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# Building a Better Future: Housing Development Opportunities in Worcester

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by


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## Abstract

The project team carried out a housing study for the city of Worcester, Massachusetts. This was done through the Worcester Community Project Center and sponsored by Worcester's Executive Office of Neighborhood Services. The study includes a profile of the Worcester housing market, with comparisons to Cambridge, Lowell, Springfield, and Providence, a time-series analysis, and a suitability analysis. The suitability analysis ranks buildable areas with respect to their suitability for the placement of single-family, two-family, three-family, multifamily, elderly, and special-needs housing.

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# 1.0 Executive Summary

## 1.1 Overview

This report is intended to evaluate various characteristics of the current Worcester housing market, analyze how these characteristics have changed over time, compare Worcester's housing market with that of Cambridge, Springfield, Lowell, and Providence, and identify locations in the city that are highly suitable for new housing developments of several different types. This suitability analysis will provide a foundation for the subsequent decision-making process to be carried out by the City of Worcester regarding the best way to address the city's housing needs. The Executive Office of Neighborhood Services has sponsored students at Worcester Polytechnic Institute (WPI) to conduct this study through WPI's Worcester Community Project Center. This project intersects with two other projects also being conducted at the Worcester Community Project Center, which deal with open space, transportation, and economic development.

This report is organized into 6 chapters, including the Executive Summary. The remaining 5 chapters are:

2. Introduction: This chapter describes the purpose of our project and explains the need for it. It explains the housing shortage in Massachusetts and describes how the project will help Worcester to address this problem.

3. Background: This chapter lists and describes the sources we used to conduct our study. It gives an overview of each source, so that the reader can learn where we got our data from. It also could be helpful to future researchers seeking to understand the status of the Worcester housing market, as it provides a list of sources they can go to for information.

4. Methodology: This chapter describes the methods we used to conduct our research and analyze the results. For each of the four main objectives of our project, it explains what we did. This is particularly important for the fourth objective (locating areas that are suitable for future residential development), because it describes the design of the matrix we used to determine suitability.

5. Results, Analysis, and Conclusions: This section details the actual results we obtained and analyzes the data. In addition to the written analysis, graphs and charts are used to help the reader visualize the results we obtained from our research. The results of the suitability analysis are displayed in maps. These maps can also be viewed in electronic form using Mapinfo (they can also be converted to Arcview). This chapter also details the conclusions we drew from our results and

makes recommendations to the city as to what we believe are the most appropriate locations for future placement of the different types of housing we examined.

6. Recommendations for Future Worcester Housing Studies: The final chapter includes additional recommendations we would like to make to the city. These recommendations focus on five areas: filling in data gaps, augmenting data collection, additional suitability matrix attributes, utilizing the suitability maps we created, and handling parcels that are suitable for multiple housing types. In our research, we came across gaps in the available information. We recommend that the city fill these gaps so that future researchers can conduct a more thorough analysis of the housing market. There are also facets of the analysis that we would have liked to conduct but could not, either because of time constraints or a lack of necessary information. These facets are listed as possible avenues for future researchers to explore. Finally, we explained the usefulness of the different types of suitability maps we made, and gave our suggestions for how to determine the best type of housing development for parcels that were ranked as highly suitable for more than one type of housing.

## 1.2 Key Findings

Profile of the Worcester Housing Market

- The median monthly household income in the city is $ 2,968.58 (Table P53, factfinder.census.gov). Thus, a median-income household that pays 30% of its income towards rent could afford to pay a monthly rent of $890.58. Although this is well above the Worcester median gross rent of $577/month (Table H63, factfinder.census.gov), there are still 13,988 renting households in Worcester that are paying more than 30% of their household income towards their rent (Table H73, factfinder.census.gov).
- The loan-to-value ratio tends to be much higher in the outlying tracts of the city than in the city center.
- Worcester relies heavily on older units for its housing supply. Nearly half of Worcester's stock of housing units was built in 1939 or earlier (Table H36, factfinder.census.gov).

- The distribution of renter- vs. owner-occupied housing units in Worcester is roughly even, with 41.1% of housing units being owner-occupied and the remainder renter-occupied (Table H7, factfinder.census.gov).

## Comparison with Lowell, Springfield, Cambridge, and Providence

- In most respects, Worcester is comparable to Lowell, Springfield, and Providence. Cambridge tends to be very different from Worcester.
- The total value for new residential construction is consistently higher in Worcester than in Springfield or Lowell.
- Worcester is a more affordable city to reside in with the exception of Lowell.
- All five of the cities we studied rely heavily on older housing stock.
- Worcester provides more subsidized housing for the elderly and people with special needs than Lowell, Springfield, and Cambridge do.

## Time Series Analysis

- The median gross rent increased very slightly between 1990 and 2000, from $527/month to $577/month (Tables H043A and H63, factfinder.census.gov). During the years between 1990 and 2000, the median value of a house in Worcester decreased from $128,200 to $119,600 (Tables H061A and H76, factfinder.census.gov).
- Between 1999 and 2002, single-family homes were the most-sold type of housing unit, and two-family homes were the least-sold (RKG Associates). Sales of all housing unit types dropped between 2001 and 2002.
- Between 1999 and 2002, condos had the lowest median value (RKG Associates). Between 1999 and 2001, single-family homes had the highest median value, but they were surpassed by three-family homes in 2002.
- Between fiscal years 2001 and 2003, residential properties experienced a higher rate of growth in assessed value than commercial and industrial properties (WRRB, 2003). This suggests that the residential market in Worcester is stronger than the commercial/industrial market.

## Suitability Analysis

- Single-family housing construction should be focused on the area south of Green Hill Park, the area just northeast of the airport, and the northern corner of the city. The downtown area and the area along the northwestern border of the city should be avoided.
- Two-family housing should be concentrated in the downtown area and the region south of Green Hill Park.
- The southeastern corner of the city and the downtown area are particularly suitable locations for three-family homes.
- The northernmost corner of the city and the section between the downtown area and the airport are good locations for the placement of multifamily homes.
- There are eight census tracts, mostly along the borders of the city, that have high deficits of elderly housing. Future construction of elderly housing should focus on these tracts. In some cases, placement of elderly housing in these tracts may necessitate improvements in the transportation infrastructure there.
- The northern corner of the city and the locality between the downtown area and the airport are appropriate locations for special-needs housing. Since the areas that are suitable for special-needs housing overlap with those that are suitable for multifamily housing, there is an opportunity for the city to fulfill the need for both housing types by encouraging construction of multifamily housing developments that contain some handicapped-accessible units in these areas.
- The buildout analysis we constructed is an improvement to the current state of knowledge of the city because it is at the parcel level. The earlier buildout analysis conducted by the CMRPC only went down to the zone level, and did not reflect the idiosyncrasies of individual parcels as ours does.

## 2.0 Introduction

In local governments today, trying to balance all of the different demands for housing is an ongoing dilemma. The population of people who require housing is constantly changing, and the need for different types of housing changes with them. The different types of housing a society needs include low-income housing, elderly housing, and a range of sizes, from single-family homes to large apartment complexes.

Within Massachusetts there is a plan addressing this housing issue. Executive Order 418 was implemented to help cities within the state to develop a Community Development Plan. By utilizing these guidelines we intend to facilitate Worcester's compliance with E.O. 418, and provide the city with the information it needs to improve its existing housing market.

The issue of providing adequate housing for a community is one that has been studied before in Worcester. At least since 1972, housing studies have been published periodically by organizations such as the Central Massachusetts Regional Planning Commission (CMRPC) and the Worcester Redevelopment Authority. These studies have sought to summarize the housing market conditions in Worcester at the time. More recent studies have been undertaken with the aim of improving housing market conditions in some way. The study conducted by RKG Associates, Inc. in 2002, for example, was conducted with the goal of increasing property tax revenues for the city. The Worcester Regional Research Bureau (WRRB) initiated its Benchmarking Economic Development in Worcester study in 2002 in order to assess Worcester's economic progress and offer suggestions for improvement. Finally, the Massachusetts Housing Partnership presented its Housing Needs Workbook to guide communities in addressing the specific issue of affordable housing. All of these studies, each conducted with different aims in mind, present us with a variety of perspectives from which to view the housing issue. Thus, they provide us with a foundation on which to base our research, but also demand that we critically evaluate the sources we use.

Some of the previous studies mentioned above have been very comprehensive, taking into account a diverse array of variables and conducting sophisticated analyses of them. Despite this, there is a significant gap in the prior research in this area. None of the studies we examined has conducted a suitability analysis, using a suitability matrix as described in Technical Assistance Bulletin #3, to rank each area of undeveloped residential land with regard to its suitability for different types of housing developments.

This gap provides an opportunity for us to extend the current research. We can go beyond what has been done before by not only identifying residentially-zoned areas of land in the city that are currently undeveloped, but also constructing suitability matrices for each of these areas, and ranking them with respect to their suitability for future residential development. Thus, we can both expand the current state of knowledge and provide guidance for the city in making housing decisions for the future.

The City of Worcester has a need for an updated and expanded version of the housing market profile that was conducted by RKG Associates in 2002. A suitability analysis for future housing development based on the housing market profile will allow planners to identify the best places in which alternative housing could be established. Obtaining this information will enable us to create a spatial analysis of the housing market activity, using electronic maps constructed with GIS software in an Arcview program format. These maps will allow the city to visualize the current housing situation and devise ways to meet Worcester's present and future housing needs.

# 3.0 Background

## 3.1 Introduction

The purpose of this project is to create a profile of Worcester's housing market, construct a time series analysis of the housing market, compare Worcester's housing market with that of Cambridge, Springfield, Lowell, and Providence, and finally conduct a suitability analysis of areas in the city that could be used for new residential developments. In order to achieve this purpose, it is vital to consider the procedure for carrying out a housing study, the issue of affordable housing, and the current housing situation in the city. The ultimate goal of this project is to contribute to the revitalization and sustainability of Worcester. Thus, this project can be viewed as one part of an integrated whole, with the transportation/open space and economic development projects comprising the other parts of this whole. Together, the results of all three projects will be used to transform Worcester into a 21st century city.

## 3.2 Executive Order 418 and the Community Development Plan

In January 2000, then-Governor Paul Cellucci and then-Lieutenant Governor Jane Swift issued Executive Order 418. This order was designed to supply cities with the tools necessary for successfully attending to the housing needs of the state of Massachusetts. A major part of the Executive Order is the Community Development Plan, which focuses on developing housing for citizens across a broad range of incomes, while at the same time balancing the economic needs of the city, as well as improvements to open space preservation and transportation.

The housing portion of E.O. 418 is focused on assisting communities in (1) identifying zoning and land use options that provide a range of housing opportunities, (2) making future decisions regarding land use and housing development alternatives, (3) building a constituency for implementation of the Community Development Plan by educating residents about housing needs, opportunities, conflicts, and constraints, and (4) encouraging creative thinking regarding the appropriateness and desirability of different patterns of land use, identifying alternative housing types that might better serve the needs of all residents, including the elderly and disabled, as well as various types and sizes of households (Commonwealth of Massachusetts, 2000). The logic of the approach is as follows:

### 3.2.1 Steps to a Housing Study

The community development plan is broken down into six steps:

1) "Gather Information and Complete a Housing Supply Inventory" (Commonwealth of Massachusetts, 2000). The purpose of this process is to gain awareness of all current housing stock and to be familiarized with the city's recent growth trends. The housing market profile and time series analysis we constructed directly address this step. Also included in this step would be an assessment of whether or not a community has fulfilled the goal of 10% affordable housing from the Massachusetts General Laws (MGL) Chapter 40B[1].

2) "Complete an Assessment of Housing Demand" (Commonwealth of Massachusetts, 2000). The housing demand assessment is an analysis of the characteristics of the different occupants of housing throughout the region. Important statistics to assess the housing demand include household size, current and projected population through the year 2008, age distribution, quantities and types of households, and income.

3) "Quantify Need by Comparing Supply and Demand" (Commonwealth of Massachusetts, 2000). This research focuses on the community's unmet housing needs and offers the community a better understanding of how the housing needs of today could reasonably be addressed, keeping in mind land use regulations and construction trends.

4) "Address Needs by Setting Goals and Objectives" (Commonwealth of Massachusetts). In this step, local officials will compare any gaps between supply and demand that have been identified in the previous step to the city's vision statement to assess their importance. Specific goals, including cost parameters and deadlines, are developed as part of this step.

5) "Draft a Preliminary Future Housing Map" (Commonwealth of Massachusetts, 2000). This stage lays out the plan for type, location, and quantity of future housing units in a map format. Our suitability analysis will form a basis for this step by identifying locations in the city that are suitable for different types of housing developments.

6) "Identify Additional Housing Opportunities" (Commonwealth of Massachusetts, 2000). This task might be thought of as fine-tuning the final proposed housing plan. At this stage building factors such as neighborhood characteristics, transportation infrastructure in the area, and the employment opportunities central to new building locations are considered.

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[1] Chapter 40B is part of the Massachusetts General Laws (MGL). It mandates that 10% of the housing in each community be affordable for low-income families. For a discussion of Chapter 40B and communities' responses to it, see Appendix A.

Some characteristics, such as proximity to public transportation routes, will be addressed in our suitability matrix; others are beyond the scope of our study and will be left for future analysts to consider.

These six steps have greatly informed our research efforts as a framework for initial assessments of Worcester's unique individual housing needs. They establish what a community needs to do in order to satisfy the requirements of E.O. 418. Thus, they have allowed us to assess the gaps in the existing research and determine ways in which our study might fill in those gaps.

### 3.2.2 Technical Assistance Bulletin #3

An additional government document of importance to our study is Technical Assistance Bulletin #3. The Technical Assistance Bulletin is published for those engaged in the mapping process of the Community Development Plan outlined by E.O. 418. The bulletin is intended to assist planners in achieving an efficient planning process that will best make use of GIS technology to help a community agree on the most suitable type, quantity, and location of future land uses. This bulletin provides a framework for conducting a housing suitability analysis. It explains how the housing suitability map must clearly illustrate the degree to which different geographical areas of the community are appropriate for each of the different types of housing. To convert housing demand data into a housing suitability map, the bulletin suggests using a housing suitability matrix.

The bulletin provides a list of attributes that affect an area's suitability for housing development. These attributes can be broken down into 1) built environment, which considers current zoning, proposed zoning, highway and transit access, brownfields, public water, sewer, and septic systems, 2) socio-cultural amenities including redevelopment sites, scenic views, access to jobs, access to retail, agricultural lands, and access to recreational areas, and 3) the actual area's breakdown of housing types including one-, two- and multi-family housing, high-rise apartments, townhouses, assisted living, handicapped-accessible dwellings, and second homes. Once all of these attributes are tabulated, a suitability map can be created. By taking the suitability map and overlaying it with other maps such as the natural resource suitability map, existing land use maps, zoning, infrastructure, and public facilities maps, planners may identify areas suitable not only for housing, but also for economic development and transportation improvements. The areas most

qualified for meeting the community's future housing need can now more easily be identified by the absence or presence of physical, cultural, economic, and municipal assets within the maps created.

We anticipate that these maps will be highly useful to us in conducting our study. They will allow us to easily visualize housing market data. Overlaying maps displaying different types of data will help us to simplify complex overlaps between different types of land and properties available in the city. Of course, ours is not the first housing study to be conducted in the city of Worcester. Several important studies have been carried out previously, representing several different perspectives on the issue of housing.

### 3.3 Previous Housing Studies

E.O. 418, Chapter 40B, and Technical Assistance Bulletin #3 give us the background needed to establish our goals and objectives for the project. In addition, an examination of recent studies of the Worcester housing market is necessary for us to understand the current conditions of this market. Housing studies have been conducted in Worcester as far back as 1972 and 1973. However, we will be focusing on more recent studies. Two notable studies in this respect are the 2002 Benchmarking Economic Development in Worcester study and the more well-known RKG housing study.

#### 3.3.1 Benchmarking Economic Development in Worcester: 2001

This study was published by the Worcester Regional Research Bureau (WRRB) in 2001 to assess Worcester's performance with respect to a variety of economic indicators. This was the first report published by the WRRB's Center for Community Performance Measurement. The report concludes that between 1995 and 2001, the average annual value of new construction projects in Worcester outpaced that of Hartford and Springfield, but was lower than that for Providence (WRRB, 2001). Furthermore, this growth "is shifting toward residential rather than commercial development, indicating that Worcester may become a 'bedroom community' of metro-Boston commuters" (WRRB, 2001).

#### 3.3.2 Benchmarking Economic Development in Worcester: 2002

The Worcester Regional Research Bureau (WRRB) published this study as a follow-up to a study published in 2001. Updates and comparisons were made in this document. The findings

included an increase of 15% in the value of residential property over the previous fiscal year (WRRB, 2002). There was also an increase in the labor force, despite a decrease in jobs, meaning more workers were commuting to other areas. Along with this information, the WRRB found that the tax rate in Worcester is higher than all bordering towns, despite an 8% decline (WRRB, 2002). Methods of improving economic growth are also discussed, including the possibility of an improved airport.

This study found that the economic situation in Worcester is in a state of flux. This dynamic environment provides opportunities for progressive change that can help to make Worcester a more prominent New England city. One aspect of this change should be to improve the housing market, as this will draw more people to our city to live.

### 3.3.3 Distressed Property in Worcester: The Problems and the Options

The WRRB prepared this report in 1997 to discuss the issue of vacant, abandoned, and condemned buildings in the city of Worcester. The report explains why vacant buildings create problems for a city, assesses the seriousness of the problem in Worcester, describes the methods used by the city to deal with such properties, describes programs that other cities have implemented to deal with the problem, and makes recommendations to the city. Among these suggestions are: shortening the allotted time for owners of buildings with code violations to begin work on correcting the violation, making greater use of MGL Chapter 58, Section 8 (which allows the city to grant tax abatements for certain abandoned residential properties that are to be rehabilitated), taking action to begin rehabilitating recently vacated structures before they become so damaged that demolition is the only way to deal with them, and developing a Land Stewardship Demonstration Program (in which the city donates public property to a land trust organization, which can then administer the land in a way that augments its neighborhood revitalization programs) (WRRB, 1997).

### 3.3.4 The RKG Study

In 2002, the City of Worcester commissioned a housing market study from RKG Associates, Inc., an economic and real estate consulting firm based in Durham, NH. The purpose of the study was to identify ways for Worcester to increase its property tax revenues. To achieve this goal, RKG analyzed the real estate market in Worcester, dividing the city into 15 geographic submarkets whose

housing conditions were analyzed separately. The indicators of housing market status for each submarket were compared to each other and to Worcester as a whole. This allowed the study to identify those areas of the city whose housing markets appear to be in particularly poor shape, and offer suggestions for revitalizing those areas. In addition, the report analyzed population trends, predicted the demand for housing based on anticipated population growth over the next 10 years, conducted a detailed study of the available housing in the city, and made recommendations for improving housing market conditions. This study is very comprehensive, and the data and maps it contains provide an important starting point for our own analysis.

The study predicts that by 2010, Worcester's population will grow by 4,100-11,300 (RKG Associates, 2002). This population growth could generate a demand for 700-1,900 additional houses and 1,000-2,800 additional rental units (RKG Associates, 2002). Currently, Worcester possesses 70,723 housing units, of which 13.3% is affordable housing for low-income families (RKG Associates, 2002). This exceeds the 10% mandated by Chapter 40B of Massachusetts law. By contrast, only 3% of houses in Worcester are worth $200,000 or more, and only 2% of rented units had monthly rents of $1,000 or more (RKG Associates, 2002). A summary table for this data is shown in Table A. Based on this data, RKG concluded that Worcester should be "less aggressive" in building housing suitable for low-income families, and instead concentrate on building high-end housing in order to attract more wealthy people to the city (RKG Associates, 2002). Specifically, RKG recommends replacing some of the triple-deckers present in Worcester with single-family homes.

**Table A: Affordable and Upscale Housing in Worcester as a Percentage of the Total**

| Table A: Affordable and Upscale Housing in Worcester as a Percentage of the Total | | | |
|---|---|---|---|
| Total Housing Units | Percentage of Houses Worth $200,000 or more | Percentage of Rental Units with Monthly Rents of $1,000 or more | Percentage of Housing Affordable for Low-Income Families |
| 70,723 | 3% | 2% | 13.30% |

Source: RKG Associates, Housing Market Study: City of Worcester, Massachusetts, Chap. 1, pp. 3, 5, 8.

This study thus presents one perspective on the housing shortage in Worcester. This perspective assumes that the proper goal for the city to work towards is to attract more wealthy people to the city and collect more money through property taxes on expensive houses and luxury condominiums/apartments. As such, it gives us one way to look at the goal of improving Worcester's housing market, which we are trying to advance through this project. The following section presents other points of view on the best way to improve the city's housing market. All of these different perspectives are useful to us, as they present us with a wide variety of ways of looking at our topic.

### 3.3.5 Response to the RKG Study

These recommendations generated a significant amount of controversy, particularly among affordable housing advocates. The Worcester Telegram and Gazette ran a series of articles written by Bronislaus B. Kush covering this controversy. In one article, Grace C. Carmark, executive director of the Central Massachusetts Housing Alliance (CMHA), characterized the study's recommendations as "absurd," and stated, "It would be ridiculous to pursue such a policy right in the middle of Worcester's worst housing crisis" (Kush, "Housing Advocates Blast Study", 2002). The advocates contended that the study's comparisons between Worcester and nine surrounding communities are flawed because these communities are all much smaller than Worcester. A more credible approach, they said, would have been to compare Worcester to other cities in Massachusetts (Kush, "Affordable Housing Analyses Conflict", 2002).

Affordable housing advocates were not the only Worcester citizens with reservations about the RKG study's conclusions. The Worcester Regional Research Bureau (WRRB) issued a report titled "Questions and Comments on Worcester's Housing Market Study," in which it raised doubts about the study's recommendations. This report assesses the data collected by RKG and concludes that there is an "unmet need" for 2,010 high-end units and 5,540 affordable units (WRRB, 2002). The report disputes the RKG study's recommendation that the city should build more high-end housing to meet the need for more expensive units. It also challenges the RKG study's recommendation that Worcester should replace some of its triple-deckers with single-family homes, pointing out that the median value for triple-deckers in 2001 was similar to that for single- and two-family homes, and that the triple-deckers showed the largest increase in median value since 1999

(WRRB, 2002). Thus, replacing triple-deckers with single-family homes is not necessarily the best way to increase residential tax revenues.

Clearly, the perspective of Worcester's housing market articulated by the RKG study is not the only one that exists. As we conduct our research, our task will be to take into account the many divergent perspectives and construct our own informed outlook on the status and needs of Worcester's housing market.

## 3.4 Methodological Guidance

### 3.4.1 The Housing Needs Workbook

The Housing Needs Workbook is a handbook published by the Massachusetts Housing Partnership (MHP). The MHP describes itself in the Workbook as "a public agency financed by the banking industry" (MHP, 2003). The focus of the MHP is on affordable housing, and it provides information, technical advice, and favorable financing to cities and towns, developers, and community housing groups in order to aid them in developing affordable housing. The purpose of the Workbook is to help communities assess their need for affordable housing. It provides references to helpful sources of data on housing, templates for calculations, and questions that need to be answered in order to understand a community's housing needs.

The Workbook is divided into sections, each of which focuses on a particular aspect of the affordable housing problem. Each section presents several questions that need to be answered to assess affordable housing need, as well as suggestions on where to go to obtain the needed data. The last section is a set of templates for the organization of housing data. Clearly, this handbook has the potential to provide valuable methodological guidance for our project. It lays out clearly the types of information we need to collect in order to assess the need for affordable housing in Worcester, identifies sources that we can use to obtain this data, and provides templates that we can use to effectively organize the data we collect. This handbook is clearly a useful resource for any community that is carrying out the second ("Complete an Assessment of Housing Demand") or third ("Quantify Need by Comparing Supply and Demand") steps in the E.O. 418 process.

#### 3.4.1.1 Rental Housing

This section of the workbook focuses on gathering information regarding the availability and affordability of rental housing in a community. It recommends using data from the US Census and

the Dept. of Housing and Community Development (DHCD) to analyze the amount of rental housing available, the percentage of that housing that is subsidized, the median rent cost, the vacancy rate in rental housing units, the length of the waiting list for subsidized rental housing, and other factors (MHP, 2003). It also provides a template for calculating an affordable rent rate for one's individual community (MHP, 2003).

#### 3.4.1.2 Accessibility of Homeownership

This section of the workbook concentrates on determining how feasible it is for a moderate-income family in one's community to purchase their first home there. It provides resources for analyzing factors such as housing prices and the buying power held by renters, including a template for calculating this buying power (MHP, 2003).

#### 3.4.1.3 Necessity of Housing for Senior Citizens

According to the Housing Needs Workbook, many communities have focused their affordable housing efforts on providing housing for senior citizens. While elderly housing is certainly necessary, the percentage of affordable housing mandated by Chapter 40B that has been set aside for seniors is often disproportionate to the number of seniors living in a given community (MHP, 2003). In addition, many seniors today are longer-lived and healthier than seniors in previous decades, necessitating a change in the nature of housing for the elderly in Massachusetts (MHP, 2003). Thus, this section of the handbook is designed to help communities determine the housing needs of their senior citizens. Factors to consider are the amount of subsidized elderly housing that is present in the community, the presence (or absence) of houses that are suitable for seniors, the assistance needs of seniors in the community, and the ages of the community's seniors (MHP, 2003).

#### 3.4.1.4 Housing for Persons with Special Needs

This section emphasizes the importance of providing housing for those citizens who have physical and/or mental disabilities. It encourages communities to determine the amount of special needs housing already provided by the community and the number of people in the community who have a need for such housing (MHP, 2003). This is an important consideration, since the Massachusetts Developmental Disabilities Council estimates that 108,000 Massachusetts citizens have developmental disabilities (MHP, 2003).

#### 3.4.1.5 Templates and Additional Resources

Finally, the Housing Needs Workbook provides templates showing how to quantify the available housing of different types in the community, waiting lists for subsidized housing, status of the rental housing market, and status of the owned housing market. It also provides a list of other resources that can be consulted.

### 3.5 Massachusetts Housing Finance Agency

The Massachusetts Housing Finance Agency's Housing List lists all of the privately owned subsidized housing developments in each city in Massachusetts as of 2002. It gives the owner, address, phone number, and types of apartments (studio, one-bedroom, two-bedroom, etc.) in each development. It also states how many apartments in each development are family units, elderly units, and handicapped-accessible units. In addition, the list quantifies how many apartments in each development are low-income, moderate-income, and market-rate units.

### 3.6 U.S. Census Bureau Data

The U.S. Census Bureau provides us with an abundant supply of general housing statistics and figures. Through this report we learn about the occupancy status in Worcester, including occupied units and vacant housing units. It contains facts on the number of vacant housing units for rent, for sale, for migratory workers, and for seasonal purposes. There is an outline of the different races and ages of householders. The census also provides us with quantities of each type of unit in the city, what year structures were built, the number of rooms, and the number of vehicles each household possesses.

This data provides us with a potent means of comparing Worcester with other cities. The relevant statistics gathered by the census bureau for Worcester can be compared with those from Cambridge, Lowell, and Springfield in order to set Worcester's housing market within a larger regional context.

### 3.7 Summary

Executive Order 418 is the raison d'être of our project. The housing, transportation, and economic analyses it mandates will be conducted by three teams from WPI. Our team will be completing the housing portion of this analysis. The Building Vibrant Communities handbook lays

out the steps we will need to carry out to complete this process, and the Housing Needs Workbook gives us specific guidance on assessing the need for affordable housing in Worcester. Chapter 40B provides additional background on the affordable housing issue, and is an important mandate to consider in any housing analysis. Technical Assistance Bulletin #3 explains the use of GIS maps and suitability matrices, which will be an important component of our research. The Benchmarking Economic Development in Worcester studies highlight the changing nature of Worcester's economy, including changes in its housing market. The RKG study and the responses to that study's conclusions present a wide range of perspectives on the issue of how Worcester can best revitalize its housing market. Finally, the US Census Bureau data provides a survey of many different characteristics of Worcester's housing market. The data contained in all of these sources provides a solid foundation for us as we conduct our project.

# 4.0 Methodology

## 4.1 Introduction

This project had three major objectives, which we completed over the course of seven weeks. First, we created a profile of the contemporary Worcester housing market and compared it with the housing markets in Lowell, Springfield, Cambridge, and Providence. Second, we constructed a time series analysis of that market. Third, we conducted a suitability analysis of areas in the city that are not currently developed, as well as vacant buildings that could be rehabilitated or demolished and replaced.

## 4.2 Objective 1: Profile of Worcester's Housing Market and Comparisons With Other Cities.

To obtain this objective, we began by contacting various city officials to ask for information. These officials included Michael LaMotte and Matthew Coggins in Lowell and Tony Miloski in Worcester. The Transportation/Open Space and Economic Development teams obtained data from Cambridge and Springfield and passed it on to us. Mr. Miloski provided us with US Census 2000 data for Worcester, and we obtained more extensive census data from the US Census Bureau's website. We also obtained census data from Cambridge, Lowell, Springfield, and Providence from this website. This census data was the main basis for our comparison of the five cities.

### 4.2.1 Characterization of Housing by Occupancy

First, we compared the total number of housing units in each city. To do this, we added the number of occupied housing units (from Census Table H7) to the number of vacant housing units (from Census Table H8).

The next category we examined was occupancy. This included an investigation of both the number of vacant housing units in the city (from Census Table H8) and the amount of owner- vs. renter-occupied housing units (from Census Table H7). From this data we calculated the percentage of the city's total housing stock that is currently vacant. Some data on vacant buildings was also obtained from Paul Cahill at the Department of Code Enforcement and Deputy Chief Gray at the Worcester Fire Department. This data was used to identify potential future housing sites (see Chapter 4.4).

We also compared the percentage of owner-occupied and renter-occupied housing units in the five cities. For each city, we divided the number of owner-occupied housing units (from Census

Table H7) by the total number of housing units. We then repeated this procedure for the renter-occupied housing units. All percentages were calculated from the total number of housing units, which includes both vacant and occupied units. Then we analyzed vacancy rates in the five cities. We used Census Table H8 to determine the number and percentage of vacant housing units in each city.

### 4.2.2 Characterization of Housing by Typology

We extracted information on number of units in housing structure from Table H32 of the 2000 US Census data. This allowed us to determine the number of single-family, two-family, three- and four-family, and more than four-family homes in the city. From this information, we determined the percentage of the city's total housing stock that is comprised of each type of housing. This factor was a key part of the Worcester housing market profile. We then compared these percentages with the corresponding percentages in Lowell, Cambridge, and Springfield.

### 4.2.3 Characterization of Housing by Cost and Value

The next parameter we analyzed for each of the five cities was housing costs. We compared median gross rents (from Table H63) and median house values (from Table H76) for Worcester, Lowell, Cambridge, Springfield, and Providence. We also compared median household income (from Table P53), since citizens of a city with a higher median income could reasonably be expected to be able to afford a higher median rent or house price. In addition, we determined the percentage of household income devoted to paying rent (from Table H69) to help us assess the affordability of housing in each city.

The Department of Revenue makes some home sales data available to the public. We used this data to make comparisons of actual sales values to assessed values. From this website, we obtained sales values for the year 2000 and assessed values at time of sale for a variety of different property types (single-, two-, three-, four- to eight-, more than eight-family homes, condominiums, developable lands, and potentially developable lands). Using Excel, we calculated the mean sales price and mean assessed value at time of sale for each property type, and tabulated the results.

Finally, we utilized the raw data gathered by RKG Associates for their study. The RKG raw data contains information on the total number of homes sold in each of the years from 1999 to 2002,

categorized as single-family homes, two-family homes, three-family homes, and condominiums. It also provided statistics on the median and average values for each of these types of homes over the time period 1999-2002. We made graphs showing the total number of sales, median value, and average value for single-, two-, three-family homes, and condominiums for the years 1999-2002.

### 4.2.4 Location of Investment in Housing

The Home Mortgage Disclosure Act (HMDA) data can be used to analyze the location of investment in housing in the city. We used HMDA Excel data tables, provided by Professor Krueger, to create a thematic map showing the loan-to-value ratio of each census tract in the city. This map shows what percentage of the average property value the average loan for that census tract covers. This can allow identification of regions in the city where loan investment as a percentage of property value is particularly high or low. Appendix D describes the nature of HMDA, and the codes and categories used to assess each of the variables we examined.

### 4.2.5 Characterization of Housing by Age

Next, we used the census data (Table H36) to analyze the age distribution of housing units in Worcester. We tabulated the number of housing units built during the time periods of: 1990-2000, 1980-1989, 1970-1979, 1960-1969, 1950-1959, 1940-1949, and 1939 or before. This allowed us to determine the extent to which Worcester relies on older housing stock. We followed the same procedure for Lowell, Cambridge, and Springfield and made comparisons between these cities and Worcester.

### 4.2.6 Characterization of Housing by Elderly and Handicapped-Accessible Units

The Massachusetts Housing Finance Agency's *Housing List* gives a listing of privately-owned subsidized housing in Worcester. A number of parameters are described for each facility, including how many units in the facility are reserved for the elderly and how many are handicapped-accessible. Using this list, we determined the number of elderly units and the number of handicapped-accessible units in the city's privately-owned subsidized housing stock. The same

analysis was carried out for Lowell, Springfield, and Cambridge, allowing for comparisons between these cities and Worcester.

### 4.2.7 Summary of Objective 1

Using the data we gathered on these parameters, we compiled a comprehensive profile of the current Worcester housing market. This profile contained graphs showing the vacancy rate, owner- vs. renter-occupied housing, types of housing, and age of housing, as well as a written analysis of each of these variables. The written analysis also discussed housing costs in Worcester, as represented by assessed and sales values, median rent, and percentage of income used to pay rent. In addition to this we compared the loan to property value ratio for each individual census tract in Worcester. Comparisons were made between Worcester and Springfield, Lowell, Cambridge, and Providence with respect to most of these variables.

## 4.3 Objective 2: Construct a time series analysis of the Worcester housing market.

The next step was to investigate how Worcester's housing market has changed over time. To accomplish this, we obtained 1990 census data on median family income (from Census Table P107A), total number of housing units (from Census Table H001), number of vacant units (from Census Table H004), owner- vs. renter-occupied units (from Census Table H008), number of units in a housing structure (from Census Table H020), age of housing units in the city (from Census Table H025), median gross rent (from Census Table H043A), median gross rent as a percentage of household income (from Census Table H050A), and median house value (from Census Table H061A). We also used documents from the Department of Code Enforcement and the WRRB's two economic benchmarking studies to assess the change in the number of vacant buildings in Worcester from 1997 to 2002.

From this data, we constructed a comprehensive picture of the changes that have affected the Worcester housing market over the past decade. A written analysis described the changes that have taken place with respect to each of the parameters described above. Graphs were also used to provide a visual representation of these changes.

We also wished to show the projected changes in population and number of households in Worcester, as this demonstrates the need for additional housing units to be built in the future. The

CMRPC has made projections of this type, using data from MassHighway. We used this data to graph the population and household changes during the period from 2000 to 2030.

### 4.4 Objective 3: Conduct a suitability analysis of areas in the city that could be used for new residential developments.

The final objective of this project was to aid the city in making zoning and housing placement decisions by identifying areas of land in the city where new housing developments could be built and ranking them for suitability for different types of such developments. These suitability determinations were described in a written analysis and also represented visually through the use of GIS layers in the Mapinfo program.

#### 4.4.1 Identification of Eligible Areas

The identification of the eligible areas in the city was carried out using the unbuilt parcels layer and the list of vacant buildings provided by the Fire Department and Department of Code Enforcement. Buildings listed in the Worcester Fire Department's "Vacant/Abandoned Buildings with MBL" and parcels found in the unbuilt parcels layer were considered as possible future housing sites.

First we took the layer of slopes and put the parcels layer on top of it and used the parcels layer as a "cookie cutter" to get the various slopes in each and every different parcel. Then we made a buffer around all bodies of water of 30 feet on either side and used them to show where in the parcels buildings could not be built. Then we created a parcel buildout analysis by determining the front, back, and side setbacks for each different zone. We averaged the front, back and sides' setbacks to get the total amount of setback needed on each side of the parcel, thus developing a smaller parcel that represented the buildable area of the original parcel. We then went into MapInfo and cut out this smaller parcel from the original parcel. This created a parcels layer with smaller parcels that did not touch. This in the end gave us the total amount of area in each parcel that was buildable. The eligible areas were mapped in a GIS layer and identified by MBL number. A zoomed-in view from the buildout analysis map is shown in Appendix F. A buildout analysis created by the CMRPC existed before our project began. However, this buildout was organized by zone and did not extend down to the parcel level. While this does convey certain information, it has

the disadvantage of not including the idiosyncrasies of individual parcels, which can be very important for suitability and construction decisions. Our buildout analysis makes a new contribution to the city of Worcester because it was conducted at the parcel level. Thus, the city can now see the square footage of buildable land for each individual *parcel* in Worcester.

### 4.4.2 Suitability Matrix Design

The design of the suitability matrix reflects the ordinances of the City of Worcester and the needs of a diverse population. The parameters used to construct the matrix fall into three distinct categories, which were described in Technical Assistance Bulletin #3: natural environment, built environment, and socio-cultural amenities. These attributes are as follows:

| Natural Environment | Constructed Environment | Social/Cultural Aspects |
|---|---|---|
| Lakes/ponds | Highway access | Access to commercial areas |
| Rivers/streams | Public transportation access | Open space/ parks |
| | Brownfields | Historic Buildings/sites |
| | Zoning | Schools |

Each eligible area was evaluated for its suitability for five different housing types based on these attributes. These housing types are:

-Single-family

-Two-family

-Three-family

-Multifamily

-Special needs housing

-Elderly housing

The parameters of ponds and streams come under the category of the natural environment. City ordinances require a 30ft no-build buffer around bodies of water. In accord with this, parcels on which any type of housing might be built should have sufficient buildable area to allow for a 30ft buffer around any ponds or streams on the property.

The built environment category consists of highway access, public transportation access, and brownfields. Highway access is important to make it easy to reach areas outside the city; for this

reason, parcels that are within 2 miles of a highway are considered more suitable than those that are not for two-, three-, or multi-family housing. However, noise and traffic make it undesirable to live immediately adjacent to a highway. Therefore, while all distance increments within two miles of a highway receive bonuses to their suitability score, these bonuses are lower for parcels that are within one-eighth mile of a highway. Since the handicapped and the elderly are less likely to be driving long distances, no suitability requirement is imposed for highway access to those parcels being considered for elderly and special-needs housing. There is also no suitability requirement imposed for single-family homes, since most families living in single-family homes possess at least one car, and therefore might place a more importance on the aesthetic value of being far from a highway than the convenience of being near one.

Public transportation cuts down on traffic jams and is more environmentally friendly than the use of many individual cars. Therefore, access to public transportation is an important consideration when deciding where to place new housing. We recommend that location within one mile of public transportation (defined as a bus route) be considered suitable for two-, three-, and multi-family housing construction. Since many elderly and handicapped persons may be unable to drive or find it difficult to do so, public transportation is even more important for these citizens. Therefore, elderly and special-needs housing should be located within one half-mile of public transportation.

There are both advantages and disadvantages to using brownfields as residential development sites. Because these sites have already housed industrial buildings, they are already connected to city sewers, water lines, and electricity (Frye and Leung, 1999). Redeveloping brownfields in inner cities can give a boost to nearby urban renewal initiatives, as well as improving the appearance of the inner city area. In addition, redeveloping inner-city brownfields rather than expanding outwards can help to slow down urban sprawl. However, making brownfields safe for residential use is a complicated and expensive process. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) mandates a "complex cleanup process" involving "site identification, preliminary assessment, site inspection, National Priorities Listing (NPL), remedial investigation and feasibility study, record of decision, remedial design, remedial action, construction completion, delisting from NPL" (Frye and Leung, 1999). Therefore, we have decided not to include brownfields in our list of potential future housing sites because of the difficulty of cleaning up these sites to insure that they are safe for residential use. Furthermore, sites that are close to brownfields are considered less suitable for housing than those that are not.

One important consideration when deciding to where to place housing is the existing zoning in the area. It is desirable to have an area or neighborhood that consists of the same types of houses. So, for example, a single-family zone would be a more suitable area for single-family homes than for three-family homes. Therefore, we embedded zoning into our suitability matrix as one of our criteria.

Access to commercial zones, access to parks or other forms of open space, historic buildings that provide valuable cultural and civic heritage, and the nearness of schools are all important socio-cultural amenities. For most types of housing, commercial zones should be located within 2 miles of the housing. The closer a parcel is to a commercial zone, the higher the bonus to its suitability score. Elderly and special-needs housing should be placed within one mile of commercial zones to accommodate those citizens who have mobility impairments.

Some sort of open space, such as a park, should be accessible within one half-mile of most types of housing. Once again, this recommended distance is halved for elderly and special-needs housing to meet the needs of those citizens. Once again, the closer a parcel is to open space, the higher the bonus it gets. Having historic sites and buildings in the area is desirable, although not as crucial as access to transportation or open space. Therefore, the recommended distance from historic buildings is two miles or less for all types of housing. Although a parcel being considered for elderly or special-needs housing will get a higher bonus for being near a historic site, the bonus differences are not as dramatic for the different distance increments as they are for the other attributes.

Finally, for all housing types except elderly housing, placement within two miles of a school is preferable so that children do not have to be bused a long distance to get to and from school. Once again, therefore, the closer a parcel is to a school, the higher the bonus it gets. Since elderly persons typically do not have school-age children living with them, there is no suitability requirement for nearness to a school for elderly housing. Appendix C shows the suitability matrices we used to obtain the suitability scores for the eligible parcels we identified. There are six matrices, each one corresponding to a different type of housing.

A database was constructed in Microsoft Access for the suitability matrices. The matrices were then applied to each of the eligible parcels. For each attribute, each parcel received a score from 1 to 5 representing its suitability for each of the six housing types based on that attribute. If a particular attribute was not important for a given housing type (for example, nearness to schools for

elderly housing), that attribute was worth 3 suitability points (in other words, an average score on a 1-5 scale) for that type of housing. The scores for each attribute were then added to give each parcel a suitability score for each of the six types of housing. We decided that zoning was more important than any of the other categories we included in the suitability matrix. Therefore, we weighted zoning so that the suitability score for each parcel with respect to zoning would be multiplied by 2, essentially making it count for twice as much as any of the other criteria. Next, we created maps for each of the six different housing types, with the exception of elderly housing, showing the most suitable locations we identified for that type of housing.

We found that it necessary to create a separate suitability matrix design for elderly housing. The first step that needed to be completed in order to determine the most suitable locations for future construction of this housing type is to map the elderly housing that already exists. To our knowledge, this is not something that had been done before. We mapped the elderly housing facilities that were listed in the Massachusetts Housing Finance Agency's *Housing List*. This is a list of all the subsidized housing units in the city and the map of this can be found in Appendix H. Next, we used the US Census data provided to us by Tony Miloski to determine the number of elderly people living in each census tract. Then, we assumed that three out of four elderly people are self-sufficient; that is, they do not need to live in an elderly housing facility (nursing home, assisted living community, retirement home, etc). This reduced the number of elderly people in each tract by three-quarters. Next, we calculated the number of people for whom subsidized elderly housing units are provided in each tract. We subtracted this number from the estimated number of non-self-sufficient elderly determined above to obtain the elderly housing deficit for each tract. A thematic map was created to show the deficits in each census tract in Worcester.

One of the main strengths of the suitability matrix is that it can be changed by future analysts to reflect a different set of priorities or to include new information that comes to light. Thus, it is a flexible model that can change as the city changes.

# 5.0 Results, Analysis, and Conclusions

## 5.1 Objective 1: Profile of Worcester's Housing Market and Comparison With Other Cities.

In addition to creating a detailed profile of Worcester's housing market, we compared selected characteristics of the housing market in Worcester to similar characteristics in Cambridge, Lowell, Springfield, and Providence. Worcester is the largest of the five cities we studied, with 70,723 housing units in 2000 (Tables H7 and H8, factfinder.census.gov). Providence was the next largest, with 67, 915 units, followed by Springfield with 61,172 units, Cambridge with 44,725 units, and Lowell with 39,468 units (Tables H7 and H8, factfinder.census.gov). For most of the factors we examined, Worcester, Lowell, Springfield, and Providence were comparable, while Cambridge was significantly different.

### 5.1.1 Characterization of Housing by Occupancy

Worcester has a very low vacancy rate, with only 3,695, or 5.2%, of its housing units being vacant (Table H8, factfinder.census.gov). This is lower than the vacancy rate for the state of Massachusetts, which is 6.8%. However, it is slightly higher than the overall vacancy rate for Worcester County, which is 5.0%. The vacancy rate for rental units specifically is even lower, with only 1,767 out of 39,753 rental units vacant in 2000. This corresponds to a rental vacancy rate of 4.4% (Tables H7 and H8, factfinder.census.gov).

All four of the other cities we studied have very low vacancy rates as well. Providence has the highest vacancy rate, at 8.1%. Springfield has a 6.6% vacancy rate, Cambridge has 4.7%, and Lowell has 4.0%. Worcester is intermediate between the other cities for this characteristic, as

demonstrated by Figure 1.

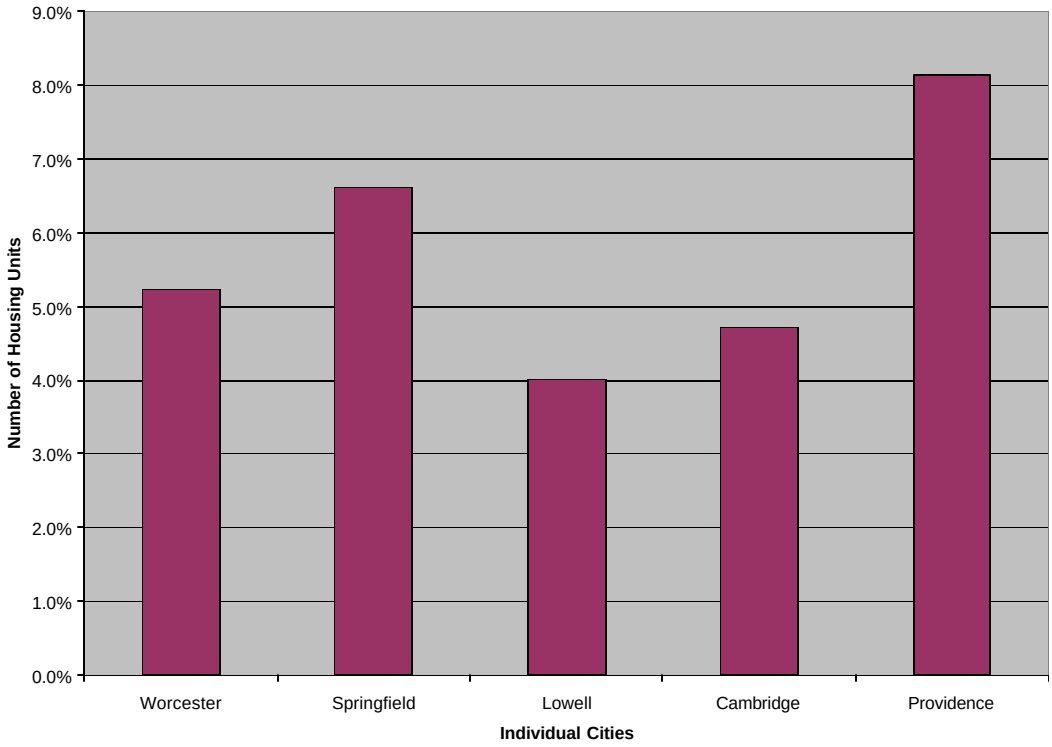


**Figure 1: Percentage of Vacant Housing Units in the Five Comparison Cities**

The Worcester Department of Code Enforcement deals with vacant and abandoned buildings in the city. Some vacant housing units may be only temporarily vacant, for example if one tenant moves out and a new tenant has not yet been found to take his place. Others may be genuinely abandoned: they have been vacant for a long time, have become dilapidated, and the owner may even have stopped paying taxes on the property. The board of code inspectors, led by Mr. Paul Cahill, determines whether a building meets the minimum standards for habitation. If it does not, the building can be condemned. The Chapter 139 Building Inspection Committee on condemned buildings will then contact the owner to ask them to rehabilitate the building (this is always the preferred option). If the owner doesn't take steps to rehabilitate or demolish the building, this committee can recommend that the city issue a demolition order. In order for this to happen, the building must be not only vacant, but also dangerous and dilapidated. If the owner doesn't pay taxes on the building and cannot be located, the Treasurer's Office can also go to land court to attempt to seize the building and the land it's on.

Documents obtained from Mr. Cahill show that as of January 30, 2003, the Building Inspection Committee had identified 16 buildings that they classified as "dilapidated and dangerous" and recommended for demolition. Between July 1, 2002 and July 1, 2003, a total of 10 buildings had been demolished, 4 at the owner's expense and 6 at the city's. Between July 1, 2003 and October 1, 2003, 7 more buildings were demolished (6 of these by the owner of the property). During the period from July 1, 2003 to October 1, 2003, 29 buildings had at least one unit released from condemnation.

While renter-occupied housing units do make up the majority of Worcester's housing stock, there are many owner-occupied units as well. In fact, 29,042, or 41.1%, of Worcester's housing units are owner-occupied (Table H7, factfinder.census.gov). Owner-occupied housing makes up a smaller percentage of the total housing stock in Worcester than it does in the state or county as a whole. 57.5% of Massachusetts's housing is owner-occupied, as is 61.6% of the housing in Worcester County.

The percentage of owner-occupied housing is 46.6% in Springfield, 41.4% in Lowell, 30.7% in Cambridge, and 31.8% in Providence (Table H7, factfinder.census.gov). Thus, Worcester has an intermediate amount of owner-occupied housing as compared to the other cities. For this characteristic, Worcester is most similar to Lowell, which has almost the same percentage of owner-occupied housing, and least similar to Cambridge, which has 10.4% fewer owner-occupied housing units. This data is shown in Figure 2.

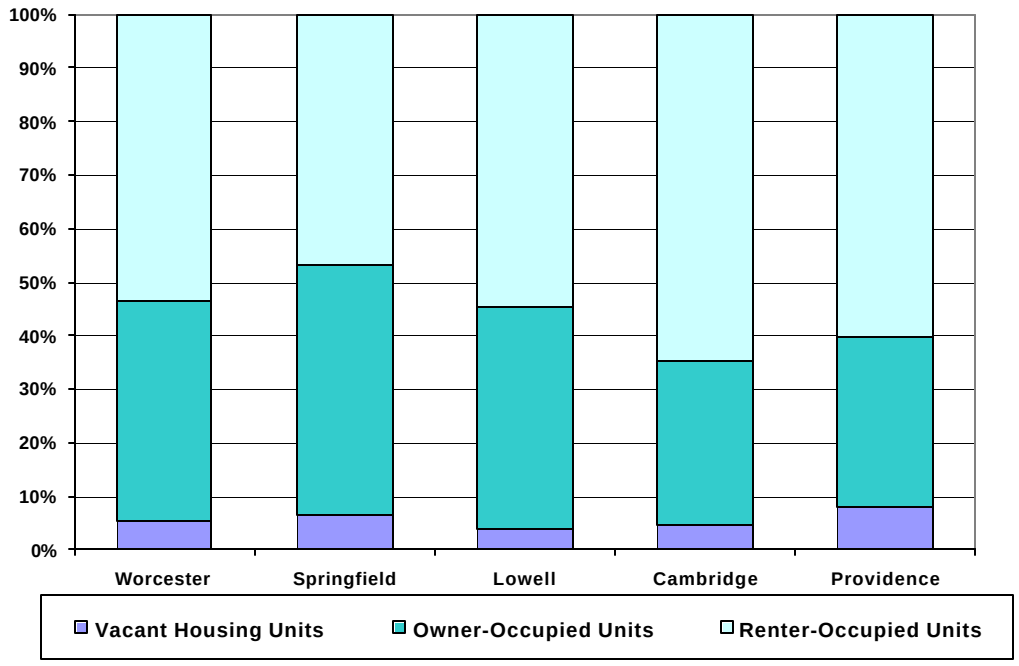


**Figure 2: Owner vs. Renter Occupied Units in the Five Comparison Cities**

Worcester has consistently had a higher value for new residential construction than either Springfield or Lowell. This trend is especially noticeable for the most recent fiscal year (2003), in which the value of Worcester's new residential growth exceeded the value of Lowell's by $51,261,804 and Springfield's by $72,324,498. This data is displayed in Figure 3 (WRRB, 2003).

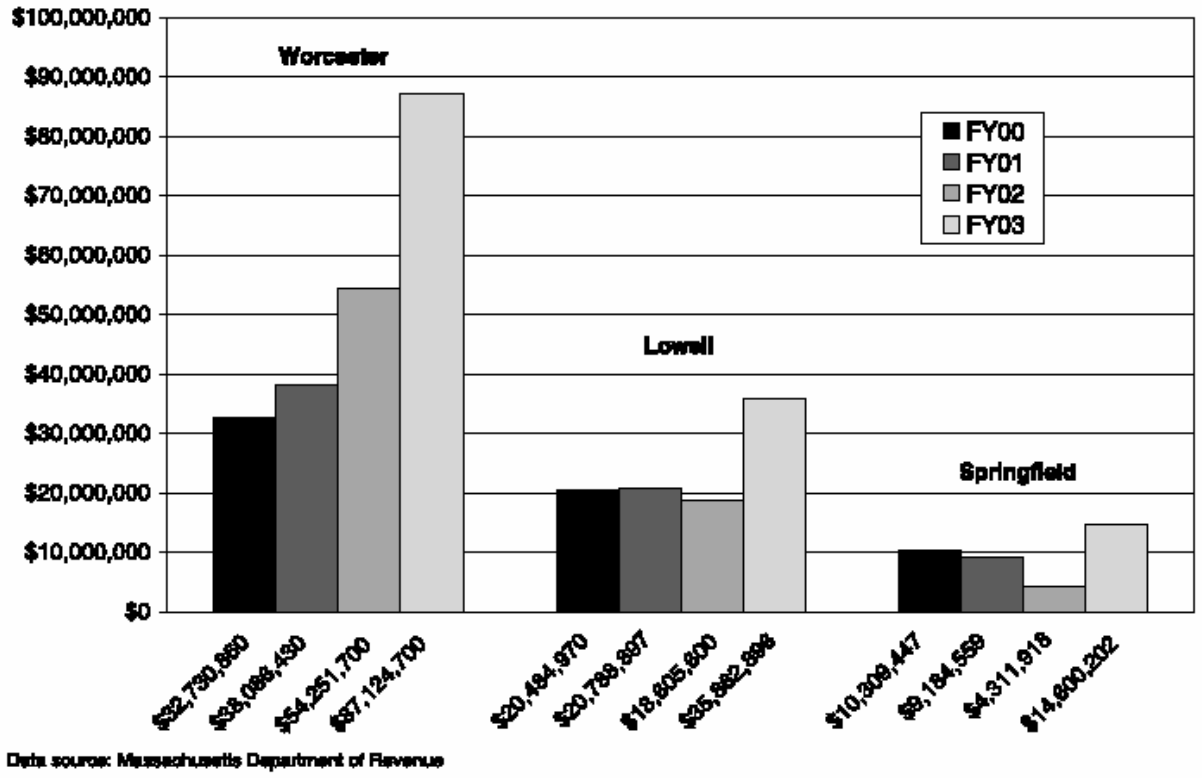


**Figure 3: WRRB Chart: Value of New Residential Construction in Comparable Massachusetts Cities, FY00-FY-03**

(Benchmarking Economic Development in Worcester: 2003 p.7)

### 5.1.2 Characterization of Housing by Typology

As of 2000, Worcester possessed 70,723 housing units (Tables H7 and H8, factfinder.census.gov). Of these, 25,937 were single-family homes, 7,426 were two-family homes, 18,695 were three- or four-family homes, and 18,447 were more than four-family homes (Table H32, factfinder.census.gov). Thus, the most prevalent type of housing in Worcester is single-family homes, which comprise 36.7% of Worcester's total housing stock. Duplexes make up the smallest housing category in the city, comprising only 10.5% of the city's housing stock. This data is displayed in Figure 4.

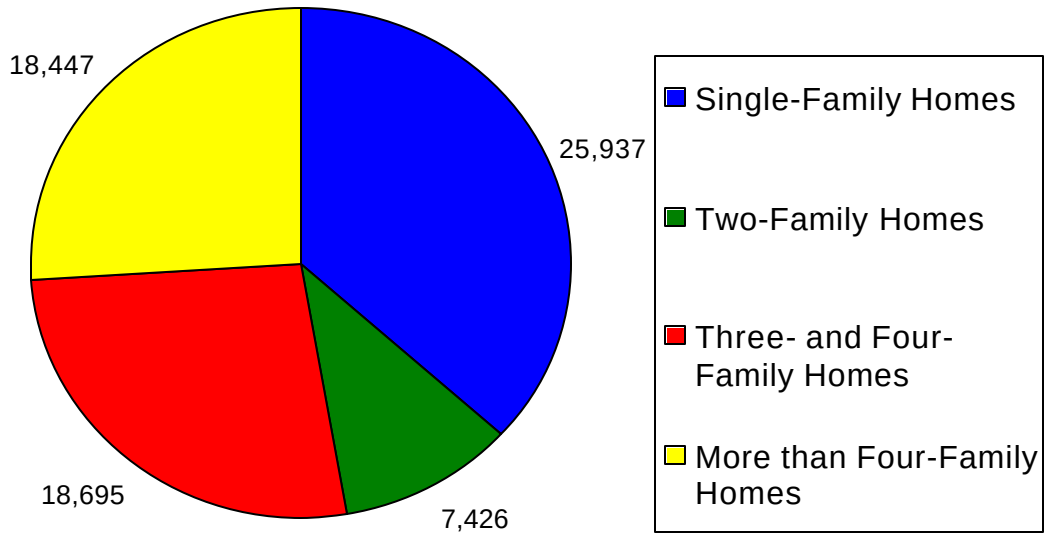


**Figure 4: Single-, Two-, Three-/Four-, and More than Four-Family Homes in Worcester**

Springfield, Lowell, and Providence also have single-family homes as the largest fraction of their housing markets, with single-family homes making up 47.7%, 35.0%, and 25.4% of total housing units, respectively (Table H32, factfinder.census.gov). Cambridge has a far lower proportion of single-family homes, with these units comprising only 14.1% of the total. Worcester thus has a higher percentage of single-family homes than three out of the four comparison cities studied. Worcester also has a large percentage of three- and four- and more than four-family homes: 26.4% of Worcester's housing units are three- or four-family homes, and 26.1% are more than four-family homes. The other four comparison cities have smaller percentages of three- and four-family homes: 7.6% in Springfield, 12.1% in Lowell, 19.5% in Cambridge, and 25.6% in Providence. Two of these cities, Lowell and Cambridge, have higher percentages of more than four-family housing than Worcester (31.0% and 47.5%, respectively). Springfield and Providence, on the other hand, have only 20.4% more than four-family homes. Worcester has the lowest percentage of two-family homes of any of the cities we examined, with only 10.5% of the total housing stock being two-

family homes. The other four cities have much higher percentages of two-family homes: 16.8% in Springfield, 17.7% in Lowell, 14.1% in Cambridge, and 20.4% in Providence. This data is displayed in Figure 5.

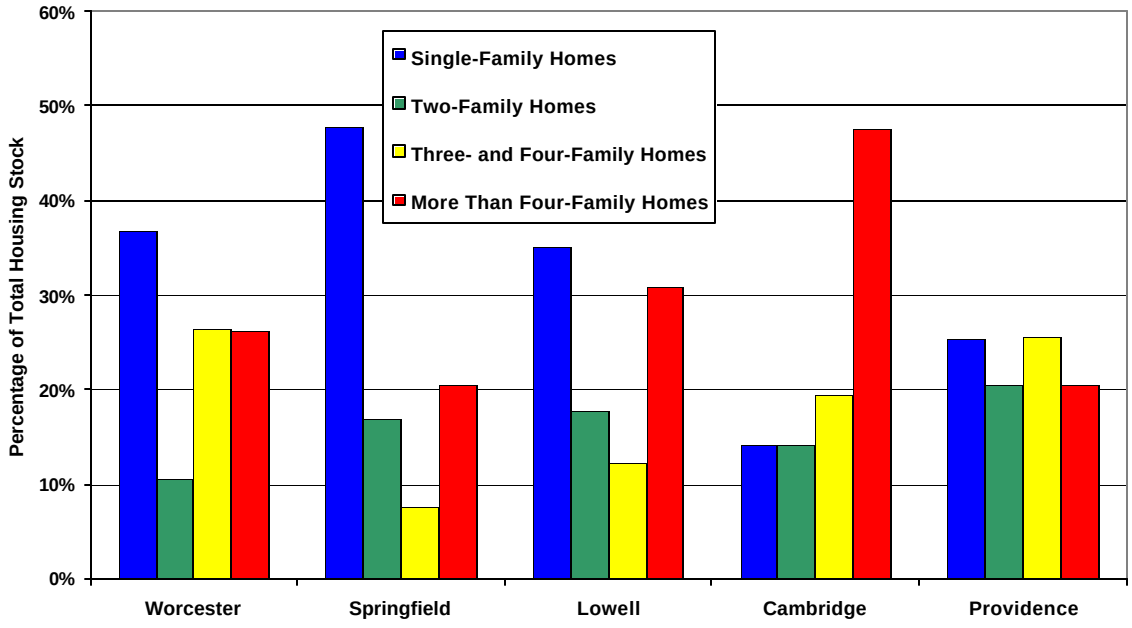


**Figure 5: Single- and Multifamily Homes in the Five Comparison Cities**

### 5.1.3 Characterization of Housing by Cost and Value

In 2000, the median gross rent in Worcester was $577 per month (Table H63, factfinder.census.gov), and the median assessed value for a house was $119,600 (Table H76, factfinder.cenus.gov). The median gross rent in Worcester is lower than that for Massachusetts ($684) and Worcester County ($580). In 1999, the median household income for Worcester was $35,623 (Table P53, factfinder.census.gov). This gives a median monthly household income of $2,968.58. According to the *Housing Needs Workbook*, if a household spends more than 30% of its income on housing, that housing is not considered to be affordable. Thus, a Worcester household with the median income could afford to pay $890.58 per month in rent. Of the 37,908 renting households in Worcester, 13,988, or 36.9%, pay 30% or more of their income towards their rent (Table H73, factfinder.census.gov). Thus, just over a third of Worcester's renting residents are living in housing that is not affordable for them. This percentage is low compared to the other cities

we examined. In Providence, 42.7% of the renting population pays 30% or more of its income towards rent (Table H69, factfinder.census.gov). In Springfield, this number is 41.8%, in Lowell it is 35.6%, and in Cambridge it is 41.9%. This is demonstrated in Figure 6.

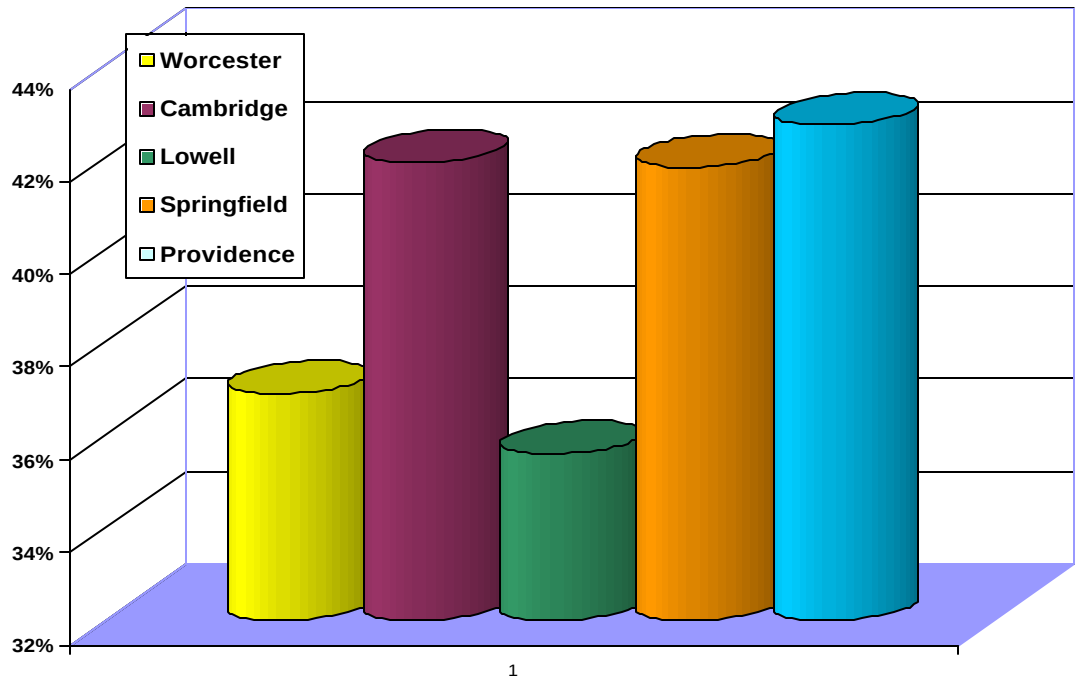


**Figure 6: Percentage of Renters Who Pay More Than 30% of Household Income Towards Rent**

Housing costs in most of the cities studied were within the same general range, with the exception of Cambridge, where housing costs were higher than in the other four cities. The median gross rents for Worcester, Springfield, Lowell, and Providence were all within the $500-$650 range (Table H63, factfinder.census.gov). Cambridge's median gross rent was well above that of the other four cities, at $962. The same type of pattern was observed for the median value for owner-occupied units. These values were within the $80,000-$140,000 range for Worcester, Springfield, Lowell, and Providence (Table H76, factfinder.census.gov). Cambridge's median house value was again significantly higher, at $398,500. These disparities are in line with the median household incomes in these cities: the median incomes in Worcester, Springfield, Lowell, and Providence are within the $25,000-$40,000 range, while that for Cambridge is $47,979 (Table P53, factfinder.census.gov). The median household income for Worcester County is similar to that for Cambridge, at $47,874. The disparity is even greater when one looks at the median household income for Massachusetts: $50,502. This information is shown in Figures 7-9.

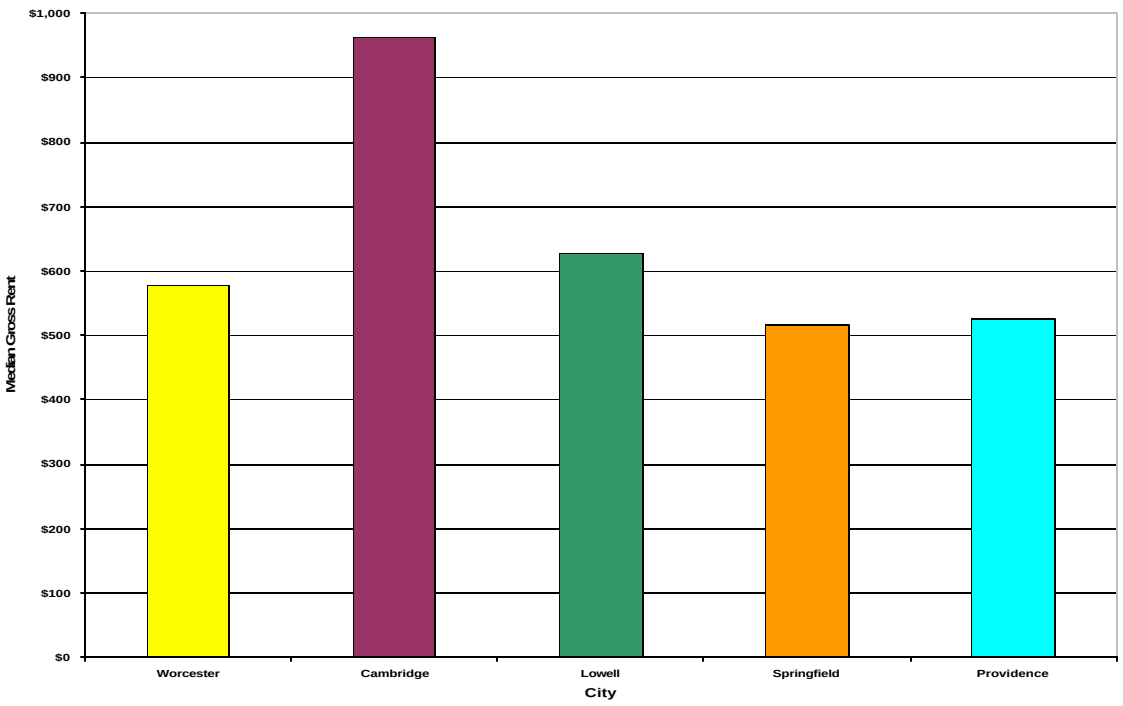


**Figure 7: Median Gross Rent in the Five Comparison Cities**

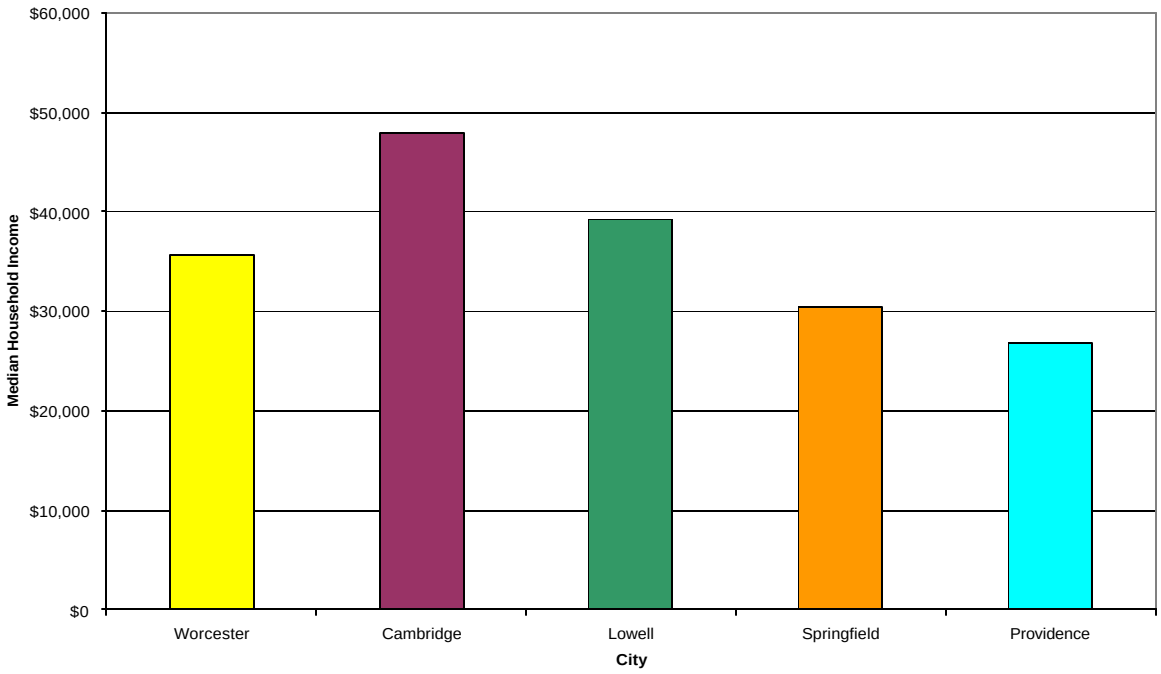


**Figure 8: Median House Values in the Five Comparison Cities**

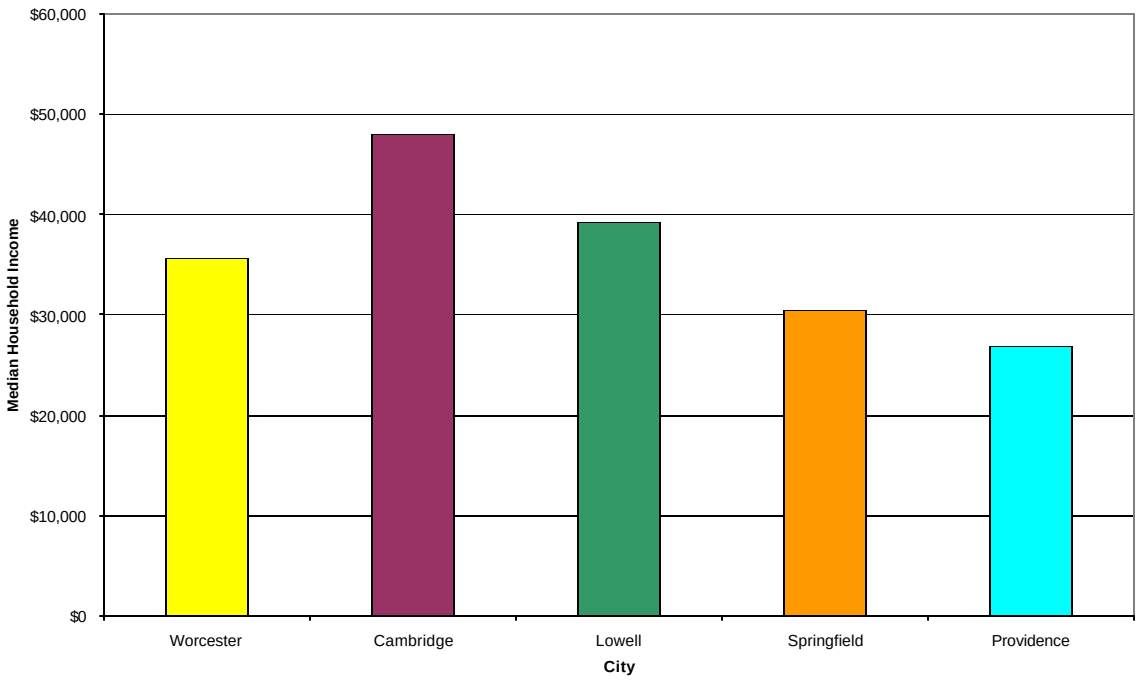


**Figure 9: Median Household Incomes in the Five Comparison Cities**

The Department of Revenue's website allows the public to access records giving the sale values and locations of homes in their communities. These records contain both the actual sale price and the assessed value at the time of the sale for each property, allowing comparisons to be made between the assessed and sale values for homes. Using this database, we found data on sales and assessed values for properties sold in Worcester in the year 2000, classified by housing type (single-family, two-family, three-family, four to eight units, more than eight units, developable land, and potentially developable land). Table B summarizes our findings.

**Table B : Comparison of Mean Sale Price with Mean Assessed Value for Worcester**

| **Type of Property** | **Mean Sale Price** | **Mean Assessed Value at Time of Sale** |
|---|---|---|
| Single-Family Home | $142,444.95 | $133,700.10 |
| Two-Family Home | $122,351.01 | $114,720.27 |
| Three-Family Home | $124,772.10 | $119,293.75 |
| Four to Eight Units | $147,585.16 | $140,473.44 |
| More Than Eight Units | $608,184.79 | $561,321.43 |

| | | |
|---|---|---|
| Condominiums | $95,150.72 | $88,794.46 |
| Developable Land | $67,933.21 | $62,198.25 |
| Potentially Developable Land | $107,000 | $100,350 |

Source: Massachusetts Department of Revenue, http://dorapps.dor.state.ma.us/la3/home/home.asp

As shown in Table B, for all housing types, the mean sale price was higher than the mean assessed value at the time of the sale. Thus, the properties sold in 2000 sold, on average, for a higher price than they were valued at by the City Assessor's Office. The largest difference between the mean sale price and the mean assessed value was observed for more-than-eight-unit properties. For these properties, the difference was $46,863.36. Three-family homes had the smallest difference between mean sale price and mean assessed value, at $5,478.35. In terms of both mean sale price and mean assessed value, the highest-valued type of property was more-than-eight-unit property, and the lowest-valued type was developable land. Interestingly, land that was only "potentially developable" was more highly valued than land that was categorized as "developable."

Worcester tends to outpace Lowell and Springfield in terms of the annual growth in the total assessed value of all the residential properties in the city. In general, over the four years examined, Worcester has somewhat higher growth than Lowell, and both Worcester and Lowell have much higher growth than Springfield. One notable exception is the growth that occurred between fiscal years 2001 and 2002. During this period, Lowell's growth exceeded Worcester's by an astounding 32.8%. Figure 10 shows these trends (WRRB, 2003).

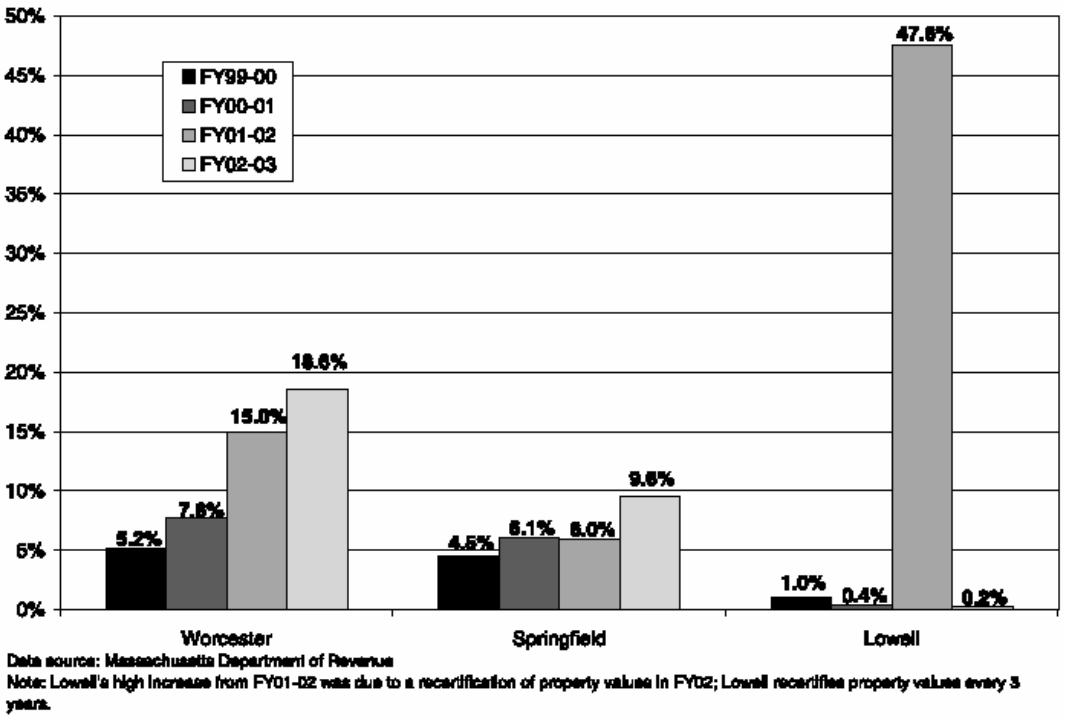


**Figure 10: WRRB Chart: Annual Growth in the Total Assessed Value of Residential Properties**

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From the Home Mortgage Disclosure Act (HMDA) data, it is possible to determine the loan-to-value ratio of each census tract in the city. This number represents the ratio of the average loan amount to the average property value in that census tract. The lowest loan-to-value ratios are seen in the central area of the city. For these census tracts, the average loan covers less than 58% of the cost of the property being purchased. The highest loan-to-value ratios are observed in the northern and western corners of the city, with smaller pockets of high ratios occurring in the center of the city and one census tract in the southeast. These loans cover over 75% of the cost of the property. Figure 11 shows this information.

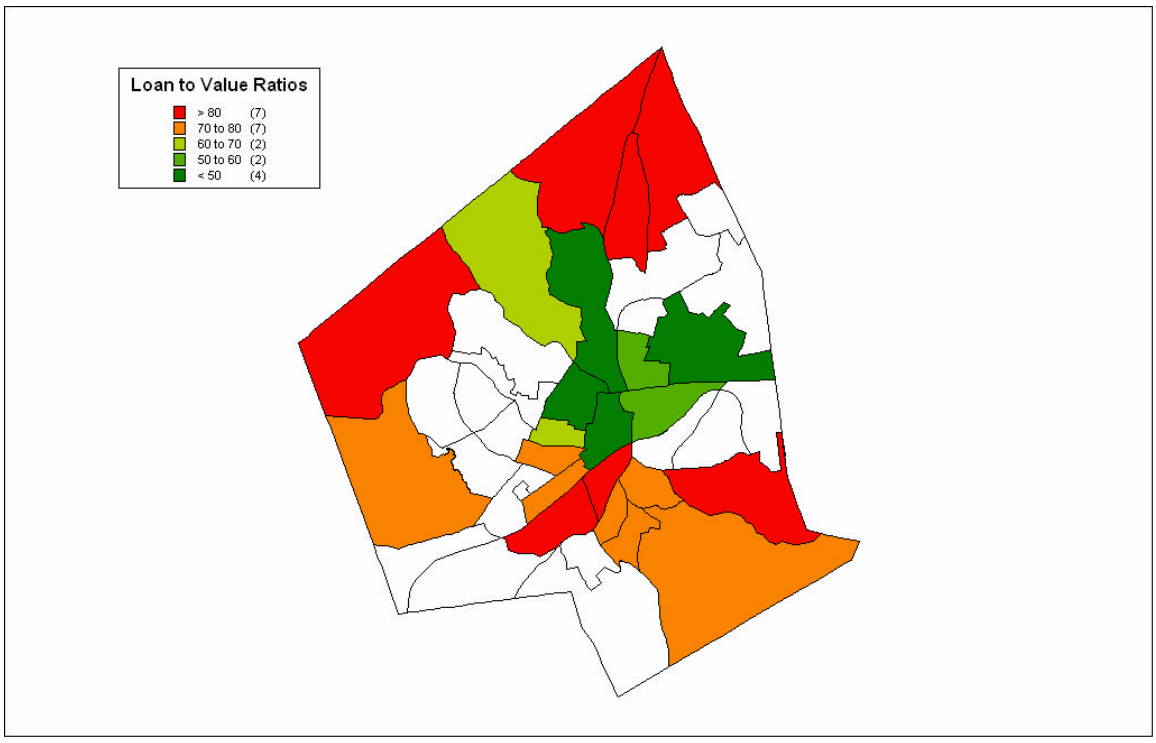


**Figure 11: Loan to Value Ratio in Worcester**

### 5.1.4 Characterization of Housing by Age

Worcester relies heavily on older housing units for its housing stock. 40.7% of Worcester's housing (28,768 units) was built in 1939 or earlier (Table H36, factfinder.census.gov). Only 4.9% (3,471 units) was built since 1990. Figure 12 shows the age distribution of Worcester's housing units.

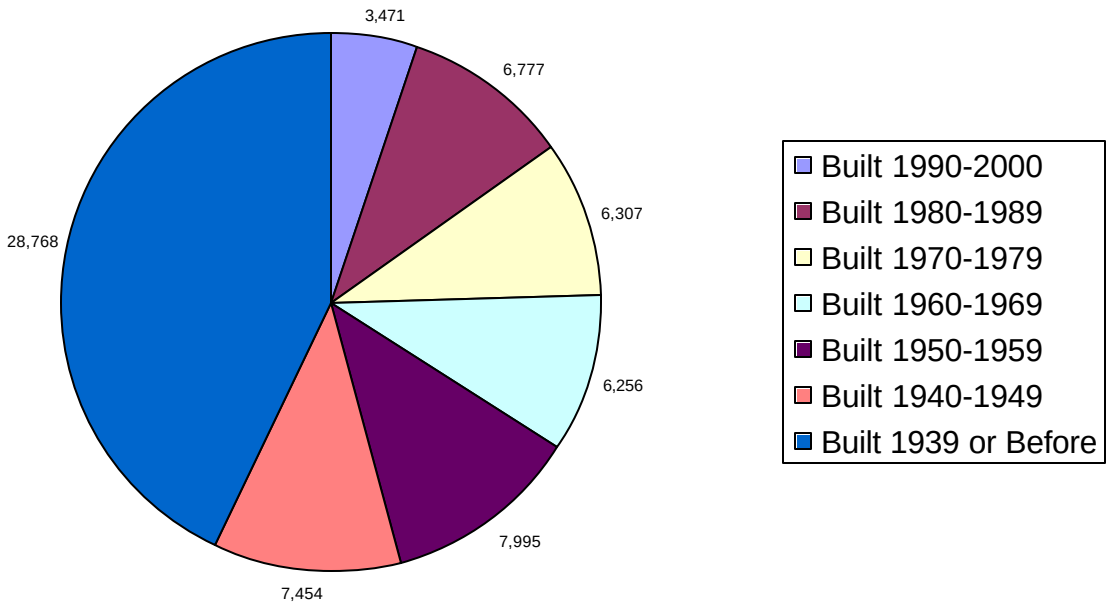


**Figure 12: Age of Housing Units in Worcester**

This reliance on older housing stock is a trait that all five of the comparison cities have in common. The distribution for the other cities is similar to Worcester's, the smallest percentage of housing units having been built since 1990 and the largest percentage having been built in 1939 or before, as can be seen from an examination of Figure 13 (Table H36, factfinder.census.gov). In a way, this makes sense, since there are more years before 1939 than since. However, such a large reliance on older housing stock creates some problems. The Massachusetts Housing Partnership's Housing Needs Workbook states, "A community dependent on older rental housing stock will typically experience more deteriorated properties which are more likely to have lead paint, code violations, and sub-standard conditions" (MHP, 2003). Although the MHP's handbook is speaking about rental properties in particular, the same issues apply to older owner-occupied properties.

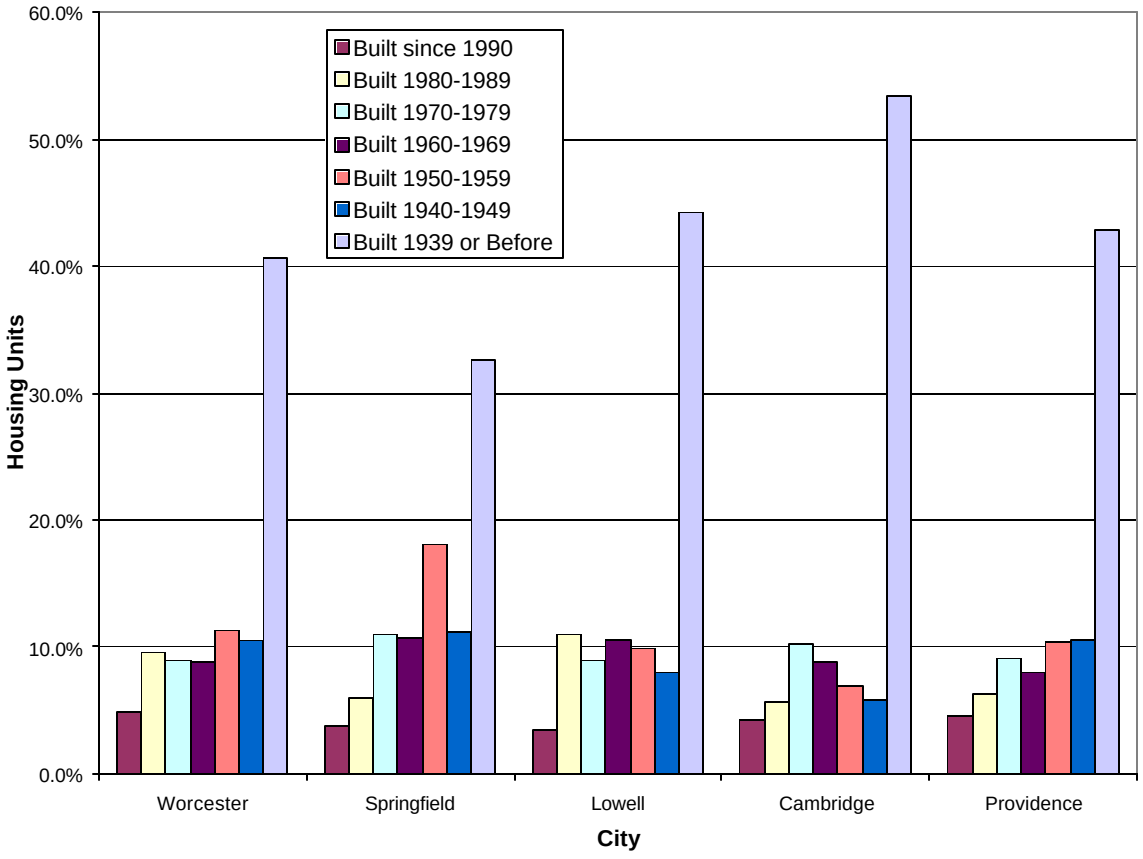


**Figure 13: Age of Housing Units in the Five Comparison Cities**

The percentage of total housing units that were built in 1990-2000 in Worcester was 4.9%, which exceeded that in Springfield by 1.11%, Lowell by 1.43%, and Cambridge by 0.67%. Thus, while the percentage of housing stock that is new construction in Worcester is low, it is higher than that for any of the other three Massachusetts cities we looked at.

### 5.1.5 Housing for the Elderly and People with Special Needs

In 2000, there were 24,449 people over the age of 65 living in Worcester (Table P8, factfinder.census.gov). Of these, 10,879 own their homes and 8,573 rent (Table H14, factfinder.census.gov). These statistics indicate that there are 4,997 senior citizens who do not own or rent their homes. The origin of this gap is not clear, although it may reflect seniors who live in nursing homes but are not paying for their tenure there themselves. Of those renting, 3,339, or

38.9%, pay 30% or more of their income towards rent (US Census 2000, Table H71). Therefore, over one-third of Worcester's renting senior citizens are living in housing that is not affordable for them. This percentage is slightly higher than that for the renting population in general. The Massachusetts Housing Finance Agency's *Housing List* shows that there are 2,271 subsidized housing units reserved for the elderly in Worcester.

The 2000 Census reported that 28,270, or 18.1%, of Worcester's population have at least one disability (Table P119, factfinder.census.gov). 15,311 Worcester citizens reported a "self-care" disability, and 16,491 reported a "go-outside-home" disability (Tables P123 and P124, factfinder.census.gov). The Massachusetts Housing Finance Agency's *Housing List* shows that there are 165 subsidized handicapped-accessible housing units in Worcester.

Worcester provides more housing for the elderly and handicapped-accessible housing to its citizens than do the other three Massachusetts cities we studied (Massachusetts Housing Finance Agency, 2002). As shown in Figure 14, Worcester has a greater percentage of subsidized housing units dedicated to housing for the elderly than Lowell, Cambridge, or Springfield.

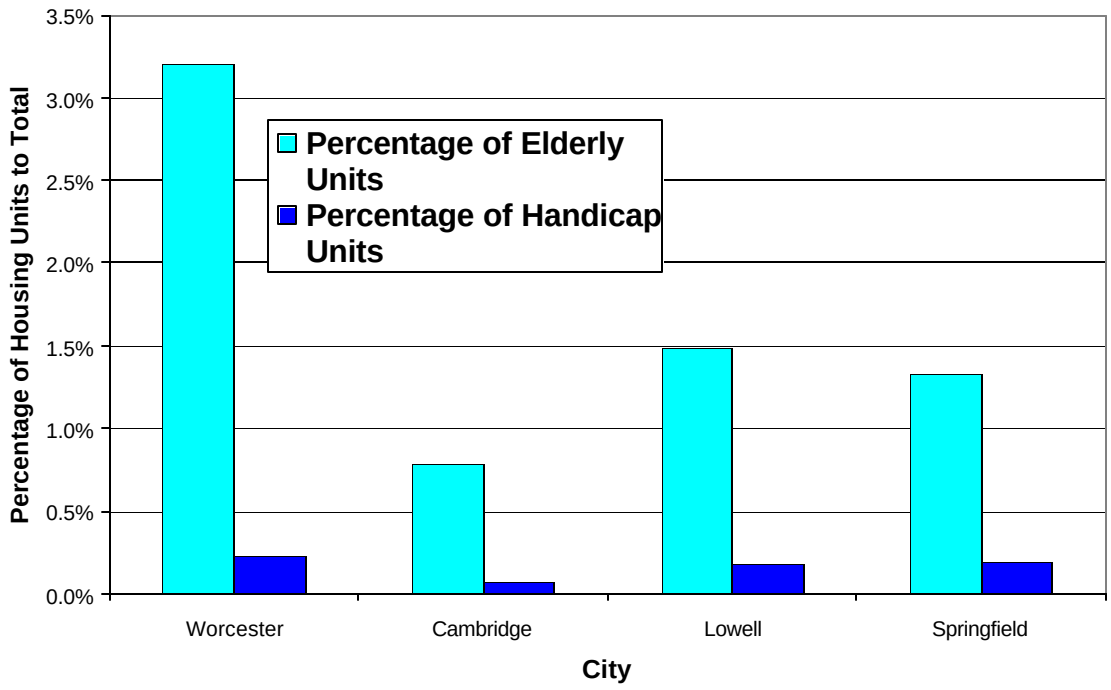


**Figure 14: Elderly and Handicapped-Accessible Units in the Massachusetts Comparison Cities**

## 5.2 Objective 2: Construct a Time Series Analysis of the Worcester Housing Market

The CMRPC has projected population and household trends forward to 2030 for each municipality within their area, based on projections made by MassHighway. The CMRPC predicts that Worcester's population will increase from its 2000 value of 172,648 to 185,905 by 2030. In addition, the CMRPC predicts that the number of households in Worcester will increase from 67,028 (the number present in 2000) to 76,739 by 2030. Since the US Census (2000) reported that there were only 70,723 housing units in Worcester, more housing units will clearly need to be built to keep up with the predicted increases in population and households. These trends are shown in Figures 15 and 16.

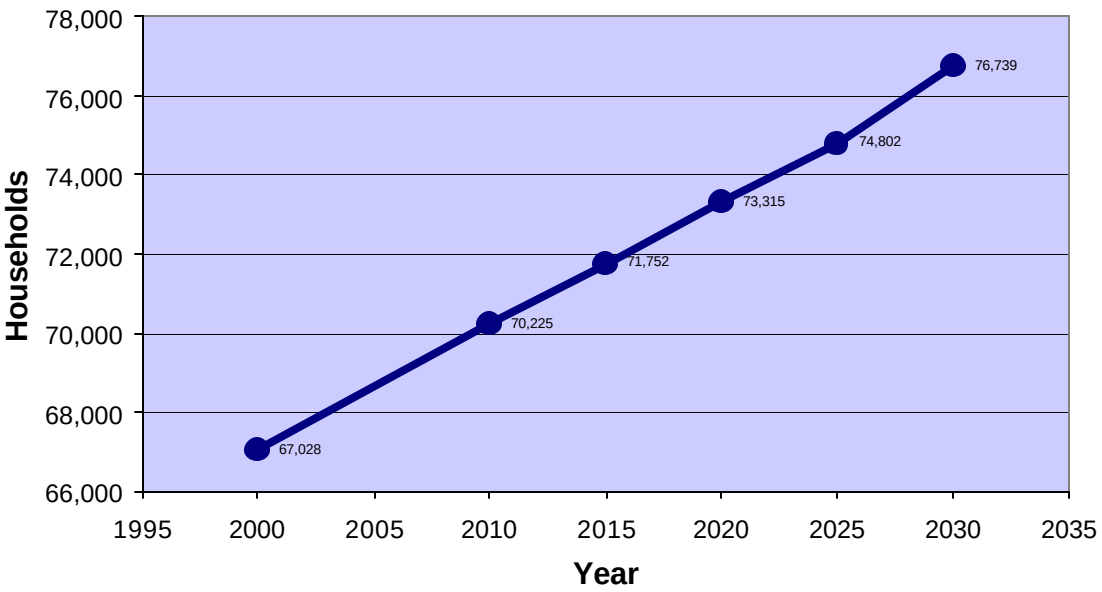


**Figure 15: Projected Increase in the Number of Households in Worcester**

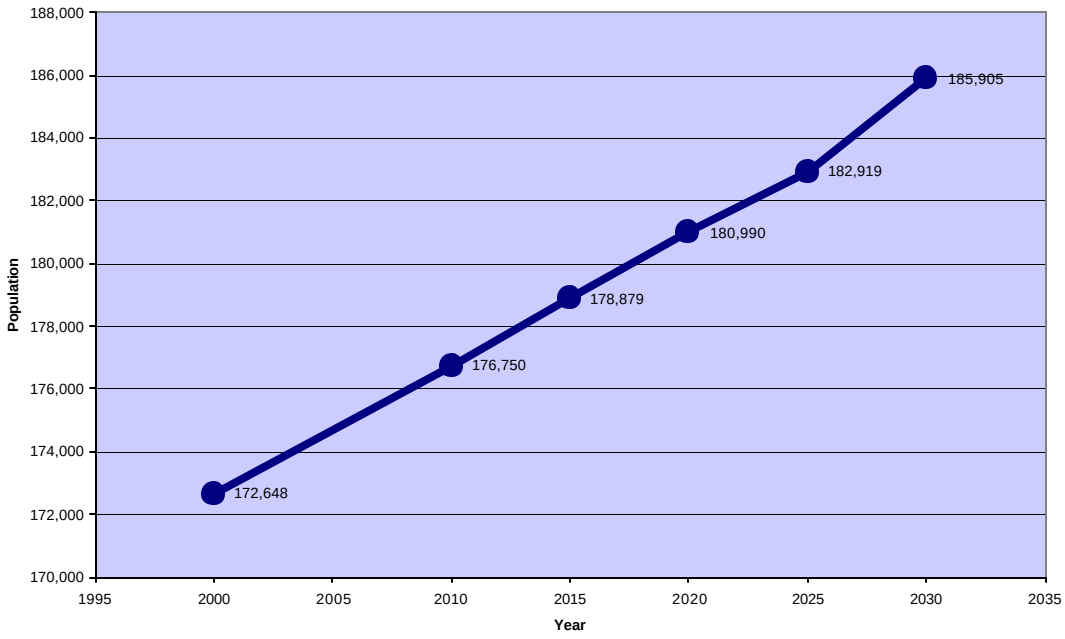


**Figure 16: Projected Population Growth in Worcester**

### 5.2.1 Occupancy

The number of vacant housing structures has dropped steadily since 1997. There has been a slight increase in the number of vacant structures over the past year. The number of vacant residential structures increased by 7, from 107 to 114, while the number of vacant commercial buildings increased by 5, from 44 to 49. As in previous years, there are more vacant residential buildings than commercial buildings, as shown in Figure 17 (WRRB, 2003).

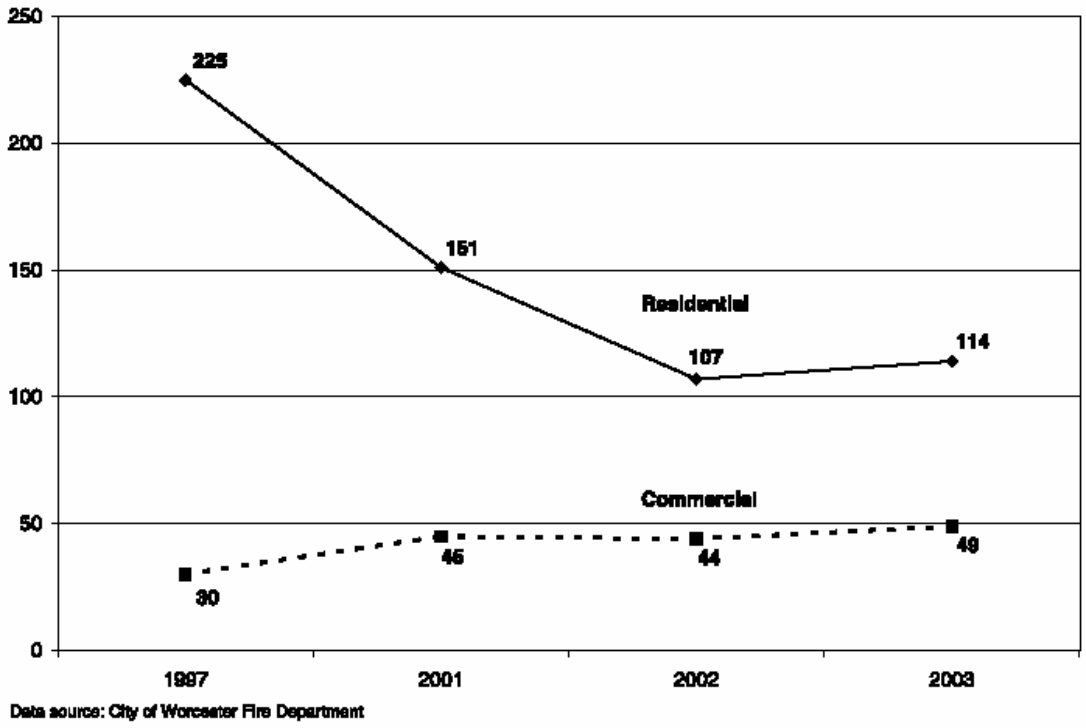


**Figure 17: WRRB Chart: Historical Trend of Vacant Structures: 1997-2003**

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Some of the buildings that were vacant in 2002 had tax liens taken out on them because their owners did not pay property taxes to the city. Some of these buildings were reoccupied. Others have remained vacant, but their owners have resumed paying taxes. Still others are vacant and continue to owe back taxes. Figure 17, developed by the WRRB, shows the current status of the buildings that were listed as vacant in 2002. As can be seen from Figure 18, the majority of the buildings have had no change in status since last year. A few, however, have been reoccupied, and 2 (both residential) are still vacant but no longer owe taxes to the city (WRRB, 2003).

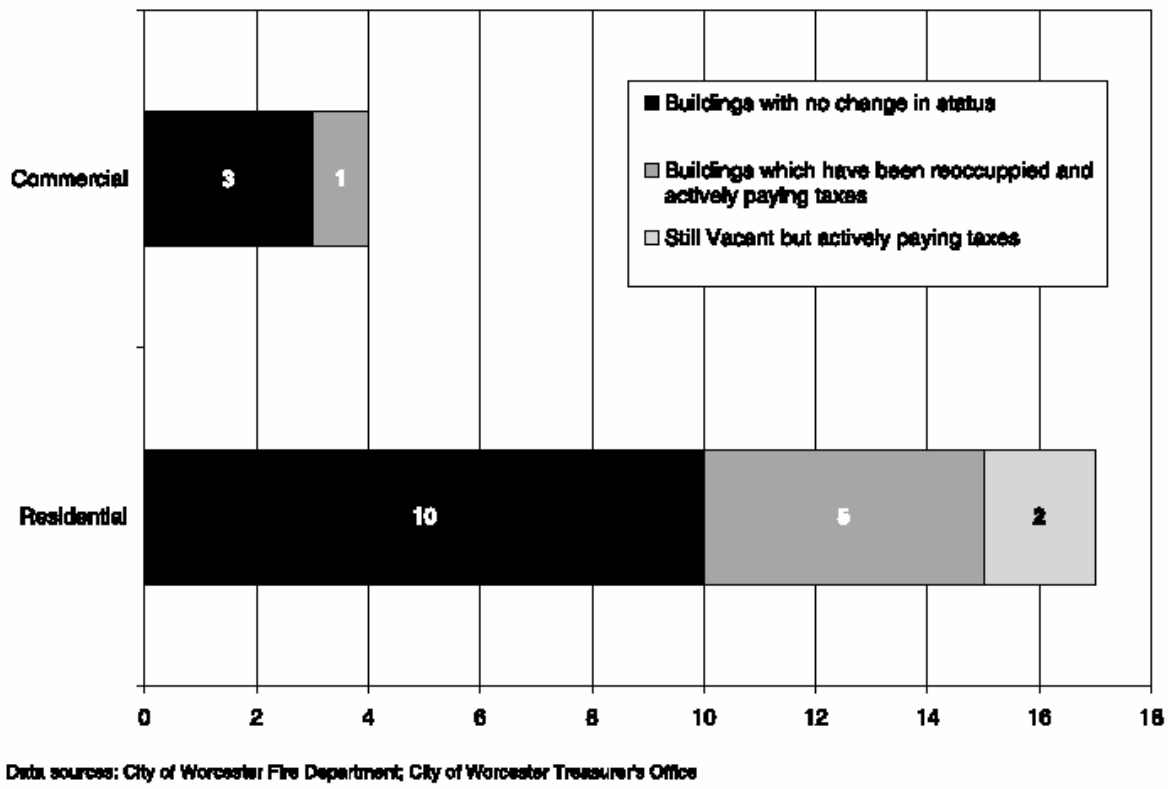


**Figure 18: WRRB Chart: Current Status of 2002 Vacant Commercial and Residential Buildings with Tax Liens**

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The number of both owner- and renter-occupied housing units increased between 1990 and 2000 (Tables H008 and H7, factfinder.census.gov). In both years, renter-occupied units outnumbered owner-occupied units.

### 5.2.2 Types of Housing

The general distribution of housing types has remained constant between 1990 and 2000, although there have been some minor changes. The number of single-family, two-family, and more than four-family homes increased from 1990 to 2000, while the number of three- and four-family homes decreased (Tables H020 and H30, factfinder.census.gov). However, the pattern of housing types remained the same: in both 1990 and 2000, single-family homes were the largest component of Worcester's housing stock, followed by three- and four-family homes and more than four-family homes, with two-family homes making up the smallest fraction of available housing in Worcester.

Between 1990 and 2000, 3,027 new housing units were built. Of these, 2,338, or 77.2%, were single-family homes.

### 5.2.3 Housing Costs and Sales Over Time

Although the median gross rent in Worcester did increase between 1990 and 2000, the change was very small. Median gross rent in 1990 was $527 (Table 043A, factfinder.census.gov). In 2000, the median gross rent had increased by only $50 from the 1990 value, to $577 (Table H63, factfinder.census.gov).

The median assessed value for a house in Worcester actually declined in the period from 1990 to 2000. In 1990, the median assessed value for a Worcester house was $128,200 (Table H061A, factfinder.census.gov). In 2000, this value decreased to $119,600 (Table H76, factfinder.census.gov).

The RKG study analyzed a set of variables for several different types of housing. For each variable, RKG analyzed the changes that took place between 1999 and 2002 for four different housing categories: single-family homes, two-family homes, three-family homes, and condominiums. The first measure we examined was total sales. Throughout the time period studied, single-family homes were the most-sold type of housing. Two-family homes were the least-sold type of housing between 1999 and 2002. The number of sales for three-family homes and condos fell in between these two extremes. Sales of all four home types dropped significantly between 2001 and 2002, with the steepest drop being shown by single-family homes. This data is shown in Figure 19.

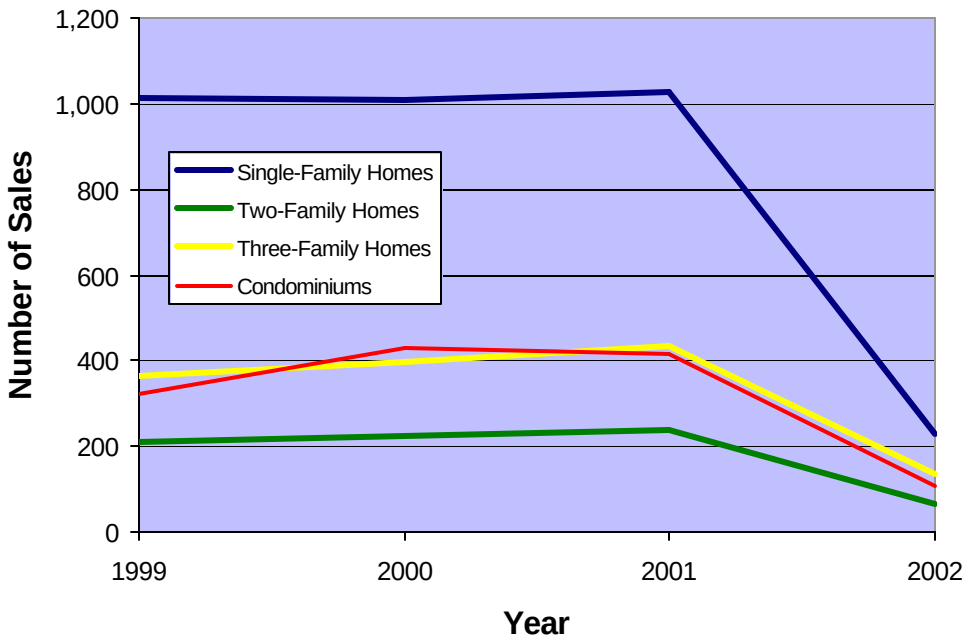


**Figure 19: Time-Series: Total Sales of Housing by Type**

RKG Associates also investigated both the median and average values for the four housing types described above. Throughout the time period 1999-2002, condominiums consistently had the lowest median value of the four housing types. In the period 1999-2001, single-family homes had the highest median value. However, between 2001 and 2002, three-family homes surpassed single-family homes in median value, so that in 2002, three-family homes were the highest-valued housing type. Two-family homes consistently had slightly lower median values than single-family homes, and the pattern of change in the median value of two-family homes closely followed that for single-family homes. This data is displayed in Figure 20. These changes can also be viewed in terms of percentage changes in median value from year to year. This data is displayed in Table C, found

below Figure 20.

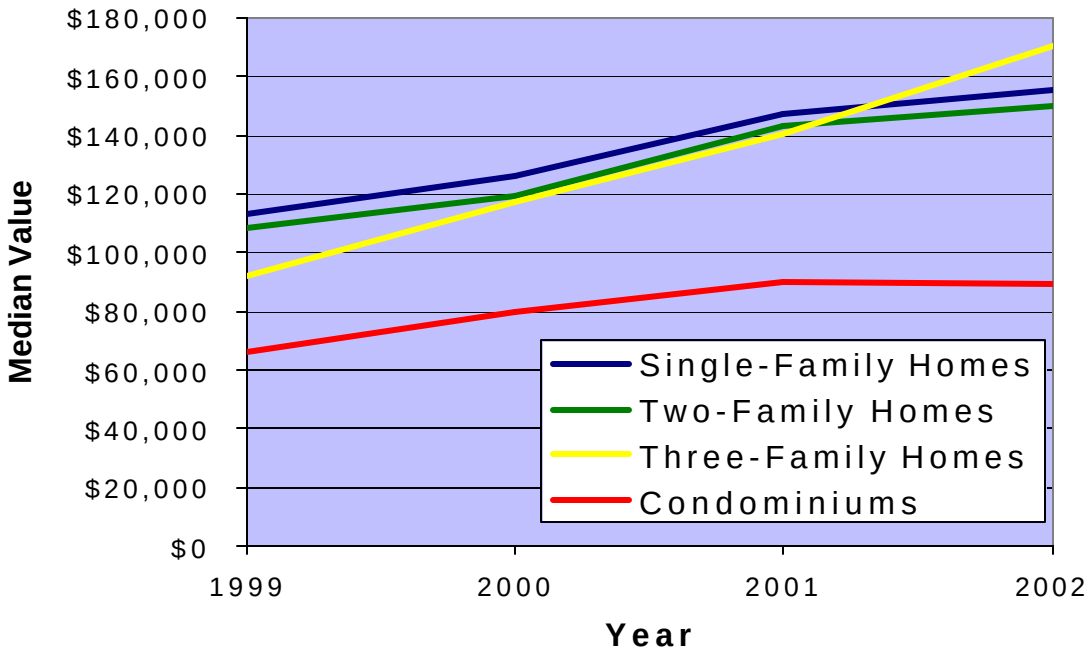


**Figure 20: Time-Series: Change in Median Values of Housing by Type**

**Table C: Percent Change in Median Values Over Time**

| Type | Year | | |
|---|---|---|---|
| | 1999-2000 | 2000-2001 | 2001-2002 |
| Single-Family | 11.5% | 17.1% | 5.4% |
| Two-Family | 9.9% | 20.2% | 4.8% |
| Three-Family | 27.7% | 19.6% | 21.4% |
| Condominium | 19.5% | 13.2% | -0.6% |

Source: RKG raw data file Sale_Sum

In terms of average value, the picture is somewhat different. Single-family homes were the highest-valued housing type throughout the period from 1999-2002, and condominiums were consistently the lowest. While three-family homes showed the greatest increase in average value

between 2001 and 2002, they did not surpass single-family homes in average value as they did for the median value. Two-family homes had a higher average value than three-family homes in 1999, almost the same average value in 2000 and 2001, and lower average value in 2002. Figure 21 shows the changes in average value from 1999 to 2002. Again, this data can be analyzed in terms of percentages as well. Table D shows this percentage analysis, as conducted by RKG Associates. RKG Associates' data shows that three-family homes increased dramatically in value from 1999 to 2003, whether the measure being used is average or median value. Thus, it is logical to conclude that these properties are a financial asset to the city.

**Table D: Change in Average Values Over Time**

| Type | Year | | |
|---|---|---|---|
| | 1999-2000 | 2000-2001 | 2001-2002 |
| Single-Family | 15.4% | 15.8% | 8.9% |
| Two-Family | 8.4% | 24.6% | 3.7% |
| Three-Family | 24.2% | 23.9% | 18.6% |
| Condominiums | 15.8% | 14.8% | -4.3% |

Source: RKG raw data file Sale_Sum

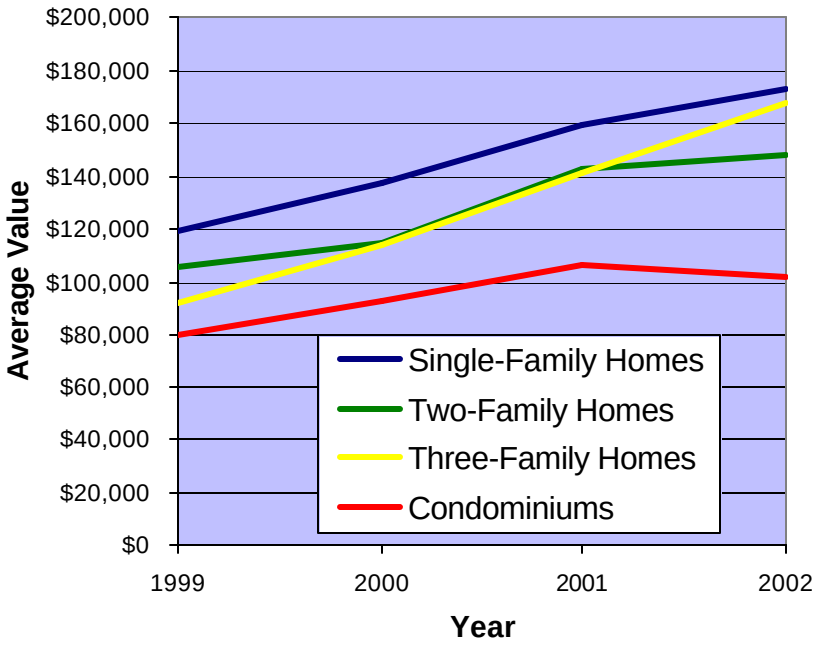


**Figure 21: Time-Series: Change in Average Values of Housing by Type**

The Worcester Regional Research Bureau recently released its *Economic Benchmarking in Worcester: 2003* study, which is a follow-up to the studies conducted in 2001 and 2002. This study found that the total assessed value for all residential properties is greater than that for commercial and industrial properties. Furthermore, growth in the total assessed value of residential properties from fiscal year 2001 to fiscal year 2003 outpaced growth in the value of commercial and industrial properties. This data is shown in Figure 22 (WRRB, 2003).

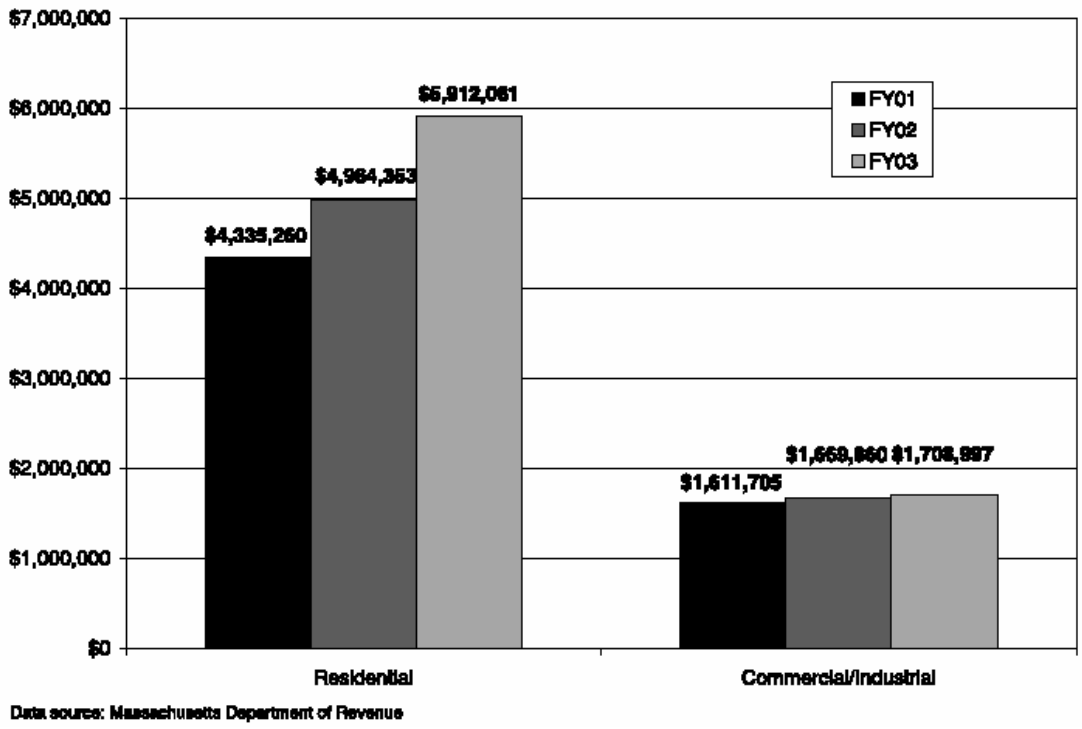


**Figure 22: WRRB Chart: Growth in the Total Assessed Value of Properties by Class**



In addition to these findings, the WRRB reported that the fraction of total property value in the city made up by residential properties is increasing, while the fraction comprised of commercial and industrial properties is decreasing. According to the study, the proportion of total property value made up by residential properties increased from 70.68% in 1996 to 77.58% in 2003. Over the same period of time, the proportion of total property value made up by commercial and industrial properties declined from 29.12% to 22.42%, as shown in Figure 23(WRRB, 2003).

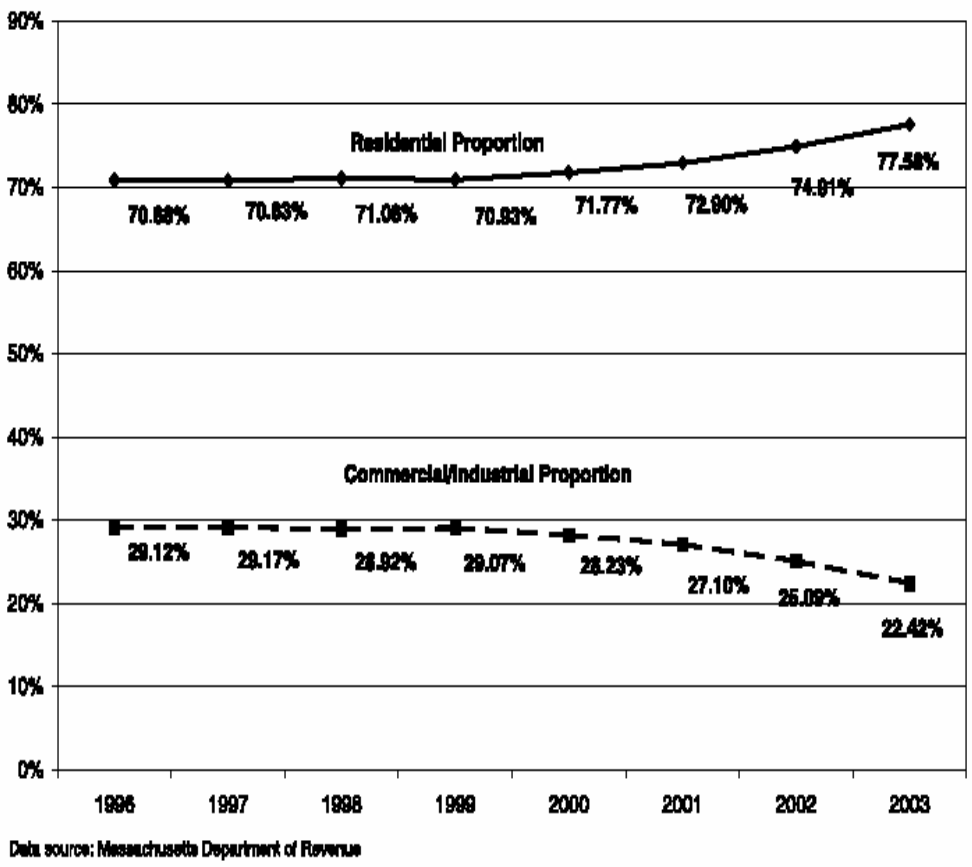


**Figure 23: WRRB Chart: Trend in the Distribution of Property Values, FY96-FY03**

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Recent construction trends have also shifted from a commercial and industrial focus to an emphasis on construction of residential buildings. The WRRB reports that since 1997, the percentage of new construction that consists of commercial and industrial buildings has dropped from 84.3% to 46.6%. Meanwhile, the percentage of new construction that represents residential buildings increased from 15.7% to 53.4%. In 2003, for the first time, a majority of new construction was residential rather than commercial or industrial. The WRRB's graph, shown in Figure 24, illustrates these construction trends (WRRB, 2003).

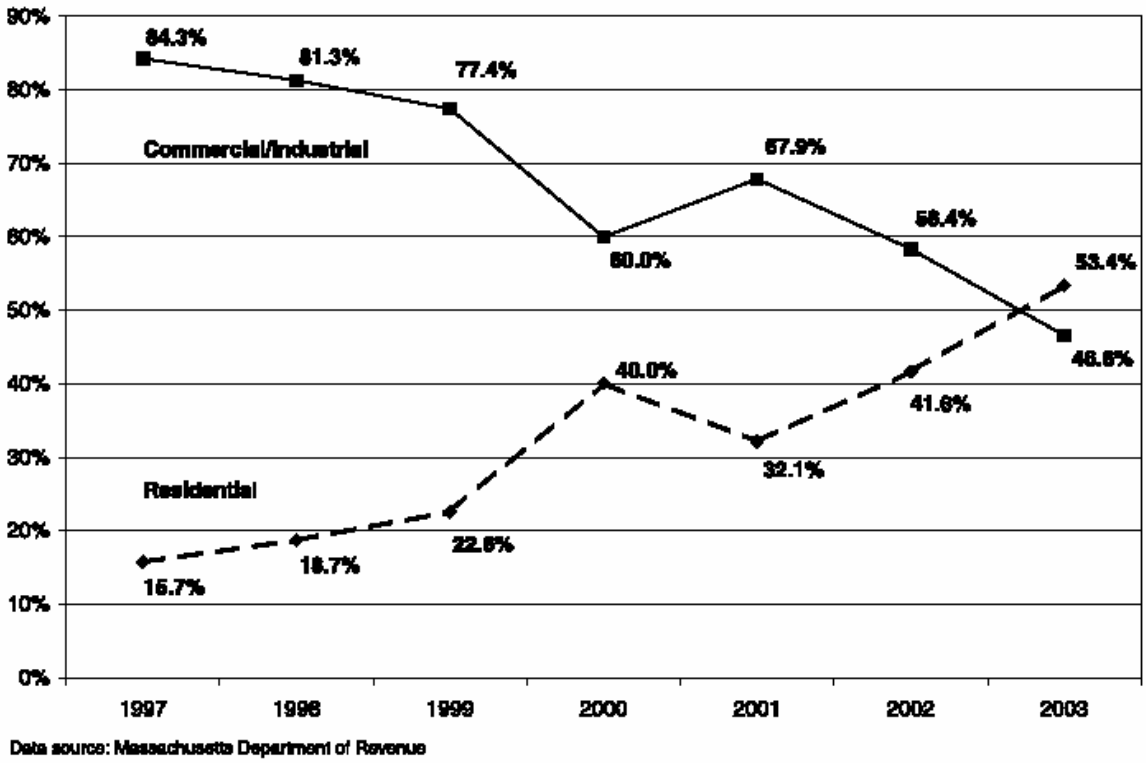


**Figure 24: WRRB Chart: Distribution of the Value of New Construction in Worcester, FY97-FY03**

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### 5.2.4 Age Distribution Over Time

The age distribution of Worcester's housing units has remained relatively constant over time. In both 1990 and 2000, the largest portion of Worcester's housing stock was made up of units built in 1939 or before (Tables H025 and H36, factfinder.census.gov). The number of housing units built during this period declined between 1990 and 2000. This result is not unexpected, since older housing units are often demolished and replaced with new ones. In both years, houses built between 1990 and 2000 represented the smallest fraction of the total housing stock.

The number of housing units built in the 1980's also declined. Unusual results, however, were seen when the number of housing units constructed in the 1970's, 1960's, and 1950's was analyzed. From 1990 to 2000, the number of housing units built in these decades increased. Since it is clearly impossible for the number of units built in the 1950's, 1960's, and 1970's to have actually increased between 1990 and 2000, we concluded that some of the units built in these decades were

counted in the 2000 census but not the 1990 census. This would account for the apparent increase. Figure 25 shows the change in the age distribution of Worcester's housing units over time.

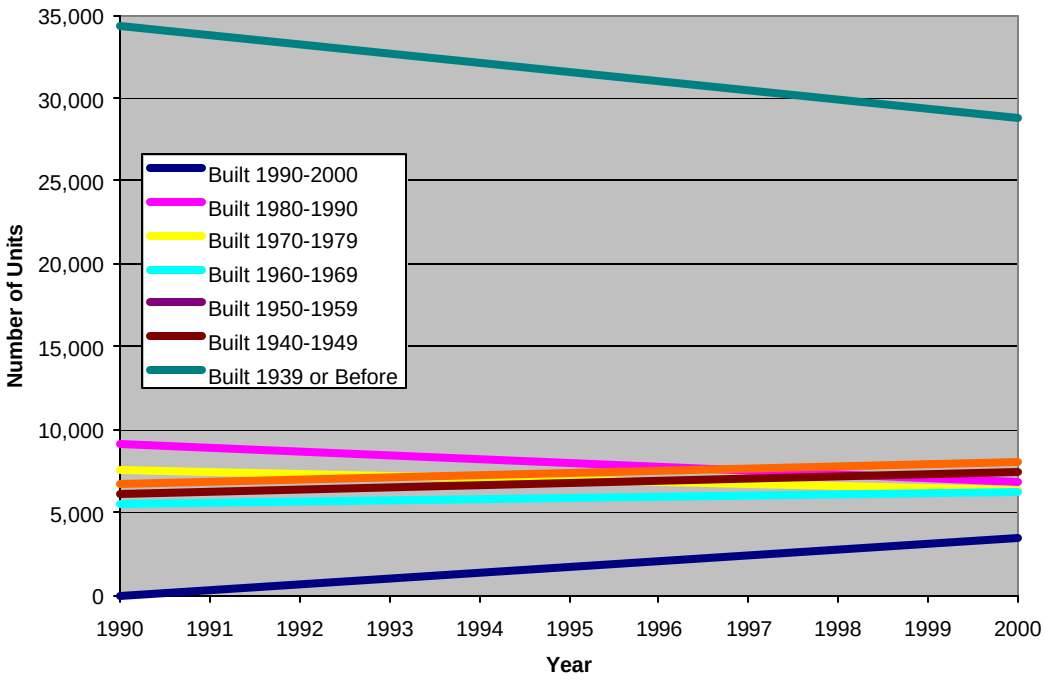


**Figure 25: Change in Age Distribution of Housing Units Over Time**

### 5.2.5 Building Permit Data

The US Census Bureau maintains records for each city and town showing how many residential building permits were issued in that town each month. For Worcester, the months March and April of 2002 and April and June of 2003 did not have building permit data available. Also, data was only available up to September of 2003. For 2002 and 2003, with the exception of the months mentioned above, we compiled the building permit data collected by the Census Bureau.

The vast majority of the residential building permits issued during the past two years have been for single-family homes. Only 2 permits for two-family homes and 4 for five-or-more-family homes were issued. No permits were issued for three- and four-family homes. By contrast, 630 permits were issued for single-family homes. Assuming that most of the homes that permits are

issued for are actually built, and that no homes are built without permits, this means that most new construction is for single-family homes.

## 5.3 Objective 3: Conduct a Suitability Analysis of Areas in the City That Could be Used for New Residential Developments

### 5.3.1 Identification of Eligible Areas

Six maps were created to show the suitability of all parcels in the city for different types of housing. Each map corresponded to one of the housing types we had chosen to focus on: single-family, two-family, three-family, multifamily, elderly, and special-needs. For all of these maps, a higher score corresponds to higher suitability for the given type of housing. These are the areas for which recommendations will be made.

### 5.3.2 Placement of Housing

On each unbuilt type or abandoned parcel, the city should encourage construction of a housing type for which that parcel has a high suitability score. The city can accomplish this by 1) purchasing the parcel and constructing the housing itself, or 2) offering incentives to private developers to build the desired type of housing on parcels the developer has purchased. The city might also consider refusing to grant building permits for proposed construction of a type for which the parcel in question has a low (24 or lower) suitability score.

### 5.3.3 Single-Family Suitability

Several patterns were observed in the suitability of parcels in Worcester for single-family housing. Most of the downtown area was unsuitable for single-family homes, as was a large segment of the southeastern corner of the city. Another low-suitability area was found along the northwestern border of the city. Interestingly, this area corresponded with a region identified by the transportation and open space team as having poor transportation accessibility, which explains its lack of suitability for single-family housing.

One cluster of parcels that were suitable for single-family housing is located in the eastern area of the city, just south of Green Hill Park. Another was found in the western portion of the city,

northeast of the airport. A suitable cluster was also identified in the extreme northern corner of Worcester. We recommend that future single-family housing construction be focused on these areas.

The numerical suitability distribution is roughly even. Approximately one-third of the parcels in the city are highly suitable for single-family housing, approximately one-third are moderately suitable, and approximately one-third are unsuitable. The first map in Appendix G shows the suitability distribution for single-family homes.

### 5.3.4 Two-Family Suitability

The suitability distribution, both numerical and spatial, for two-family homes is significantly different from that for single-family homes. The downtown area is more suitable for two-family homes than for single-family homes. Although some downtown parcels are still deemed unsuitable, some of the downtown parcels that were listed as unsuitable for single-family homes are suitable for two-family homes. The area south of Green Hill Park is more suitable for two-family homes than for single-family homes, although a large portion of the southeastern corner of the city is still unsuitable. The area along the northwestern border of the city, on the other hand, is even more unsuitable for two-family homes than it is for single-family homes. This is most likely due to its poor transportation accessibility. In our matrix, accessibility to transportation is more important for multifamily homes than for single-family homes, so an area whose transportation inaccessibility makes it a poor location for single-family homes would be an even worse location for two-, three-, and multifamily homes. Therefore, we recommend that the northwestern border area of the city be avoided for single- and two-family home construction until the transportation infrastructure there can be improved. Two-family housing construction should be concentrated in the downtown area and the region south of Green Hill Park.

Whereas the suitability distribution for single-family homes was approximately even, for two-family homes it is skewed towards the extreme ends of the suitability spectrum. Most of the city's parcels are either highly suitable or highly unsuitable for two-family housing construction, with little middle ground. The second map in Appendix G shows this suitability distribution.

### 5.3.5 Three-Family Suitability

The downtown area and city center are much more suitable for three-family homes than they were for single- and two-family homes. The southeastern corner of the city is also more suitable for

three-family homes than it was for single- and two-family housing construction. The area along the northwestern border of the city that was determined to be highly unsuitable for single- and two-family homes remains unsuitable for three-family homes. Interestingly, the northern corner of the city and the area just northeast of the airport are less suitable for three-family homes than they were for single- and two-family homes. This suggests that different areas of the city should be centers of construction for the different housing types. The northern corner of the city, the area northeast of the airport, and the area south of Green Hill Park are good locations for single- and two-family housing construction, while three-family housing construction should focus on the downtown area and the southeastern region of the city.

In terms of numerical distribution, the suitability patterns for three-family homes resemble those of single-family homes more than two-family homes. As with the single-family homes, the suitability distribution is roughly equal, with approximately one-third of parcels in each of the three suitability categories. The suitability distribution is shown in the third map in Appendix G.

### 5.3.6 Multifamily Suitability

The downtown area of the city is very poorly suited to multifamily homes, as is the southeastern region of the city. (There is, however, one cluster of suitable parcels in the southeastern region.) The area along the northwestern border area that was unsuitable for all the other housing types is also unsuitable for multifamily housing construction.

There are two major clusters of parcels that are highly suitable for multifamily housing construction in Worcester. One is a large region of the city between the downtown area and the airport. The other is the extreme northern corner of the city. Thus, these regions ought to be the focus of multifamily housing development in the future.

Once again, the numerical suitability distribution is about even, with roughly one-third of the city's parcels in each suitability category. This mimics the distribution pattern for single-family and three-family housing. The fourth map in Appendix G shows this suitability distribution.

### 5.3.7 Elderly Housing Suitability

There are eight census tracts in Worcester that have a high elderly housing deficit. In each of these tracts there are at least 200 more elderly people living in that tract than there are places in subsidized elderly housing units. These tracts are mostly around the borders of the city. The city center in general has a lower elderly housing deficit. We suggest that future elderly housing

construction projects be located in one of the eight tracts identified as having high elderly housing deficits, since this is where the need for that type of housing is highest. One caveat is that two of these tracts contain portions of the northwestern border area that was identified earlier as having poor transportation accessibility. Since elderly people tend to rely on public transportation, construction of elderly housing in these areas will need to occur hand-in-hand with the extension of public transportation systems in those regions. The fifth map in Appendix G displays the elderly housing deficit for each census tract in Worcester.

### 5.3.8 Special-Needs Suitability

The downtown area is highly unsuitable for special-needs housing, which is rather surprising, since there tend to be many bus routes and other amenities in this area. The southeastern segment of the city is also very poorly suited to special-needs housing, although the cluster in this region that was suitable for multifamily homes is also suitable for special-needs housing. The large region between the downtown area and the airport that was suitable for multifamily housing is also a good place for special-needs housing. The extreme northern corner of the city is also a suitable location for housing for persons with special needs. The overlap in suitable areas between multifamily housing and special-needs housing suggests an intriguing possibility. Large apartment complexes could be built in these regions that have elevators and that contain some units that are specially adapted for citizens with special needs. This would allow two highly suitable housing types to be built on the same parcel. Regardless of how it is done, special-needs housing construction should be concentrated in the region between the downtown area and the airport, the northern corner of the city, and the suitable cluster in the southeastern corner. The sixth map in Appendix G gives the special-needs housing suitability distribution.

### 5.3.9 Overall Housing Placement Notes

The downtown area is unsuitable for all housing types except for two- and three-family homes, so these housing types should predominate in future construction in this area. The southeastern corner of the city is really only suitable for three-family homes, so this region should be a center for construction of that housing type. The northern corner of the city and the area northeast of the airport are “hot spots,” being suitable for several housing types. Constructing several different

types of housing in these regions could allow the city to create vibrant communities in these regions, enhancing the city’s overall development and providing a place for incoming residents to live.

# 6.0 Recommendations for Future Worcester Housing Studies

## 6.1 Utilizing the Suitability Maps

Each suitability map contains a plethora of information on the parcels in the city. In addition to a given parcel's suitability for each of the six housing types, the maps inform the reader of the address, MBL number, square footage, acreage, owner, tax type, assessed value, zoning type, land value, and building value for each parcel. In addition to what was already in the layers obtained from the city, we included information on the suitability value for each parcel and the buildings count. These maps, which contain information on all the parcels in the city, will be very useful to the city in the future. If a parcel becomes vacant or abandoned, or if the buildings currently on it are razed, these maps can be used to suggest what kind of housing should be built in its place.

## 6.2 Suitability Matrix Attributes

In addition to the parameters used to construct our suitability analysis, there were other attributes that we would have liked to use but could not. First, information on whether certain parcels were part of the city water and sewer systems could not be obtained, as sewer and water line maps are not made available to the public. Because of concerns about terrorism, an act of Congress is necessary to obtain these records.

Access to employment is also difficult to determine. The work done by the economic development team will provide information that can be used by the city or other groups to take employment opportunities into account when constructing future suitability matrices.

Finally, we chose values for the attributes we examined that seemed appropriate to us at the time. Doing this involved making some assumptions (for example, that most residents of single-family homes have cars and therefore can be located farther away from highways). The city may want to do studies to refine the requirements used to construct the matrix.

## 6.3 Handling Parcels that are Suitable for Multiple Housing Types

In some cases, a parcel may have high suitability scores for multiple housing types. In some instances, the suitability scores for different housing types may even be equal. What should be done when a single parcel or area of the city is highly suitable for more than one type of housing?

In some cases, the suitability scores of a given parcel may be exactly the same for two or more types of housing. As described in section 5.1.3, housing structures containing more than eight units had the highest assessed value at time of sale, and thus would contribute most to the city's property tax revenues. Therefore, we recommend that the majority of properties that are equally suitable for multifamily and other housing types be used to build multifamily homes containing more than eight units. Since, in 2002, three-family homes had the highest median sale value (see section 5.2.3), emphasis should also be placed on the building of three-family homes. The construction of the desired types of housing can be encouraged in two ways. First, unbuilt parcels and abandoned or vacant properties in the suitable areas can be purchased by the city and used for the construction of three-family and multifamily housing. Second, incentives can be offered to private developers who plan to build three-family and multifamily housing on the properties they have purchased in the suitable areas. Of course, the city should also allow private developers to build other types of housing on areas of land that are suitable for multiple housing types, in order to accommodate those citizens whose particular housing needs are better served by single- and two-family housing. Finally, for parcels that are equally suitable for elderly or special-needs housing and other types of housing, construction of elderly and special-needs housing should be given priority.

In cases where the suitability scores of a parcel for two or more different types of housing are high but not equal, construction on that parcel should be of the housing type for which the parcel's suitability score is highest. This would insure that each parcel is developed in the most ideal way. The same methods as described above can be used to encourage desirable construction types on these parcels.

### 6.4 Data Gaps

For the time-series analysis portion of our project, most of the factors we looked at were only able to be measured for 1990 and 2000, since the US Census is only performed once every ten years. It would be useful to have information on housing characteristics for years in between the decennials, so that changes in the housing market could be charted on a year-by-year basis. Therefore, one recommendation is that the city performs a "mini-census" each year, collecting data on housing characteristics for a sample population within the city to assist in future time-series analyses of the Worcester housing market.

In addition, it would be useful to have data from other comparable cities (such as Lowell, Cambridge, or Springfield) showing how they went about constructing suitability matrices for their cities. This could help Worcester to refine the matrix presented in this report for future analyses. It would also be useful to see what steps these cities took to address the results of their suitability analyses, as these steps could provide a model for Worcester's own efforts.

We obtained home sales data from the Worcester Assessor's Office, and had originally intended to create a thematic map showing the locations of homes that sold for prices within a set of dollar value ranges. This would have allowed for an identification of clusters of high-priced and low-priced homes in the city. Unfortunately, the format of the data did not allow for the creation of such a map. The properties in the Assessor's data were listed by MBL number, which identifies an individual parcel. Thematic maps, however, can only be created for census tracts. As census tract information was not provided in the Assessor's data, we were not able to develop a thematic map of this data. We do feel that such a map would be a valuable asset to the city in locating clusters of similarly-priced homes, and recommend that the Assessor's data be organized by census tract so that such a map can be created.

We were able to obtain some building permit data from the website of the US Census Bureau. This data gave the number of building permits issued each month for several different types of housing (single-family, two-family, three- and four-family, and five or more-family) for the period between January 1998 and October 2003. However, data is not available prior to 1998 or for several months in 2002 and 2003. The most recent data (November 2003) is also not available. Future investigators should attempt to obtain this data from Worcester's Department of Code Enforcement. This would allow investigators to include the most current data in their analyses, as well as helping them to construct a complete time-series analysis for a longer period than is currently available on the Census Bureau website.

### 6.5 Data Collection

The Worcester Fire Department's list of vacant buildings is continually being updated and changed as buildings are condemned, rehabilitated, or demolished. While this is an excellent way to insure that the city is working with up-to-date information, it makes a time-series analysis difficult since lists of vacant buildings from previous years are not available. This also makes it difficult to track progress or see where vacant buildings have historically been concentrated within the city.

Therefore, another suggestion is that at the end of each year, the current list of vacant buildings be stored separately from the ongoing list to establish a historical progress report within different areas of the city.

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# Appendices

## Appendix A: Chapter 40B and Affordable Housing

Chapter 774, another important component of our analysis of Worcester's housing market, is an amendment to Chapter 40B of the Massachusetts General Laws. It deals with low income housing in the state of Massachusetts. The goal of Chapter 40B was to establish conditions for the development of low- to moderate-income housing. It was also designed so that the cities' authority to regulate this low- to moderate-income housing was at a minimum. Developers used Chapter 774 to go around the very restrictive local zoning regulations that prevented the building of adequate affordable housing in some communities.

One of the effects that Chapter 774 had on communities was that if a community was found to be "unreasonably restrictive" of low income housing it could become ineligible to receive grants from the state (Magnarelli, 1989). Chapter 774 has also been used to develop subsidized housing for low income families.

There was much resistance from the communities to Chapter 774 and its approach to affordable housing. Over 70% of the people were against low income housing developments in their communities (Magnarelli, 1989). There were also many alleged adverse affects of these low income housing projects, including health, traffic, and safety hazards caused by the project. Most of the people thought that the quality of living in their town was unaffected because of the lower income housing that was placed there. Very few communities reported a decrease in the standard of living while even fewer reported an increase in the standard of living.

Chapter 40B holds an important relationship to the project we intend to carry out. In identifying the housing needs of Worcester, we will need to address the needs of the community for affordable housing, answering questions such as, Does Worcester meet the requirement for 10% affordable housing? If so, is this sufficient to provide affordable housing for everyone in the community who needs it? How much more affordable housing should be built and where should it be located? Our initial perspective on this issue is that the determination of whether a community contains an adequate amount of affordable housing should not be based merely on whether or not it meets the requirements of Chapter 40B. Rather, it must be based upon an analysis of whether or not the community provides sufficient affordable housing for all those who live in that community who need it.

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## Appendix C: Suitability Matricies

### Single-Family

### Housing

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|
| eighth-mile | | 4 | 3 | 4 | 4 | 3 | 4 |
| quarter-mile | | 3 | 4 | 3 | 3 | 2 | 3 |
| half-mile | 3 | 2 | 5 | 2 | 2 | 2 | 2 |
| one mile | 3 | 1 | 5 | 2 | 1 | 1 | 2 |
| 1.5 miles | 3 | 1 | 5 | 2 | 3 | 1 | 2 |
| two miles | 3 | 1 | 5 | 1 | 3 | 1 | 1 |

### Two-Family

### Housing

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|
| eighth-mile | | 4 | 3 | 4 | 4 | 3 | 4 |
| quarter-mile | | 3 | 4 | 3 | 3 | 2 | 3 |
| half-mile | 5 | 2 | 5 | 2 | 2 | 2 | 2 |
| one mile | 4 | 1 | 5 | 2 | 1 | 1 | 2 |
| 1.5 miles | 3 | 1 | 5 | 2 | 3 | 1 | 2 |
| two miles | 2 | 1 | 5 | 1 | 3 | 1 | 1 |

### Three-Family

### Housing

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|
| eighth-mile | | 4 | 3 | 4 | 4 | 3 | 4 |
| quarter-mile | | 3 | 4 | 3 | 3 | 2 | 3 |
| half-mile | 5 | 2 | 5 | 2 | 2 | 2 | 2 |
| one mile | 4 | 1 | 5 | 2 | 1 | 1 | 2 |
| 1.5 miles | 3 | 1 | 5 | 2 | 3 | 1 | 2 |
| two miles | 2 | 1 | 5 | 1 | 3 | 1 | 1 |

### Multifamily

### Housing

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| eighth-mile | | 4 | 3 | 4 | 4 | 3 | 4 |
| quarter-mile | | 3 | 4 | 3 | 3 | 2 | 3 |
| half-mile | 5 | 2 | 5 | 2 | 2 | 2 | 2 |
| one mile | 4 | 1 | 5 | 2 | 1 | 1 | 2 |
| 1.5 miles | 3 | 1 | 5 | 2 | 3 | 1 | 2 |
| two miles | 2 | 1 | 5 | 1 | 3 | 1 | 1 |

**Elderly**

**Housing**

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|
| eighth-mile | 3 | 4 | 3 | 4 | 4 | 4 | 3 |
| quarter-mile | 3 | 3 | 4 | 3 | 3 | 3 | 3 |
| half-mile | 3 | 2 | 5 | 2 | 3 | 3 | 3 |
| one mile | 3 | 3 | 5 | 2 | 3 | 2 | 3 |
| 1.5 miles | 3 | 3 | 5 | 3 | 3 | 2 | 3 |
| two miles | 3 | 3 | 5 | 3 | 3 | 1 | 3 |

**Special-Needs**

**Housing**

| Points | Highway Access | Public Transportation Access | Brownfields | Commercial Zones | Open Space/Parks | Historic Sites | Schools |
|---|---|---|---|---|---|---|---|
| eighth-mile | 3 | 4 | 3 | 4 | 4 | 4 | 4 |
| quarter-mile | 3 | 3 | 4 | 3 | 3 | 3 | 3 |
| half-mile | 3 | 2 | 5 | 2 | 3 | 3 | 2 |
| one mile | 3 | 3 | 5 | 2 | 3 | 2 | 2 |
| 1.5 miles | 3 | 3 | 5 | 3 | 3 | 2 | 2 |
| two miles | 3 | 3 | 5 | 3 | 3 | 1 | 1 |

| Zoning Suitability Criteria | | | | | | |
|---|---|---|---|---|---|---|
| zone | Single-Family | Two-Family | Three-Family | Multifamily | Elderly | Special-Needs |
| A-1 | 0 | 0 | 0 | 0 | 0 | 0 |
| BG-2.0 | 0 | 1 | 1 | 2 | 0 | 0 |
| BG-3.0 | 0 | 1 | 1 | 2 | 0 | 0 |
| BG-4.0 | 0 | 1 | 1 | 2 | 0 | 0 |
| BG-6.0 | 0 | 1 | 1 | 2 | 0 | 0 |
| BL-1.0 | 0 | 1 | 1 | 1 | 0 | 0 |
| BO-1.0 | 0 | 1 | 1 | 1 | 0 | 0 |
| BO-2.0 | 0 | 1 | 1 | 1 | 0 | 0 |
| IN-H | 0 | 0 | 0 | 0 | 3 | 4 |
| IN-S | 0 | 2 | 3 | 3 | 0 | 0 |
| MG-0.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| MG-1.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MG-2.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ML-0.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| ML-1.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ML-2.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RG-5 | 3 | 3 | 3 | 3 | 3 | 3 |
| RL-7 | 4 | 4 | 0 | 0 | 0 | 4 |
| RS-10 | 4 | 2 | 0 | 0 | 0 | 0 |
| RS-7 | 4 | 1 | 0 | 0 | 0 | 0 |

**Appendix D: Home Mortgage Disclosure Act**

The Home Mortgage Disclosure Act (HMDA) was enacted in 1975, and is enforced by the Federal Reserve Board's Regulation C. HMDA requires lenders to report public loan information. The Federal Financial Institutions Examination Council (FFIEC) then makes reports of this data for individual metropolitan areas.

HMDA "can be used to assist: in determining whether financial institutions are serving the housing needs of their communities; public officials in distributing public-sector investments so as to attract private investment to areas where it is needed; and in identifying possible discriminatory lending patterns" (www.ffiec.gov/hmda/history.htm). Thus, it is a highly useful resource for public officials.

The HMDA data we examined contained detailed information on the loans taken out in the city between 1997 and 2001. The maps we created cover four variables: year, loan type, loan amount, and owner occupancy. For HMDA reporting, loans are divided into four types: those insured by the Federal Housing Administration (labeled 2), those guaranteed by the Veterans Administration (labeled 3), those guaranteed by the Farm Service Agency or Rural Housing Service (labeled 4), and all others (referred to as conventional loans, labeled 1) (FFIEC, 2003).

Loan amount values are listed in thousands of dollars; thus the entry 160 corresponds to a loan for $160,000. Loan amounts are rounded to the nearest $1,000; thus a loan for $175,800 would be listed as 176.

For owner-occupancy, an entry of 1 indicates that the property in question is occupied by the owner and is the owner's principal dwelling. An entry of 2 indicates that the property is not owner-occupied (i.e. rented) or that is not the owner's principal dwelling (for example, vacation homes). An entry of 3 indicates that this category is not applicable. This code is used for multifamily homes, homes that are not located in a metropolitan statistical area (MSA), and homes that are located in an MSA where the reporting institution has no offices. (An MSA is defined as "an area that contains a city with a population of at least 50,000, or contains an urbanized area with a population of 50,000 or more and has a total metropolitan population of 100,000 (75,000 in New England)" [www.ffiec.gov/hmda/glossary.htm].)

## Appendix E: Permitted Dimensions by District Table 4.2

| DISTRICT | USE | LOT AREA (minimum square ft.) | FRONTAGE (minimum linear ft.) | FRONT YARD (minimum depth, linear ft.) | SIDE YARD (minimum depth, linear ft.)* | REAR YARD (minimum depth, linear ft.) | HEIGHT (maximum in stories) | HEIGHT (maximum in ft.) | FLOOR TO AREA RATIO (maximum) |
|---|---|---|---|---|---|---|---|---|---|
| RS-10 | Single Family | 10,000 | 80 | 25 | 10 | 20 | 2+ | 35 | NA |
| | Limited Residential Hospice House | 40,000 | 80 | 25 | 10 | 20 | 2+ | 35 | NA |
| | Other Permitted | NA | 80 per du | 25 | 20 | 50 | 2+ | 35 | 0.3 to 1 |
| RS-7 | Single Family Detached, Single Family Semi-detached | 7,000 per du | 65 per du | 20 | 8 | 20 | 2+ | 35 | NA |
| | Limited Residential Hospice House | 30,000 | 65 | 25 | 10 | 20 | 2+ | 35 | NA |
| | Other Permitted | NA | 65 per du | 25 | 20 | 50 | 2+ | 35 | 0.4 to 1 |
| RL-7 | Single Family Detached | 7,000 | 65 | 20 | 8 | 20 | 2+ | 35 | NA |
| | Single Family Semi-Detached | 4,000 per du | 35 per du | 20 | 8 | 20 | 2+ | 35 | NA |
| | Single Family Attached | 3,000 per du | 25 per du | 20 | 8 | 20 | 2+ | 35 | NA |
| | Two-Family Dwelling | 8,000 | 70 | 20 | 8 | 20 | 2+ | 35 | NA |
| | Three Family Dwelling | 9,000 | 75 | 20 | 8 | 20 | 3+ | 50 | NA |
| | Multi-Family Dwelling, First Unit | 7,000 | 65 | 20 | 10 | 20 | 3+ | 45 | NA |
| | MFD, Additional Unit, Low Rise | 2,000 per du | +5'per du to total of 140' | NA | NA | NA | NA | NA | NA |
| | Limited Residential Hospice House | 20,000 | 65 | 25 | 10 | 20 | 3+ | 50 | NA |
| | Other Residential Permitted | 7,000 | 65 | 20 | 10 | 20 | 3+ | 45 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Other Non-Residential | 7,000 | 65 | 20 | 20 | 20 | 3+ | 45 | 0.5 to 1 |
| RG-5 | Single Family Detached | 5,000 | 50 | 15 | 8 | 15 | 2+ | 35 | NA |
| | Single Family Semi-Detached | 3,000 per du | 30 per du | 15 | 8 | 15 | 2+ | 35 | NA |
| | Single Family Attached | 3,000 per du | 25 per du | 15 | 8 | 15 | 2+ | 35 | NA |
| | Two-Family Dwelling | 6,000 | 55 | 15 | 8 | 15 | 2+ | 35 | NA |
| | Three Family Dwelling | 7,000 | 60 | 15 | 8 | 8 | 3+ | 50 | NA |
| | Multi-Family Dwelling, First Unit | 5,000 | 50 | 15 | 10 | 15 | 8+ | 90 | NA |
| | MFD, Additional Unit, Low Rise | 1,000 per du | +5' per du to total of 125' | NA | NA | NA | 3+ | 45 | NA |
| | MFD Additional Unit, High Rise | 750 per du | +5' per du to total of 100' | NA | NA | NA | 8+ | 90 | NA |
| | Limited Residential Hospice House | 15,000 | 50 | 20 | 10 | 10 | 3+ | 50 | NA |
| | Other Residential Permitted | 5,000 | 50 | 15 | 10 | 15 | 3+ | 45 | NA |
| | Other Non-Residential | 5,000 per du | 50 per du | 15 | 10 | 15 | 3+ | 45 | 1.0 to 1 |
| DISTRICT | USE | LOT AREA (minimum square ft.) | FRONTAGE (minimum linear ft.) | FRONT YARD (minimum depth, linear ft.) | SIDE YARD (minimum depth, linear ft.)* | REAR YARD (minimum depth, linear ft.) | HEIGHT (maximum in stories) | HEIGHT (maximum in ft.) | FLOOR TO AREA RATIO (maximum) |
| BO-1.0** | ALL | NA | NA | 15 | 10 | 10 | 3 | 40 | 1 to 1 |
| BO-2.0** | ALL | NA | NA | 15 | 10 | 10 | 3 | 40 | 2 to 1 |
| BL-1.0** | ALL | NA | NA | 10 | NA | 20 | 2+ | 40 | 1 to 1 |
| BG-2.0** | ALL | NA | NA | NA | NA | 15 | NA | 50 | 2 to 1 |
| BG-3.0** | ALL | NA | NA | NA | NA | 10 | NA | 100 | 3 to 1 |

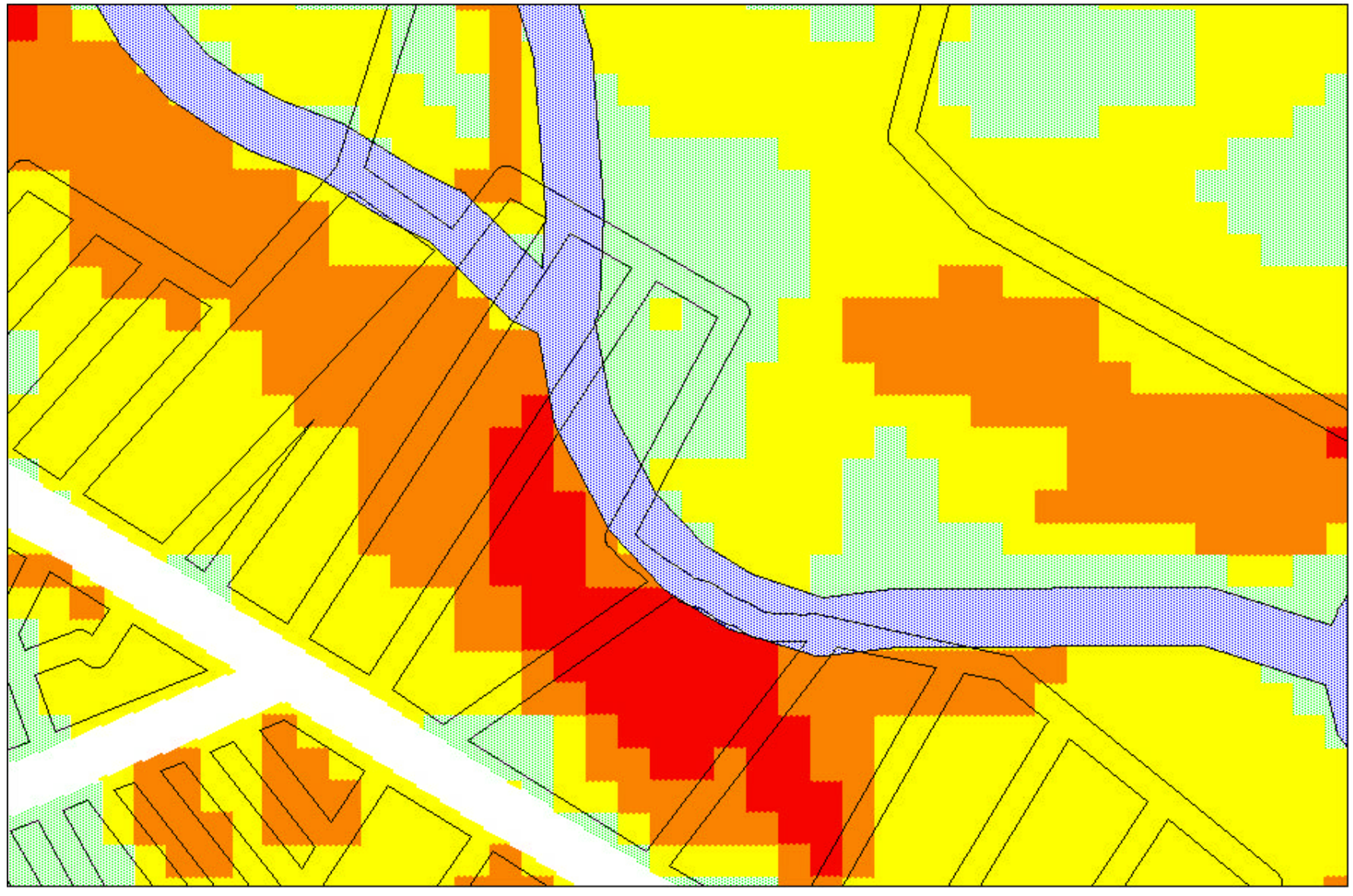
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| BG-4.0 | ALL | NA | NA | NA | NA | 10 | NA | 150 | 4 to 1 |
| BG-6.0 | ALL | NA | NA | NA | NA | 10 | NA | NA | 6 to 1 |
| IP-0.33 | ALL | 75,000 | 200 | 25 | 25 | 25 | NA | 50 | 0.33 to 1 |
| ML-0.5 | ALL | NA | NA | 25 | NA | 25 | NA | 50 | 0.5 to 1 |
| ML-1.0 | ALL | NA | NA | 10 | NA | 15 | NA | 50 | 1 to 1 |
| ML-2.0 | ALL | NA | NA | 10 | NA | 25 | NA | NA | 2 to 1 |
| MG-0.5 | ALL | NA | NA | 25 | NA | 25 | NA | 50 | 0.5 to 1 |
| MG-1.0 | ALL | NA | NA | 15 | NA | 15 | NA | NA | 1 to 1 |
| MG-2.0 | ALL | NA | NA | 15 | NA | 15 | NA | NA | 2 to 1 |
| IN- | ALL | NA | NA | 15 | 10 | 10 | NA | NA | NA |
| IN-H | ALL | NA | NA | 15 | 10 | 10 | NA | NA | NA |
| A-1 | ALL | NA | NA | 15 | 10 | 10 | NA | NA | NA |
| | | | | | | | | | |

* Not applicable to that portion of a semi-detached or attached single family dwelling, where permitted, that shares a party wall or a double wall on or along a common side lot line with an adjacent unit.

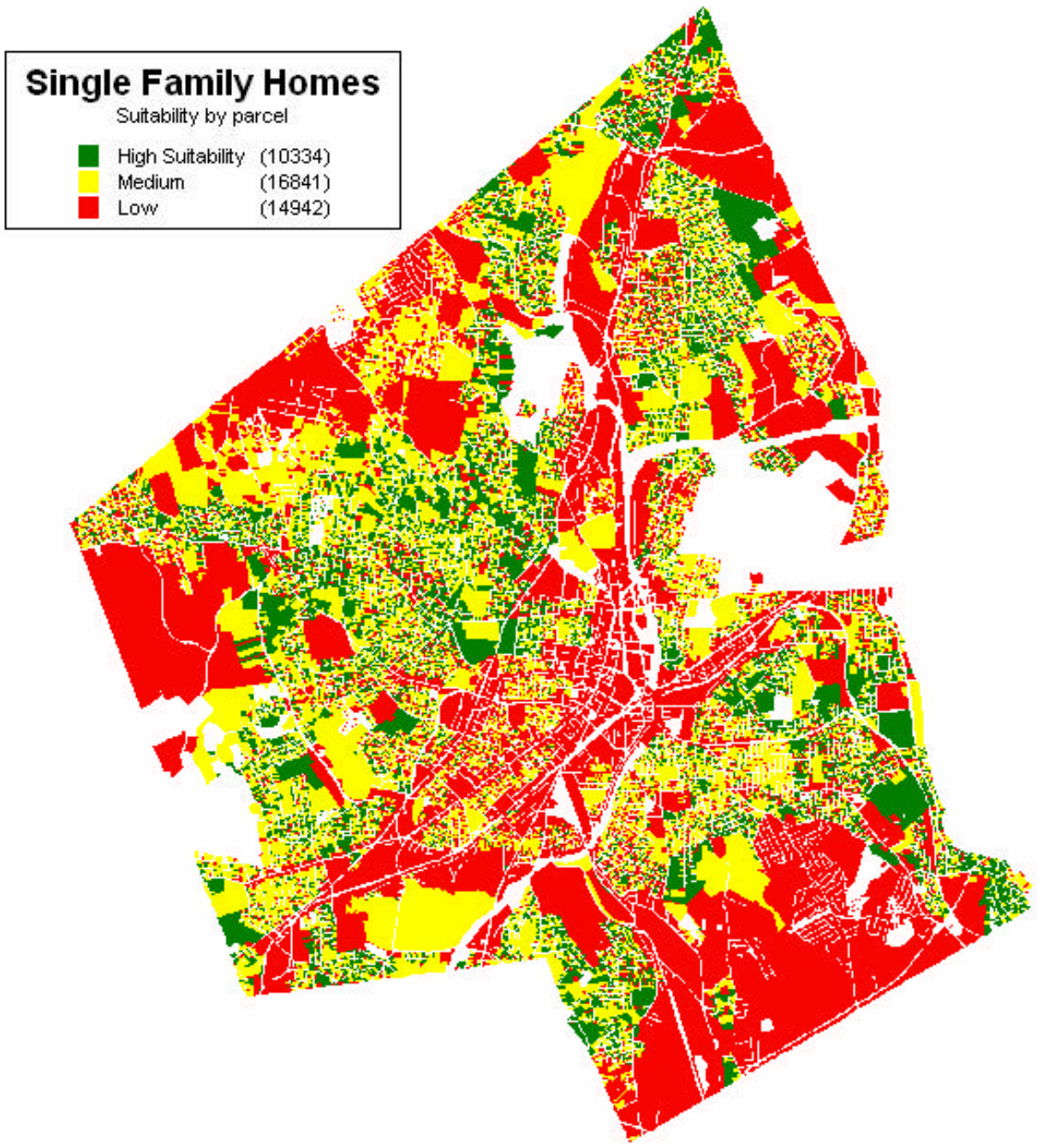
** NOTE: In BO,BL, and BG02.0 and BG-3.0 Districts, at least 10% of the lot area must be set aside for recreational purposes; excluding the 5 foot buffer

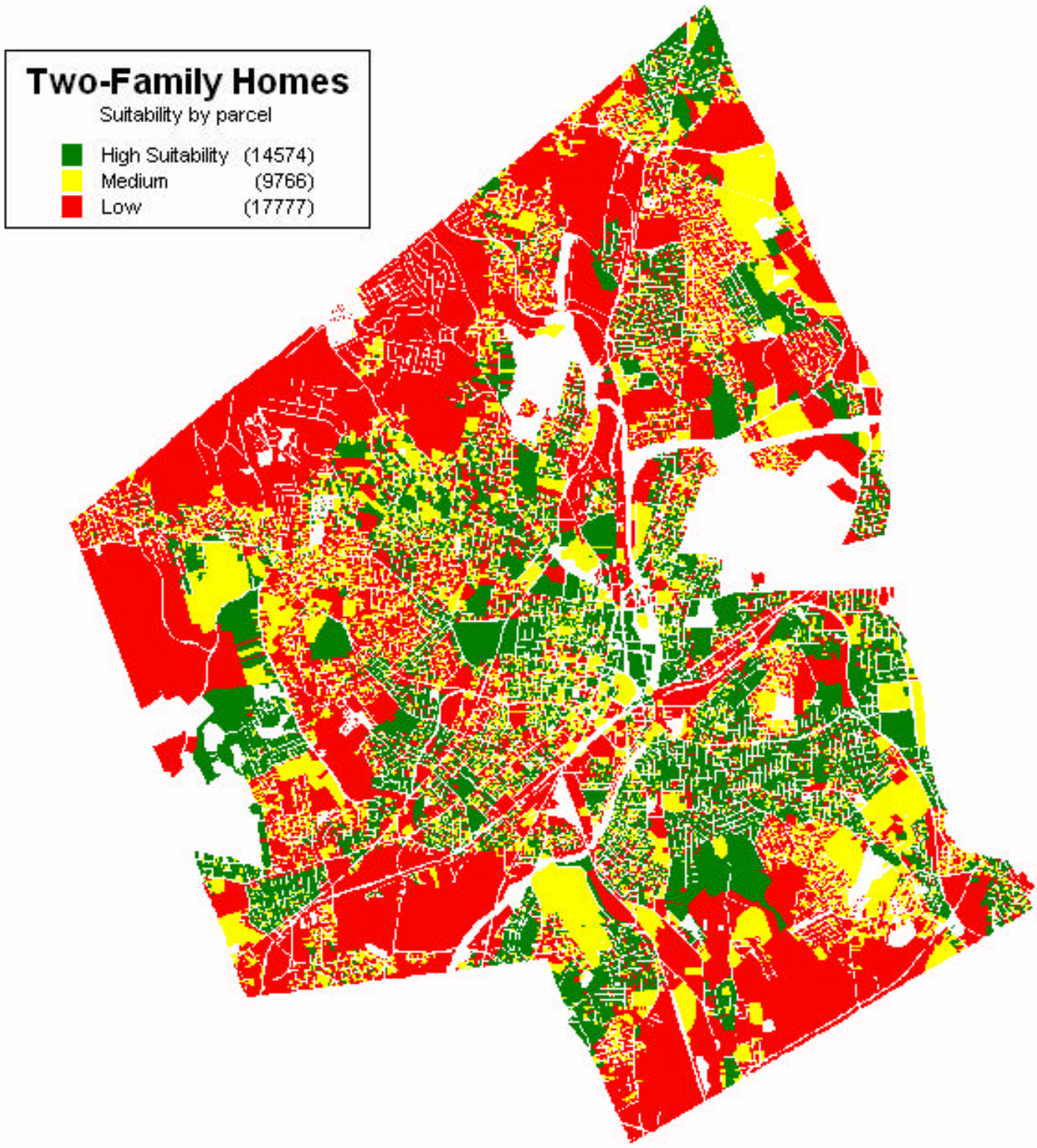
NOTE: The designations 2+ and 3+ indicate a height in stories plus an attic, as herein defined

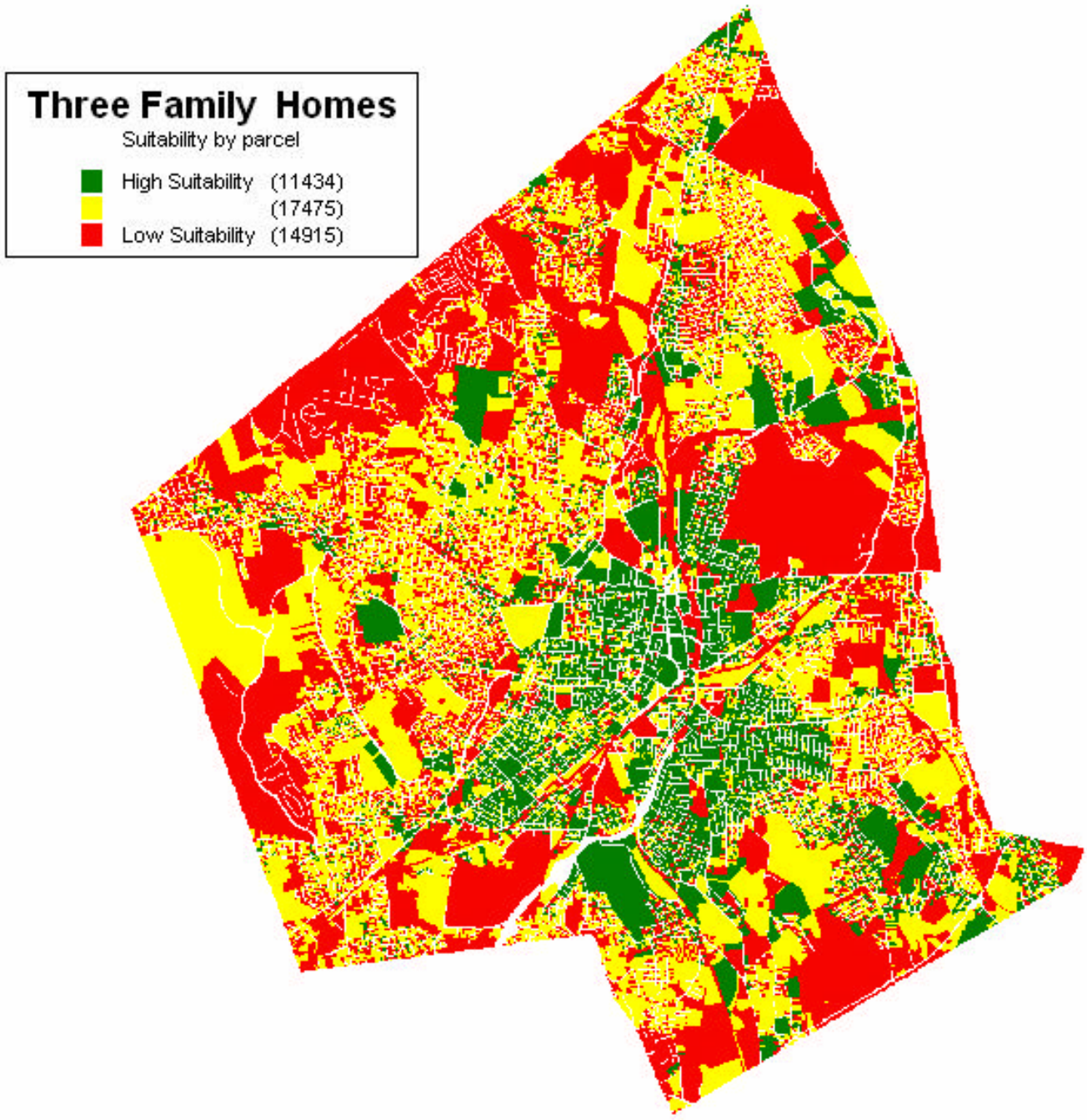
**Appendix F: Buildout Analysis Map**

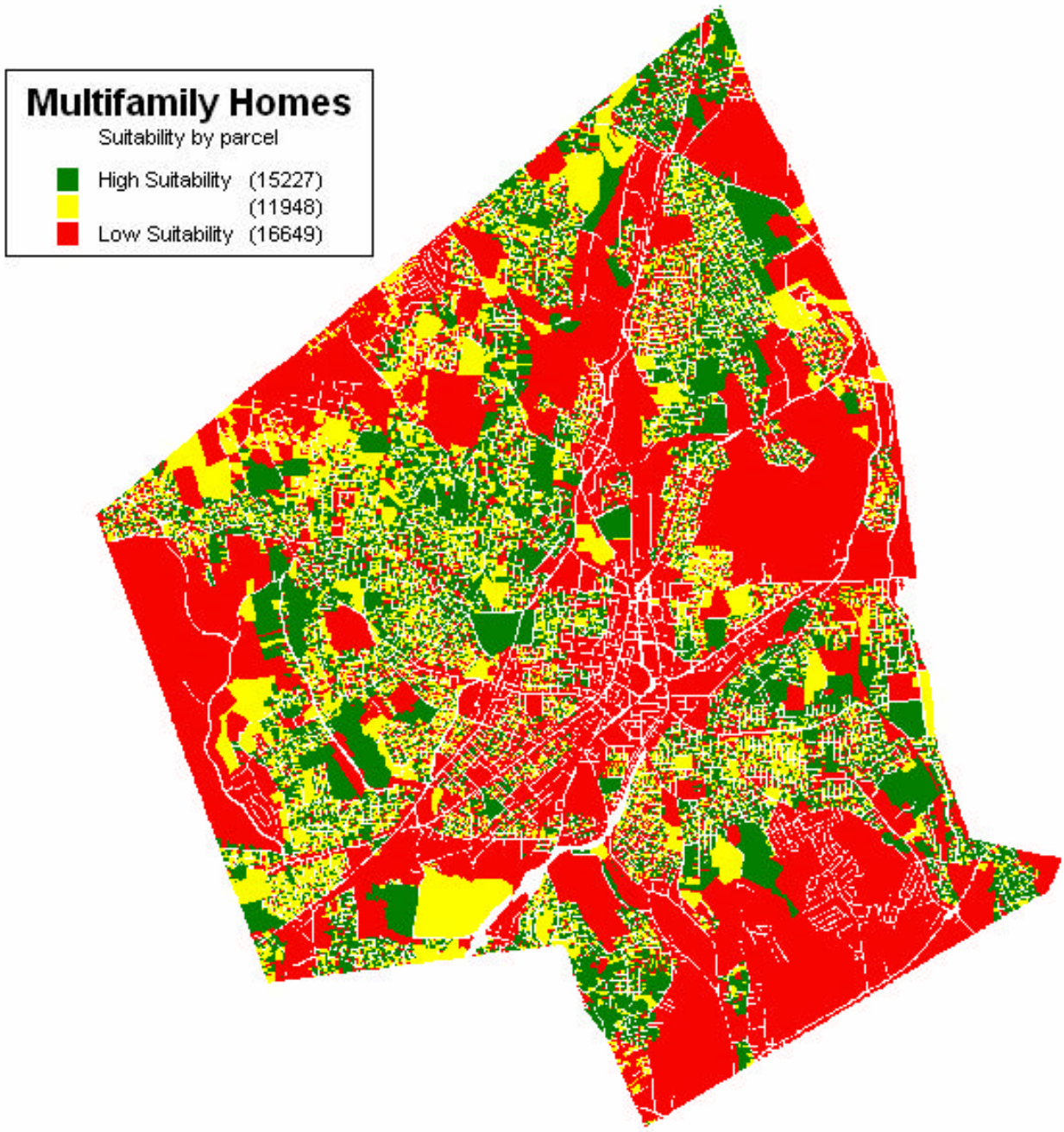


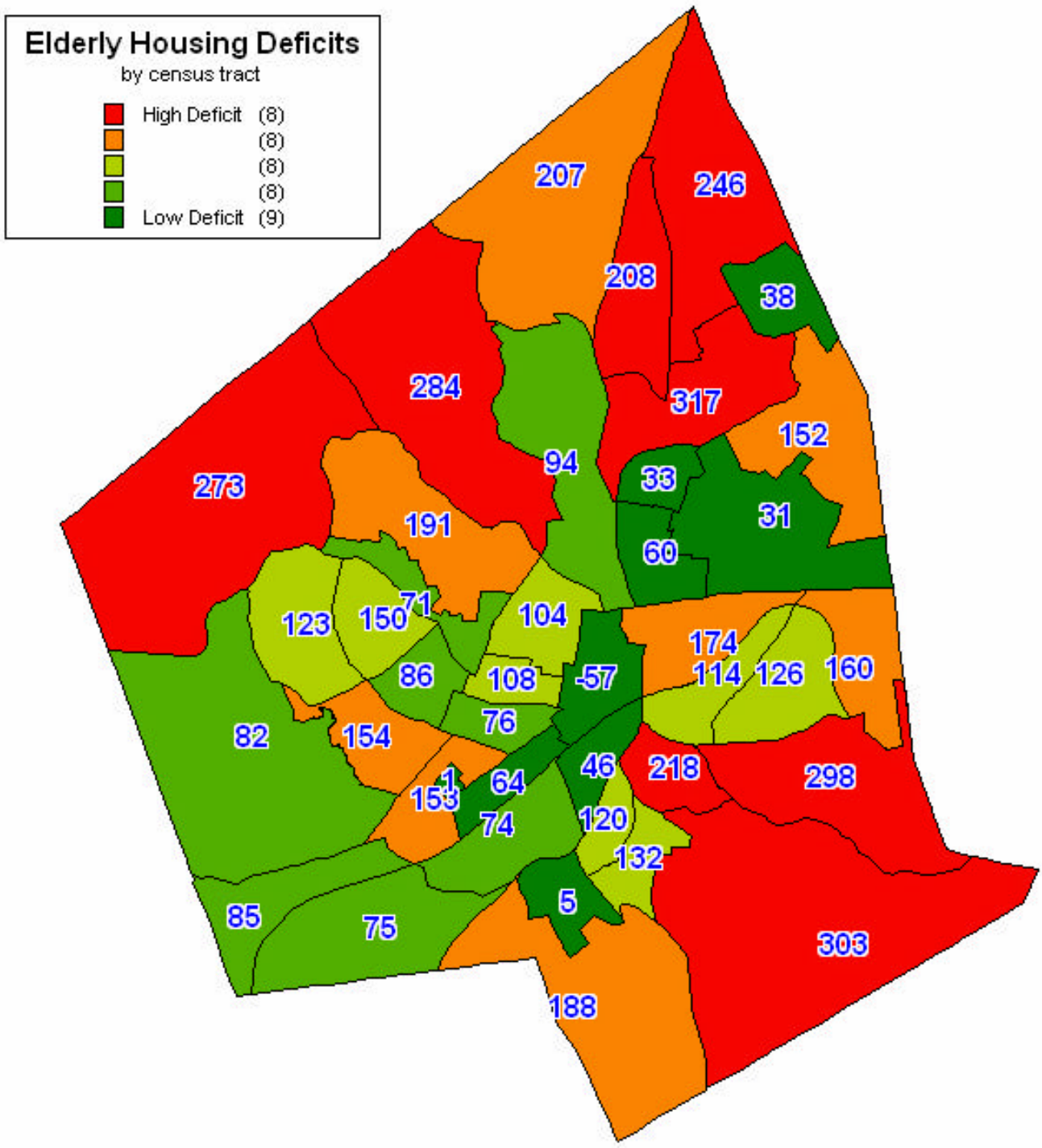
**Appendix G: All Suitability Maps**




Two-Family Homes
Suitability by parcel
High Suitability (14574)
Medium (9766)
Low (17777)


Three Family Homes
Suitability by parcel
High Suitability (11434)
(17475)
Low Suitability (14915)


Multifamily Homes
Suitability by parcel
High Suitability (15227)
(11948)
Low Suitability (16649)


Elderly Housing Deficits
by census tract
High Deficit (8)
(8)
(8)
(8)
Low Deficit (9)
207
246
208
38
284
317
152
94
33
273
31
191
60
71
123
150
104
174
86
108
-57
114
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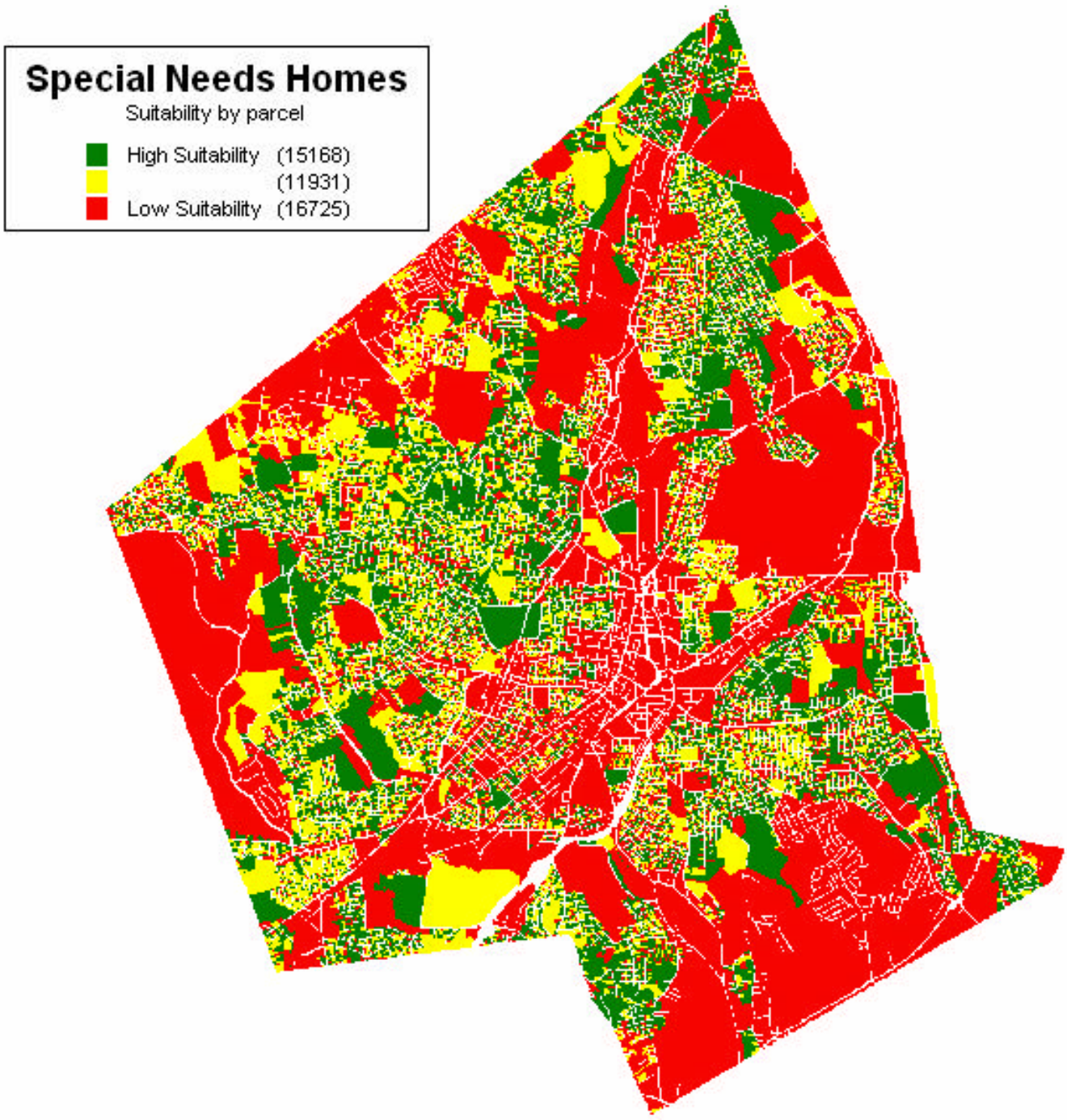
64
153
74
120
132
5
85
75
303
188


Special Needs Homes
Suitability by parcel
High Suitability (15168)
(11931)
Low Suitability (16725)

**Appendix H: Location of Existing Subsidized Elderly Housing**