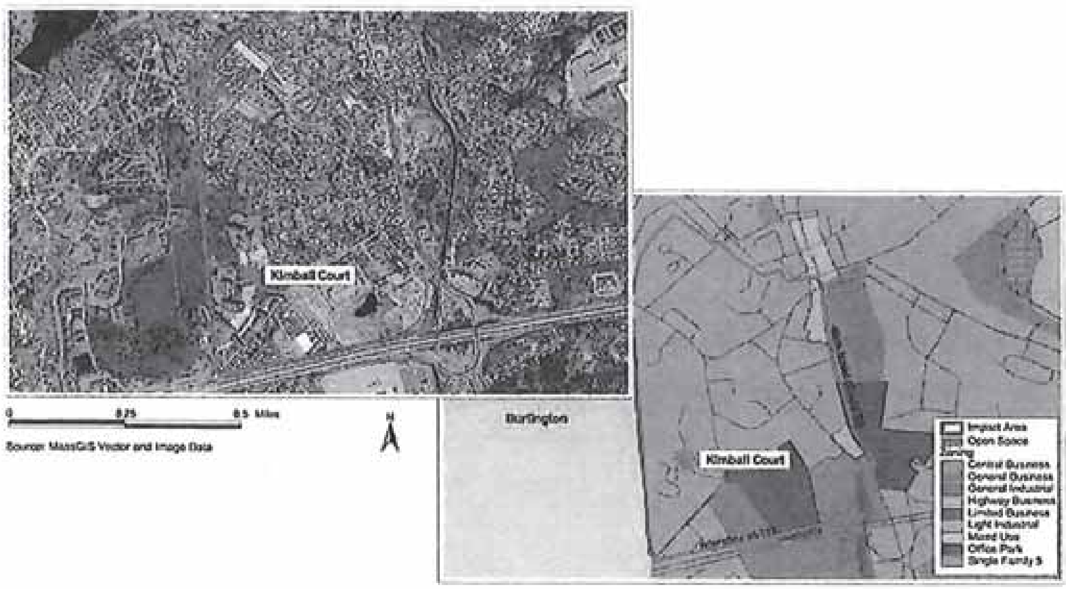
IMPACT AREA

Kimball Court is located on the western edge of Woburn adjacent to the Burlington border. We have only considered the single-family homes in Woburn as part of the impact area. The boundary is rectangular shaped with three definitive edges formed by Burlington to the west, Route 128 to the south, and Main Street on the east. The northern edge is marked where Merrimac Street intersects Main Street and winds west through residential streets to where Pearl Street crosses into Burlington. The Kimball Court impact area is one of the largest in the study, in part because the development is so dominating that its presence radiates deeply into the residential neighborhood. The topography of the impact area slopes from the north and east toward Kimball Court. The grade affords houses close to Main Street and farther north clear site lines of the seven-story buildings.

Figure 4 shows an aerial photograph and zoning map of the impact area and surrounding

Exhibit 8

Figure 4. Aerial Photograph and Zoning Map: Kimball Court, Woburn



neighborhood. The photograph clearly depicts the mismatch between the form and scale of Kimball Court and neighboring single-family homes. Most of the open space adjacent to the development provides a buffer only to Burlington; Woburn residents face a sharp edge with little or no transition. The zoning map reinforces the point that Kimball Court is an island amid a single-family district. There are other non-residential uses to the south facing I-95/Route 128, but Kimball Court penetrates into the neighborhood as opposed to remaining on the periphery.

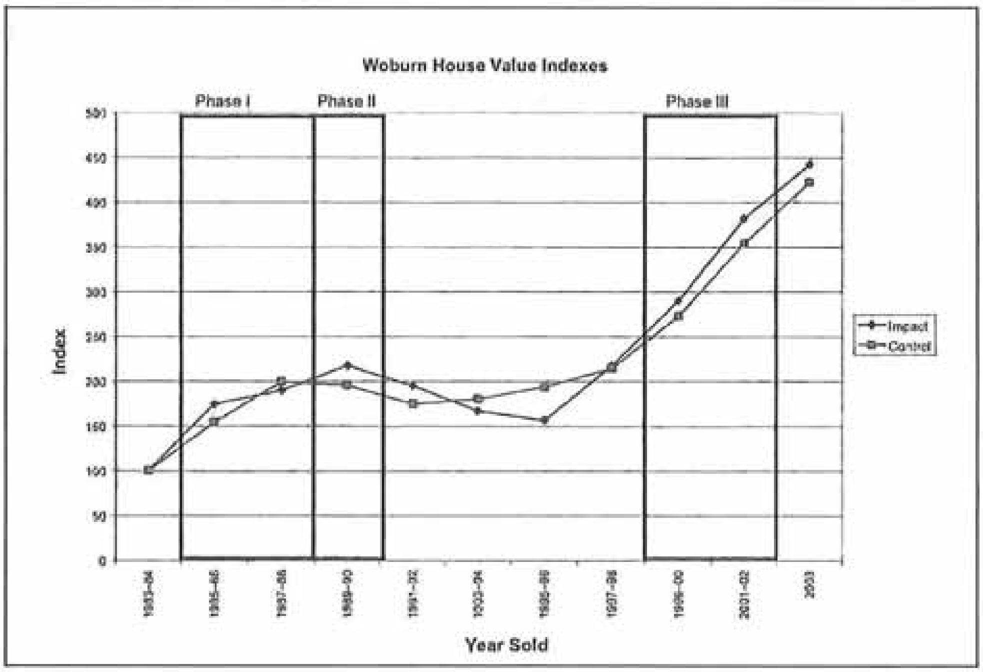
SALES PRICE INDEXES

Chart 1 shows the house price indexes for the control and impact areas. Both indexes track house price movements over time that are consistent with the Boston area's market experience. House prices rose strongly through the mid-1980's peaking in late 1988 and 1989. Prices generally declined during the early 1990s, but by 1996 the market had turned a corner and house prices rebounded sharply. Both the control area and the impact area followed the experience of the larger Boston market, with both indexes following very similar price paths.

In the years after the introduction of each Kimball Court phase, the impact area and control area experienced similar appreciation in sale price for single family homes. Over the

Exhibit 8

Chart 1. Woburn House Value Indexes



course of the entire study the compound annual growth rate for sale prices was 7.9% for the control area and 8.1% for the impact area.

PHASE I

The first phase was permitted in 1985 and completed in 1988. The appropriate analysis period using our price indexes begins at the two-year period preceding permitting (1983–84) and ends with the two-year period following completion. During this Phase I analysis period, the impact area experienced a 13.9 percent annual growth rate, slightly greater than the control area's 11.9 percent rate. (See Chart 2.) This was a turbulent period, with home prices doubling.

PHASE II

The second phase was permitted in 1989 and completed in 1990. The analysis period thus begins with 1987–88 and runs through 1991–92, the two-year period after completion. For the Phase II analysis period the impact area house values were essentially unchanged (growth rate of 0.6 percent). Over the same time period, house prices in the control area declined slightly, with an annual growth rate of -3.3 percent. House values around Kimball Court were not adversely impacted by the mixed-income, multi-family rental development.

PHASE III

The final phase was permitted in 1999 and completed in 2002. Our analysis period, therefore, runs from 1997–98 through 2003, the last year for which data were available. During the Phase III analysis period, the house values in the impact area rose 12.6 percent annually. The trend for the control area was nearly identical, with house values experiencing an average annual appreciation rate of 12.0 percent.

Overall, we see that there are no substantive differences between the two price paths. Sale prices for single-family homes in the impact and control areas moved nearly in tandem during the three development phases of Kimball Court.

CONCLUSION

To answer the question, "Do large-scale, high-density mixed-income rental developments negatively impact nearby single-family property values in suburban Boston?", we studied the relationship over time, within 8 separate communities, between single-family house prices directly impacted by such developments and those that were not. Our case selection criteria identified

Chart 2. Woburn Annual Growth Rates

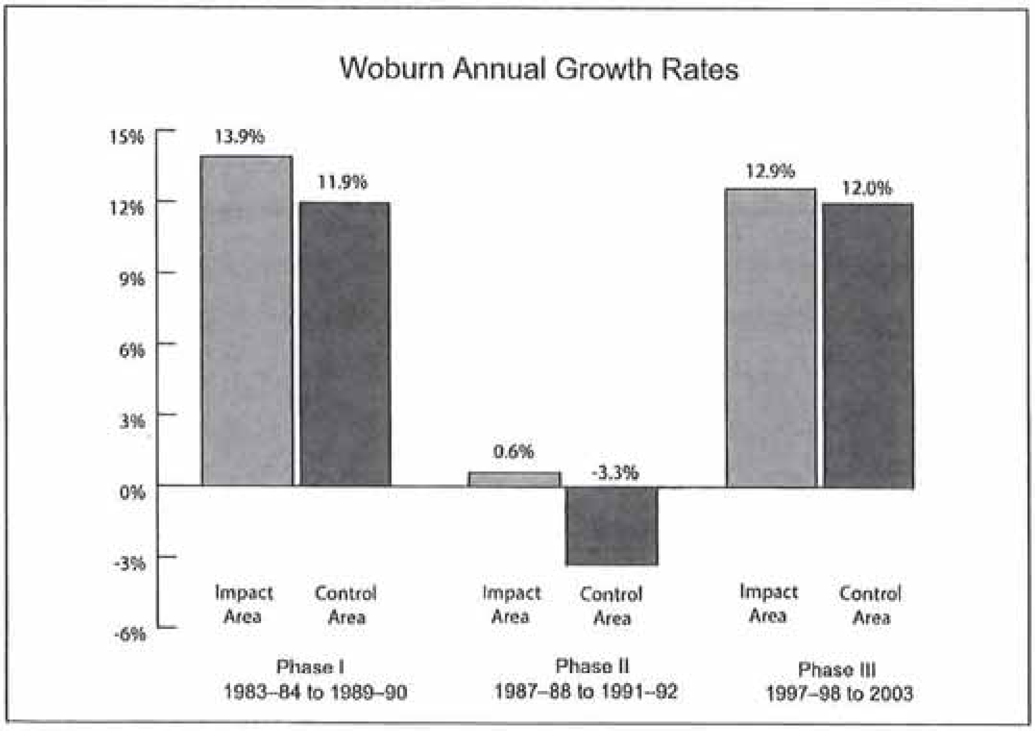


Exhibit 8

some of the worst-case scenarios of multi-family intrusion into a single-family neighborhood. As such, the developments we evaluated should have the greatest likelihood for negatively impacting adjacent residences. Moreover, given the often contentious nature of the comprehensive permit process, wherein fears of property devaulation and radical changes in neighborhood charcter were expressed, it seems readily apparent that many local residents would accept this premise.

The empirical analysis for each of the seven cases indicated that the sales price indexes for the impact areas move essentially identically with the price indexes of the control areas before, during, and after the introduction of a 40B development. We find that large, dense, multi-family rental developments made possible by chapter 40B do not negatively impact the sales price of nearby single-family homes. Our findings are transferable to similar developments in towns such as the ones studied.

Massachusetts-style mixed-income, multi-family developments need not be feared in terms of property value losses. The 40B developments considered in this study are high quality housing and, when built, represented the top of the local market. Nearly three-quarters of the housing units in our case studies are market rate. These 40B projects are not just affordable housing developments; they are market-rate multi-family rental communities incorporating an affordable component.

Our finding of the absence of negative property value effects associated with 40B developments should allay municipalities' and homeowners' fears with respect to approving high-quality projects. Given the severe shortage of affordable housing in the Boston metropolitan area, we hope the results of our research will contribute to increasing the rate at which municipalities are able to come into compliance with Massachusetts's affordable housing laws.

Exhibit 8

CHAPTER 1: INTRODUCTION

This report addresses an important question in the heated debate concerning higher-density, mixed-income development in neighborhoods comprised of single-family detached houses: Do multi-family mixed-income rental developments impact nearby single-family property values in suburban Boston communities? The fear of property value loss is often seen as a serious motive for resident opposition to higher-density mixed-income developments; in fact, there has been no research addressing this question for the Boston metropolitan area.

Our case studies are drawn from the set of developments made possible by Chapter 40B of the Massachusetts General Law, also known as the Comprehensive Permit Law and Anti-Snob Zoning Act. Chapter 40B is a Massachusetts statute that enables developers to obtain state-authorized comprehensive permits in municipalities that have not yet come in compliance with state affordability criteria. Developments seeking comprehensive permits can override local zoning regulations if (1) less than ten percent of a municipality's housing stock is defined as affordable; and (2) at least 20 or 25 percent of the housing units in the proposed development are affordable. The 20 percent figure applies when the affordable units are open to households earning less than 50 percent of the area median income (AMI), and 25 percent are set aside when the criterion is household income less than 80 percent of the AMI.

This study examines the relationship between seven predominantly large-scale, high-density, multi-family rental 40B developments and single-family house value in six communities in suburban Boston. Comparative house price indexes have been created for each development using hedonic modeling to determine whether home values decreased, stayed the same, or increased over time as the result of the 40B development. No effective differences were found between the home price indexes for the impact and control areas in all seven case studies. Property values of single-family homes adjacent to higher-density developments track values of homes that are not proximate to the high-density developments. The fear of relative decline

Exhibit 8

of nearby property values is not consistent with the empirical evidence.

The developments considered here were either "contentious" or "highly contentious." These categories relate (1) to the level of opposition the developments faced during the permitting process and (2) which entity granted the final permit decision: the town, Housing Appeals Committee, Superior Court, Appellate Court, or Supreme Judicial Court. These categories are used to show how the 40B process has been framed and re-framed over time.

The 40B process can be conceptualized in terms of three stages:

1. Introduction—The developer introduces a project to the town.
2. Debate—The permitting process negotiations and bargaining between the developer and municipality.
3. Resolution—Final permit decision.

The three-stage process emerged from our analysis of the highly contentious developments. We found that highly contentious projects often occur when towns are unprepared for new development. They either lack background for judging the costs and benefits to the town of the proposed development, or they simply do not want higher density development. Developers sometimes propose a project that may be larger than appropriate and are met with hostility. The permitting process puts the two parties at odds, setting the stage for a high-stakes, seemingly zero-sum game. In these highly contentious projects, the debate stage, which could be an opportunity for mutual revision of the development program, takes place with little negotiation or bargaining between developers and municipalities. Inevitably, it ends in a permit denial from the town. This denial leads to an extensive third stage with a long, expensive legal process. Fear of a protracted battle gives developers incentive to maximize project density in their initial proposals to compensate for anticipated extra costs, and the failure to resolve the question of density in earlier stages leaves towns with little leverage once the courts render the permit decision.

The approach to contentious developments approved as a result of 40B requirements has been reframed over time. Initially, the process was framed in such a way that resulted in a strictly dichotomous solution of receipt or non-receipt of a comprehensive permit. As a result of contentious projects, developers and towns began to re-frame how to proceed with Stage 2 of the 40B process by concluding that they could each have a better end result if they negotiated

Exhibit 8

and bargained during the permitting process. In these cases, the municipality ends up making the final permit decision in Stage 3 instead of forcing the developer to appeal the permit through the higher-stakes court system.

Non-contentious developments are possible but have been uncommon. In this report, only Littleton Green, a 24-unit age-restricted development, falls into this category. Because of the target population and small size, there was little community opposition to the development. Moreover, from the town's perspective, granting the comprehensive permit without intervention by state-level authorities who often restrict the scope of town behavior provided an opportunity for the town to negotiate for the incorporation of its own needs into the development program.

RESEARCH METHODOLOGY

This is the first study for Massachusetts of property values effects of multi-family affordable developments. We applied rigorous, state-of-the-art quantitative research methods to explore this issue as fully as possible.

We designed the research approach to focus on contentious and highly contentious development; our focus on numerous "worst-case" scenarios meant choosing developments that many would consider "most likely" to have negative impacts. The selected 40B mixed-income developments had to be: (1) located within the Boston metropolitan area, (2) permitted between the mid-1980s and 2000, (3) rental apartments, and (4) embedded in single-family residential neighborhood. This process identified a group of developments that are generally both larger and denser than the typical 40B development. It could be argued that most of the case studies are the types of developments that suburbanites fear most: the worst neighbor that one would hope to have. If there were ever projects expected to cause negative impacts on surrounding property values, it would be the large, dense developments examined in this study.

A crucial step in building the methodology was to identiy "impact areas" to use in the empirical analysis. How an impact area is defined is critical to achieving objective results. We carefully and conservatively drew impact area boundaries according to strict criteria, which resulted in impact areas that are almost exclusively abutters of the development. Impact area designation was done on a case by case basis; we did not simply apply a generic formula such as drawing a quarter- or half-mile radius around the development capturing all the homes in the

Exhibit 8

area. Our procedure included review of aerial photos, zoning maps, road maps, discussions with municipal officials, and site visits.

This study uses hedonic modeling techniques to create comparative sales price indexes for each impact area and its respective control area, defined as the remainder of single-family homes in a town. Implicit in hedonic modeling is the assumption that home buyers assign value to the individual characteristics that make up a house (e.g., size, number of bathrooms). Hedonic modeling is a statistical tool used to estimate the value of these structural attributes. Since home values change over time, our models also estimate effect of time on house value. This is allows us to use the hedonic results to price a typical house over time. We thus built and compared house price indexes for impact and control areas to determine if house prices were affected by the introduction of 40B developments.

CHAPTER 40B: A HISTORY, DESCRIPTION AND RESULTS

Massachusetts' Chapter 40B statute was written in 1969 partly in response to the form and consequence of twentieth-century suburbanization. Chapter 40B was "based on a remarkably early recognition by its proponents that exclusionary zoning practices, such as large minimum lot size requirements and bans on multi-family housing, play a significant role in driving up housing costs and causing the dominant spatial pattern of economic and racial segregation found in most metropolitan areas of the United States."[1] The law was intended to stem the tide of widespread income and recial segregation in Massachusetts by giving the state the authority to supercede local (suburban) exclusionary zoning regulations.

The 40B statute has two main objectives: housing production and household mobility. The production objective is to increase the supply of both affordable and multi-family housing in Massachusetts. The mobility objective is to provide opportunities for low- and moderate-income (particularly minority low-income) families to move out of the concentrated poverty of the inner city into suburban areas with increased educational and economic opportunities.

Specifically, General Law Chapter 40B "was enacted to provide expeditious relief from exclusionary local zoning by-laws and practices which might inhibit the construction of low and moderate income housing in the Commonwealth's cities and towns."[2] Pursuant to the statute, "a qualified builder wishing to build low or moderate income housing may file with a local board of

Exhibit 8

appeals an application for a comprehensive permit instead of filing separate applications with each local agency having jurisdiction over the project."[3] If a local zoning board denies an application for a comprehensive permit, the developer may appeal to the Housing Appeals Committee (HAC), and the HAC will review the decision "to determine whether the board's decision is reasonable and consistent with local needs."[4] The local zoning board has the burden of proving that the development will cause health, safety, environmental effects that outweigh the need for low and moderate income housing. If the HAC finds that the decision of the zoning board is not reasonable and consistent with local needs, it can direct the issuance of a comprehensive permit by the board. Chapter 40B is responsible for creating approximately 30,000 housing units to date, nearly 18,000 of which are privately owned rental housing units that are affordable to households earning at or below 80 percent of the AMI.[5]

HOUSING TRENDS

While the Boston area's population has been increasing, the number of housing units permitted annually in Massachusetts has declined significantly over the past few decades, from an average of 31,000 units per year during the 1970s to only 17,000 per year throughout the 1990s. Population and income growth and declining housing production are partly responsible for the recent major runup in housing prices and rents. Another contributory factor has been the constraints on land use throughout Boston's metropolitan area imposed by large lot single-family zoning in suburban communities.

The decline in permitting of multi-family housing is even more striking, dropping from an average of 14,000 per year in the 1970s to 1,300 per year for most of the 1990s.[6] Massachusetts ranked forty-seventh in the country in multi-family housing starts in 2002, in the same league as large rural states such as Wyoming and North Dakota with less than 10 percent of the population of Massachusetts.[7]

AFFORDABLE HOUSING TRENDS

A thorough assessment of housing affordability is the focus of a related project.[8] It is useful here, however, to note that the vast majority of Boston-area towns and cities have not met the ten percent requirement in the Chapter 40B legislation. (See Table 1.1.) Jurisdictions with low-

Exhibit 8

income neighborhoods dominate the "above 10%" group (Boston, Lawrence, Lowell, Springfield, and Worcester).

EXCLUSION AND OPPOSITION

Exclusionary zoning and local opposition in suburban communities have significantly hindered both market-rate and affordable multi-family housing production. Massachusetts has a strong tradition of home rule, and municipalities use exclusionary zoning practices such as large lot single-family zoning to effectively close the door to the suburbs for lower- and moderate income families.

Chapter 40B has been so contentious because it supercedes the control over the most significant power suburbs have—zoning. Residents resist 40B developments in their neighborhoods and expend considerable effort to block comprehensive permit applications.

The arguments presented in opposition to 40B developments are numerous and often pertain to traffic and congestion, architectural design and contextual sensitivity, property value, municipal budgeting, and environmental impacts. Many believe, however, that most citizen opposition can be distilled to a fear of neighborhood devaluation. Thus, residents are acting in what they believe to be the interest of wealth preservation by protecting the value of their homes—the asset that is most often the largest component of their investment portfolios.[10] This study examines whether this self-interest is well founded.

Table 1.1 Boston Area Municipalities Subsidized Housing Inventory

Boston Metropolitan Area Municipalities' Affordable Housing Share	Number of Municipalities	Percent
0-2.5%	24	15%
2.5-5.0%	69	45%
5.0-7.5%	33	21%
7.5-10.0%	16	10%
Above 10%	13	8%
Total	155	100%

Source: MA Dept of Housing and Community Development, Subsidized Housing Inventory, April 2002.

Exhibit 8

REPORT ORGANIZATION

In the following chapters we present our research methodology and empirically examine the impact of 40B developments on surrounding property values.

Chapter 2 describes the case selection process and identification of each impact area. Our treatment of these issues sets this study apart from most previous work.

Chapter 3 outlines the theoretical framework for using hedonic modeling and presents the specific econometric methodology used in this study.

Chapter 4 presents our empirical findings. We review the results of each case study by discussing the price indexes.

Notes

[1] Krefetz, Sharon Perlman. *The Impact and Evolution of the Massachusetts Comprehensive Permit and Zoning Appeals Act: Thirty Years of Experience with a State Legislative Effort to Overcome Exclusionary Zoning*, 22 Western New England Law Review, 2001.

[2] Stonefield, Sam. *Symposium: Affordable Housing in Suburbia: The Importance but Limited Power and Effectiveness of the State Override Tool*, 22 Western New England Law Review, 2001.

[3] *Zoning Board of Appeals of Greenfield v. Housing Appeals Committee*, 1983.

[4] *Zoning Board of Appeals of Wellesley v. Housing Appeals Committee*, 1982.

[5] *Ibid.*

[6] Heudorfer, Bonnie. *The Record on 40B: The Effectiveness of the Massachusetts Affordable Housing Zoning Law*. Citizens' Housing and Planning Association, June 2003.

[7] *Ibid.*

[8] Hindman, Matthew. "A worthy strategy for affordable housing," *The Boston Globe*, March 27, 2004.

[9] Boston Affordability Index forthcoming, May 2005.

[10] Fischel, William. *The Homevoter Hypothesis*. Cambridge, MA: Harvard University Press, 2001.

Exhibit 8

CHAPTER 2: CASE STUDIES: METHODOLOGY AND DESCRIPTION

The research methodology employed was designed to maximize the likelihood of finding a negative impact on single-family housing prices from large-scale rental developments. If negative impacts are not found for the cases studied here, it is highly unlikely that they would be found in other cases.

CASE SELECTION PROCESS

The case selection process began with an examination of developments having used Chapter 40B to obtain zoning relief. The Citizens' Housing and Planning Association (CHAPA), in their June 2003 report on the effectiveness of Chapter 40B, assembled a list of all 40B developments, totaling 491 projects. Table 2.1 is a compilation of summary statistics for the complete 40B project list. The mean project size is 58 units with a standard deviation of 60 units; the overwhelming majority of projects are 120 units or less in size. The median of the inventory list is a 37-unit project, and the most common sized project is only eight units.

This inventory of projects was broken down by a number of selection criteria to find an appropriate group of cases studies. First, only projects within the Boston metropolitan area[i] were eligible for the study. Second, the projects were required to have received their comprehensive

Table 2.1 Summary Statistics: Chapter 40B Developments

Total Development Size	
Mean	58
Median	37
Mode	8
Standard Deviation	60
Range	311
Minimum	1
Maximum	312
Count	491

Exhibit 8

permit and have been fully developed between the mid-1980s and 2000. This time frame was necessary to satisfy the data requirements for the analysis.[3] Third, we only examined multi-family rental developments, not homeownership, and projects that were mixed income. Fourth, we tried to select larger projects that were very dissimilar in size, bulk, form, and density from the surrounding community. Our intention here was to find developments with a high likelihood of engendering community opposition. We felt that these larger projects that were generally out of scale with surrounding housing would be the most likely to create a perception of negative externalities and subsequent property devaluation.

After applying these selection criteria to CHAPA's 40B inventory list, the number of possible projects to examine was significantly reduced. With this shortened list of developments, we then proceeded to identify the projects on GIS maps with data layers of streets, rivers, open space, zoning, and land use designations to assure that the developments were not located at the edge of the town and were sited in residential neighborhoods. Additionally, we used aerial photographs in order to obtain a better sense of whether projects were incorporated in residential neighborhoods or isolated. The results of this analysis were striking (but not surprising to anyone who has closely followed 40B): we found the overwhelming majority of the developments either placed at the edges of towns, or cut off from the community by large amounts of open space, interstate highways, high-tension power lines, rail corridors, and industrial and manufacturing uses.

Finally, we made site visits to all the potential projects that remained after the previous analysis was complete. This exercise was instrumental to determining whether or not a project was actually integrated with the community. We also met with planners, building inspectors, assessors, and GIS specialists in order to obtain a better sense of the neighborhood context for

Table 2.2 Summary Statistics: Subject Sites

Total Development Size	
Mean	198
Median	193
Mode	N/A
Standard Deviation	163
Range	501
Minimum	24
Maximum	525
Count	7

each of the developments. This phase of the case selection process was extremely important in determining the final list of projects for the study.

CASE STUDY SITES

We successfully identified seven mixed-income, multi-family developments that matched our criteria. Table 2.2 shows a compilation of the summary statistics for these developments. These seven projects have a median size of 193 units, and fall in a range from 24 units to 525 units. The mean size of the projects in the study is 198 units, and there is a large standard deviation of 163 units: our case projects vary substantially in size. The mean, median, standard deviation and range of our sample are all higher than the values for the entire group of 40B developments described above. This stems in part from treating each multi-phase project as a single large development.

As can be seen by the map of the study sites (Figure 2.1), the nine developments in the study are dispersed throughout the greater Boston metropolitan area. Woburn is bisected by Route 128/Interstate 95 northwest of Boston. Wilmington lies just north along Interstate 93. Littleton is further northwest of the city at the junction of routes 2 and 495. Norwood and Randolph are south of Boston along the southern section of Route 128. Finally, Mansfield is southwest of the city at the junction of Interstates 95 and 495.

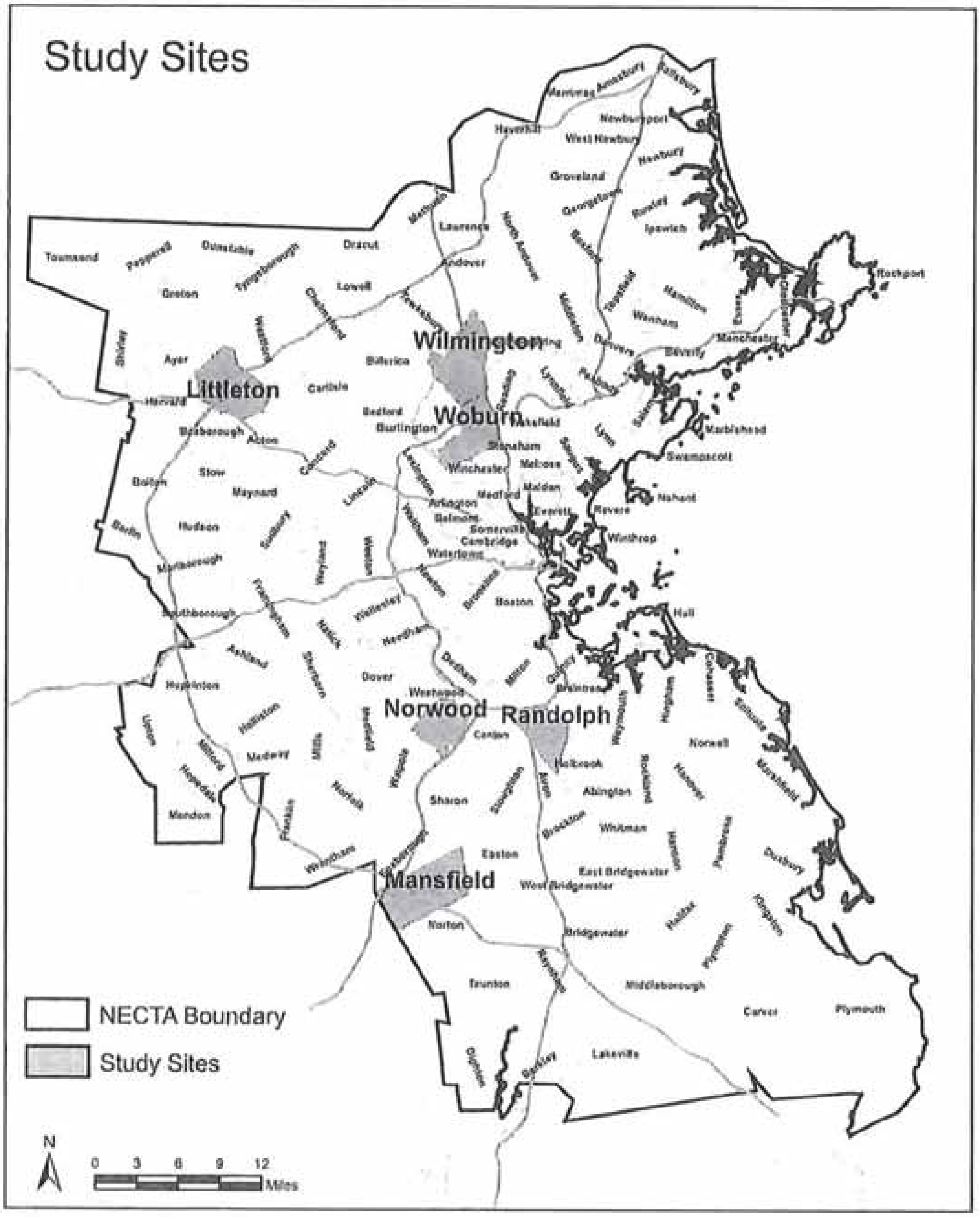
Table 2.3 presents the characteristics of the individual developments including their location, developer, total size, the number and percentage of affordable units, density, year permitted and completed, comprehensive permit approval body, and category of opposition.

IMPACT AREA DESIGNATION

The impact area for each case study is intended to represent the neighborhood within which the development is located. The single-family houses within the impact area boundary are the ones that can realistically be expected to be directly impacted by the development. Impact areas are designed to incorporate a continuous network of roads and social interaction while taking into account barriers such as geographic features and major infrastructure, zoning, and local political divisions such as school districts. A specific set of criteria were used to identify impact areas. For properties to be included in the impact area they must satisfy one of the following: (1) be direct

Exhibit 8

Figure 2.1 Map of Study Sites



abutters; (2) be part of a contiguous road network of primary and secondary streets radiating from the development site; (3) have a visual connection and direct line-of-sight to the development;

Exhibit 8

Table 2.3 Study Sites – Detailed Statistics

Development	Location	Developer	Total Units	Affordable Units	% Afford-able	Density (units/ acre)	Year Permit-ted	Year Com-pleted	Approval Body
Littleton Green	Littleton	Dementian Guschov	24	24	100%	10.0	1986	1987	Board of Appeals
Pond Side at Littleton	Littleton	First Littleton LP/State Street Development	90	32	35.6%	9.0	1987	1989	Mediation: ZBA, HAC, Developer
Mansfield Depot I/II	Mansfield	Keith Development	245	71	29.0%	16.6	1986 1987	1988 1989	Mediation: ZBA, HAC, Developer
Olde Derby Village	Norwood	Wilson Street Trust	193	35	25.2%	15.4	1985	1986	Superior Court
Liberty Place	Randolph	Liberty Place Associates	107	27	25.2%	9.2	1987	1989	Board of Appeals
Avalon Oaks	Wilmington	AvalonBay[1]	204	41	20.1%	9.1	1997	1999	MA Appeals Court
Kimball Court Apartments (I, II, III)	Woburn	Joseph Mullins	525	127	24.2%	19.3	1985 1989 1999	1988 1990 2002	MA Appeals Court

1. Initial permit request initiated by Wilmington Arboretum.

Exhibit 8

or (4) be adjacent to open space connections, via playing fields and dedicated walking or bike paths. These criteria define an area where all neighbors potentially experience a perception of an imposing new higher-density development.

Ultimately, impact areas were determined on a case-by-case basis. It would have been highly inappropriate to apply a generic test such as drawing an arbitrary distance radius around the development capturing all the homes in the area. Our decisions were informed by analyses of GIS maps, zoning, aerial photographs, road atlases, and site visits. Most importantly, we held discussions with local municipal officials such as planners, building inspectors, tax assessors, GIS specialists, and town managers in order to gain their perspective of neighborhood impact by each 40B development. In almost every case these discussions reduced the size of our preliminary impact area. This study's careful and conservative treatment of the impact area limited its boundary to slightly beyond the direct abutters of each development. Figure 2.2 shows photographs of the impact areas for three of the case studies. As can be seen in the photographs, all of these homes have direct site lines to the developments and the projects are wholly embedded in single-family home neighborhoods.

Studies examining the relationship between affordable housing and residential property

Figure 2.2 Impact Area Photographs

Top L- View from Kimball Court Apartments, Top R View from Avalon Oaks, Bottom R- Avalon Oaks, looking out on neighborhood

Exhibit 8

value that have been conducted elsewhere in the U.S. define the impact areas as contiguous neighborhood fabrics ranging from 500 feet to one-half mile from the site in question.[3] These definitions are not readily adaptable to our study. These previous studies examined much more densely developed neighborhood areas. Urban neighborhood boundaries are rarely clearly delineated, as locations several blocks from a subject site may still maintain strong visual sight lines and social connections to the site. Well-connected urban neighborhoods allow the relative feeling of proximity to extend farther away from an impact site than in suburban Boston, where impact areas dissolve quickly due to large-lot zoning and irregular street patterns.

CONTROL AREAS

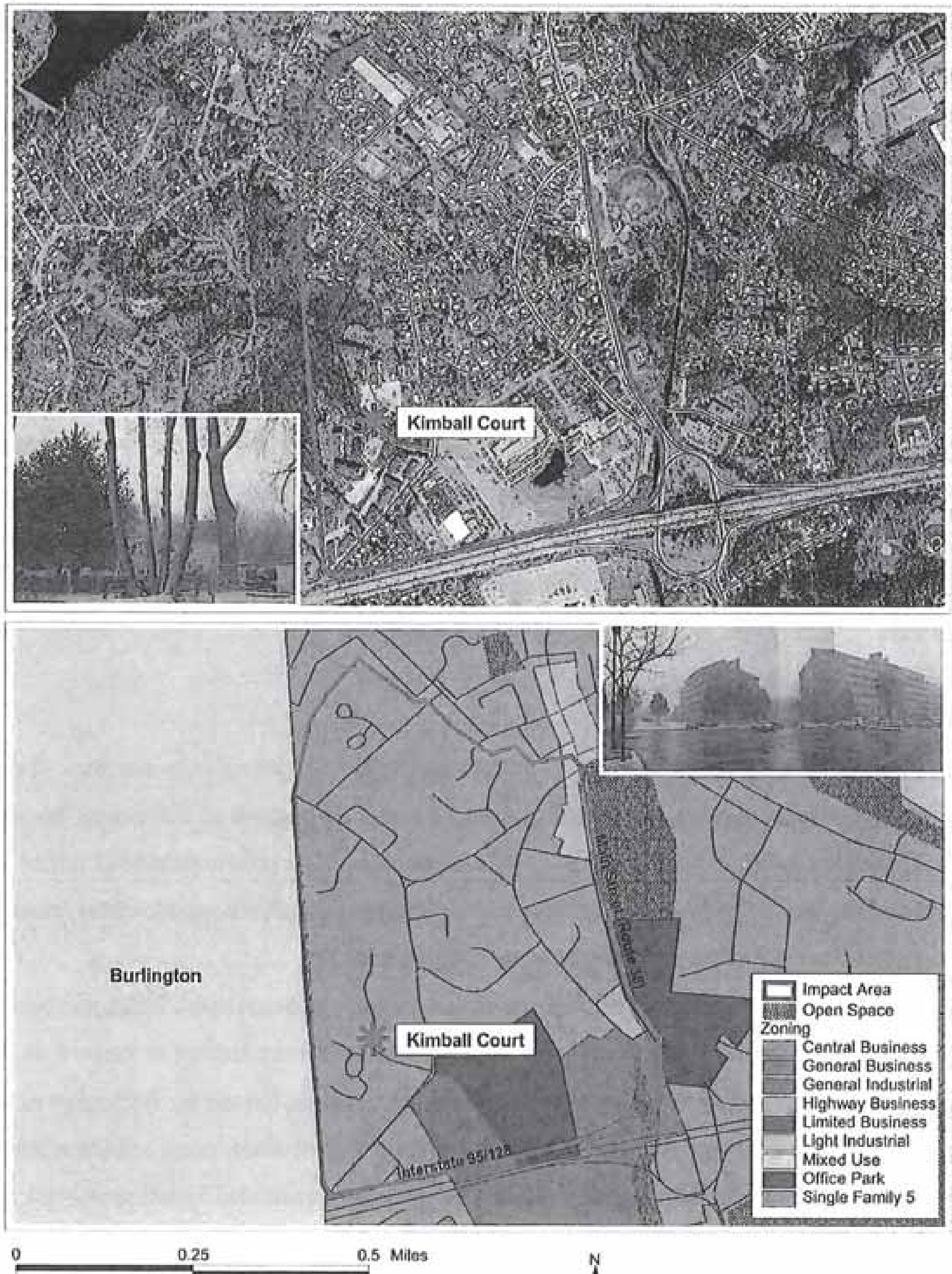
This study defines the control area as the municipality in which the development is located. All but one development examined in this study are located in municipalities organized as towns with a public-meeting form of government. The strong allegiance to home rule and the marked differences in the range and quality of public services provided by each municipality imply that houses are not always close substitutes among municipalities.

WOBURN

Woburn is the densest community in the study with 1.9 housing units per acre. It also has one of the highest rates of renter-occupied housing, 39 percent of the overall housing stock. In addition to Woburn having the lowest median income (approximately $55,000) of the studied communities, it also has one of the lowest percentages of subsidized affordable housing, accounting for only 5.7 percent of the city's total housing stock.

Kimball Court is located on the western edge of Woburn adjacent to the Burlington border, as indicated in Figure 2.3. We only consider the single-family homes located in Woburn as the impact area. The boundary is rectangular with three clear edges formed by Burlington to the west, Route 128 to the south and Main Street on the east. The northern edge is marked where Merrimac Street intersects Main Street and winds west through residential streets to where Pearl Street crosses into Burlington. The Kimball Court impact area is one of the largest in the study, in part because the development is so dominating that its presence radiates deeply into the residential neighborhood. In fact, the *Boston Business Journal* lists Kimball Court as the sixth

Figure 2.3



Source: MassGIS Vector and Image Data

Exhibit 8

largest apartment complex in Massachusetts, with 525 units in the first three phases.

Figure 2.3 shows an aerial photograph and zoning map of the impact area and surrounding neighborhood. Most of the open space adjacent to the development provides a buffer only to Burlington; Woburn residents face a sharp boundary with little or no transition. The topography of the impact area slopes from the north and east toward Kimball Court. The grade affords houses close to Main Street and farther north clear site lines of the seven-story buildings. The photographs clearly depict the mismatch between the form and scale of Kimball Court and neighboring single-family homes. The zoning map reinforces the point that Kimball Court is an island amid a single-family district. There are other non-residential uses to the south facing I-95/Route 128, but Kimball Court penetrates into the neighborhood as opposed to remaining on the periphery.

Kimball Court's density is 19.34 units per acre, by far the densest development in the study and over ten times more dense than Woburn's average density of 1.9 units per acre. This was likely the cause of some resident opposition.

In the case of Kimball Court, there was significant resistance to the development from the beginning. Kimball Court's developer, Joseph Mullins, properly filed a complete application for a comprehensive permit on October 6, 1983. The Woburn Zoning Board of Appeals (ZBA) issued a denial of the comprehensive permit on December 14, 1983, after having failed to hold a public hearing within 30 days of receipt of the application and inadequately advertising the December meeting at which a vote was held.

The board based its decision to deny the permit based on its inconsistency with local needs and that the proposed development "would have an adverse effect on the health and safety, not the occupants of the proposed housing but the residents in general."[4] Additional concerns cited by the ZBA were drainage, flooding, inadequate water pressure, and that the access road to the site was unsafe. In short, the board believed that the development would have a "deleterious effect" on the health and safety of town residents.

In October of 1984, the Superior Court decided in favor of granting the permit to Kimball Court primarily because the Woburn Board of Appeals failed to act within the statutory time period. According to a previous court decision, the Chapter 40B was enacted "to provide *expeditious* relief from exclusionary local zoning by-laws and practices which might inhibit construction of low and moderate income housing in the Commonwealth's cities and towns."[5] [Authors' emphasis]

Exhibit 8

Additionally, the Superior Court found that proper notice was not given for the public hearing; the notices were late and were not posted in the appropriate locations.

Proper notice is designed to promote the general welfare of the community and give citizens the chance to voice questions, concerns, or support for projects. The ruling stated that the decision granting of the permit to Kimball Court was not based on a technicality of the statute, "but a legislative and jurisdictional policy that citizens in the town are entitled to notice and the opportunity to be heard and that this policy [would] be strictly enforced."

On May 24, 1985, the Massachusetts Appeals Court affirmed the decision of the Superior Court and in doing so ordered the issuance of the comprehensive permit for Kimball Court Apartments. Subsequently, the second and third phases of the Kimball Court apartments were both approved by the Woburn Board of Appeals, in 1989 and 1999 respectively, without significant opposition.

LITTLETON

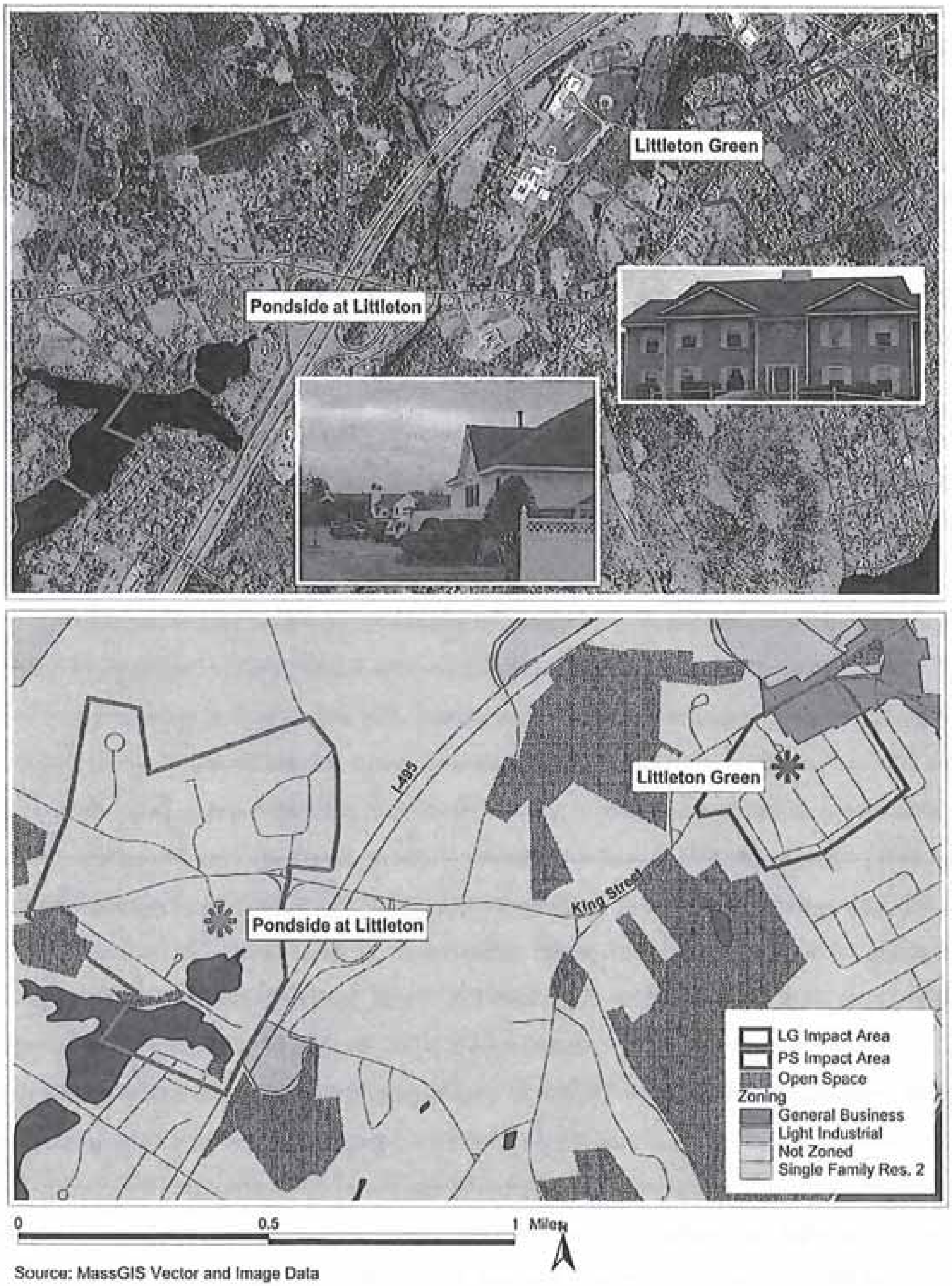
This study evaluates two 40B developments located in the town of Littleton. Each development has an independent impact area. The two developments received comprehensive permit approval in successive years. The analysis periods for the two impact areas overlap, and in an effort to better isolate the influences of the two 40B developments a single control area is used. The control area includes all single-family homes in the town of Littleton minus the homes in the two impact areas.

Figure 2.4 shows the extents of both impact areas. Pond Side and Littleton Green are located relatively close to one another, but not close enough to be considered part of the same residential neighborhood. In addition to distance, they are separated by I-495. Both developments are surrounded by single-family residences: Littleton Green is embedded in relatively dense, contiguous neighborhood, and Pond Side is in the middle of a looser, diffuse residential area. Littleton Green is a 24-unit, 100-percent affordable elderly housing development made up of three buildings with eight one-bedroom units per building. Pond Side is larger, with 90 units. Although 90 units is still relatively small, Littleton's entire housing supply is only slightly more than 3,000 units. Pond Side alone therefore represented a 3 percent increase in Littleton's housing stock.

The impact area surrounding the Littleton Green development is compact and shaped like a square. The development is situated close to the center of the impact area and the majority of

Exhibit 8

Figure 2.4



Source: MassGIS Vector and Image Data

Exhibit 8

houses in the area are abutters. The boundary is defined by King Street (Route 2A) to the north, Goldsmith Street on the east, Lochslea Street along the south and both Edsel Road and Baldwin Hill Road on the west. All the properties in the impact area are part a tight road network and have sight lines to Littleton Green.

The Pond Side 40B is also located on King Street, a few miles west of Littleton Green. Pond Side's impact area is more spread out and the surrounding land use pattern is dispersed. There are few direct abutters, but the lay of the land combined with the orientation of the site plan make the project very visible. All the houses on Mill Street and those contained by the triangle of Mill Street, King Street and Interstate 495 are considered abutters. Homes on Pleasant Street have a clear view of Pond Side across mill pond, and as such are considered to be impacted even though they are outside of the contiguous street network. The Wychwood Drive neighborhood and the homes off of New Estate Drive are on the opposite side of the busy King Street. These two streets, and their tributary roads, are included in the impact area because they connect with King Street across from the only entrance to Pond Side: so neighbors are constantly confronted with the development. The left inset in Figure 2.6 depicts the view from Wychwood Drive.

The histories of the two developments are quite different. There was no substantive resident or town opposition to the Littleton Green development. This was likely due to the project's small scale and age restriction. Generally speaking, developments that are limited to elderly residents are much easier to find approval as they serve a "deserving" population and by their nature do not raise concerns regarding the impact of the development on potentially crowded school systems and congested roads. The fact that the project had only 24 units likely made it significantly more acceptable for nearby residents. It is worth noting, however, that Littleton Green's density of 10 units per acre is considerably higher than Littleton's overall denisty of only 0.3 units per acre.

The project was granted a comprehensive permit in May of 1986 after three Board of Appeals hearings at which some questions and concerns regarding the development were raised, but not enough to halt or stall the development process. The concerns raised during the comprehensive permitting process focused primarily the environmental impact of the development on the surrounding community. Even without controversy, it still took over six months from the initial application submission to get final approval from the Board of Appeals.

The story of the approvals process for Pond Side is unique among the case studies in that it was a case in which local residents felt that the developer was taking advantage of the town's lack of affordable units to push through an unwanted market-rate development that would have otherwise been rejected by the zoning board. Pondside was proposed shortly after the town had approved three other comprehensive permits, one of which was Littleton Green, and the town was feeling inundated with permit applications. This led the Planning Board to argue that "the Board of Appeals ha[d] granted such permits in the past and a project which only has twenty percent subsidized units is greatly lacking and is not a legitimate override of the zoning." At a subsequent hearing, a member of the ZBA commented that he didn't think the town "would swallow seventy-five percent not subsidized" housing. In short, because Littleton was quite close to meeting the state-mandated 10 percent affordable threshhold, the town wanted to encourage more affordable housing so that it would be released from its obligation to grant comprehensive permits to non-conforming development projects. Pondside's permit application was originally denied by the ZBA, but it was ultimately granted after mediation sessions overseen by the HAC in April 1987.

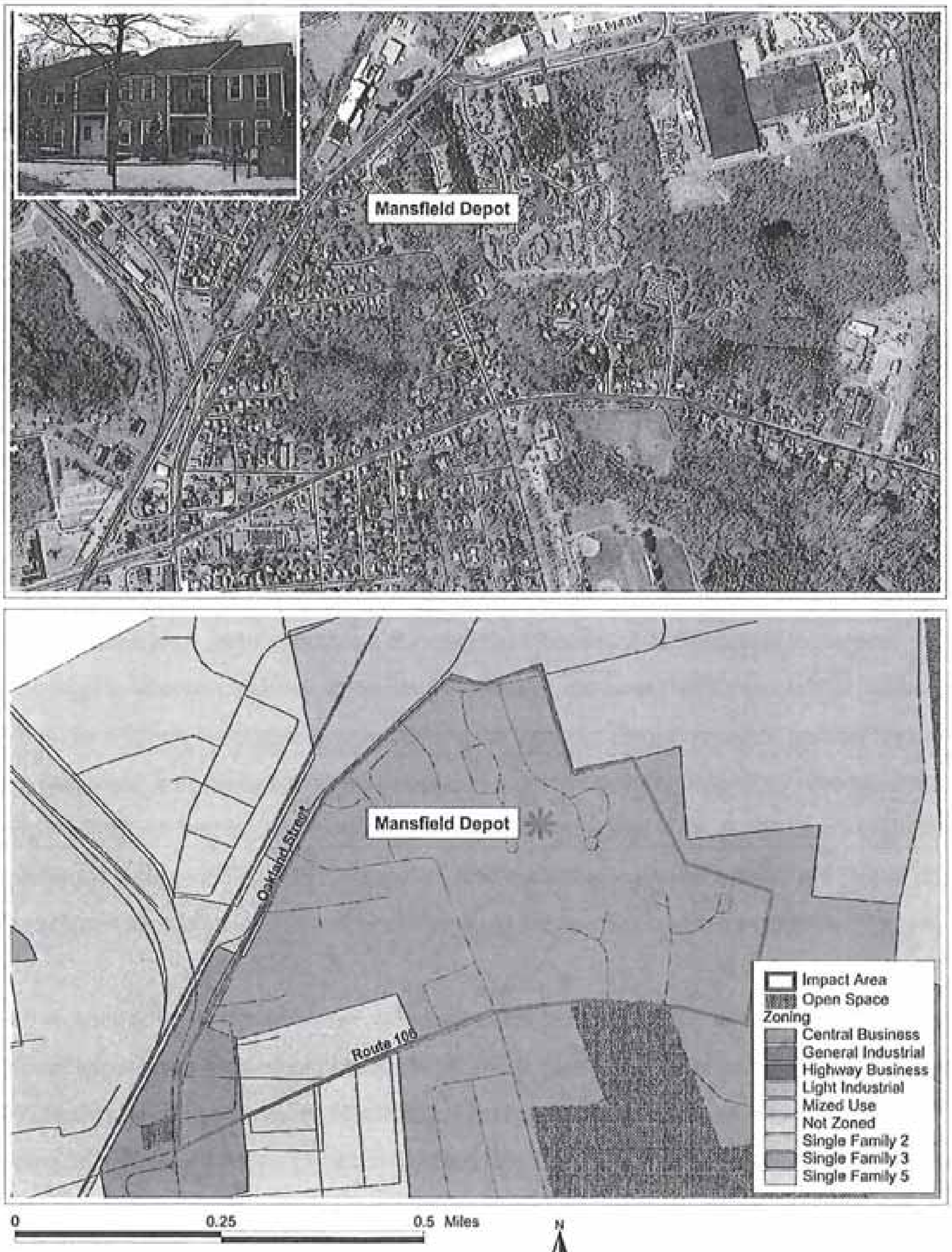
MANSFIELD

The town of Mansfield, 26 miles south of Boston, is a relatively small, rural community with a population of roughly 22,000 residents. Mansfield's economy consists primarily of agricultural and manufacturing firms, and the town has attempted to zone significant portions of land for industrial use with varying degrees of success. Despite its perceived small size, Mansfield grew substantially from 1980 to 2000 with a population increase of over 66 percent, by far the highest growth rate of the studied communities. Even with its large increase in population, Mansfield is still one of the least dense communities in the study, with an average density of 0.62 housing units per acre.

Located in an area originally zoned industrial and surrounded by industrial uses on three sides, Mansfield Depot consists of a total of 245 units of mixed-income multifamily rental housing, nearly 30 percent of which is affordable. Phase I of Mansfield Depot, permitted in October of 1986, includes 150 units, 25 percent of which are affordable to residents earning less than 80 percent of the area median income. Permitted in December of 1987, Phase II includes 95 units with 35 percent of the units affordable. The units in both phases have a comparatively large number of family-sized units, with 63 three- and four-bedroom apartments. Mansfield Depot consists of

Exhibit 8

Figure 2.5



Source: MassGIS Vector and Image Data

Exhibit 8

primarily two and three story buildings and provides a number of services for residents including on-site child care, an exercise room, club house, sauna, and playground. The entire development was completed in July 1989.

Mansfield Depot is located close to the Foxborough border just north of the thickly-settled town center. The impact area is triangular shaped with two long sides formed by Oakland Street on the west and Route 106 on the south. The eastern border captures two residential cul-de-sacs before connecting back with Mansfield Depot to the north. The development is surrounded by forest. Because of the open space, there are not many single-family abutters and no contiguous road network. The project footprint is large and many of the buildings are visible from adjacent properties. The inset in Figure 2.5 shows the size of a typical building in the development. A formal bike and walking path extends from the south west corner of Mansfield Depot through the wood behind many houses to the playing fields and elementary school south of Route 106. The bike and walking path strengthens the development's connection to its neighbors. The actual extent of the impact was established after consulting the Director of Planning and building department officials.

A ZBA hearing regarding the proposed comprehensive permit was held on May 22, 1986. The Mansfield Housing Authority offered "complete support" for the project, citing the need for low-cost rental housing "in a town that is experiencing a great deal of growth." At the time there were 300 applicants on MHA waiting list. The planning board, on the other hand, was not as supportive of the project; in their memorandum to the ZBA, they noted a number of concerns regarding the proposed development, including drainage, site lighting, means of access, sidewalks, and safety concerns regarding residential development in an industrial zone. The Industrial Development Commission commented that they did not oppose the project, "however, it is *not* the best use of our industrial land" [emphasis in original].

The ZBA's denial of the comprehensive permit was filed in July 1986 after another hearing. According to the decision, the permit was denied for a number of reasons, including that the "applicant did not present a convincing case that the Town of Mansfield hampers the construction of low or moderate income housing." Additionally, since the project site was located in an industrial zoned area, the "Board felt that this was not the best use of the industrial land and the project may be incompatible with industrial uses." Concerns regarding deflated property values in the

Exhibit 8

surrounding industrial area were also specifically raised in the ZBA decision: "This concern was also voiced by industrial abutters who are concerned it may depreciate industrial land values and limit the further development of the Ryan and Elliot Industrial Park." Additional concerns regarding whether or not the developer had properly searched for property in multi-family residential zones, traffic, drainage, flooding, access roads, accessibility, and proximity to amenities and services were also raised.

Following an appeal to the HAC, the ZBA and developer reached a settlement agreement in October of 1986 with a number of conditions, including construction of a secondary access, fencing, suitable drainage, sidewalks, and a school bus shelter.

As with the first phase of Mansfield Depot, the second phase had the support of the Mansfield Housing Authority but was opposed by the planning board. At the hearing, a letter was entered into the record from an abutter who was opposed to the first phase, but was now writing in support of Phase II stating that the "developer of the complex has been a good neighbor, and we are working together to maximize the positive aspects of this development and to minimize any negative effects. If I can in some way assist some people who are less advantaged in this town and in this region through this letter, then I will be most pleased." The second phase was approved in December 1987 subject to certain conditions including maintaining 35 percent of the units affordable in perpetuity.

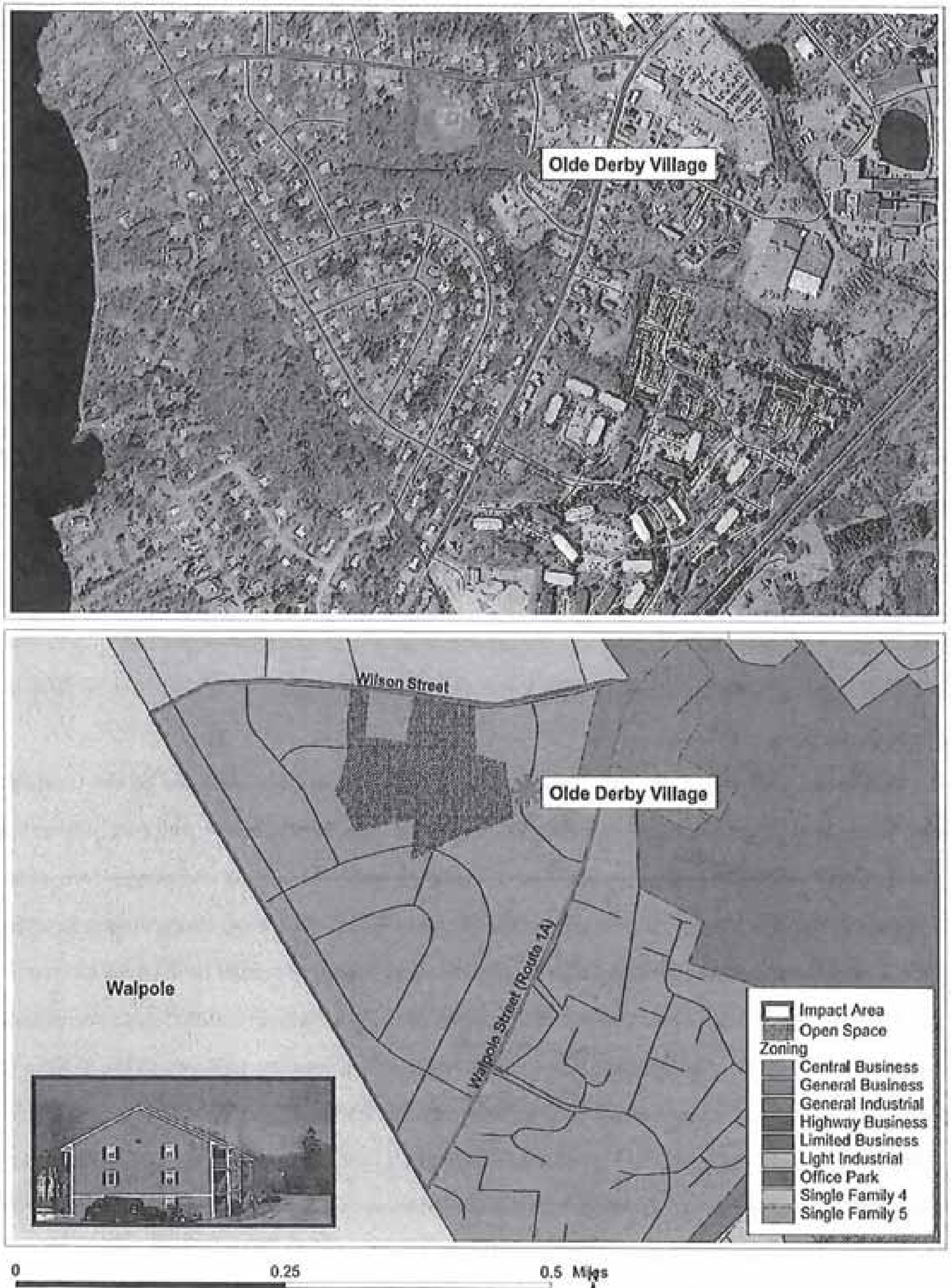
NORWOOD

The Town of Norwood, 14 miles south of Boston, is an economically diverse community consisting of manufacturing, suburban residential, and retail trade centers. With a population of nearly 30,000 residents, it has one of the highest densities in the study with 1.78 housing units per acre. From 1980 to 2000, Norwood's population decreased by 3.8 percent. It also has a comparatively low fraction of affordable housing, 5.4 percent of the total housing stock, the lowest percentage of the communities in the study. On the other hand, the town has the highest ratio of renter-occupied housing in the study, at 43 percent. Interestingly, Norwood also has the largest percentage of homeowners without a mortgage—36 percent—in the study.

Olde Derby Village, previously known as Countryside Village and Wilson Street, consists of 139 units, 35 of which (25 percent) are designated affordable. The development is made up of

Exhibit 8

Figure 2.6



Source: MassGIS Vector and Image Data

MIT

Exhibit 8

six buildings and is centrally located within Norwood, close to public amenities such as schools, churches, playgrounds, and the public library. The project is relatively dense with 15.4 units per acre on a nine acre site.

The impact area surrounding the Olde Derby Village 40B development is shaped like an equilateral triangle. Olde Derby Village occupies the eastern point of the triangle. The impact area is contained by three streets: Wilson on the north, Garden Parkway to the southwest and Walpole Street to the southeast. Houses located on both sides of these boundary streets are considered in the impact area. The area is not defined by an interconnected street network, but all the single-family houses are nearby and many are abutters.

Figure 2.6 depicts the relationship of Olde Derby Village to the surrounding area. Walpole Street is a major thoroughfare that separates the impact area. The development mediates between the adjacent commercial and industrial uses to the east and the isolated single-family district. Olde Derby Village is situated on a small hill, with building terraced up the hill. The site elevation increases the development's visibility to residential neighbors. Figure 2.6 also includes a photograph of the transition between the development and the residential neighborhood. It shows that buildings in the development are quite a bit larger than adjacent homes and that neighbors are close.

Despite a need for over 1,000 low and moderate income housing units at the time Olde Derby Village was proposed, the project faced vehement opposition. Norwood was able to hold up the development process for more than 13 years despite having a comprehensive permit granted and confirmed by the HAC and then the Superior Court. Norwood was still able to control the development through conditions attached to the comprehensive permit that stipulated that the project was to comply with Norwood's building code and that the town had to approve detailed construction plans and specifications. The permit was written by the HAC in 1974, in Chapter 40B's infancy. It is logical to conclude that not only was the town not very 40B-savvy, but the HAC and Superior Court were likely not very savvy at this point in time as well. The HAC and Superior Court's allowance of Norwood to stall the development for over a decade without any intervention points to some significant problems with the 40B process.

Among the reasons for opposing Olde Derby Village noted in the Superior Court documents were health and safety hazards, traffic, drainage, school impact, and water supply issues, as

Exhibit 8

cited by the Board of Appeals, School Committee, Planning Board, and the Board of Health. *The Patriot Ledger* at the time, however, indicated that what town residents really cared about, first and foremost, was stopping the project from happening and that they were seeking every possible option for complaint to get rid of the project.

RANDOLPH

Randolph is an economically and ethnically diverse community located 15 miles south of Boston. The town has a population of 31,000, and is the most ethnically diverse community. It has a population that is approximately 62 percent white, with 23 percent and 11 percent of residents African American and Asian, respectively. In addition to being the most diverse of the studied communities, Randolph is also one of the densest communities in the study with nearly 1.8 housing units per acre. The housing stock is largely owner-occupied with only 28 percent rental-occupied housing units. The town also has a relatively small percentage of subsidized affordable housing at 5.7 percent of the total housing stock.

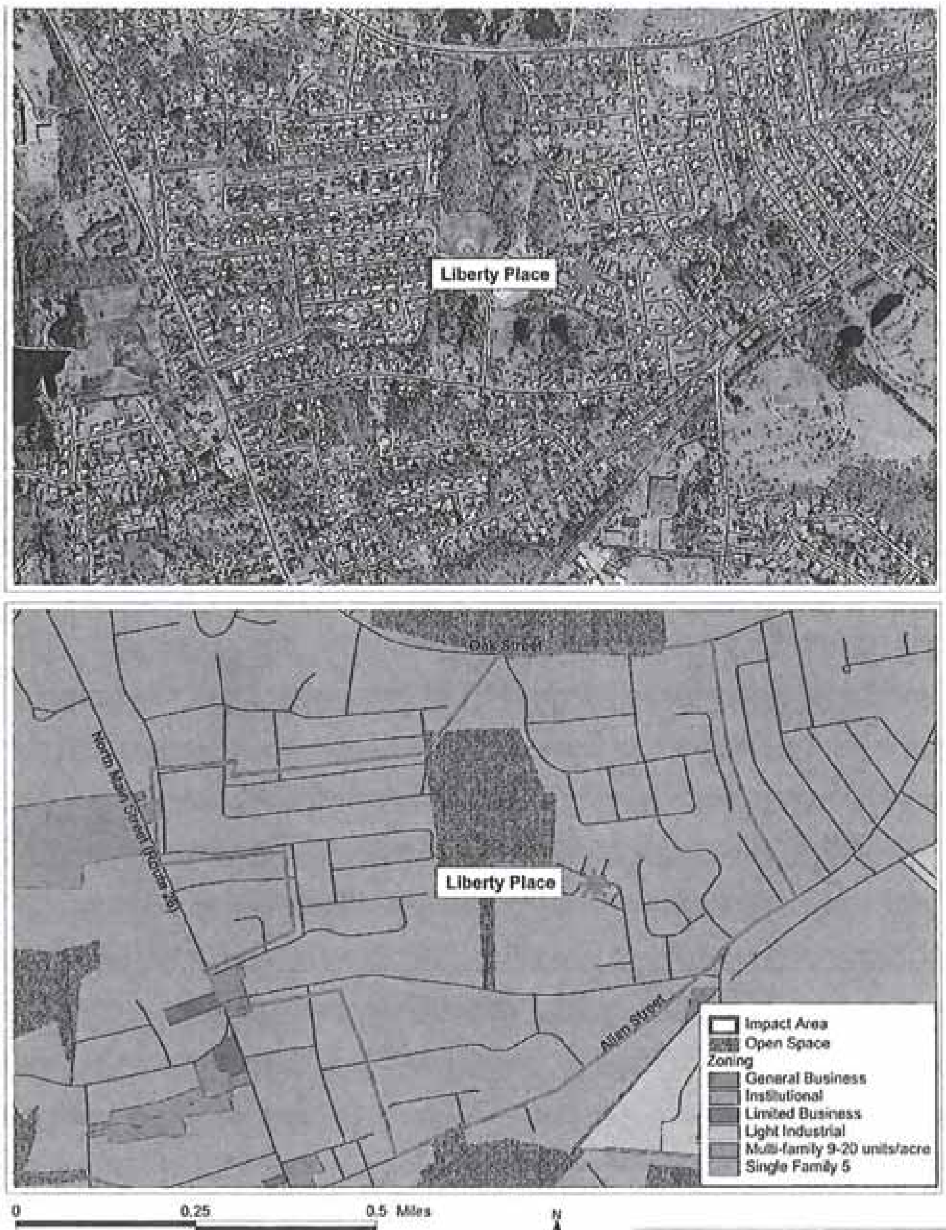
Liberty Place consists of 107 multi-family rental units, 27 of which are set aside for households earning 50 percent of the area median income. The project consists of three- and four-story buildings spread over the site surrounded by a significant amount of open space. Liberty Place abuts a local elementary school and a single-family residential neighborhood.

The impact area encircles part of a contiguous residential district. The boundary weaves through streets and is defined more by proximity than distinct features. In determining the extent of the impact area we visited the site and met with town official in the Department of Public Works and the Zoning Board of Appeals. Figure 2.7 reveals how Liberty Place straddles two neighborhoods. Both neighborhoods are thickly settled and defined by block-like street patterns. The two neighborhoods are knit together by the playing fields around Lyons School. The neighborhood to the west is connected to secondary roads and the playing fields. The fields create site lines to the project and a conduit for residents of Liberty Place to enter the neighborhood. Many of the homes in the eastern neighborhood are abutters of Liberty Place. The development is located on a rise making it more visible to these residents.

The comprehensive permit for the Liberty Place development was ultimately approved by the Randolph Zoning Board of Appeals in July of 1987, but not without an extensive and often

Exhibit 8

Figure 2.7



Source: MassGIS Vector and Image Data

Exhibit 8

controversial four-month public hearing process. Throughout the permitting process, residents, ZBA members, and other municipal officials strongly opposed the proposed development for many reasons, with property value concerns among the long list. However, in the end, the town did approve the comprehensive permit in a relatively short time frame and was able to negotiate with the developer for a 12 percent decrease in project size, maintenance of affordable units in perpetuity, and major changes in the site plan including reducing the number of buildings, increasing setbacks, and incorporating more green space.

WILMINGTON

Wilmington is a suburban industrial town 15 miles north of Boston. The town's population grew by more than 21 percent between 1990 and 2000, and currently has approximately 21,000 residents. Despite this population growth, Wilmington's density is only 0.65 housing units per acre—relatively low in comparison to the other communities in the study. The town's housing stock is primarily owner-occupied, with more than 90 percent homeownership in the study. Wilmington is also one of the least diverse communities in the study, with only 4 percent of its residents identified as non-white in the 2000 census.

Completed in 1999, Avalon Oaks, a 204-unit, garden-style apartment development (including 41 affordable units), is the most recent project examined in this study. The project includes a community center, an outdoor swimming pool, and a small playground. Consisting of primarily two- and three-bedroom units, the development is spread across eight three-story walk-up buildings. With 20 percent of the units set aside for households earning at or below 50 percent of the AMI, Avalon Oaks has the lowest percentage of affordable units in the study.

Avalon Oaks is located in the north east quadrant of the municipality, away from downtown. It is situated adjacent to an exit for Interstate Highway 93. The impact area is primarily comprised of a contiguous and clearly defined residential neighborhood to the west. Abutters to the east and single-family houses south of the elementary school are also included. We set the impact area after discussions with town officials in the planning and building departments.

Like the Kimball Court development in Woburn, Avalon Oaks is built directly in the backyard of many abutters. Figure 2.8 is a photograph taken from the side yard of an abutter in the neighborhood to the east. The portion of Avalon Oaks that faces this neighborhood is

Exhibit 8

not as overwhelming as in Woburn. The scope of the development is out of proportion with the surrounding land use pattern (see figure 2.8), but the site planning and context sensitive design effectively mitigates the bulk and density. The development is split into two sections. A northern portion clusters larger buildings close to I-93 and away from residents. The other section stretches smaller buildings along a curvilinear road parallel to the adjacent neighborhood.

Avalon Oaks in Wilmington was also a highly contested project during its first iteration in the late 1980s. The site was initially proposed for the Wilmington Arboretum development in 1987, but the town denied the comprehensive permit, and the decision was appealed to the HAC. The HAC ordered the granting of the permit, but Wilmington appealed the decision first to the Superior Court and then to the Massachusetts Appeals Court. The comprehensive permit was decisively granted by the Appellate Court in September of 1995.

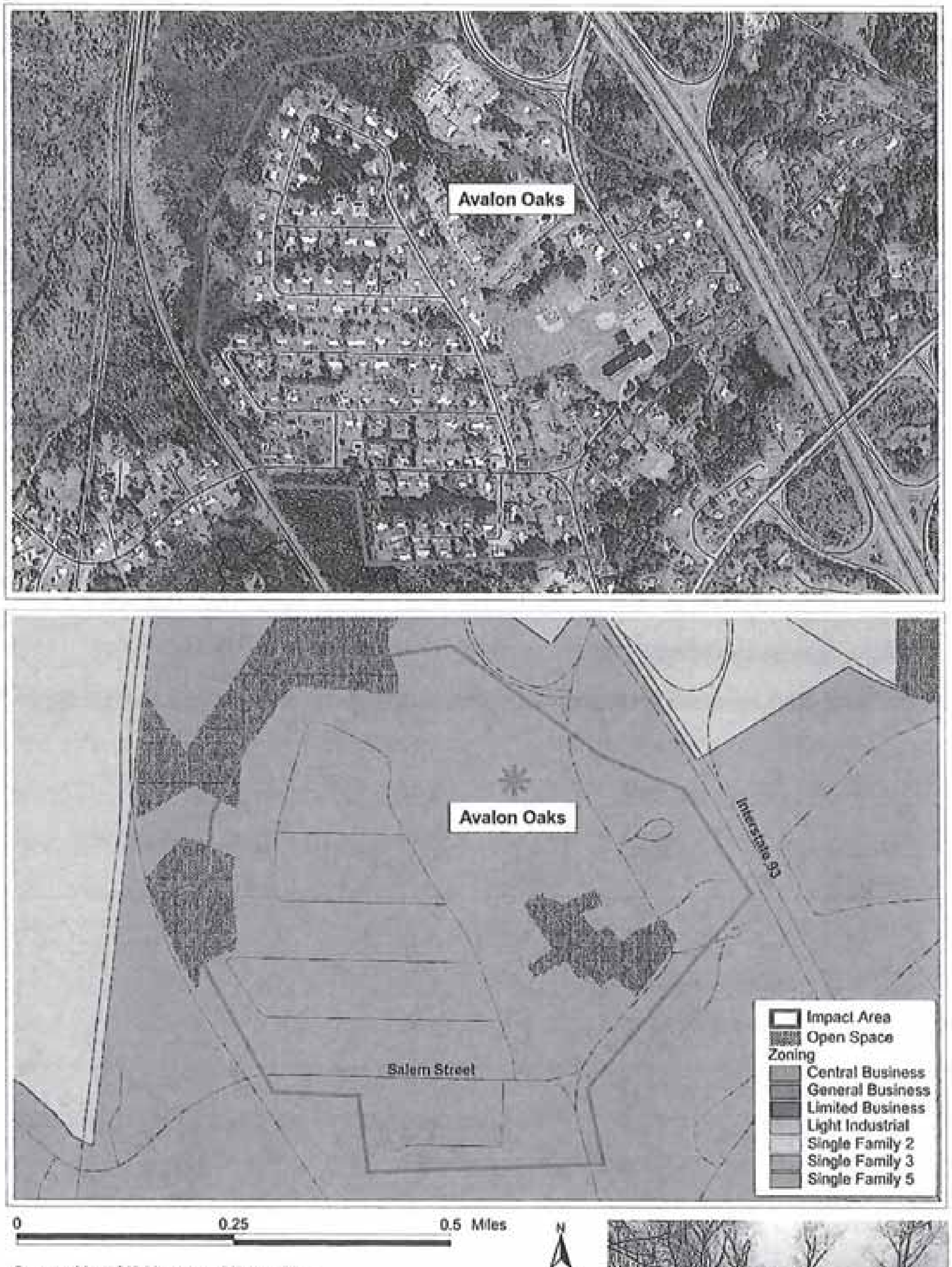
During the eight-year court battle with Wilmington, the original developer of the property, Wilmington Arboretum Associates, went bankrupt and was forced to transfer the rights to develop the site to its mortgagee in 1992. The mortgagee oversaw the appeals process through to the Appellate Court decision in 1995. In 1996, Avalon Bay Communities purchased the site and requested a transfer of the same comprehensive permit. The Wilmington Board of Appeals granted the transfer but held all of the requirements and conditions of the initial permit the same, including an identical number of housing units and affordability requirements.

It is interesting that the Avalon Oaks project was not nearly as controversial as the initial proposal for Wilmington Arboretum. According to Wilmington's director of planning and conservation, one of the reasons for this was that the new developer "sat down with the town and redesigned the project." The project became an "an entirely different animal from what people typically imagine when they think of affordable housing." Not only was Wilmington able to at least contribute to the design (if not the overall density) of the project, the project itself evolved from what residents originally perceived as a large affordable housing development to a well-designed market rate project with a percentage of affordable housing. Even with the redesign and change in perception about the anticipated residents, Avalon Oaks' density of 9.1 units per acre is 14 times more dense than Wilmington's average.

The analysis period starts when Avalon Bay took control and ends in the year the development was occupied.

Exhibit 8

Figure 2.8



Source: MassGIS Vector and Image Data

Exhibit 8

Notes

[1] As described in the introductory chapter, the Boston Metropolitan Area for the purposes of this study is defined as the 155 Massachusetts cities and towns in the Boston-Cambridge-Quincy New England Metropolitan City and Town Area (NECTA) Census designation.

[2] For this study we obtained every single-family home sale recorded between1982 and 2003. We wanted to have data for a few years prior to the granting of the comprehensive permit and several years after the development was complete to establish long and continuous price indexes.

[3] Lyons and Loveridge, (1993) use ¼ and ½ mile; Galster, Tatian, and Smith (1999) and Galster, Tatian, and Smith (2001) use distance intervals from 500 feet to 2,000 feet; Lee, Culhane, and Wachter (1999) use ¼ and ½ mile.

[4] Muller, Carol J. Letter to the Housing Appeals Committee from the Woburn City Solicitor, dated January 12, 1984.

[5] Zoning Board of Appeals of Greenfield v. Housing Appeals Committee, 1983; Board of Appeals of Hanover v. Housing Appeals Committee, 1973.

[6] Quill, Ed. "SJC: Town bid aimed at blocking low-income housing," The Boston Globe, May 1, 1987.

Exhibit 8

CHAPTER 3: QUANTITATIVE METHODOLOGY

This chapter discusses the methodology employed to investigate the impact of large, multi-family mixed-income rental developments on the value of surrounding single-family homes. The first section of the chapter provides a theoretical framework for the use of a hedonic modeling approach. The second section describes our econometric methodology.

THEORETICAL FRAMEWORK

We seek to determine the response of housing consumers, and hence the housing market, to the presence of an amenity or disamenity in a local housing market. Some opponents of Chapter 40B claim that mixed-income multi-family rental housing developments constitute a neighborhood disamenity; we investigate this claim.

Our strategy is to measure and compare house price behavior for a control area and an impact area. To do this, we need to build quality-controlled house price indexes for the impact and control areas. We use a hedonic modeling approach in order to make use of all house transactions. We chose not to use repeat sales because of the requirement that only houses that sell twice during the study period be used; this would require eliminating too many sales observations in our impact areas.

An alternative strategy is to focus on distance to a disamenity. This method attempts to measure the effect of distance between individual houses and the disamenity, holding constant other determinants of house value. We do not take this approach because our site visits and discussions with local officials indicated that sight lines varied considerably based on topography, street layouts, and other similar factors that led us to conclude that identifying the impact area based on a fixed radius would have been inappropriate.[1]

Exhibit 8

HEDONIC MODELING FOR HOUSING MARKETS

For the purpose of the model, we assume the sales price of a house is the sum of a "bundle of goods and services,"[2] including the structural attributes of the house and the neighborhood in which the house is located. Examples of structural attributes include house size, lot size, and the number of bathrooms and bedrooms. The hedonic model uses multivariate regression analysis to estimate the value, or "implicit price," of each of these attributes.

To specify a hedonic equation, we use sales price as the dependent variable. Each of the attributes hypothesized to be determinants of sales price are explanatory or independent variables. The estimated coefficient or parameter for a given explanatory variable represents its effect on value or "implicit price." The standard practice in the hedonic literature is to represent the dependent variable house price is as a natural logarithm.[3] In addition to being a method that has been found to be useful in the economic literature, it also provides a convenient interpretation of the coefficients of the explanatory variables. These coefficients can be interpreted as the percentage change in house value resulting from an additional unit of an explanatory variable. Knowing the contribution of each attribute to house value makes it possible to examine how the price of a house changes by altering the quantity of a structural attribute or other explanatory variable.

We are interested in tracking how the sales price for a typical house changes with time. To accomplish this goal a hedonic model requires two stages. The first stage estimates a hedonic price equation to establish a relationship between house value and housing attributes, including year sold. The effect of time on sales price is estimated by including the year a house sold as an explanatory variable in the hedonic model. In the second stage, the hedonic results are used to "price" a typical house over time. Separate hedonic models and indexes are created for both the impact area and control area in each case.

In a perfectly efficient market, information about a negative event would disseminate quickly and prices would react to this new information immediately. In this case, when the appearance of a disamenity is anticipated, prices for homes near the disamenity would instantly fall; that is, the (hypothesized) capital loss would occur at one point in time, with no further effects occurring in the future.

In reality, housing markets are not perfectly efficient; buyers and sellers lack perfect information. In the context of this study, some home buyers and sellers may not be aware of a

Exhibit 8

mixed-income, multi-family development slated for construction nearby. More likely, some players in the market may know that mixed-income housing is being developed, but they may not really understand the nature of the project. Furthermore, even if someone has been fully informed throughout the process that led to the development, uncertainty could still remain about the final product and the identity of the actual residents. Imperfect information is reflected in the variation in sale prices achieved in the market.

The various issues regarding information comprehension and dissemination imply that the assimilation of knowledge about a particular event in the local housing market will occur differentially over time. Selling a house takes time. There are also high transaction costs associated with the sale of a house, which may prolong a decision to sell. The impact of an announced multi-family development will presumably be strongest in the time interval from announcement to after the units are rented. Thus our evaluation of price change over time focuses this time period.

APPLIED QUANTITATIVE METHODOLOGY

Our empirical research methodology is thus designed to best answer the question of whether mixed-income, multi-family developments influence the sales price of adjacent single-family houses. This methodology draws on the considerable related research in the field of housing economics.[4] With one exception, hedonic modeling has not been used to construct impact and control house price indexes to measure the effect of mixed-income, multi-family development.[5]

We conducted a thorough examination of the neighborhood of each development to establish a realistic impact area. We then purchased transaction data from a third-party vendor to obtain a reliable data set of all single-family home sales in our case towns.

DATA

This study uses sales transaction data for single-family houses. We obtained records for all transactions between 1987 and 2003, and most of the transactions between 1982 and 1986. In order to use transaction data in hedonic modeling, the records must contain information about the structural attributes of the house in addition to the sales price and the date it sold. All the requisite information is not compiled by one agency in a uniform format. Transaction data including address, sales price, date, buyer, seller, mortgage amount, etc. are collected by the Registries of Deeds in

Exhibit 8

Massachusetts. Records containing information pertaining to property attributes are maintained by local municipal assessors. We purchased data from a third party vender, The Warren Group, to bridge the gap between registries' and assessors' records. The Warren Group collects data from both sources and assembles it into one database.[6]

The data sets for each case were cleaned to eliminate incomplete records and statistical anomalies. We also filtered for non–arm's length transactions and lot sizes with extremely high values. All identifiable non–arm's length transactions were removed.[7] Lot size is the only structural valuable with extreme outliers. These were systematically selected and removed.[8]

Woburn Example

HOUSING PROFILE

We use the Woburn case to demonstrate our methodology. Table 3.1 provides descriptive statistics for Woburn's housing stock in both the control area and impact area. The mean and standard deviations for each variable in the model are provided. The mean of a dummy variable is its percentage of the whole variable set. Looking at bathrooms, the mean for bath1 is 0.38; thirty-eight percent of the houses in the control sample have one bathroom. On average, houses in the impact area are slightly more expensive, larger, and situated on bigger lots than houses in the control area. Additional description statistics about each sample are provided in the Appendix.

ANALYSIS PERIOD

As indicated above, housing markets are very complex, and information is absorbed over time. The best way to capture the influence of an event is to observe price trends before, during, and after the event and look for substantial variations from the overall trend. We create sales price indexes that begin before comprehensive permit approval and that extend well beyond the initial occupancy of the projects. The twenty-year time frame of this study (1983–2003) provides a dynamic perspective on the cyclicality of prices.

The analysis period around each mixed-income, multi-family development is designed to include the years in which the influence of the development was strongest. The length of each analysis period varies slightly, but the definition is the same for all. It begins with comprehensive

Exhibit 8

permit approval and ends in the year when the project was placed in service, generally three years. Small projects that were constructed quickly have shorter analysis periods, while large, complex projects tend to have longer analysis periods.

THE HEDONIC MODEL

For a useful hedonic model, it is important that the coefficients for the explanatory, or "independent," variables to exhibit a realistic relationship with the house price dependent variable, and that these coefficients be measured precisely, i.e., have low standard errors. Analyses of descriptive statistics were undertaken to construct sensible explanatory variables.

The first stage of our hedonic models involves specifying the attributes that are considered to be important determinants of home price.[9] All of our models contain a combination of the

Table 3.1

Descriptive Statistics

Variable	Control		Impact	
	Mean	Std. Dev.	Mean	Std. Dev
Price	*188,250*	*86,583*	*195,064*	*80,874*
Intersf	*1,471*	*486*	*1,561*	*433*
Lotsize	*11,774*	*5,889*	*12,138*	*6,592*
Bathrooms	*1.61*	*0.61*	*1.61*	*0.62*
1	**0.38**	**0.48**	**0.37**	**0.48**
1.5	0.23	0.42	0.25	0.43
2	0.24	0.43	0.25	0.44
>=2.5	0.16	0.36	0.13	0.33
Bedrooms	*3.18*	*0.78*	*3.36*	*0.78*
<=2	**0.15**	**0.35**	-	-
3	0.58	0.49	-	-
<=3	-	-	**0.68**	**0.47**
>=4	0.28	0.45	0.32	0.47
Year Built	*1946*	*40*	*1935*	*54*
<=1919	**0.20**	**0.40**	-	-
1920-59	0.43	0.49	-	-
1960-79	0.18	0.38	-	-
1980-89	0.09	0.29	-	-
1990-03	0.10	0.30	-	-
<=1899	-	-	**0.19**	**0.39**
1990-46	-	-	0.19	0.39
1947-54	-	-	0.21	0.41
1955-90	-	-	0.20	0.40
1991-03	-	-	0.20	0.40

Bold Independent variables are base case (omitted)

Exhibit 8

following explanatory variables: house size, lot size, number or bedrooms, number of bathrooms, and the year the house was built. To explain the empirical methodology more thoroughly, we use Woburn as an example. In Chapter 4, we will present the house price indexes constructed from the hedonic models.

Independent variables were selected after examination of the sample's descriptive statistics. House size (intersf) and lot size (lotsize) are entered as continuous variables; that is, the actual square footage of the attribute is used in the model (Table 3.2). House size is usually the strongest predictor of sales price. Lot size is also typically important.

Bathrooms and bedrooms are entered as dummy variables. The number of bathrooms is divided into four categories; one bathroom or less (bath<=1), one and one-half bathrooms (bath1.5), two bathrooms (bath2), and two and one-half or more bathrooms (bath>=2.5). Bath1 is used as the base case and thus omitted from the equation. The coefficients for the remaining

Table 3.2

Control					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.195	-	0.031	364.970	0.000
intersf	0.000	N/A	0.000	6.560	0.000
lotsize	0.000	N/A	0.000	10.680	0.000
bath1.5	0.081	8.41%	0.013	6.080	0.000
bath2	0.061	6.32%	0.014	4.500	0.000
bath>=2.5	0.160	17.35%	0.019	8.270	0.000
bed3	0.089	9.27%	0.014	6.170	0.000
bed>=4	0.095	9.96%	0.018	5.280	0.000
yrblt1920-'59	0.113	11.99%	0.013	8.520	0.000
yrblt1960-'79	0.199	22.01%	0.016	12.090	0.000
yrblt1980-'89	0.212	23.57%	0.020	10.670	0.000
yrblt1990-'03	0.260	29.73%	0.021	12.580	0.000
yrsold1983-'84	-0.434	-35.21%	0.031	-14.060	0.000
yrsold1987-'88	0.258	29.38%	0.026	9.800	0.000
yrsold1989-'90	0.238	26.88%	0.027	8.660	0.000
yrsold1991-'92	0.124	13.16%	0.026	4.720	0.000
yrsold1993-'94	0.155	16.72%	0.025	6.080	0.000
yrsold1995-'96	0.228	25.55%	0.025	9.040	0.000
yrsold1997-'98	0.329	38.90%	0.025	13.160	0.000
yrsold1999-'00	0.570	76.75%	0.025	22.790	0.000
yrsold2001-'02	0.831	129.65%	0.026	32.400	0.000
yrsold2003	1.008	173.92%	0.028	36.020	0.000
N	4762	Adjusted R-Squared	0.5553	Std. Error of the Estimate	0.32387

Omitted variables: bath1, bed<=2, yrblt<=1919, yrsold1985-'86

Exhibit 8

bathroom variables relate each of them to the one bathroom case. For Woburn, we find the coefficients for the bath1.5 and bath2 behave plausibly, increasing price by 8.4 percent and 6.3 percent, respectively, compared to a house with only one bathroom. The 17.4 percent standardized coefficient for bath>=2.5 is not uncommon in hedonic equations. This fairly large coefficient most likely indicates that bath>=2.5 is correlated with, and acting as a proxy for, other "quality" features not available in the data.

To find the change in house value for having, say, 1.5 baths instead of one bath, we proceed as follows: We use the regression results to "price" a house that is typical in every dimension, except that it has one bathroom. We then repeat this calculation for the 1.5 bathroom case. The latter case will have an estimated value 8.4 percent higher. This percentage change may be quickly found by looking at the standardized coefficient.

Bedrooms are split into three categories, with houses containing two or less bedrooms used as the base case. Bed3 (three bedrooms) and bed>=4 (four or more bedrooms) have very similar positive coefficients: 9.3 percent and 10 percent, respectively. One might expect the presence of more bedrooms to exhibit a greater positive influence on sales price. Remember, however, that our hedonic equations hold the size of the house constant. So this increase in bedrooms means a decrease in other living space. Sometimes the coefficient of the dummy variable with the most bedrooms is lower than (and sometimes negative) the coefficient of the dummy variable representing fewer bedrooms. In this case, the bedroom dummy variables have nearly identical coefficients, indicating that the two configurations are equally valued.

The influence of age is captured by the year in which a house was built. The year built variable is divided into quintiles that are roughly adjusted to reflect housing vintages. The dummy variable yrblt1919 (homes built in 1919 or earlier), representing the oldest homes, is omitted from the model. In general we expect newer houses to have higher sales prices, holding other characteristics constant. This is the case here: Each successively newer category of houses adds more value to the sales price than the previous. Deviations from this pattern can occur because year built is often a proxy for house style. Often it is the case that specific house styles are unique to different time periods. Sometimes a style of house built several decades (or even one hundred years ago) is more desirable than that of the types of house built recently.

The final set of explanatory variables consists of dummy variables representing time.

The year in which a house sold is used to trace price movements over time. Relatively small sample sizes in the impact areas drove the construction of the year sold independent variables. It was necessary to pair years to have enough observations for each (two-year) period to obtain reasonably precise coefficient estimates. It should be noted that the designation of time intervals is an arbitrary assignment. It does not matter how time is captured (months, quarters, year etc.) as long as it is appropriate to the context of the model. Pairing years is perfectly acceptable as long as we are willing to accept the "cost" of looking at two-year effects. Given the impact area sample sizes, this is the best path to follow. All houses that sold in adjacent years were thus combined into one time interval. An attempt was made to avoid pairing years when behavior of the larger market changed abruptly. The year sold interval 1985–86 was omitted from the regression and serves as the model's base time period. For Woburn, the coefficient of yrsold1987–88 is 29.4 percent, implying that houses in this two-year interval sold for almost 30 percent more than houses in the omitted base year interval.

Separate hedonic equations are constructed and estimated for both the control area and impact area models. To obtain a price index, we use the results to "price" a typical house over time. See the Appendix for the regression coefficients for the other case studies.

HEDONIC MODEL: WOBURN CONTROL AREA

The control area sample consists of all single-family homes in the City of Woburn other than those located within the impact area. The hedonic model is estimated using 4,762 house sales observations during the period 1983–2003. The model performs well, providing precise estimates of the regression coefficients. As indicated above, for bedrooms, bathrooms, and age, the regression coefficients show the difference from a base case. The base case for year sold is having sold in 1985–86. The standardized coefficients indicated in Table 3.2 show the effect on home price for each characteristic.

HEDONIC MODEL: WOBURN IMPACT AREA

The results for the impact area model are given below in Table 3.3. The impact area contains 157 observations. The equation is not estimated as precisely, since sample size is smaller than the area control case. Nonetheless, the results are the best that could be obtained, given our

Exhibit 8

Table 3.3

Impact					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.344	-	0.117	97.270	0.000
intersf	0.000	N/A	0.000	2.200	0.029
lotsize	0.000	N/A	0.000	2.530	0.012
bath1.5	0.135	14.43%	0.052	2.570	0.011
bath2	0.003	0.25%	0.053	0.050	0.962
bath>=2.5	0.057	5.89%	0.080	0.720	0.474
bed>=4	0.084	8.75%	0.046	1.810	0.072
yrblt1900-'46	0.016	1.62%	0.061	0.260	0.793
yrblt1947-'54	0.165	17.95%	0.062	2.640	0.009
yrblt1955-'90	0.146	15.69%	0.059	2.470	0.015
yrblt1991-'03	0.382	46.49%	0.069	5.550	0.000
yrsold1983-'84	-0.558	-42.74%	0.133	-4.190	0.000
yrsold1987-'88	0.084	8.76%	0.101	0.830	0.408
yrsold1989-'90	0.221	24.76%	0.097	2.270	0.025
yrsold1991-'92	0.109	11.55%	0.113	0.970	0.335
yrsold1993-'94	-0.044	-4.29%	0.103	-0.430	0.671
yrsold1995-'96	-0.111	-10.54%	0.097	-1.150	0.252
yrsold1997-'98	0.218	24.34%	0.087	2.510	0.013
yrsold1999-'00	0.507	66.05%	0.092	5.530	0.000
yrsold2001-'02	0.784	119.08%	0.096	8.130	0.000
yrsold2003	0.930	153.44%	0.106	8.770	0.000
N	157	Adjusted R-Squared	0.742	Std. Error of the Estimate	0.21462

Omitted variables: bath1, bed<=3, yrblt<=1899, yrsold1985-'86

conservative definition of impact area. (In the "town group" regressions reported later, we are able to use larger sample sizes.) There are fewer variables for structural attributes because houses in the impact area are more homogeneous than houses in the control area. The homogeneity of the impact area meant that the base case for number of bedrooms became three bedrooms, while the base case for year built became "built in 1899 or before."

GROUPED TOWNS

In some cases, it was necessary to "group" cases and use the grouped results to provide price indexes. Grouping increases sample size, which reduces standard errors and noise (random variation) in the year sold variables, thus generating more precise indexes. In Littleton, we

Exhibit 8

grouped the two developments. We also constructed a group consisting of Mansfield, Norwood and Randolph. In grouping towns or developments, we considered geographic proximity similarity in control area price movements, and roughly simultaneous introductions of mixed-income, multi-family rental developments.

Notes

[1] See Case, Pollakowski, and Wachter on comparisons of price index methods.

[2] Rosen 1974.

[3] Lusht 1997 and Malpezzi 2002.

[4] As in Case, Pollakowski, and Wachter.

[5] Weinstein 2002.

[6] The Warren Group maintains an active database of complete transactions records from 1987 through the present. They also have an inactive database of just sales records from 1982 to 1986. This inactive database does not include any structural attributes of the property. We wanted to use records from the inactive database to extend the length of our sales indexes. However, to make the records in the inactive database useful we had to merge them with the active database. The merging process identified houses that sold in both databases and attached the structural attributes of the house from the active database to the corresponding, incomplete sales record in the inactive database. The merge was accomplished using the Select Query function in Microsoft Access setting property address as the common field.

Merging the structural attributes of a house from the active database to the same house in the inactive database assumes the characteristics of the house have remained constant over time (i.e. no additions were made or the house was not replaced); or put another way the bundle of goods that produced a sale price in 1982 is the same bundle that produced the sale price for the same house in 2003. This merging process certainly caused some inconsistencies matching transaction records with structural characteristics over time, but the likely degree of error is low. The resulting merge was successful; however, the conversion rate for matching records was around 50% percent; meaning half of the houses sold in the inactive database resold in the active database. The quantity of transactions per year for the inactive database is about half the number of transactions in the active database. The two databases were combined once each sales record contained the same types of information.

Exhibit 8

[7] Sale price data were skewed to the right, meaning there was an abnormally high frequency of low sale prices. This skewness is due in part to the presence of "non-arms length" transactions. The removal of low price transactions representing "non-arms length" required subjective review; statistical testing, graphic representation and common sense were used to screen records. All transactions with a sale price equal to or less than $50,000 were selected for review. Scatter plots of price and year sold were created to identify whether previously flagged transactions were outliers for the year in which they sold. The identified outliers were also compared against two standard deviations from the sample mean. The identified outliers and suspected non–arm's length transactions were compared to other structural attributes of the property and assessor information the see if the price seemed appropriate. We considered the buyer and seller, mortgage amount, year built, interior square feet and lot size. The sale of many low-priced homes were transactions between family members or had mortgages considerably larger than the sale price. Examples of these two scenarios would be a house that sold for $30,000 but had a mortgage of $225,000; or a larger-than-average-sized house on a three-quarter acre lot that sells for $25,000 between family members. In one instance, the same house sold for $15,000 five times on the same day to different individuals all with the same last name. Seeming abnormally low sales transactions and outliers that failed the non–arm's length subjective test were removed.

[8] The average lot size in many of the towns is around one-half acre (20,000 square feet), yet all towns had some transactions with lot sizes of several acres (200,000+ square feet, and in one instance 2.5 million square feet or 57 acres). All transactions with lot sizes over three standard deviations were removed from the impact areas.

[9] The independent variables are included in the models in one of two forms; as a continuous number or as a dummy variable. A dummy variable represents a dichotomous relationship. Either a house contains two bedrooms or not. For each dichotomous possibility (one bedroom/not one bedroom; two bedrooms/not two bedrooms; etc.), there is a separate dummy variable. When dummy variables are used, one of the possible variables is omitted from the model to establish a base case. As mentioned earlier in the chapter, a dummy variable coefficient is interpreted as the percent change in price compared to the excluded variable. Let's look at an example from Woburn to interpret the coefficient of the independent dummy "bath1.5." This dummy variable represents all houses in the sample that contain one and one-half bathrooms. The standardized coefficient of "bath1.5" in the control area hedonic model is 8.4%. This means that having one and half bathrooms in a house adds eight point four percent more value

Exhibit 8

than only one bathroom, the excluded variable, holding all other variables constant.

Dummy variables are constructed by separating the values for each variable into bins. Each bin then becomes its own dummy variable. We tried for each bin to contain similar numbers of observations. To clarify this procedure let us look again at Woburn for an example. Houses in Woburn contain as few as one bathroom or as many as five. Houses with one bathroom became dummy variable "bath1," houses with one and a half bathrooms became dummy variable "bath1.5," etc. Dummy variable "bath>=2.5" contains all houses with two and a half or more bathrooms.

Exhibit 8

CHAPTER 4: FINDINGS

This study's findings are presented in terms of house price indexes for impact and control areas in each study town. Looking at these index pairs for each of the towns, it can be seen that the impact area indexes track the control area indexes. There is neither a tendency for the impact areas to do better or worse.

We begin with a thorough examination of price behavior for the Kimball Court Apartments development in Woburn. The assessment of subsequent case studies will be more brief, with more detailed results presented in the Appendix. The hedonic regression results used to construct the price indexes are presented in Chapter 3 and in the Appendix.

WOBURN

Chart 4.1 shows the house price indexes for the control and impact areas. As described in Chapter 3, these indexes are constructed from the hedonic equation results. Both indexes track house price movements over time that are consistent with the Boston area's market experience. House prices rose strongly through the mid-1980's peaking in late 1988 and 1989. Prices generally declined during the early 1990s, but by 1997–98, the market had turned a corner and house prices rebounded sharply. Both the control area and the impact area followed the experience of the larger Boston market, with both indexes following very similar price paths.

The City of Woburn has seen three phases of the Kimball Court mixed-income, multi-family housing development. All phases were permitted using chapter 40B, and each phase has a separate analysis period. The analysis period for each phase begins with the issuance of the comprehensive permit and concludes in the year each phase was placed in service. The three analysis periods are not all the same length; these differences are related to the construction and development timeline of each project phase. The impact area and the control area remain the same for all phases.

Exhibit 8

Chart 4.1

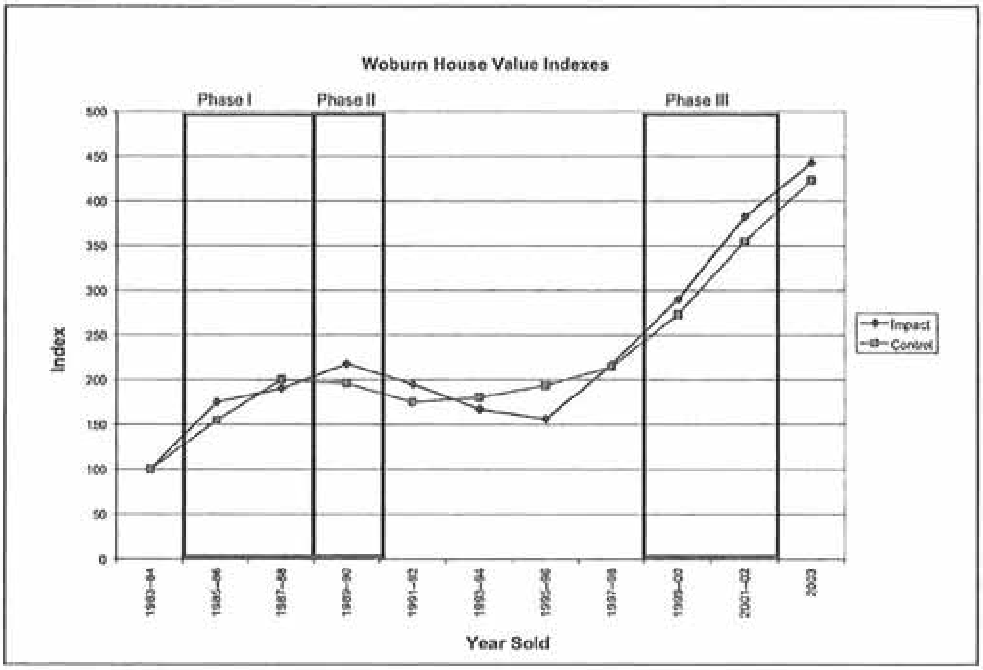


Chart 4.2

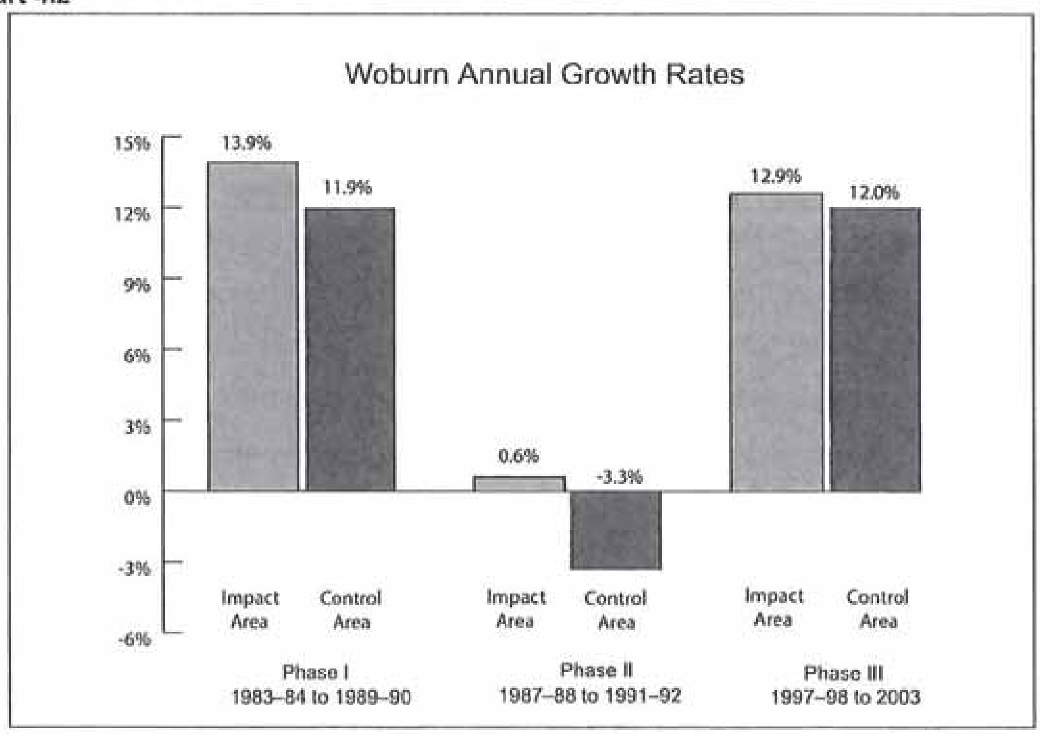


Exhibit 8

In the years after the introduction of each Kimball Court phase, the impact area and control area experienced similar appreciation in sale price for single family homes. Over the course of the entire study the compound annual growth rate for sale prices was 7.9 percent for the control area and 8.1 percent for the impact area.[i]

PHASE I

The first phase was permitted in 1985 and completed in 1988. The appropriate analysis period using our price indexes begins at the two-year period preceding permitting (1983–84) and ends with the two-year period following completion. During this Phase I analysis period, the impact area experienced a 13.9 percent annual growth rate, slightly greater than the control area's 11.9 percent rate. (See Chart 4.2.) This was a turbulent period, with home prices doubling.

PHASE II

The second phase was permitted in 1989 and completed in 1990. The analysis period thus begins with 1987–88 and runs through 1991–92, the two-year period after completion. For the Phase II analysis period the Impact area house values were essentially unchanged (growth rate of 0.6 percent). Over the same time period, house prices in the control area declined slightly, with an annual growth rate of -3.3 percent. House values around Kimball Court were not adversely impacted by the mixed-income, multi-family rental development.

PHASE III

The final phase was permitted in 1999 and completed in 2002. Our analysis period, therefore, runs from 1997–98 through 2003, the last year for which data were available. During the Phase III analysis period, the house values in the impact area rose 12.6 percent annually. The trend for the control area was nearly identical, with house values experiencing an average annual appreciation rate of 12.0 percent.

Overall, we see that there are no substantive differences between the two price paths. Sale prices for single-family homes in the impact and control areas moved nearly in tandem during the three development phases of Kimball Court.

Exhibit 8

LITTLETON

There were two separate developments in Littleton that were analyzed. The first case is Littleton Green, a smaller elderly rental 40B development. The Pond Side mixed-income, multi-family development is a much larger and more noticeable rental community, and its impact on the surrounding neighborhood might be expected to be more significant. For reasons of sample size, these two developments are considered together. The analysis period for Littleton begins in 1984–85 and continues through 1990–91 (Chart 4.3). Over that time, house values in the impact area experienced a 16.0 percent annual appreciation rate. For the same period, the control group saw a smaller 7.5 pecent annual growth. Due to random fluctuations in the impact area index (reflecting modest sample size), we consider it unlikely that the impact area did so "well." We thus examined a slightly longer period, 1982–83 through 1992–93. Over that time period, the impact area experienced an annual appreciation of 6.9 percent, while the control area appreciated at an annual rate of 7.7 percent.

Chart 4.3

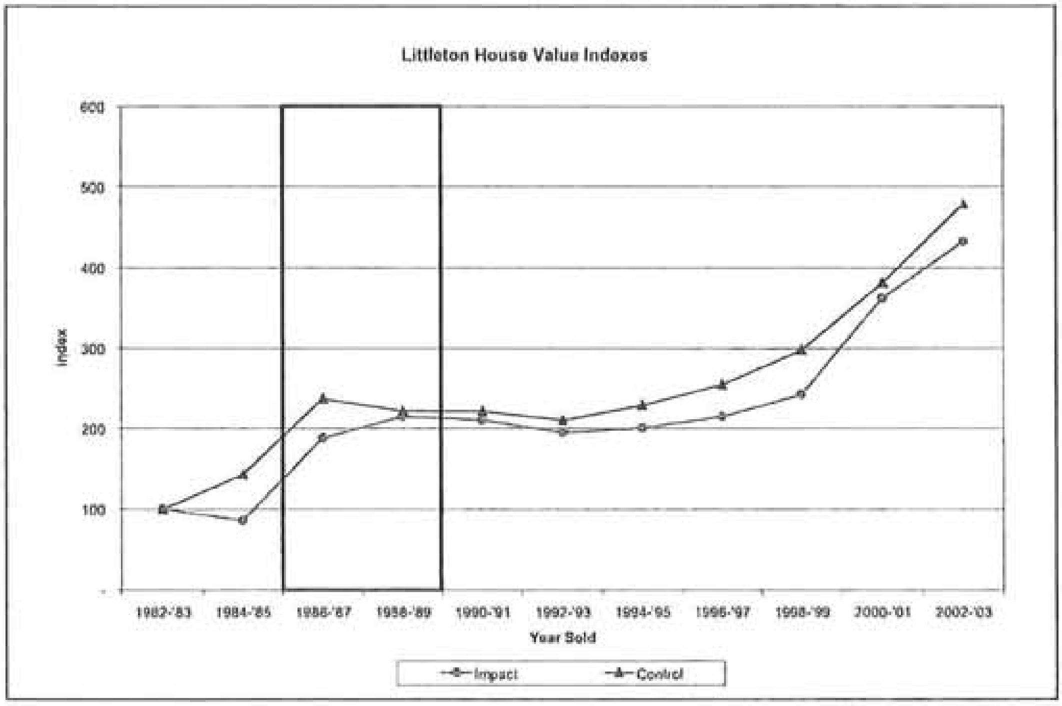
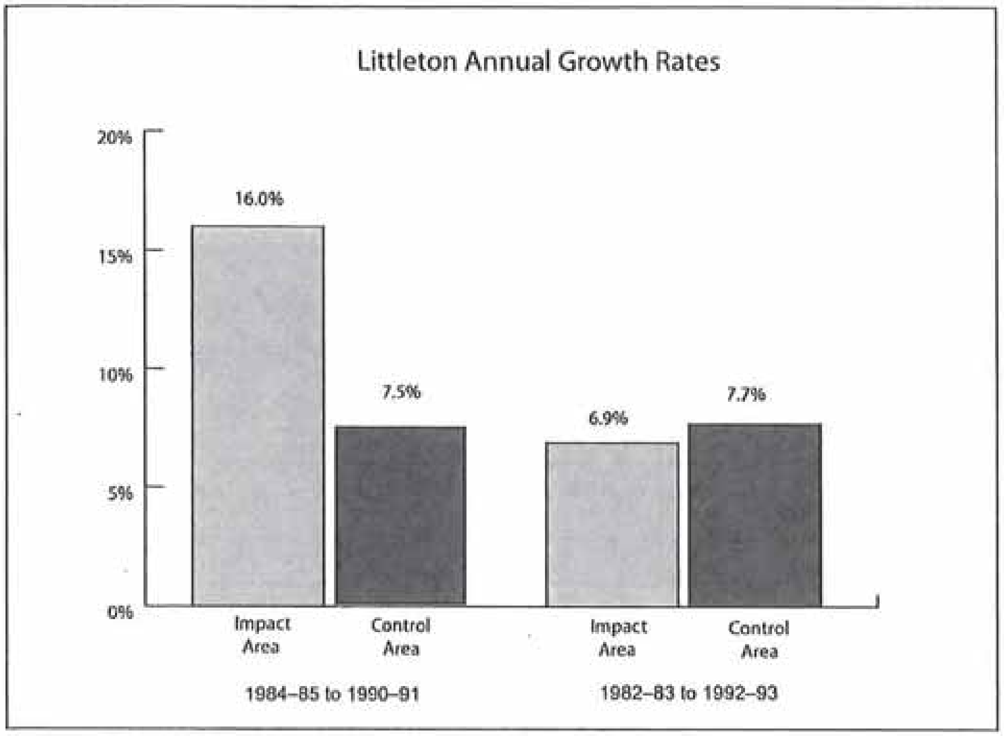


Exhibit 8

Chart 4.4



NORWOOD

Chart 4.5 displays the sales price indexes for the impact and control areas. The comparative indexes follow very similar price paths. The compound annual growth rates for the two areas are comparable for the development period and the entire study period. Taking 1983–84 as the base period for both indexes, the change in index values from the base period through the period just after construction was completed (1989–90) reflects an average annual growth rate of 13.9 percent for the impact area versus 13.2 percent for the control area (Chart 4.6). Again, the are no effective differences between the impact area and control area indexes. We conclude that the introduction of Olde Derby Village did not negatively impact the sales price of nearby single-family homes.

Exhibit 8

Chart 4.5

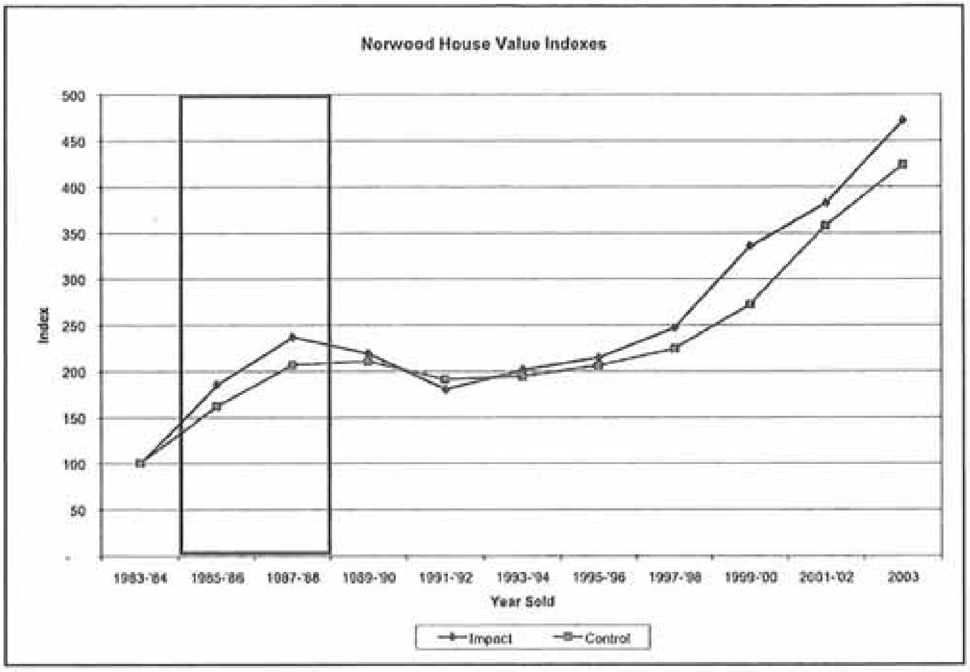


Chart 4.6

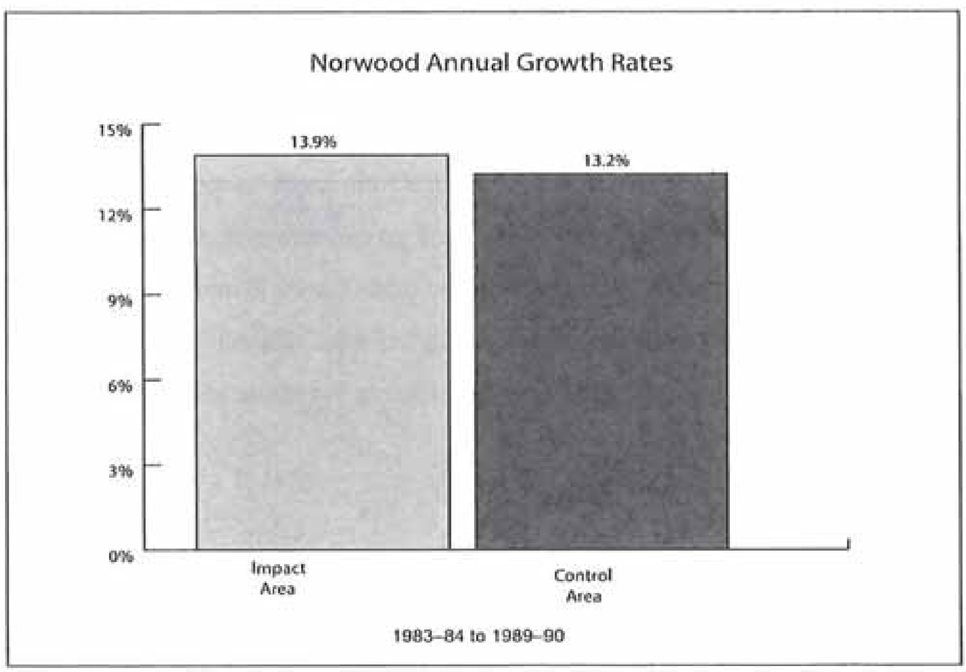


Exhibit 8

MANSFIELD AND RANDOLPH

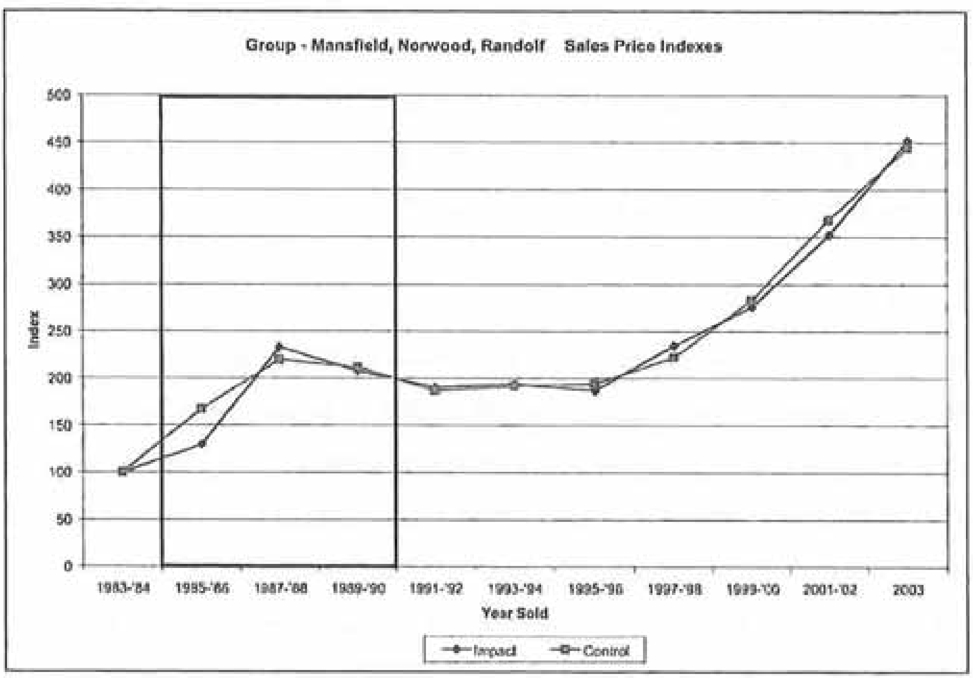
The Mansfield Depot 40B development was constructed in two phases. The two phases were permitted in consecutive years; they were also completed in consecutive years. The first phase was permitted in 1986. The second phase was competed in 1989. The permitting for Liberty Place in Randolph occured during 1987–88, and the construction was completed during 1989–90. Our analysis period, therefore runs from 1985–86 through 1991–92.

The sample size in several two-year periods for the impact areas in Mansfield and Randolph were too small to provide sufficiently robust estimate of house values in the impact areas. The analysis period for the two developments coincides with that for Olde Derby Village in Norwood. Because the three developments line up closely, we are able to calculate a single price index for the three towns as a group.

GROUP: MANSFIELD, NORWOOD AND RANDOLPH

The analysis period for Mansfield, Norwood, and Randolph as a group is defined by the complete development period for all three towns. In begins in 1983–84, the two-year period prior

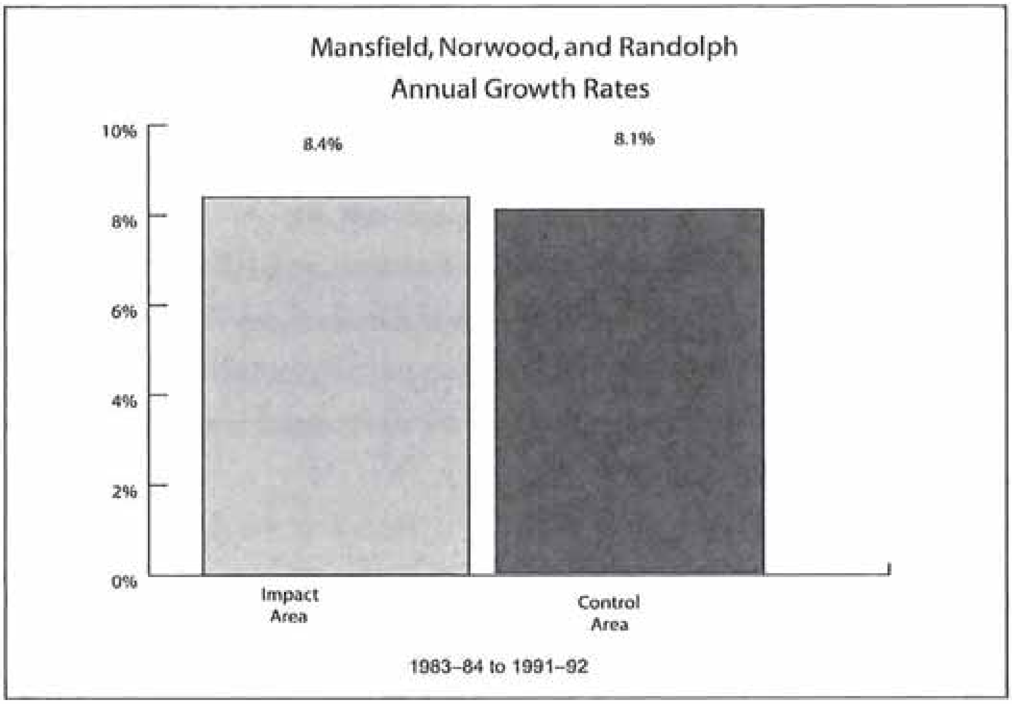
Chart 4.7



MIT

Exhibit 8

Chart 4.8



to when the earliest development, Norwood's Olde Derby Village, received its comprehensive permit, and it ends in 1991–92 after the last developments were completed. Both Liberty Place and Mansfield Depot were placed in service the same year.

The indexes for the impact sample and control sample move similarly over time (Chart 4.7). The two samples have effectively identical compound annual growth rates, 8.4 and 8.1 percent for the impact and control areas, respectively (Chart 4.8).

WILMINGTON

Price indexes for the impact area and control area track nearly identically throughout the entire data series. It is worth noting that the development was originally proposed as the Wilmington Arboretum and was denied a comprehensive permit in 1987. The permit denial was overturned on appeal in 1990 and the HAC decision was upheld by the Superior Court in 1993. The decision was reaffirmed by the Appeals Court in 1995. The judicial history of the development should have been an indication that the question of building a mixed-income, multi-family rental development in Wilmington was a matter of when, not if. As such, we would have expected to

Exhibit 8

find a siginificant deviation in the impact area from the control area sometime around 1990, when the HAC overturned the local zoning board, if there were to be a negative impact on neighboring single-family house values.

Our analysis period begins with the two-year interval before the permit was issued (1995–96) and ends in 2001–02 following completion of construction (Chart 4.11). For the period between 1995–96 and 2001–02, annual growth rates were 8.0 percent and 10.0 percent for the impact area and control area, respectively (Chart 4.12). The two percentage point difference in annual growth rates for the impact area and control area over the analysis period disappears when measuring from the period before permitting through 2003. When house values are compared through 2003, the impact area experienced an annual growth rate of 11.2 percent, compared to 11.0 percent for the control area (Chart 4.12). We conclude that the introduction of the large, dense, multi-family Avalon Oaks development did not negatively affect the sales price of single-family homes in the impact area.

Chart 4.11

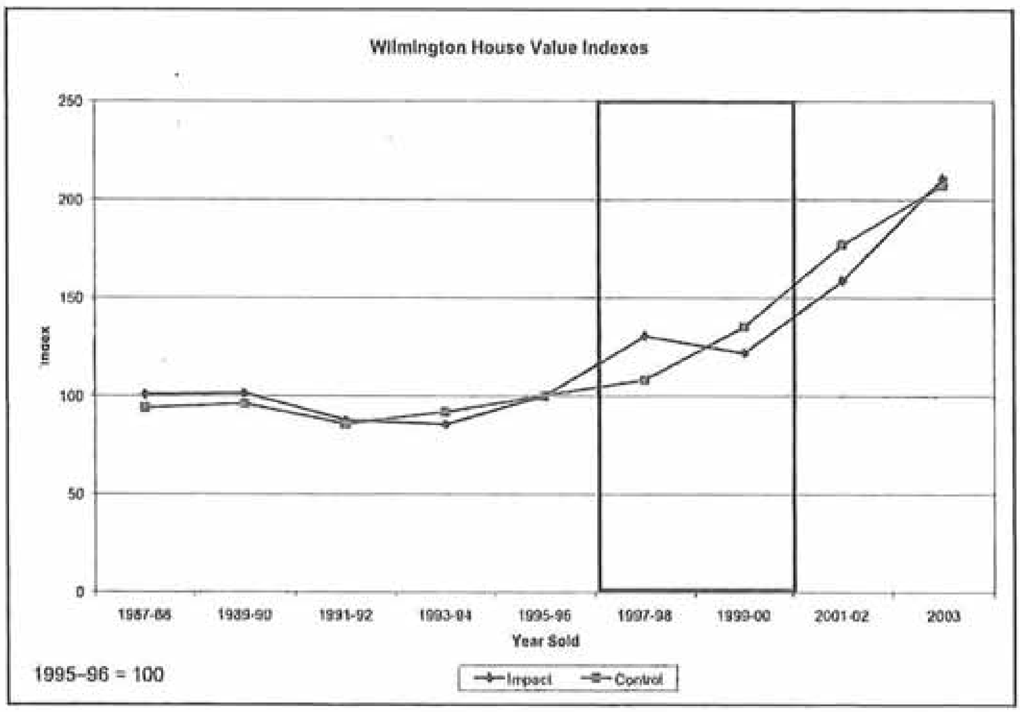


Exhibit 8

Chart 4.12

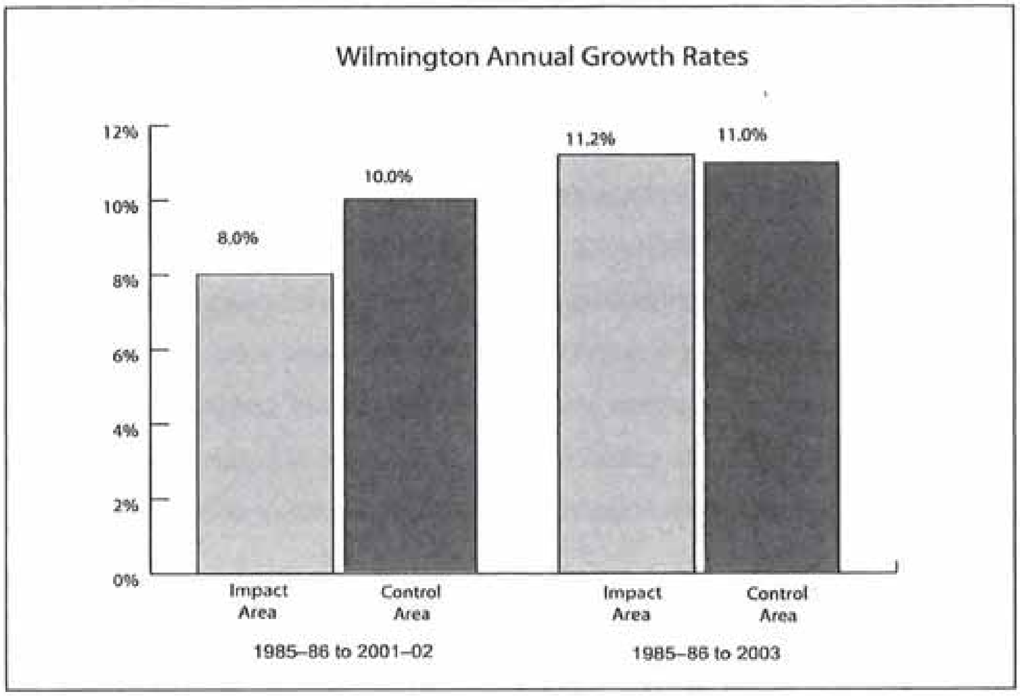


Exhibit 8

APPENDIX

WOBURN

Descriptive Statistics				
	Control		Impact	
Variable	Mean	Std. Dev.	Mean	Std. Dev
Price	*188,250*	*86,583*	*195,064*	*80,874*
Intersf	*1,471*	*486*	*1,561*	*433*
Lotsize	*11,774*	*5,889*	*12,138*	*6,592*
Bathrooms	*1.61*	*0.61*	*1.61*	*0.62*
1	**0.38**	**0.48**	**0.37**	**0.48**
1.5	0.23	0.42	0.25	0.43
2	0.24	0.43	0.25	0.44
>=2.5	0.16	0.36	0.13	0.33
Bedrooms	*3.18*	*0.78*	*3.36*	*0.78*
<=2	**0.15**	**0.35**	-	-
3	0.58	0.49	-	-
<=3	-	-	**0.68**	**0.47**
>=4	0.28	0.45	0.32	0.47
Year Built	*1946*	*40*	*1935*	*54*
<=1919	**0.20**	**0.40**	-	-
1920-59	0.43	0.49	-	-
1960-79	0.18	0.38	-	-
1980-89	0.09	0.29	-	-
1990-03	0.10	0.30	-	-
<=1899	-	-	**0.19**	**0.39**
1990-46	-	-	0.19	0.39
1947-54	-	-	0.21	0.41
1955-90	-	-	0.20	0.40
1991-03	-	-	0.20	0.40

Bold Independent variables are base case (omitted)

Exhibit 8

Control					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.195	-	0.031	364.970	0.000
intersf	0.000	N/A	0.000	6.560	0.000
lotsize	0.000	N/A	0.000	10.680	0.000
bath1.5	0.081	8.41%	0.013	6.080	0.000
bath2	0.061	6.32%	0.014	4.500	0.000
bath>=2.5	0.160	17.35%	0.019	8.270	0.000
bed3	0.089	9.27%	0.014	6.170	0.000
bed>=4	0.095	9.96%	0.018	5.280	0.000
yrblt1920-'59	0.113	11.99%	0.013	8.520	0.000
yrblt1960-'79	0.199	22.01%	0.016	12.090	0.000
yrblt1980-'89	0.212	23.57%	0.020	10.670	0.000
yrblt1990-'03	0.260	29.73%	0.021	12.580	0.000
yrsold1983-'84	-0.434	-35.21%	0.031	-14.060	0.000
yrsold1987-'88	0.258	29.38%	0.026	9.800	0.000
yrsold1989-'90	0.238	26.88%	0.027	8.660	0.000
yrsold1991-'92	0.124	13.16%	0.026	4.720	0.000
yrsold1993-'94	0.155	16.72%	0.025	6.080	0.000
yrsold1995-'96	0.228	25.55%	0.025	9.040	0.000
yrsold1997-'98	0.329	38.90%	0.025	13.160	0.000
yrsold1999-'00	0.570	76.75%	0.025	22.790	0.000
yrsold2001-'02	0.831	129.65%	0.026	32.400	0.000
yrsold2003	1.008	173.92%	0.028	36.020	0.000
N	4762	Adjusted R-Squared	0.5553	Std. Error of the Estimate	0.32387

Omitted variables: bath1, bed<=2, yrblt<=1919, yrsold1985-'86

Impact					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.344	-	0.117	97.270	0.000
intersf	0.000	N/A	0.000	2.200	0.029
lotsize	0.000	N/A	0.000	2.530	0.012
bath1.5	0.135	14.43%	0.052	2.570	0.011
bath2	0.003	0.25%	0.053	0.050	0.962
bath>=2.5	0.057	5.89%	0.080	0.720	0.474
bed>=4	0.084	8.75%	0.046	1.810	0.072
yrblt1900-'46	0.016	1.62%	0.061	0.260	0.793
yrblt1947-'54	0.165	17.95%	0.062	2.640	0.009
yrblt1955-'90	0.146	15.69%	0.059	2.470	0.015
yrblt1991-'03	0.382	46.49%	0.069	5.550	0.000
yrsold1983-'84	-0.558	-42.74%	0.133	-4.190	0.000
yrsold1987-'88	0.084	8.76%	0.101	0.830	0.408
yrsold1989-'90	0.221	24.76%	0.097	2.270	0.025
yrsold1991-'92	0.109	11.55%	0.113	0.970	0.335
yrsold1993-'94	-0.044	-4.29%	0.103	-0.430	0.671
yrsold1995-'96	-0.111	-10.54%	0.097	-1.150	0.252
yrsold1997-'98	0.218	24.34%	0.087	2.510	0.013
yrsold1999-'00	0.507	66.05%	0.092	5.530	0.000
yrsold2001-'02	0.784	119.08%	0.096	8.130	0.000
yrsold2003	0.930	153.44%	0.106	8.770	0.000
N	157	Adjusted R-Squared	0.742	Std. Error of the Estimate	0.21462

Omitted variables: bath1, bed<=3, yrblt<=1899, yrsold1985-'86

Exhibit 8

LITTLETON

Descriptive Statistics				
	Control		Impact	
Variable	Mean	Std. Dev.	Mean	Std. Dev
Price	*213,779*	*118,143*	*177,111*	*94,639*
Intersf	*1,866*	*708*	*1,832*	*752*
Lotsize	*46,663*	*92,369*	*33,365*	*36,533*
Bathrooms	*1.79*	*0.68*	*1.66*	*0.68*
1	-	-	*0.39*	*0.47*
<=1	0.32	0.47	-	-
<=1.5	-	-	-	-
1.5	0.16	0.37	0.18	0.41
2	0.19	0.39	0.19	0.38
>=2	-	-	-	-
>=2.5	0.32	0.47	0.23	0.46
Bedrooms	*3.11*	*0.83*	*3.02*	*0.45*
<=2	0.20	0.40	-	-
2	-	-	0.10	-
3	0.50	0.50	-	-
<=3	-	-	0.77	0.38
>=4	0.30	0.46	0.13	0.38
Year Built	*1950*	*33*	*1956*	*34*
<=1942	0.28	0.45	-	-
1943-'55	0.29	0.45	-	-
1956-'74	0.22	0.42	-	-
1975-'91	0.15	0.36	-	-
1992-'03	0.06	0.24	-	-
<=1949	-	-	0.16	0.39
1950-'65	-	-	0.59	0.37
1956-'63	-	-	0.25	0.44

Bold Independent variables are base case (omitted)

Control					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.375	-	0.042	273.740	0.000
intersf	0.000	N/A	0.000	11.020	0.000
lotsize	0.000	N/A	0.000	3.480	0.001
bath1.5	0.041	4.14%	0.027	1.500	0.134
bath2	0.039	4.02%	0.026	1.530	0.126
bath>=2.5	0.192	21.20%	0.032	6.000	0.000
bed3	0.126	13.39%	0.022	5.590	0.000
bed>=4	0.171	18.59%	0.029	5.830	0.000
yrblt1943-'55	0.054	5.52%	0.024	2.220	0.026
yrblt1956-'74	0.115	12.24%	0.026	4.510	0.000
yrblt1975-'91	0.157	17.01%	0.028	5.700	0.000
yrblt1992-'03	0.114	12.04%	0.030	3.780	0.000
yrsold1982-'83	-0.864	-57.85%	0.056	-15.530	0.000
yrsold1984-'85	-0.505	-39.65%	0.047	-10.820	0.000
yrsold1988-'89	-0.065	-6.33%	0.043	-1.530	0.126
yrsold1990-'91	-0.070	-6.74%	0.043	-1.620	0.106
yrsold1992-'93	-0.121	-11.41%	0.039	-3.100	0.002
yrsold1994-'95	-0.036	-3.53%	0.041	-0.890	0.376
yrsold1996-'97	0.070	7.20%	0.039	1.800	0.071
yrsold1998-'99	0.227	25.49%	0.038	5.920	0.000
yrsold2000-'01	0.473	60.47%	0.039	12.210	0.000
yrsold2002-'03	0.702	101.77%	0.039	18.050	0.000
N	2031	Adjusted R-Squared	0.6312	Std. Error of the Estimate	0.3485

Omitted variables: bath<=1, bed<=2, yrblt<=1942, yrsold1986-'87

Impact					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
_cons	10.956	0.00%	0.150	72.900	0.000
intersf	0.000	N/A	0.000	1.280	0.201
lotsize	0.000	N/A	0.000	1.550	0.123
bed2	0.076	7.86%	0.097	0.780	0.438
bed4	-0.108	-10.26%	0.091	-1.190	0.237
yrblt_50	-0.092	-8.82%	0.091	-1.010	0.312
yrblt_8090	-0.082	-7.92%	0.094	-0.880	0.381
bath15	0.226	25.40%	0.096	2.370	0.019
bath2	0.061	6.26%	0.085	0.710	0.476
bath25	0.187	20.60%	0.122	1.530	0.128
yrsold1982-'83	-0.149	-13.82%	0.150	-0.990	0.324
yrsold1984-'85	0.633	88.29%	0.153	4.140	0.000
yrsold1988-'89	0.767	115.41%	0.155	4.960	0.000
yrsold1990-'91	0.744	110.51%	0.158	4.720	0.000
yrsold1992-'93	0.668	95.08%	0.154	4.350	0.000
yrsold1994-'95	0.697	100.83%	0.148	4.700	0.000
yrsold1996-'97	0.765	114.79%	0.144	5.300	0.000
yrsold1998-'99	0.885	142.21%	0.139	6.350	0.000
yrsold2000-'01	1.286	261.69%	0.152	8.480	0.000
yrsold2002-'03	1.463	332.08%	0.150	9.730	0.000
N	176	Adjusted R-Squared	0.5892	Std. Error of the Estimate	0.34998

Omitted variables: bath1, bed=3, yrblt<=1950-1965, yrsold1982-83

NORWOOD

Descriptive Statisticis				
	Control		Impact	
Variable	Mean	Std. Dev.	Mean	Std. Dev
Price	*203,612*	*85,087*	*212,842*	*86,544*
Intersf	*1,522*	*536*	*1,399*	*348*
Lotsize	*12,095*	*8,115*	*14,002*	*5,569*
Bathrooms	*1.66*	*0.59*	*1.69*	*0.46*
1	**0.28**	**0.45**	**0.12**	**0.33**
1.5	0.35	0.48	0.52	0.50
2	0.19	0.39	0.23	0.42
>=2.5	0.18	0.38	0.13	0.34
Bedrooms	*3.12*	*0.81*	*2.98*	*0.50*
<=2	**0.18**	**0.38**	**0.08**	**0.28**
3	0.57	0.49	0.84	0.37
>=4	0.25	0.43	0.08	0.27
Year Built	*1946*	*27*	*1953*	*24*
<=1923	**0.20**	**0.40**		
1924-'49	0.18	0.38	-	-
1950-'54	0.19	0.39	-	-
1955-'62	0.24	0.43	-	-
1963-'03	0.20	0.40	-	-
<=1959	-	-	**0.34**	**0.48**
1960-'65	-	-	0.55	0.50
1966-'03	-	-	0.11	0.32

Bold Independent Variables are base case (omitted)

Exhibit 8

Control					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.232	-	0.028	395.600	0.000
intersf	0.000	N/A	0.000	15.140	0.000
lotsize	0.000	N/A	0.000	5.730	0.000
bath1.5	0.047	4.81%	0.012	3.880	0.000
bath2	0.048	4.90%	0.014	3.320	0.001
bath>=2.5	0.074	7.66%	0.018	4.210	0.000
bed3	0.060	6.18%	0.013	4.580	0.000
bed>=4	0.094	9.86%	0.017	5.690	0.000
yrblt1924_'49	0.120	12.79%	0.015	7.840	0.000
yrblt1950_'54	0.120	12.75%	0.015	7.780	0.000
yrblt1955_'62	0.192	21.11%	0.015	12.890	0.000
yrblt1963_'03	0.300	34.97%	0.016	18.460	0.000
yrsold1983-'84	-0.480	-38.14%	0.032	-15.030	0.000
yrsold1987-'88	0.245	27.77%	0.026	9.570	0.000
yrsold1989-'90	0.263	30.09%	0.026	10.040	0.000
yrsold1991-'92	0.164	17.88%	0.026	6.420	0.000
yrsold1993-'94	0.184	20.18%	0.025	7.410	0.000
yrsold1995-'96	0.240	27.15%	0.025	9.500	0.000
yrsold1997-'98	0.327	38.66%	0.024	13.720	0.000
yrsold1999-'00	0.520	68.29%	0.024	21.470	0.000
yrsold2001-'02	0.795	121.45%	0.024	32.660	0.000
yrsold2003	0.963	161.86%	0.029	33.560	0.000
N	3593	Adjusted R-Squared	0.6082	Std. Error of the Estimate	0.27808

Omitted variables: bath1, bed<=2, yrblt<=1923, yrsold1985-'86

Impact					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.107	-	0.129	86.220	0.000
intersf	0.000	N/A	0.000	2.610	0.011
lotsize	0.000	N/A	0.000	1.910	0.059
bath1.5	0.288	33.33%	0.067	4.280	0.000
bath2	0.211	23.44%	0.080	2.630	0.010
bath>=2.5	0.359	43.13%	0.089	4.020	0.000
bed3	0.124	13.24%	0.072	1.720	0.089
bed>=4	0.152	16.39%	0.110	1.380	0.171
yrblt1960_'65	0.174	19.00%	0.043	4.000	0.000
yrblt1966_'03	0.097	10.14%	0.071	1.350	0.180
yrsold1983-'84	-0.691	-49.90%	0.125	-5.520	0.000
yrsold1987-'88	0.246	27.92%	0.097	2.540	0.013
yrsold1989-'90	0.167	18.13%	0.105	1.580	0.118
yrsold1991-'92	-0.030	-2.92%	0.101	-0.300	0.768
yrsold1993-'94	0.083	8.70%	0.096	0.870	0.388
yrsold1995-'96	0.147	15.89%	0.099	1.490	0.140
yrsold1997-'98	0.287	33.30%	0.103	2.800	0.006
yrsold1999-'00	0.595	81.30%	0.101	5.910	0.000
yrsold2001-'02	0.726	106.65%	0.100	7.290	0.000
yrsold2003	0.936	154.89%	0.107	8.780	0.000
N	106	Adjusted R-Squared	0.8295	Std. Error of the Estimate	0.1762

Omitted variables: bath1, bed<=2, yrblt<=1959, yrsold1985-'86

Exhibit 8

GROUP: MANSFIELD, NORWOOD, RANDOLPH

Descriptive Statistics				
	Control		Impact	
Variable	Mean	Std. Dev.	Mean	Std. Dev
Price	*186,889*	*89,253*	*169,628*	*76,871*
Intersf	*1,565*	*572*	*1,390*	*353*
lotsize	*18,495*	*13,890*	*13,026*	*6,009*
Bathrooms	*1.696*	*0.625*	*1.555*	*0.523*
1	**0.318**	**0.466**	0.329	0.471
1.5	0.263	0.440	0.371	0.484
2	0.167	0.373	-	-
>=2			0.300	0.459
>=2.5	0.253	0.435	-	-
Bedrooms	*3.135*	*0.730*	*3.098*	*0.561*
<=2	**0.143**	**0.351**	-	-
3	0.599	0.490	-	-
<=3	-	-	**0.828**	**0.378**
>=4	0.257	0.437	0.172	0.378
Year Built	*1956*	*35*	*1947*	*36*
<=1945	**0.247**	**0.432**	-	-
1946-'59	0.241	0.428	-	-
1960-'83	0.254	0.435	-	-
1984-'92	0.149	0.356	-	-
1993-'03	0.108	0.311	-	-
<=1919	-	-	**0.175**	**0.381**
1920-'51	-	-	0.223	0.417
1952-'60	-	-	0.193	0.395
1961-'77	-	-	0.211	0.408
1978-'03	-	-	0.199	0.400

Bold Independent variables are base case (omitted)

Control					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.232	-	0.028	395.600	0.000
intersf	0.000	N/A	0.000	15.140	0.000
lotsize	0.000	N/A	0.000	5.730	0.000
bath1.5	0.047	4.81%	0.012	3.880	0.000
bath2	0.048	4.90%	0.014	3.320	0.001
bath>=2.5	0.074	7.66%	0.018	4.210	0.000
bed3	0.060	6.18%	0.013	4.580	0.000
bed>=4	0.094	9.86%	0.017	5.690	0.000
yrblt1924_'49	0.120	12.79%	0.015	7.840	0.000
yrblt1950_'54	0.120	12.75%	0.015	7.780	0.000
yrblt1955_'62	0.192	21.11%	0.015	12.890	0.000
yrblt1963_'03	0.300	34.97%	0.016	18.460	0.000
yrsold1983-'84	-0.480	-38.14%	0.032	-15.030	0.000
yrsold1987-'88	0.245	27.77%	0.026	9.570	0.000
yrsold1989-'90	0.263	30.09%	0.026	10.040	0.000
yrsold1991-'92	0.164	17.88%	0.026	6.420	0.000
yrsold1993-'94	0.184	20.18%	0.025	7.410	0.000
yrsold1995-'96	0.240	27.15%	0.025	9.500	0.000
yrsold1997-'98	0.327	38.68%	0.024	13.720	0.000
yrsold1999-'00	0.520	68.29%	0.024	21.470	0.000
yrsold2001-'02	0.795	121.45%	0.024	32.660	0.000
yrsold2003	0.963	161.86%	0.029	33.560	0.000
N	3583	Adjusted R-Squared	0.6082	Std. Error of the Estimate	0.27808

Omitted variables: bath1, bed<=2, yrblt<=1923, yrsold1985-'86

Exhibit 8

Impact					
Dependent variable equals the natural log of price					
lnprice	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	10.602	-	0.126	84.280	0.000
intersf	0.000	N/A	0.000	1.950	0.052
lotsize	0.000	N/A	0.000	1.540	0.125
bath1.5	0.203	22.52%	0.045	4.550	0.000
bath>=2	0.213	23.73%	0.052	4.070	0.000
bed>=4	-0.031	-3.07%	0.052	-0.600	0.551
yrblt1920-'51	0.088	9.20%	0.056	1.580	0.116
yrblt1952-60	0.285	33.02%	0.057	4.980	0.000
yrblt1961-'77	0.341	40.60%	0.059	5.800	0.000
yrblt1978-'03	0.135	14.50%	0.063	2.140	0.033
yrsold1985-'86	0.258	29.44%	0.115	2.240	0.026
yrsold1987-'88	0.846	132.92%	0.099	8.570	0.000
yrsold1989-'90	0.732	107.95%	0.097	7.570	0.000
yrsold1991-'92	0.645	90.57%	0.096	6.700	0.000
yrsold1993-'94	0.661	93.71%	0.095	6.950	0.000
yrsold1995-'96	0.626	87.07%	0.095	6.580	0.000
yrsold1997-'98	0.854	134.98%	0.095	8.960	0.000
yrsold1999-'00	1.014	175.74%	0.097	10.420	0.000
yrsold2001-'02	1.260	252.50%	0.094	13.360	0.000
yrsold2003	1.509	352.00%	0.108	14.000	0.000
N	337	Adjusted R-Squared	0.5935	Std. Error of the Estimate	0.30611

Omitted variables: bath1, bed<=3, yrblt<=1919, yrsold1983-'84

WILMINGTON

Descriptive Statistics				
	Control		Impact	
Variable	Mean	Std. Dev.	Mean	Std. Dev
Price	*201,526*	*89,119*	*225,817*	*80,090*
Intersf	*1,570*	*555*	*1,693*	*701*
Lotsize	*20,702*	*14,499*	*25,593*	*8,972*
Bathrooms	*1.66*	*0.60*	*1.63*	*0.59*
1	0.32	0.47	0.29	0.46
1.5	0.28	0.45	0.39	0.49
2	0.21	0.40	0.33	0.47
>=2.5	0.20	0.40	-	-
Bedrooms	*3.13*	*0.70*	*3.26*	*0.50*
<=2	0.13	0.33	-	-
3	0.64	0.48	0.23	0.42
>=4	0.23	0.42	0.23	0.42
Year Built	*1968*	*29*	*1958*	*34*
<=1949	0.20	0.40	-	-
1950-'64	0.23	0.42	-	-
1965-'84	0.16	0.37	-	-
1985-'92	0.19	0.39	-	-
1993-'03	0.22	0.42	-	-
<=1955	-	-	0.27	0.45
1956-'64	-	-	0.21	0.41
1965-'72	-	-	0.21	0.41
1973-'03	-	-	0.30	0.46

Bold Independent variables are base case (omitted)

Exhibit 8

Control					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.409	-	0.026	438.130	0.000
intersf	0.000	N/A	0.000	7.970	0.000
lotsize	0.000	N/A	0.000	11.050	0.000
bath1.5	0.009	0.91%	0.015	0.620	0.538
bath2	0.039	3.94%	0.016	2.430	0.015
bath>=2.5	0.185	20.29%	0.021	8.760	0.000
bed3	0.081	8.40%	0.017	4.880	0.000
bed>=4	0.121	12.82%	0.022	5.580	0.000
yrblt1950-'64	0.145	15.60%	0.015	9.450	0.000
yrblt1965-'84	0.230	25.81%	0.018	13.030	0.000
yrblt1985-'92	0.234	26.30%	0.018	13.260	0.000
yrblt1993-'03	0.138	14.82%	0.018	7.650	0.000
yrsold1989-'90	0.022	2.19%	0.024	0.890	0.372
yrsold1991-'92	-0.091	-8.67%	0.023	-4.020	0.000
yrsold1993-'94	-0.022	-2.17%	0.022	-1.020	0.310
yrsold1995-'96	0.065	6.76%	0.022	3.040	0.002
yrsold1997-'98	0.144	15.44%	0.021	6.770	0.000
yrsold1999-'00	0.366	44.17%	0.022	16.940	0.000
yrsold2001-'02	0.636	88.93%	0.023	28.270	0.000
yrsold2003	0.793	121.01%	0.025	31.140	0.000
N	4431	Adjusted R-Squared	0.5015	Std. Error of the Estimate	0.32431

Omitted variables: bath1, bed<=2, yrblt<=1949, yrsold1987-'88

Impact					
Dependent variable equals the natural log of price					
Independent variables	Coefficients		Std. Error	t	Significance
	Unstandardized	Standardized			
constant	11.843	-	0.145	81.880	0.000
intersf	0.000	N/A	0.000	0.440	0.662
lotsize	0.000	N/A	0.000	1.400	0.168
bath1.5	-0.023	-2.29%	0.071	-0.320	0.747
bath>=2	0.086	9.01%	0.083	1.030	0.306
bed>=4	0.030	3.01%	0.076	0.390	0.697
yrblt1956_'64	0.052	5.35%	0.078	0.670	0.509
yrblt1965_'72	0.183	20.08%	0.082	2.220	0.030
yrblt1973_'03	0.211	23.48%	0.075	2.830	0.007
yrsold1989-'90	0.005	0.49%	0.111	0.040	0.965
yrsold1991-'92	-0.140	-13.10%	0.115	-1.220	0.229
yrsold1993-'94	-0.165	-15.20%	0.131	-1.260	0.213
yrsold1995-'96	-0.006	-0.56%	0.109	-0.050	0.959
yrsold1997-'98	0.259	29.55%	0.127	2.040	0.046
yrsold1999-'00	0.192	21.15%	0.105	1.820	0.074
yrsold2001-'02	0.455	57.69%	0.124	3.680	0.001
yrsold2003	0.740	109.53%	0.127	5.800	0.000
N	70	Adjusted R-Squared	0.6153	Std. Error of the Estimate	0.20459

Omitted variables: bath1, bed3, yrblt<=1955, yrsold1987-'88

Exhibit 8

INFORMED DECISIONS™

Dejan Eskic
Senior Research Fellow

The Impact of High-Density Apartments on Surrounding Single-Family Home Values in Suburban Salt Lake County

New, dense housing continues to be a point of conflict in growing communities as concerns over negative impacts to home values dominate the discussion. This study quantifies how new apartment construction has impacted single-family home price acceleration over the last decade.

February 2021

Kem C. Gardner
POLICY INSTITUTE
THE UNIVERSITY OF UTAH
DAVID ECCLES SCHOOL OF BUSINESS

411 East South Temple Street
Salt Lake City, Utah 84111
801-585-5618 | gardner.utah.edu

Exhibit 8

Table of Contents

Exhibit 8

Kem C. Gardner POLICY INSTITUTE
THE UNIVERSITY OF UTAH
DAVID ECCLES SCHOOL OF BUSINESS

The Impact of High-Density Apartments on Surrounding Single-Family Home Values in Suburban Salt Lake County

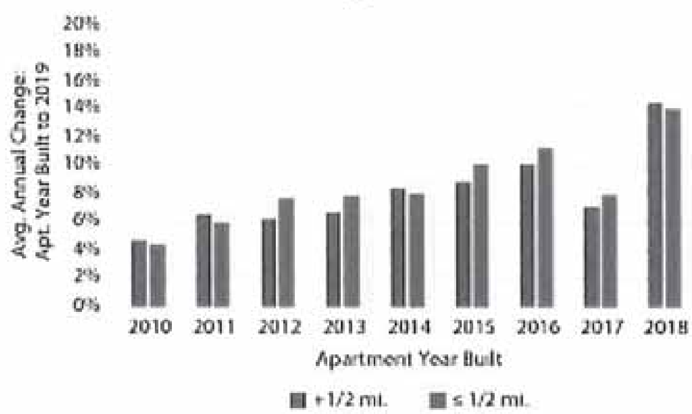
Analysis in Brief

This study found apartments built between 2010 and 2018 have not reduced single-family home values in suburban Salt Lake County. In response to accelerating housing prices over the last decade, the market continues to shift to denser development to slow this trend. However, denser development continues to be a politically controversial topic on city council agendas as existing residents often bring up negative impacts on home values. Single-family homes located within 1/2 mile of a newly constructed apartment building experienced higher overall price appreciation than those homes farther away.

Key Findings

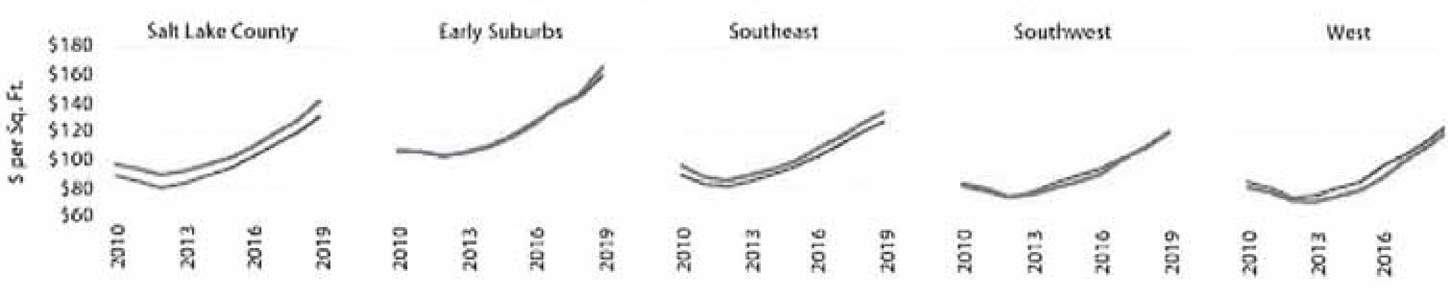
- **New Apartments Have Not Reduced Single-Family Home Values**—Between 2010 and 2019, homes located within 1/2 mile of a newly constructed apartment building experienced a 10.0% average annual increase in median value, while the value of those farther away increased by 8.6%. Only in the Southeast part of the county did homes more than 1/2 mile away from new apartment construction experience higher average price appreciation than those located ≤1/2 mile.
- **Negative Impacts**—The only occurrence where negative price trends followed apartment construction was for homes near apartments built in 2010 and 2011. This resulted from the negative economic impacts brought on by the housing crash of the prior decade.
- **Higher Value per Square Foot**—Between 2010 and 2019, homes that are located ≤1/2 mile of new apartments averaged an 8.8% higher median value per square foot compared with those farther away. However, the total median market value of single-family homes averaged 4.7% greater for those that are located more than 1/2 mile away from new apartments.
- **Homes Near Apartments Are Smaller and Older**—In suburban Salt Lake County overall, homes located within 1/2 mile of new apartments are approximately 270 sq. ft., or 11.1%, smaller than those farther away. Homes that are located ≤1/2 mile of new apartments are seven years older on average than those located farther away and lot sizes average 0.02 acre smaller for homes located ≤1/2 mile of new apartments.

Average Annual Change in Median Price, Year of Apartment Built to 2019, Salt Lake County



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Median Market Value per Square Foot of Single-Family Homes by Distance to Nearest Apartment



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Access full report at gardner.utah.edu

Exhibit 8

Introduction

Over the last decade, Utah has led the nation in the rate of population growth, resulting in a record demand for housing. While the housing oversupply of the 2000s was absorbed as the economy recovered from the recession in the early 2010s, supply in the new decade has struggled to keep up, leading to a housing shortage of 53,000 units in 2020. According to the National Association of Realtors, the year-over median sales price of a home in the Salt Lake metropolitan area increased by 12.3% in the first quarter of 2020. The Salt Lake metropolitan area ranked 16th of 182 metropolitan areas surveyed for a year-over price increase. Housing price increases were lower in 90% of the metropolitan areas surveyed.[1] Additionally, land improvement costs, such as excavation and utility work, increased by approximately 40% between 2007 and 2017, and building costs grew 23% in the same period.[2] Land prices have also soared with a limited supply across the Wasatch Front. The Wasatch Mountains to the east and the Oquirrh Mountains to the west limit the availability of developable land in Salt Lake County.

The combination of soaring demand and supply shortages continues to push the market to provide a more affordable housing product. This is typically done through density because the price of land is distributed across more units. Over the last decade, the market has shifted to denser development, with nearly 48% of all units being built as something other than single-family.

As denser projects continue to appear on city council agendas, opposition to them has grown, manifested in a rising Nimby (not in my back yard) sentiment.[3] Amongst the grievances aired by those opposing denser development is an expected negative impact on property values. The question, "Does new apartment construction negatively impact single-family home values?" is challenging to answer because the housing market, over the last decade, has experienced historic price accelerations—it is rare to find a home whose value has decreased. Rather, this study attempts to quantify how new apartment construction has impacted single-family home price acceleration.

This study found apartments built between 2010 and 2018 have not reduced single-family home values. Compared by distance, single-family homes located within 1/2 mile of a newly constructed apartment building experienced higher overall price appreciation than those homes farther away. Measuring the median value of homes from the year the apartment was built to 2019 shows that homes located within 1/2 mile of an apartment experienced a 10.0% average annual increase, while the value of those farther away increased by 8.6%. This implies an additional 1.4 percentage points in annual price appreciation for homes closer to new apartment buildings (see Table 1). Similar results are seen in most of the county, with the likely driver being that new apartment construction brings new demand and new dollars to a community and redevelops an older piece of property, thus bringing more vibrancy and "buzz" to the area.[4]

Table 1: Average Annual Change in Median Price, Year of Apartment Built to 2019

Area	>1/2 mi.	≤1/2 mi.
Salt Lake County	8.6%	10.0%
Early Suburbs	7.6%	10.7%
Southeast	7.3%	6.8%
Southwest	7.7%	9.7%
West	10.5%	13.7%

Note: See Figure 1 for area designations.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Literature Review

The academic literature leans towards showing multifamily, denser development having either no impact or a positive impact on single-family residential values. A study in King County, Washington, shows an increase in single-family home values for those located near denser development. The study also showed an increase in access to other land uses and parks, adding additional benefits.[5]

A study completed by the National Association of Homebuilders found that between 1997 and 1999, single-family values increased 2.9% for those homes within 300 feet of an apartment building, compared with an increase of 2.7% for those that weren't located next to an apartment.[6] Based on data from 1970 to 2000, a study published in 2003 by Harvard's Joint Center for Housing Studies concluded that apartments posed no threat to surrounding single-family house values.[7]

A study from researchers at Virginia Tech University concluded that apartments with attractive design and landscaping increased the overall value of nearby detached housing, citing three possible reasons.[8] These include, first, new construction serves as a potential indicator of positive economic growth; second, new apartments increase the pool of future homebuyers for current homeowners; and third, apartments with mixed-use development often increase the attractiveness of nearby communities as they provide more housing and amenity choices.[9]

An additional benefit is a decrease in traffic, not an increase as often thought. A study by the National Personal Transportation Survey found that doubling density decreases vehicle miles traveled by 38% since denser households typically own fewer vehicles.[10]

Methodology & Overview

The Salt Lake County Assessor's market value data is used to measure new apartment construction effects on single-family homes. Two measures are used. First, the average annual rate of value change from the year the apartment was constructed to 2019 is used to measure the overall impact. Second, the year-over percent change of median market value is used to estimate annual fluctuations.

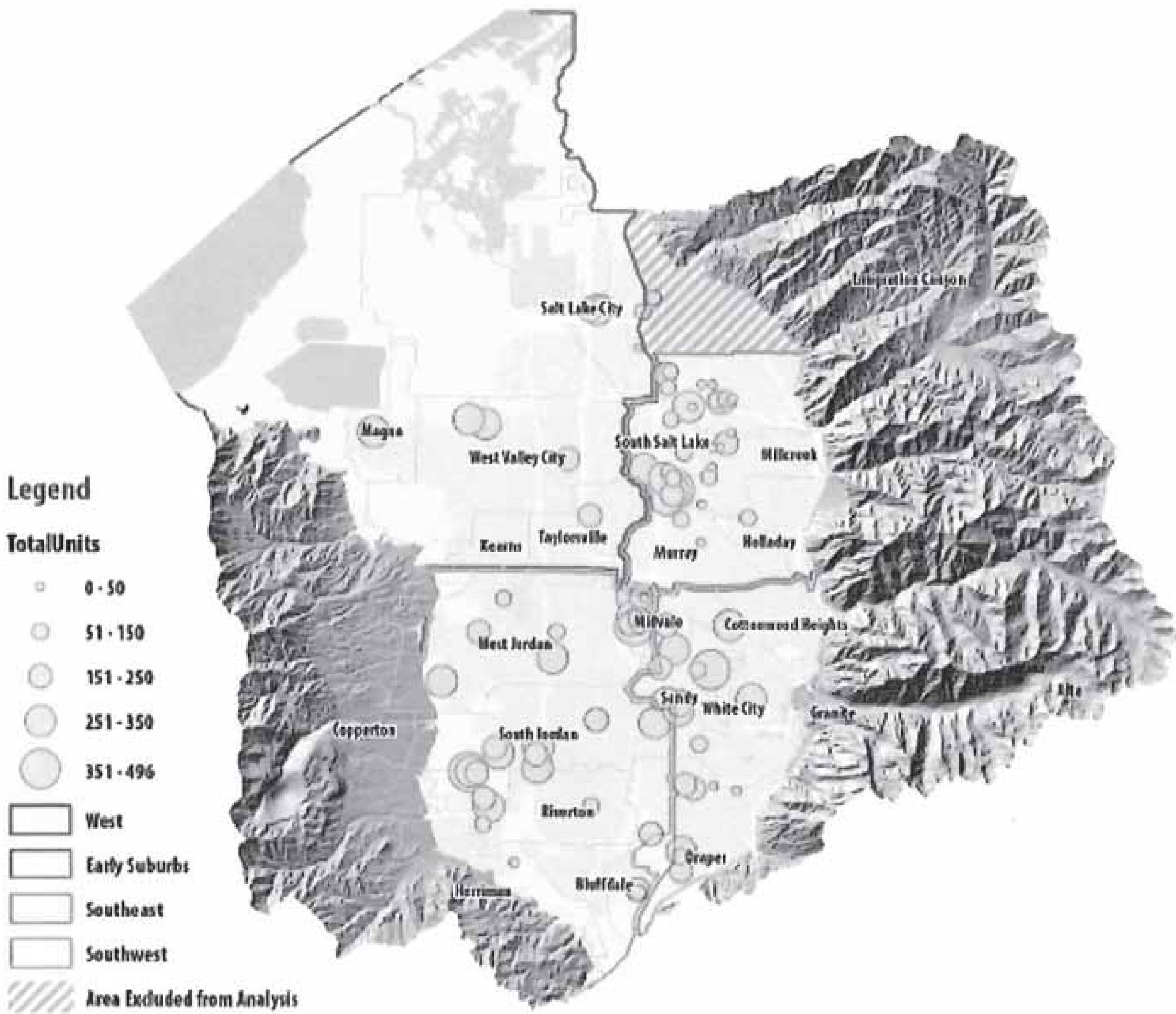
Because of data availability, only apartments built between 2010 and 2018 are used to measure these impacts. Single-family homes are divided into two categories, homes that are less than or equal to one-half mile (≤1/2 mi.) from new apartment construction, and those that are farther away (+1/2 mi.).

The five geographies covered by this study are shown in Figure 1. Because of a range of development activity and multiple factors not present in the suburban parts of the county, the greater Salt Lake City downtown area is excluded from this study. The five geographies are based on Census tracts and consist of the following cities and townships:

- **Suburban Salt Lake County:** consists of the four geographies mentioned below.
- **West:** includes a part of Salt Lake City, Magna, West Valley City, Kearns, and Taylorsville.
- **Early Suburbs:** includes a part of Salt Lake City, South Salt Lake, Millcreek, Murray, and Holladay.
- **Southeast:** includes part of Midvale, Cottonwood Heights, Sandy, and part of Draper.
- **Southwest:** includes Bluffdale, Harriman, Riverton, South Jordan, West Jordan, and part of Midvale and Draper.

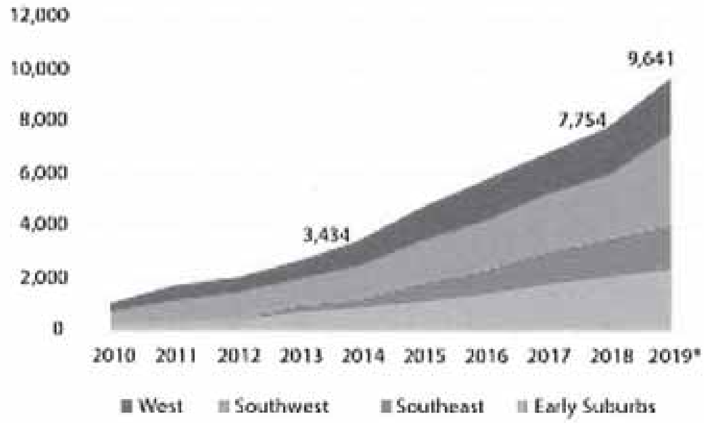
Apartment construction boomed in Salt Lake County during the last decade. Between 2010 and 2018, 7,754 units were

Figure 1: Areas of Analysis and Location of Apartments by Number of Units, 2010–2018



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 2: Cumulative Apartment Units Built, Salt Lake County
(Excluding greater downtown area)



*The data to measure impacts of apartments constructed in 2019 was unavailable at the time of this study.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

completed (see Figure 2). Another 1,887 units were delivered to the market in 2019 but are not included in this analysis as the data to measure their impacts are not yet available. By 2018, the county's Southwest area accounted for 32.2% of total apartment units built since 2010, followed by the Early Suburbs area, accounting for 26.9%. The West area held 21.5% of new units built since 2010, and the Southeast area had the lowest share with 17.1% of units.

In suburban Salt Lake County, 1,887 new apartment units completed construction and began leasing in 2019, a single-year record surpassing the 1,250 new units constructed in 2015 (see Table 2). In the Early Suburbs area, 2017 was a record year with 378 new units constructed. The Southeast area set its record in 2015, with 416 new units. The Southwest area holds the record for any single year, adding 1,048 new apartment units in 2019. The West area also reached its record in 2019 for single-year construction with the delivery of 300 units.

Key physical characteristics distinguish single-family units based on their proximity to new apartment construction and impact their value (see Table 3). The size of a home is a major factor driving market value. In suburban Salt Lake County overall, homes located within 1/2 mile of new apartments are approximately 270 sq. ft., or 11.1%, smaller than those farther away. The size difference is even greater for those homes located in the Early Suburbs area; homes ≤1/2 mile of new apartments are 640 sq. ft., or 26.0%, smaller than those that aren't. Homes located in the Southeast area are 438 sq. ft. smaller or 15.3%, while those located in the Southwest area are nearly identical, with a size difference of only 88 sq. ft., or 3.0%. The difference in size for homes in the West area is 142 sq. ft., or 7.4%.

Home age is another factor influencing value, although remodeling and updates often negate this effect. Homes in suburban Salt Lake County that are located ≤1/2 mile of new apartments are seven years older on average than those located

Table 2: Annual Apartment Units Built by Geographic Area
(Excluding greater downtown area)

Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Salt Lake County	1,008	693	292	647	794	1,250	1,027	1,038	1,005	1,887
Early Suburbs	256	100	40	307	211	210	288	378	293	300
Southeast	0	0	0	228	42	416	181	330	211	239
Southwest	496	315	252	0	258	334	270	330	238	1,048
West	256	278	0	112	283	290	288	0	263	300

*The data to measure impacts of apartments constructed in 2019 was unavailable at the time of this study.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

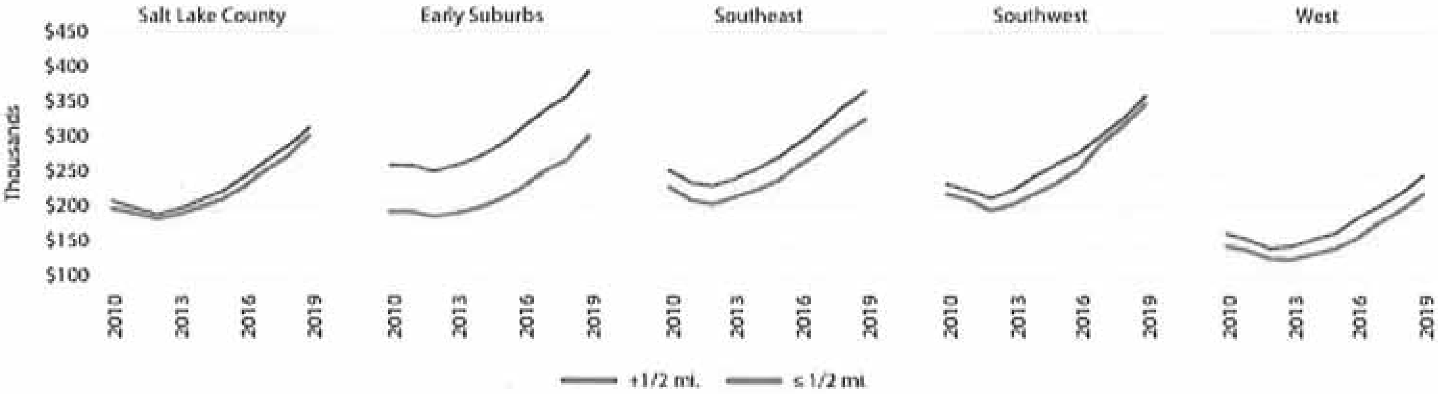
Table 3: Single-Family Characteristics by Geographic Area and Distance to New Apartments

Area	Distance to Apartment	# of Single-Family Homes	Median Bldg. Sq. Ft.	Median Age	Median Parcel Size (Acres)
Salt Lake County	+1/2 mi.	129,564	2,403	41	0.21
	≤1/2 mi.	27,829	2,134	48	0.19
Early Suburbs	+1/2 mi.	30,063	2,464	63	0.21
	≤1/2 mi.	11,383	1,824	77	0.16
Southeast	+1/2 mi.	28,378	2,866	41	0.23
	≤1/2 mi.	7,293	2,428	41	0.21
Southwest	+1/2 mi.	29,471	2,980	23	0.24
	≤1/2 mi.	5,005	2,892	19	0.22
West	+1/2 mi.	41,652	1,930	42	0.18
	≤1/2 mi.	4,148	1,788	61	0.18

Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

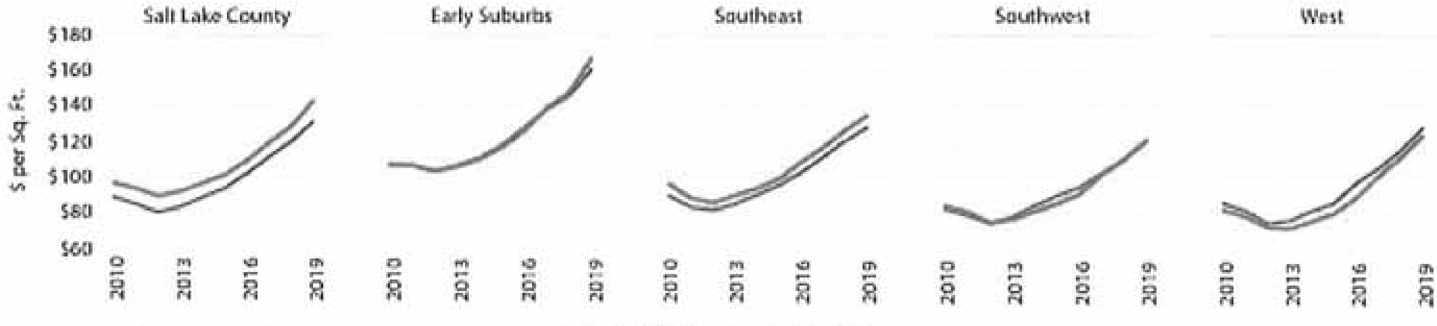
Exhibit 8

Figure 3: Median Market Value of Single-Family Homes by Distance to Nearest Apartment



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 4: Median Market Value per Square Foot of Single-Family Homes by Distance to Nearest Apartment



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

farther away. Homes located ≤1/2 mile in the Early Suburbs area are 14 years older than those that aren't. Southeast area homes are the same age, while those in the Southwest area that are located ≤1/2 mile of new apartments are four years newer than those located farther. Homes in the West area average 19 years older, the largest age difference between homes that are ≤1/2 mile of new apartments and those that are farther away.

Lot size is another key category that influences overall value. In suburban Salt Lake County, lot sizes average 0.02 acre smaller for homes located ≤1/2 mile of new apartments. For homes located in the Early Suburbs area, lots are 0.05 acre smaller for homes ≤1/2 mile from new apartments. Home lots in the Southeast, Southwest, and West areas are 0.02 acre smaller for those located ≤1/2 mile of apartments.

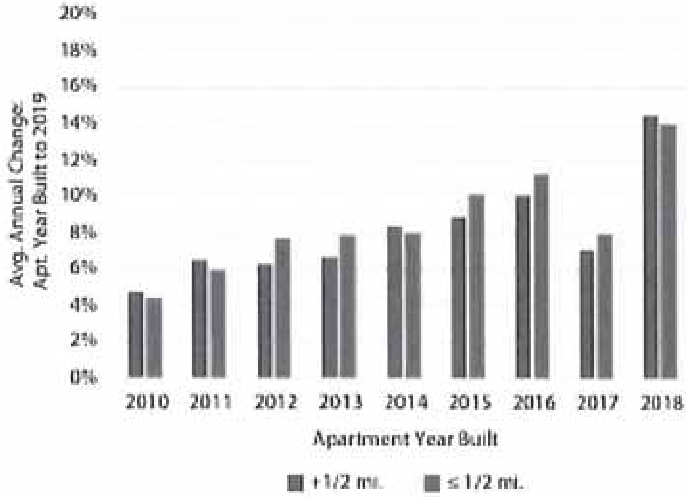
Results

The median market value of single-family homes is greater for those that are located more than 1/2 mile away from new apartments. Between 2010 and 2019, those that are farther than 1/2 mile averaged a 4.7% higher median value (see Figure 3). Homes located in the Early Suburbs area have the greatest discrepancies in values when compared by distance, with the difference averaging 34.6%. This is due to the fact that some of the most expensive and largest homes are located in the areas of Sugar House and Holladay. The average difference in value for homes located in the Southeast area over the last decade is 12.3%. Homes in the Southwest area show the median value disparity lessening with time. Between 2010 and 2016 the difference by distance was 9.1%; however, the disparity narrowed to 3.5% between 2016 and 2019. This was driven by a 10.4% increase in median building square feet for homes within 1/2 mile of an apartment, leading to an overall increase in home values. The median value for homes in the West area has averaged 13.6% between 2010 and 2019.

While the total median market value is greater for those single-family homes farther than 1/2 mile from new apartment construction, the opposite is true when measuring the median value per square foot (PSF). Between 2010 and 2019, homes

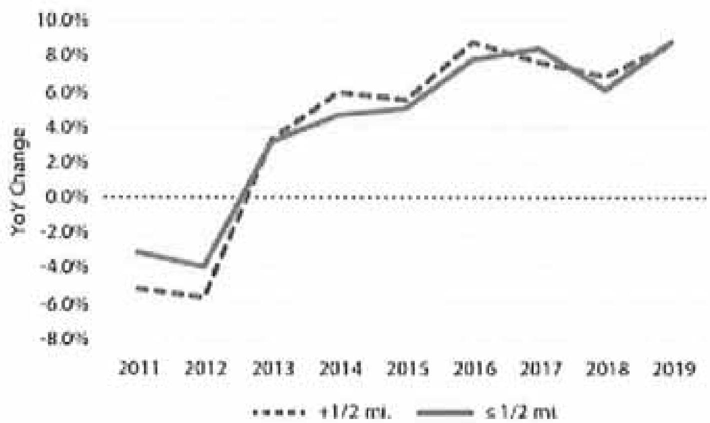
Exhibit 8

Figure 5: Average Annual Change in Median Price, Year of Apartment Built to 2019, Salt Lake County



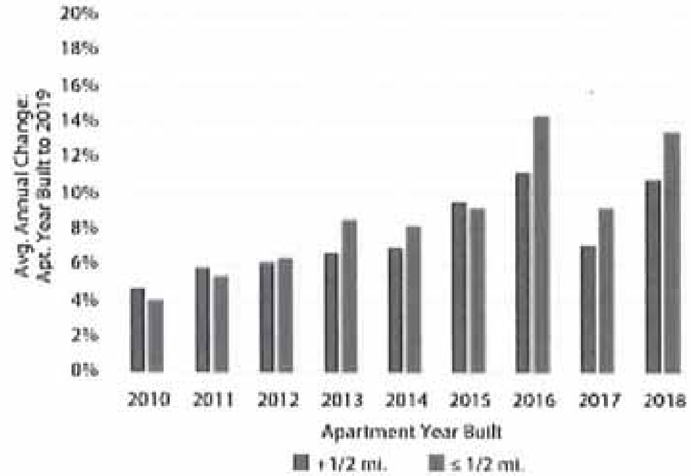
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 6: Year-Over Change of Median Market Value, Salt Lake County



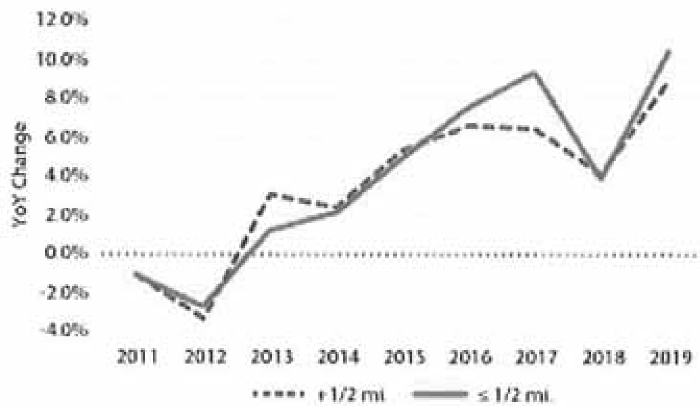
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 7: Average Annual Change in Median Price, Year of Apartment Built to 2019, Early Suburbs



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 8: Year-Over Change of Median Market Value, Early Suburbs



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

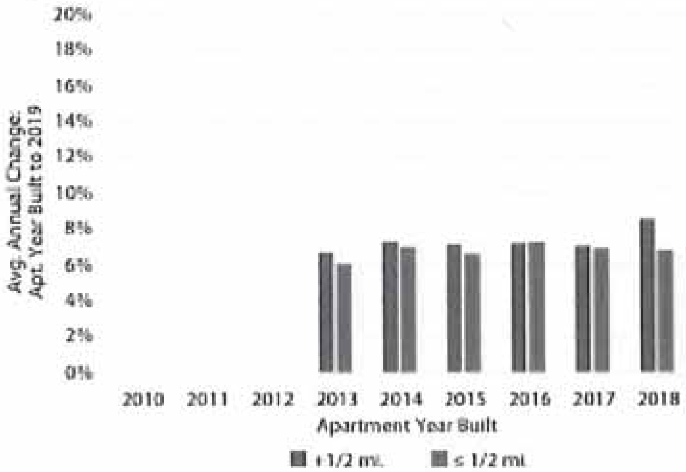
that are located ≤1/2 mile averaged an 8.8% higher PSF median value compared with those farther away (see Figure 4). Although the Early Suburbs area shows the highest discrepancy in total median market value in Figure 3, comparing values on a PSF basis shows there to be little to no difference between the two distances. PSF home values in the Southeast area averaged 5.3% higher for homes located ≤1/2 mile over the last decade. Similar to the trend seen in total median values, the PSF discrepancies in the Southwest favored homes that were farther away between 2013 and 2016, but shows no substantial difference since. The West area shows homes located ≤1/2 mile of a new apartment averaged 5.2% less in median value PSF over the decade when compared with homes farther away. The reason for this disparity is likely due to the homes' age. Homes located ≤1/2 mile of new apartments in the West area average 19 years older than those farther away.

The following sections present a summary of each individual study area's findings, starting with a summary for Salt Lake County.

Figures 5, 7, 9, 11, and 13 measure the average annual rate of value change from the year the nearest apartment was constructed to 2019. This measure is used to understand the overall impact new apartments have on existing single-family homes. Figures 6, 8, 10, 12, and 14 show year-over percent change of median market value to measure annual fluctuations.

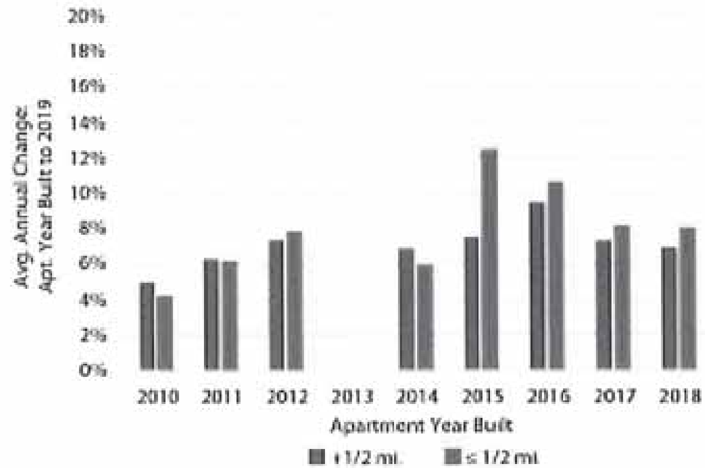
In suburban Salt Lake County, from the year of construction to 2019, single-family homes located ≤1/2 mile of a new apartment experienced a 10.0% average annual increase in value, while the value of homes farther away increased 8.6% on average annually (see Figure 5). Homes that were located more than 1/2 mile in 2010 and 2011 experienced a 1.9-percentage-point larger decline in their value than those that were closer to

Figure 9: Average Annual Change in Median Price, Year of Apartment Built to 2019, Southeast



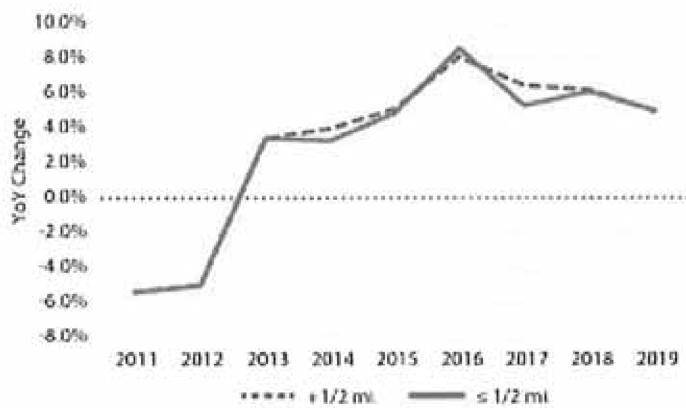
Note: There was no new apartment construction between 2010 and 2012.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 11: Average Annual Change in Median Price, Year of Apartment Built to 2019, Southwest



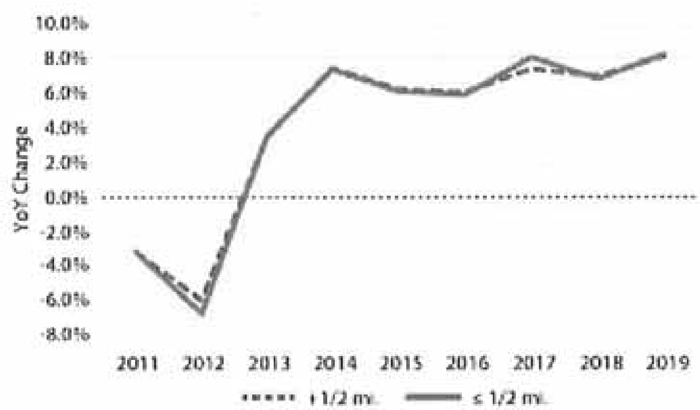
Note: There was no apartment construction in 2013.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 10: Year-Over Change of Median Market Value, Southeast



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 12: Year-Over Change of Median Market Value, Southwest



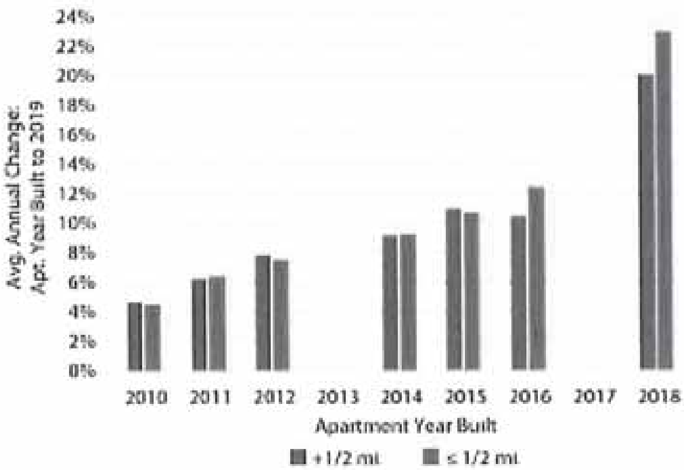
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

a new apartment building, showing that apartment proximity had a positive impact overall on preserving value during the recession (see Figure 6).

From the year of construction to 2019, homes in the Early Suburbs area that are located ≤1/2 mile of a new apartment experienced a 10.7% average annual increase in value, while the value for homes farther away increased 7.6% annually on average (see Figure 7). Year-over changes have shown some disparities over the last decade. Homes farther than 1/2 mile saw a more positive appreciation from 2012 to 2015, while homes located ≤1/2 mile outperformed those farther away between 2016 and 2019 (see Figure 8).

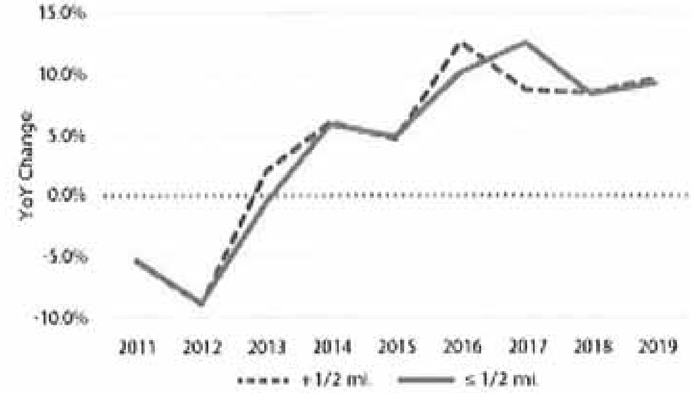
The Southeast area is the only instance where homes that are more than 1/2 mile away from new apartment construction experienced higher average price appreciation than those located ≤1/2 mile (see Figure 9). Homes farther away experienced an annual appreciation of 7.3% between year the apartment was constructed to 2019, and those located ≤1/2 mile saw their values increase 6.8% annually. The likely explanation for this discrepancy is that there is a higher concentration of larger retail development near those homes that are located ≤1/2 mile of apartments than in any other study areas. In the other three study areas, homes located ≤1/2 mile of an apartment were near an average of 20% less retail space when compared with homes farther away. In the Southeast area, there is 84% more retail space near homes that are closer to new apartment construction compared with those farther away. Year-over annual trends stayed similar for both distance categories with the exception of 2014 and 2017, when homes farther than 1/2 mile experienced slightly greater annual growth (see Figure 10).

Figure 13: Average Annual Change in Median Price, Year of Apartment Built to 2019, West



Note: There was no new apartment construction in 2013 and 2017.
Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

Figure 14: Year-Over Change of Median Market Value, West



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

In the Southwest area, from the year of construction to 2019, single-family homes located ≤1/2 mile of a new apartment experienced a 9.7% average annual increase in value, while the value for homes farther away increased 7.7% on average annually (see Figure 11). Median value year-over trends in the Southwest area show little or no difference between apartment proximities (see Figure 12).

Homes in the West area that are located ≤1/2 mile of a new apartment experienced a 13.7% average annual increase in value, while the value for homes farther away increased 10.5% annually on average (see Figure 13). Year-over trends show some fluctuation through the last decade. Homes farther than 1/2 mile outperformed annual price growth in 2013, 2016, and 2019, while homes located ≤1/2 mile outperformed in 2017, with the remaining years showing relatively similar year-over price shifts (see Figure 14).

Conclusion

The public perception about high-density housing continues to be a point of conflict in growing communities across Utah and the country. While many stereotypes and generalizations about negative impacts are brought up in public settings, high density development does not actually appear to depress home values.[11] From the year an apartment was constructed to 2019, in Salt Lake County, single-family homes that were located within 1/2 mile of new apartment construction realized 1.4% more in annual price appreciation than those single-family homes that were located farther away. This is likely because new apartment construction brings new demand and new dollars to a community and redevelops an older piece of property, thus bringing more vibrancy and "buzz" to the area.

The challenges of housing affordability are not going away anytime soon. While density is a solution to alleviate costs, zoning is the mechanism that allows or denies it. Zoning regulations, more than any other local policies, govern the annual supply of single-family and multifamily housing. In recent years, the supply of housing has not met the demand, creating a housing shortage.[12] This shortage has tremendous impacts on Utah's future. The shortage has also excluded many from homeownership, added to substantial increases in doubling-up of households, delayed marriages, and discouraged young people from forming new households.

Exhibit 8

Endnotes

1. National Association of Realtors
2. https://gardner.utah.edu/wp-content/uploads/May2018HousingReport.pdf
3. Haughey, R. "Higher Density Development Myths and Facts." Urban Land Institute - ULI Washington, D.C. 2005
4. Haughey, R. "Higher Density Development Myths and Facts." Urban Land Institute - ULI Washington, D.C. 2005
5. University of Washington. "Denser development is good for single-family home values." ScienceDaily. www.sciencedaily.com/releases/2012/06/120626151109.htm
6. National Association of Home Builders, "Market Outlook: Confronting the Myths about Apartments with Facts" (Washington, D.C.: Author, 2001), p. 4.
7. Alexander Hoffman, The Vitality of America's Working Communities (Cambridge, Massachusetts: Harvard University Joint Center for Housing Studies, 2003).
8. Arthur C. Nelson and Mitch Moody, "Price Effects of Apartments on Nearby Single-Family Detached Residential Homes," Working Draft (Blacksburg, Virginia: Virginia Tech University, 2003).
9. Arthur C. Nelson, "Top Ten State and Local Strategies to Increase Affordable Housing Supply," Housing Facts & Findings, vol. 5, no. 1.
10. Robert Dunphy and Kimberly Fisher, "Transportation, Congestion, and Density: New Insights," Transportation Research Record, 1996.
11. https://furmancenter.org/files/media/Dont_Put_It_Here.pdf
12. https://gardner.utah.edu/wp-content/uploads/Best-Practices-Dec2020.pdf

Exhibit 8

Kem C. Gardner
POLICY INSTITUTE
THE UNIVERSITY OF UTAH

DAVID ECCLES SCHOOL OF BUSINESS

Partners in the Community

The following individuals and entities help support the research mission of the Kem C. Gardner Policy Institute.

Legacy Partners

The Gardner Company
Intermountain Healthcare
Clark and Christine Ivory Foundation
KSL and Deseret News
Larry H. & Gail Miller Family Foundation
Mountain America Credit Union
Salt Lake City Corporation
Salt Lake County
University of Utah Health
Utah Governor's Office of Economic Development
WCF Insurance
Zions Bank

Executive Partners

Mark and Karen Bouchard
The Boyer Company
Salt Lake Chamber

Sustaining Partners

Clyde Companies
Dominion Energy

Kem C. Gardner Policy Institute Staff and Advisors

Leadership Team

Natalie Gochnour, Associate Dean and Director
Jennifer Robinson, Associate Director
Shelley Kruger, Accounting and Finance Manager
Colleen Larson, Administrative Manager
Dianne Meppen, Director of Survey Research
Pamela S. Perlich, Director of Demographic Research
Juliette Tennert, Chief Economist
Nicholas Thiriot, Communications Director
James A. Wood, Ivory-Boyer Senior Fellow

Staff

Max Backlund, Senior Research Associate
Samantha Ball, Senior Research Associate
Mallory Bateman, Senior Research Analyst
Andrea Thomas Brandley, Research Associate
Marin Christensen, Research Associate
Mike Christensen, Scholar-in-Residence
John C. Downen, Deputy Director of Economic and Public Policy Research
Dejan Eskic, Senior Research Fellow
Emily Harris, Demographer
Michael T. Hogue, Senior Research Statistician
Mike Hollingshaus, Senior Demographer
Thomas Holst, Senior Energy Analyst
Meredith King, Research Associate
Jennifer Leaver, Senior Tourism Analyst
Levi Pace, Senior Research Economist
Shannon Simonsen, Research Coordinator
Joshua Spolsdoff, Research Economist
Paul Springer, Senior Graphic Designer
Laura Summers, Senior Health Care Analyst
Natalie Young, Research Analyst

Faculty Advisors

Matt Burbank, College of Social and Behavioral Science
Adam Meirowitz, David Eccles School of Business
Elena Patel, David Eccles School of Business
Nathan Seegert, David Eccles School of Business

Senior Advisors

Jonathan Ball, Office of the Legislative Fiscal Analyst
Gary Cornia, Marriott School of Business
Wes Curtis, Community-at-Large
Theresa Foxley, EDCUtah
Dan Griffiths, Tanner LLC
Darin Mellott, CBRE
Chris Redgrave, Community-at-Large
Wesley Smith, Western Governors University