THE EFFECTS OF A COMMUNITY GARDEN ON NEIGHBORHOOD RESIDENTIAL PROPERTY VALUES: A CASE STUDY IN CINCINNATI, OHIO

A Thesis

Presented in Partial Fulfillment of the Requirements for the Degrees Master of City and Regional Planning and Master of Landscape Architecture

By

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ABSTRACT

Historically community gardens have made significant contributions to America as a major food source in times of hardship. Today community gardens are recognized not only as a food source but also as a tool to reduce crime, promote sense of community and increase property values in blighted inner city neighborhoods. This recognition has little documentary evidence that supports such benefits. The focus of this study is on a vacant lot community garden in Hamilton County, Cincinnati, Ohio. Its purpose is to document the effects that a community garden can have on surrounding residential property values. A multiple regression model was used to estimate the effects of the Madisonville vacant lot community garden on sales prices of 62 residential properties within a two block proximity. A set of independent variables describing sales and property characteristics were included to better explain price. As was expected, prices are higher since the garden was installed, for every one foot one moves away from the community garden residential sales prices decrease $8.57.

Dedicated to Gidgett

ACKNOWLEDGMENTS

I would like to take this opportunity to thank Gidgett for all of her understanding and encouragement over the past three years. Her love and support was always there when I needed it the most. I express sincere appreciation to Professor Hazel Morrow-Jones for her guidance and insight throughout this project. Her encouragement in times when I thought it was impossible to finish provided the energy and optimism I needed to keep moving. Special thanks goes to Professor Norm Booth for his thoughts and recommendations involving the writing of the final document. I particularly want to thank Professor Dale Bertsch and Professor Deborah Georg for encouraging me to pursue the dual degree. I thank you all.

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INTRODUCTION

A community garden can have many different meanings. How does one define a community garden? The answer to that question would seem to vary from person to person or organization to organization. After speaking with the American Community Garden Association, and the Cincinnati Civic Garden Center and reading literature on the subject, a common thread that seems to exist when defining a community garden is people coming together in a common area to grow plants. These areas range from vacant lots to roof tops. Some are located in inner cities and some are located in the suburbs. For the purpose of this study only vacant lot community gardens that exist within the City of Cincinnati, Ohio were considered.

Community Gardens have been and continue to be a viable source of food production for American families. They are said to be the staple that enabled families to avoid starvation and get through times of economic hardships and despair such as the Panic of 1893, the Great Depression and World Wars I and II. However, Community Gardens are now much more than just a food source, they have been recognized as a tool that promotes community pride, education, crime prevention as well as economic roles such as increased property values and decreased municipal maintenance spending (Riddell

1993; Malakoff 1993; Pottharst 1995). The benefits they bring are well recognized by all involved, but little has been done to document their effects. In promoting the community garden movement and the benefits they can bring to neighborhoods and communities alike, the American Community Garden Association (1993) as well as professionals (e.g. Mark Francis (1989)), have called out for research and documentation of their effects.

If research shows that community gardens have positive effects on the neighborhoods in which they occur, community gardens should then be recognized as having a place in municipal planning. With better understanding of the impacts that vacant lot community gardens have on inner city neighborhoods, planners and landscape architects have an opportunity to make important contributions to inner city neighborhoods.

Scope

An investigation of the community garden programs in the State of Ohio revealed that Cincinnati has had a program for over 25 years that consists of over 30 vacant lot community gardens located throughout the city. After seeking advice from both the American Community Garden Association and the Civic Garden Center of Cincinnati, one vacant lot community garden in Cincinnati was chosen for this study. This decision was primarily due to the long life of Cincinnati's efforts and to the availability of data.

Using a multiple regression model (hedonic price model), the residential real estate within a two block radius of the community garden was studied in an attempt to estimate

the effect that the community garden has on residential real estate sales price.[1] The dependent variable is the most recent selling price, and the independent variables are a set of property characteristics that are said to influence real estate price (Correll et al. 1978; Schroeder 1982; Thibodeau 1990).[2]

Justification

Researchers and writers have expressed concern for the lack of documented research on the effects of community gardens. Francis (1989) suggests that community gardens will continue to be an important part of the urban landscape. However, because they are not recognized by cities as an integral part of official open space systems, their long-term existence remains a question. Francis calls for future "systematic investigation of the benefits of urban gardens." Malakoff (1993), in a version of the Community Greening Review Article for the American Community Garden Association lists the number one (1) research priority as; "What effect has community greening projects had on property values?". Sally McCabe of the American Community Garden Association, as well as members in Dayton and Cincinnati have all expressed their support for the study and feel that it would be a step forward for the community garden movement.

[1] See Chapter IV - Analysis for better explanation of 2 block proximity.
[2] For a more detailed description of the methodology and data see Chapter II and IV.

Objectives

1. To document the effects of a community garden on surrounding residential property values.

2. To contribute documented research to the knowledge base of landscape architecture, city and regional planning and the community garden movement.

3. To establish a foundation or beginning for further studies of community gardens.

4. To establish a more thorough, personal understanding of the methodologies and procedures used in social science research. (For utilization in future studies.)

Research Hypothesis: Property Values

Null Hypothesis: There is no significant difference in real estate sales prices that can be attributable to the distance from the community garden.

Alternative Hypothesis: There is a significant difference in real estate sales prices and it is attributable to the distance from the community garden.

CHAPTER 1

COMMUNITY GARDENS

History

Coe (1978) suggests that community gardens have been around for centuries. To some they are considered to be the cornerstone of what we know today as agriculture. This occurred not just in the United States but all over the world. Throughout eighteenth century England "open field" or "common field" systems were a significant part of self-sufficient villages. Most villages of that time had common areas in and around the village that had no single ownership. Villagers worked together to grow food and raise cattle for consumption by the entire village. Based on family size and labor contribution, each household was entitled to a portion of the common field production; vegetables, grains and livestock.

Open field systems were an integral part of villages across the world for centuries. However, late in the eighteenth century as populations grew and people began to move into urbanized areas, common land in and around villages became more scarce. To meet

the demand of the growing population, land that was once common open spaces was used for agriculture. Villagers soon realized that growing cities were beginning to create problems that "could not be solved by just acquiring more land" (Jobb 1979). People began to appreciate common open fields simply as open space.

In the later part of the eighteenth century the Industrial Revolution "accelerated this transition from self-sufficient agriculture to industrial, money based economies" (Boston Urban Gardeners 1982). People that were once rural farmers struggled to hold onto their historic connection to the land. Few managed to acquire land near urbanized areas and those that did, out of both generosity and desperation, divided their land into small parcels to rent to others. At one time parcels rented for one guinea. It was the new beginning of community gardening; the "guinea gardens."

According to Coe (1978), by the end of the eighteenth century many of England's urbanized areas were overcrowded and disease infested. Government was forced to intervene in an effort to protect the health, safety and welfare of the public. It was through government intervention that parks and gardens became recognized as public health necessities. The Allotment Acts of 1887 and 1890 and the Local Government Act of 1894 required sanitary authorities in urbanized areas of England to provide space for community or allotment gardens. The idea spread throughout Europe and still exists today.

In the late nineteenth century a similar pattern occurred in the United States. Local governments set aside large tracks of land for parks. Although the initial objective of these parks was for recreational use it became necessary to use parcels from these areas

for food production. The Boston Urban Gardeners (1983) reported, during the Panic of 1893, a time of economic crisis, cities began to use vacant lots, park land and other open green spaces for food production. One of the first cities to do this was Detroit. Out of concern for availability of food, Detroit began to set aside vacant city property for use by community gardeners. In only two years after the start of the program, 455 acres of city land was being used for community gardens and over $28,000 worth of produce had been produced.

By the early 1900's community gardens had become a part of many American cities. Cleveland school children participated in community park gardens. The school garden program has been such a success in Cleveland that it still exists today. "It has become a model for other cities that are planning community and youth garden programs through their local school systems" (Jobb 1979). The program has been instituted as an integral part of the learning process.

As was mentioned before, community garden programs have made a significant contribution to food production in times of hardship. During World War I citizens were asked to participate in a garden program, known as the Liberty Garden Campaign, to support the soldiers. Although the Liberty Garden Campaign was not well organized it did bring together people of all ages in an effort to increase food production. In 1918 the campaign had 5 million gardens and produced over 240,000 tons of vegetables (Boston Urban Gardeners 1982). Despite criticism regarding lack of organization, the program was urged to continue until commercial agricultural systems could be reestablished. The campaign began to dwindle throughout the 1920's, but in the 1930's a new program

emerged. In the midst of the Great Depression the Garden movement returned more actively than ever before. The Relief Gardens, as they were called, provided not only food for poor families all over the U.S. they also provided a means to bring communities together. In a time of high unemployment and extreme poverty the gardens provided an avenue by which people remained connected to the land, educated children about gardening and food production and created a sense of community in which people relied on throughout the depression.

Community gardens contributed during World War II much as they had during World War I. All attention was on the war and the American agricultural system suffered. Hassan (1995) notes that the U.S. War Food Administration reported (in 1944), community gardens produced over 40% of American's fresh fruits and vegetables. Again, the strength of the community garden movement is said to have been the driving force that helped feed America in a time of crisis.

Community gardening regained strength throughout the 1960's and 1970's. The reason for this might because of the recognition the gardens received regarding the psychological, environmental and social benefits that community gardens are said to bring.

Benefits of Community Gardens

Pottharst (1995) wrote a paper featuring a community garden organization and its effects on neighborhoods in New Orleans. The Parkway Partners Program is an organization in New Orleans, Louisiana that has tackled abandoned inner-city lots. The program is aimed at "cleaning up" vacant lots by setting up community gardens. As of

1995 the Parkway Partners Program is credited with the transformation of over 20 vacant lots into places of aesthetic value, and has saved the city of New Orleans over $35,000 in maintenance and cleanup expenses. According to Parkway Partners Program, cities must bear the cost of hauling away trash dumped by insensitive citizens, exterminating rodents and snakes, cutting overgrown weeds and patrolling. In Addition, cities suffer lost revenues due to decreasing property values.

Flo Schornstein, superintendent of the New Orleans Parkway and Park Commission, is convinced that community gardens in New Orleans have brought about enormous positive change to once blighted, crime stricken neighborhoods. In places where parents were once afraid to let their children play outside, people now know each other, trust one another and together have brought a sense of community to their neighborhoods. Burglaries are down, drug dealers have gone away and houses are being sold. Schornstein says that "we feel that if a neglected lot becomes desirable again from the revitalization that results from a community garden, the program has done its job" (Pottharst 1995).

Rockwell (1994) points out that cleaning up vacant lots in American cities has become a major focus of community garden organizations around the United States. Both Chicago and New York have initiated "Turn a Lot Around" programs that have experienced success. In the first two years of the program, Chicago renovated 50 vacant lots into community gardens which were managed and maintained by neighborhood residents.

New York and Chicago have set up composting centers. Citizens of the garden neighborhoods have organized programs that work with city trash collectors and recycling centers to collect manure, grass trimmings, food residuals and leaves. Once collected, the clippings are used as mulch and fertilizers. New York's Department of Sanitation estimates that households produce over 73,000 tons of food residuals each year, which, if diverted to gardens and yards would generate a $7 million savings over disposal in the Fresh Kills Landfill.

Anne Whiston Spirn, a Professor of Landscape Architecture and Regional Planning at the University of Pennsylvania, conducted a 1990 West Philadelphia Landscape Plan that utilized Community gardens "as a vehicle for reshaping entire neighborhoods" (Knack 1994). Spirn, in her research and data collection, found a shortage of parkland, lack of open yard spaces, and an abundance of vacant lots. Using geographic information system (GIS) software as a primary tool, Spirn and her students identified several existing vacant lots in West Philadelphia that were not suitable for structural development. The final plan recommended using these lots for stormwater detention and community gardens. Spirn pointed out that planners need to begin to look at community gardens as a realistic form of open space, "community gardens don't figure in most open space plans or most land-use maps," says Spirn (Knack 1994).

In many cities the community garden movement has become much more than a means to generate food, it has become a significant part of the urban open space system. In 1987 over 600 community gardens were identified in New York City alone. McCormick (1992) reported that the Pennsylvania Horticultural Society has turned over

650 blocks in Philadelphia into community gardens since 1975. In some cities, community garden projects are being established faster than official city park projects.

Francis (1989) stated that the success of community gardens has been found in more than just inner city neighborhoods. They have made significant contributions in the workplace, hospitals and schools. The Hewlett Packard Headquarters has over 450 employees that garden in six areas. Studies in hospitals suggests that some patients may recover faster when views of vegetation have been established. Schools have transformed schoolyards into gardens plots for students to construct, grow, and maintain gardens.

Francis (1987) reported some important findings in his study of how people use and value urban open spaces. He found a significant difference in perception between what city officials thought to be the needs of open space users and the actual needs of the users. Francis looked at both parks and community gardens in his study and he found that users of both parks and gardens emphasized the value of community gardens as a source of urban open space. Public officials were found to see community gardens as only a temporary solution to vacant lot problems.

Francis also pointed out that standard design principles that are often associated with professionally designed open spaces, such as parks, did not seem to be an important aesthetic ingredient. Both park and garden users recognized the gardens' aesthetic beauty regardless of their lack of traditional design principles. Francis did offer a possible explanation of this finding by pointing out that while gardens are not usually professionally designed using formal design principles, they do often incorporate order and rhythm because of the organized plots and plant growth.

Parks and plazas are a major component in urban open space systems. According to Francis, urban open spaces must fulfill the needs of the diverse urban population. Francis found that most city officials fail to recognize community gardens as a part of the urban open space system; therefore based on the popularity of the community garden, he questions whether or not the diverse needs of the urban population is being met. Francis reported some conceptual differences that might exist between park and garden users (see Figure 1).

Francis argues that the people involved with community gardens have a deep personal connection to the landscape. It is because of this personal connection that gardens often make an important contribution to a sense of community in neighborhoods for both the users of the gardens as well as visitors or passers-by.

Francis (1987, 1989) suggests that community gardens will continue to be an important part of the urban landscape. However, because they are not recognized by cities as an integral part of official open space systems, their long-term existence remains a question. He calls for future "systematic investigation of the benefits of urban gardens".

Some Cenceptual Differences Between park and "Garden" in the City

Park	Garden
Passive	Active
Quiet/Relax	Activity/Work
Be alone	Get together
Clean/Neat	Messy but cared for
To look at	To participte in
Built/Designed	Natural
Publicly-controlled/managed	User-controlled/managed
Permanent	Temporary
Relaxing	Renewing
Green attracts people	People attract people
Liked	Loved

(Source: Francis 1987)

Figure 1: Conceptual Differences Between City Parks and Gardens.

Similar Research

A thorough search for published literature and discussions with Sally McCabe, American Community Garden Association, and Ben Long, Cincinnati Civic Garden Center, have shown that, to date, there are no published studies estimating the effects of a community garden on real estate values. This lack has both a positive and negative impact on this study. Most importantly, the positive impact provides the opportunity to conduct a study that has the potential of making an important contribution to the community garden movement. However, due to the lack of research involving community gardens,

the researcher was forced to draw from similar studies to assist in developing a workable model with as few weaknesses as possible. For example, Hammer, Coughlin and Horn (1974), in their study of a urban park in Philadelphia, used multiple regression to estimate the effect of the park on real estate values. It was reported that the sales price of homes changed relative to the proximity to the urban park. As the distance from the park increased the sales price of the homes decreased compared to the homes that sold closer to the park.

Thibodeau (1990) in a more sophisticated study, used a hedonic equation (basically multiple regression) to study the effect of a high rise office tower on residential property values. The results of this study suggested that homeowners located within 2,500 meters of the tower benefit the most and the ones located 2,500 meters or greater from the tower benefited the least.

In a study of the effects of high voltage electric transmission lines on property values, Mailton and Schwann (1995), reported that properties adjacent to the transmission lines lose 6.3 percent of their selling price value. As one might expect, the sales price of the properties furthest away from the transmission lines were least affected.

CHAPTER 2

METHODOLOGY, DATA & STUDY AREA

Model

This study empirically analyzes the relationship of residential real estate values to an existing community garden. Drawing on the literature, a regression model was developed in an attempt to estimate the impact of the community garden on neighborhood residential property values.

Multiple regression has a long history of being utilized by researchers to estimate and/or explain change in real estate values (Li and Brown 1980). Real estate value is usually measured by a property's sales price and a multiple regression model can relate a set of characteristics to the measure. This can be generalized with the following multiple regression equation:

$$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} + e_i$$

where y_i is the dependent variable (sales price); β_0 is the intercept coefficient; $\beta_1 x_{1i} + \cdots + \beta_k x_{k_i}$ describe the independent variables and their coefficients; and e is the error term.

This methodology has proven to be successful in explaining changes in property values as a result of such things as soil conservation (King and Sinden 1988), electric power plants (Blomquist 1974), homes for the mentally disabled (Galster and Williams 1994) and many others. As was mentioned in the literature review above, the model has played an important role in estimating the value of recreation and open space systems. Correll, Lillydahl, and Singell (1978), in their study of the effects of greenbelts on residential property values, reported that distance from greenbelts have a statistically significant negative impact on residential real state prices. In fact, the study concluded that with all variables used in the regression model remaining constant, there was a $4.20 decrease in price for every foot one moves away from the greenbelt.

Schroeder (1982) researched the relationship of residential property values and local park and recreation services. The study used a multiple regression model in an attempt to determine if residential property sales price changed as a result of a change in acreage of park land per 1,000 population. It was reported that there was no evidence in support of a relationship between the two variables.

Data

Throughout the literature a group of variables have been identified and proven to be statistically significant in describing change in real estate values. Although some models are more sophisticated, many models found in the research involve similar characteristics (Correll et al. 1978; Schroeder 1982).

The property characteristics included in this study are: LOT SIZE, YEAR BUILT, SPACE, ROOMS, GARAGE, FIREPLACE, BASEMENT, BRICK, DISTANCE, BEFORE/AFTER GARDEN, SALES DATE and SALES PRICE. (For a complete description of the variables and their sources see Figure 2 below.) The selection of variables was primarily based on data availability and the literature.[3]

Selection of Study Area

The study area (garden neighborhood) was selected from all gardens built within the City of Cincinnati between 1980 and 1990. The list of gardens was generated by Ben Long, the director of the Cincinnati Civic Garden Center. The reason for looking at only gardens established between 1980 and 1990 was based on the availability of data. Initially the intent was to randomly select a garden area that was representative of all the gardens built between 1980 and 1990. However, after evaluating the 1980 and 1990 U.S. census data of all the census tracts in which the gardens reside, it was determined that the random selection of the study area was not the best methodology for this study. This was primarily due to the low percentage of owner occupied units within the garden tracts. The

[3] See Chapter IV - Analysis, for specifics regarding methodology and data.

1990 mean percentage of owner occupied units was 15.3 percent.[4] In an attempt to estimate the most accurate effect on sales price it was thought to be best to select a garden area with the highest percentage of owner occupied units. It was assumed that owners living in their purchased units are more likely to consider the proximity of a community garden than owners that are not living in their unit. Furthermore, since this study looks at every residential unit within a two (2) block radius of the garden it is considered a population and not a sample; therefore, the results and conclusions that stem from this study will only pertain to the selected garden and no generalities can be made regarding other gardens.[5]

[4] See Appendix A for U.S. 1990 census data.
[5] See Chapter III - Neighborhood Characteristics for a complete description of the selected study area.

Variable	Desription	Source
SALES PRICE	Sales Price	County Recorder's Office
SALES DATE	Date of Sale - Last 2 digits of the year (all started with 19__) 65,71..	County Recorder's Office
DISTANCE	Straight-line distance from garden.	Estimated county plat maps.
LOT SIZE	Lot size in number of quare feet.	County Auditor's Office
YEAR BUILT	Year structure was built.	County Auditor's Office
SPACE	Amount of living area in square feet.	County Auditor's Office
ROOMS	Number of rooms.	County Auditor's Office
GARAGE	Dummy Variable - 0 = no garage, 1 = garage	County Auditor's Office
FIREPLACE	Dummy variable - 0 = no fireplace, 1= fireplace.	County Auditor's Office
BASEMENT	Dummy variable - 0 = no basement, 1 = basement	County Auditor's Office
BRICK	Dummy variable - 0 = no brick construction, 1 = brick construction	County Auditor's Office
B/A GARDEN	Dummy variable - 0 = sold before garden was built (1986), 1 = after	County Auditor's Office

Figure 2: Variables Included In This study and Their Sources.

CHAPTER 3

NEIGHBORHOOD CHARACTERISTICS

The Community of Madisonville

The focus of this study is on a vacant lot community garden located in Madisonville, a Northwest section of Cincinnati, Ohio (see Figure 4). According to the U.S. 1990 census and the Cincinnati City Planning Department, some descriptive characteristics of the Madisonville community are as follows:

Madisonville Community Characteristics	
Population	12,216
% Pop. White	39%
% Pop. Black	60%
% Pop. Other	1%
Avg. H.H. Income	$26,374
Total Housing Units	5,225
% Owner Units	49%
(Source: 1990 U.S. Census)	

Figure 3: Madisonville Characteristics.

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Location of Garden

The vacant lot community garden is located at 6008 Madison Road , one-half block East of Ward Road. The lot in question is delimited to the north by Madison Road, the south by Prentice Road, the east by Mathis Road and the west by Ward Road. The garden lot is 29.50 feet wide and 148.50 feet deep. The structures adjacent to the garden and located on Madison Road are a mix of commercial, and both single-family and multi-family residential units (see Figure 5 and 6). Most commercial units are located on the ground floor level and many have residential units above. Most structures immediately south and north of the garden lot and which are not on Madison Road are detached single-family houses (Figure 7).

1990 Population and Household Characteristics

The U.S. 1990 census maps were used to locate the census tract in which the garden lot is located. According to the U.S. 1990 Census of Population and Housing, tract 55, the garden neighborhood has a population of 4,750 persons. Of those persons, 77.9 percent were black, 21.5 percent were white and less than 1 percent were of other origin. Just under 30 percent of the population was under 18 years of age, approximately 29 percent was between 25 and 44 years of age and 18.7 percent was over 65. There was 1,994 households within the tract, 29.9 percent of them were reported as family households and there was an average of 2.36 persons per household. The median household income was $17,696 and approximately 15 percent received public assistance. In 1989 over 60 percent of the population was below poverty level.

Suspected Missing Page 23

Figure 5: Madison Road -East of Garden

Figure 6: Madison Road - West of Garden

Figure 7: Single Family Houses Adjacent To Garden

Madisonville Garden - A Look At Before and After The Garden

The Madisonville community garden was built in 1986 with the help of the Cincinnati Civic Garden Center and the neighborhood community. To get a better understanding of the changes that the neighborhood has incurred, neighborhood characteristics from both before and after the garden was built were compared. The garden was established in 1986, therefore the 1980 U.S. Census was used to examine the

pre-garden characteristics and the 1990 U.S. Census was used to examine the post-garden characteristics.

According to the census tract data the Madisonville garden neighborhood experienced little change in the 1980's regarding population and household characteristics. Population decreased approximately 4 percent from 4,956 in 1980 to 4,750 by 1990. Racial makeup remained relatively the same; white population decreased from 23.7 percent in 1980 to 21.5 percent in 1990; black population increased from 75.5 percent in 1980 to 77.9 percent in 1990. The median age of the community increased from 30.2 years in 1980 to 33.1 years by 1990. The most evident change occurred in median household income; increasing 33.8 percent over the 10 year span (see Figure 8).

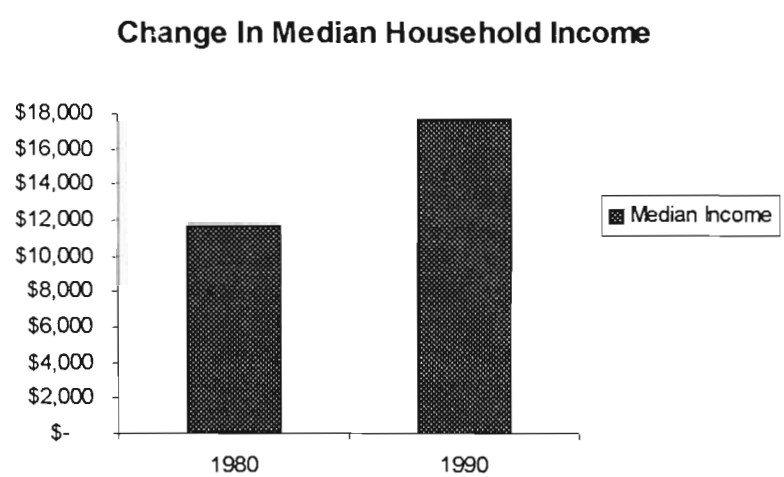


Figure 8: Neighborhood Median Household Income 1980-1990

Changes in housing characteristics was more apparent than population and household characteristics. Median house value increased 36.3 percent during the 1980's (see Figure 9). More than one-hundred (100) housing units were created, the number of vacant units increased and the number of owner occupied units decreased (see Figure 10) between 1980 and 1990. [7]

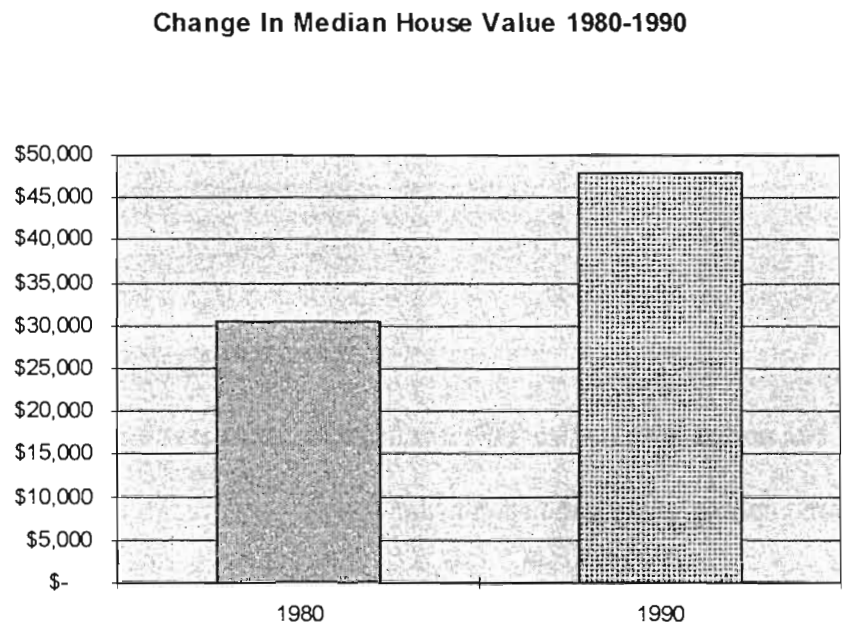


Figure 9: Change in Median House Value 1980-1990

[7] See Appendix A for both 1980 and 1990 U.S Census data used in calculations.

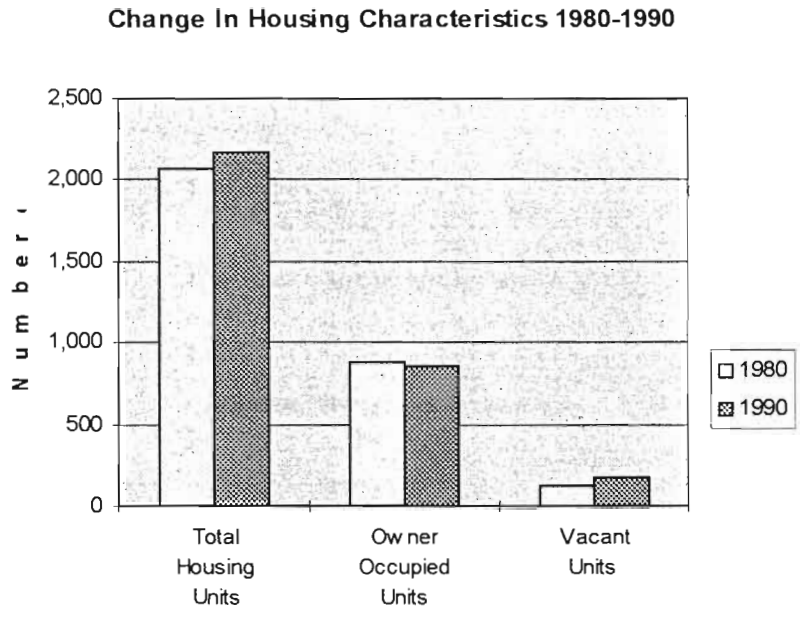


Figure 10: Change In Housing Characteristics 1980-1990

Changes Adjusted For Inflation

Above a comparison was made between the 1980 census information and the 1990 census information for the tract in which the Madisonville community garden resides. Population and race were found to remain relatively the same. Neighborhood housing vacancy rates increased and percent owner occupied housing units decreased. One of the most interesting findings from the comparison was the increases in median household income and house value. Income rose 33.8 percent and average house value rose 36.3 percent. One might speculate that there is a possibility that the community garden might have influenced these changes. Therefore to provide a more accurate comparison, the

1980 values for both income and house value were calculated into 1990 dollars.[8] According to the 1990 dollar calculation, median household income decreased from 1980 to 1990 (see Figure 11).

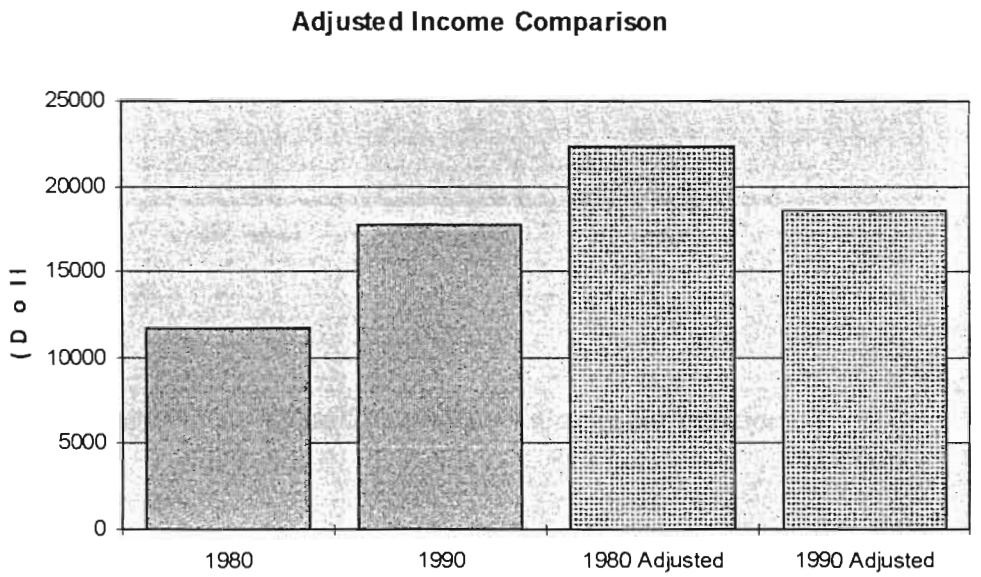


Figure 11: Income Comparison Adjusted For Inflation

Much like median household income, once adjusted average house value also is higher in 1980 than in 1990 (see Figure 12).

[8] The Annual Statistical Abstracts of the United States was used to adjust these values.

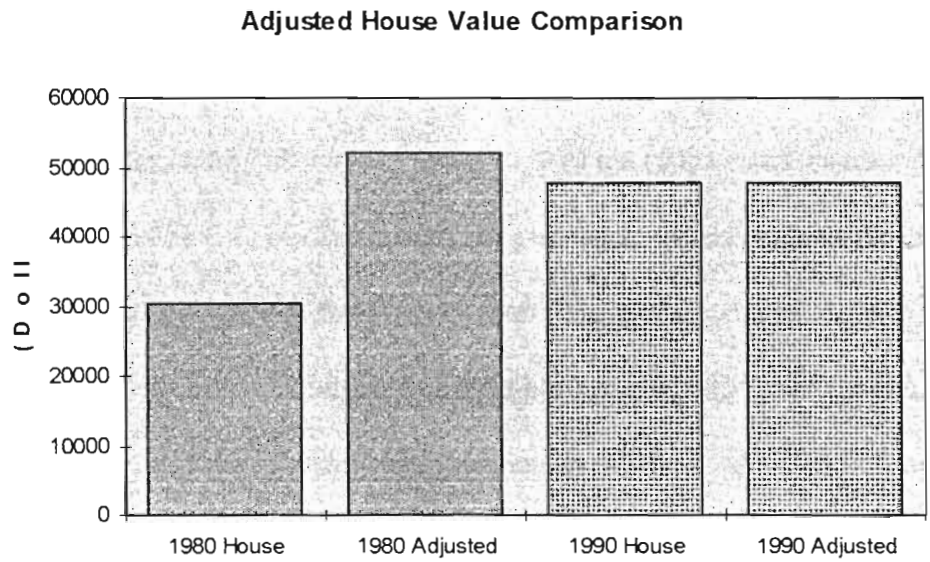


Figure 12: Average House Value Comparison Adjusted for Inflation

The objective of this comparison is simple. Although the census data depicted an increase in both income and house value in real dollars it is not true. One might have speculated the garden positively affected these values. Although it appears the community garden has not had a positive effect on income and house value, one must recognize, that the assumption can not be made that it has had a negative effect. A more detailed study is needed to determine such effects.

Madisonville Garden Compared To Nine Other Community Gardens

The demographic and socioeconomic characteristics of the Madisonville community garden neighborhood are similar to other vacant lot community garden neighborhoods in Cincinnati. Between 1980 and 1990 ten (10) vacant lot community gardens were built in the City of Cincinnati. They were located throughout the city and all were started with the guidance of the Civic Garden Center of Cincinnati. As was mentioned above (Selection of Study Area), an important deciding factor for choosing the Madisonville garden was the relatively high percentage of owner occupied housing units. Initially a concern with this selection methodology was homogeneity. Hypothetically, if the garden selected did not represent, in general characteristics, many of the other vacant lot community gardens built during the same time period, how could one even speculate that the results from this study might apply to the other gardens in Cincinnati? However, because of the very nature of this study its results and conclusions apply only to the Madisonville garden and the 2 block study area in which the study was conducted; therefore, homogeneity is not an issue.[9] Nevertheless, it seems appropriate - in the sense that similar future studies might find it useful - to report the neighborhood characteristics of the nine (9) other community gardens and how they compare to the Madisonville garden area. It also begins to explain the types of communities in which Cincinnati community gardens have been successful in. The term 'successful' is defined by the Cincinnati Civic Garden Center as any garden that has a life-span over three (3) years.

Using the 1990 U.S. Census Data, the tracts of the nine (9) other gardens built between 1980 and 1990 were analyzed. The Madisonville census tract was found to be

similar in some aspects and different in others (see Figure 13). Madisonville is similar in regards to race, the ratio between population and housing units and median age. A significant difference is evident between median income, median house value and percent owner occupied. As one might suspect, the data suggests that these variables might be correlated. When each tract is looked at individually the tracts with the highest percent of owner occupied units also have the highest median incomes and median house values (see Figure 14).

Characteristic	Madisonville	All Others
Population	4,750	2,477
% White	21.5%	26.7%
% Black	77.9%	73%
Median Age	33.1	27.9
Median Income	$ 17,696	$ 5,008
Total Housing Units	2,167	1,218
Median Value	$47,900	$ 34,500
% Vacant	7.9%	16.9%
% Owner Occupied	42.8%	12.5%

(Source: 1990 U.S. Census)

Figure 13: Comparison Between Madisonville and All Other Gardens Built 1980-1990.[10]

[9] See Chapter 2, Selection of Study Area for a more detailed discussion.

[10] All Others - The variables not labeled as Median were calculated as means. See Figure 15 for original data.

All Community Gardens Built Between 1980-1990

Garden Tract	Madisonville	West End	OTR*	OTR*	Mt. Auburn	OTR*	Walnut Hills	N. Fairmont	OTR*	OTR*
Population	**4,750**	2,630	1,594	2,312	2,204	2,346	1,968	5,334	1,594	2,312
% White	**21.5%**	3%	53%	20.4%	43.6%	19.6%	1.8%	25.8%	53%	20.4%
% Black	**77.9%**	99%	46%	78.6%	55.5%	79.7%	97.8%	73.1%	46%	78.6%
Median Age	**33.1**	16.7	29.8	27.9	28.1	23.8	35.7	20.6	29.8	27.9
Median Income	**$17,696**	$ 4,999	$ 5,008	$ 4,999	$ 22,939	$ 9,024	$7,203	$8,276	$ 5,008	$ 4,999
Total Housing Units	**2,167**	1,059	938	1,453	1,030	1,036	1,031	2,025	938	1,453
Median Value	**$47,900**	0	$ 55,000	$23,500	$ 59,400	$ 37,500	$34,500	$32,500	$55,000	$23,500
% Vacant	**7.9%**	10%	20%	23.4%	13.1%	17.3%	12.2%	13.1%	20%	23.4%
% Owner Occupied	**42.8%**	0.5%	3.7%	2.2%	35.3%	18.8%	14.1%	32.0%	3.7%	2.2%

* Gardens are located in a district called "Over The Rhine" (OTR) and are different gardens located on different streets.

(Source: 1990 U.S. Census)

Figure 14: Neighborhood Characteristics - All Gardens Built 1980-1990

The comparison above, regarding the Madisonville garden and nine other gardens built between 1980 and 1990, was made with only gardens that were in existence at the time of this study. It must be noted that there were other gardens started between 1980 and 1990 that failed. According to the Cincinnati Civic Garden Center, four gardens started between 1980 and 1990 failed sometime between 1980 and 1993. Some failed due to the lack of funding and others were destroyed by development. Because the gardens did not exist at the time of this study, they were not included when comparing all gardens and the Madisonville garden.

As mentioned earlier, the Cincinnati Civic Garden Group considers any vacant lot community garden that lasts over three years a successful garden. One might ask why some gardens last longer than others. Ben Long, Director of the Cincinnati Garden Center, believes that the longevity of community gardens is dependent on factors such as the length of the agreement between the owner and the community, community involvement, funding and developmental pressure. One of the reasons many of the gardens have lasted so long in Cincinnati is because most are built in older, poorer neighborhoods where once a lot becomes vacant, it tends to stay vacant for a long period of time. Based on the literature that talks about the benefits that community gardens are said to bring (e.g. reduced crime, increased property values, sense of community), maybe it is a good sign when a community garden is replaced by development.

CHAPTER 4

DATA & ANALYSIS

Population

Initially the number of residential properties selected for this study was higher than the number included in the study. As was mentioned before all residential properties within a two block proximity, of the garden were selected. This included 115 properties. However, once the parcel numbers were obtained and entered into the Hamilton County Auditor's computer database, it was discovered that 29 properties were commercial properties rather than residential; therefore, they were excluded. Furthermore 23 properties were discarded due to the lack of legitimate sales information. In all approximately 55 percent of the original properties within the two block proximity were included in the study.

Independent Variables

The analysis involved relating residential sales price to an array of independent variables using multiple regression. The group of independent variables were selected based on the availability of data, but more importantly, on their ability to explain or

control variation in sales price which might otherwise mistakenly be attributed to the distance from garden variable. Although all the independent variables are of interest, the focus of this study is primarily on the distance variable and its effect on sales price.

The distance to the community garden (DISTANCE) is a straight line distance and was estimated using scaled plat maps from the Hamilton County Auditor's office. As mentioned in Chapter II, Methodology, Data & Garden Selection, the study area is a two block proximity from the Madisonville community garden. The proximity was restricted to two blocks because it was felt that unlike parks or other larger recreational spaces, the people using the community garden are primarily residents that live within two blocks of the garden. This assumption was made after talking with neighborhood residents. All distances were measured at a scale 1 inch equals 50 feet. The distance was entered into the data base and used in the regression model. As a preliminary study of the relationship between the distance to park variable and sales price, the data collected for these two variables was plotted on a scatter plot using the Microsoft Excel 7.0 (see Figure 15). According to the graph and trendline produced by Excel, the relationship appears to be somewhat linear. The positive slope suggests that sales prices increase at greater distances from the garden. However, one must understand that this relationship is between the distance variable and sales price only and does not take into account all other variables that might affect price. The regression model considers all independent variables, therefore it is possible that a relationships can change.

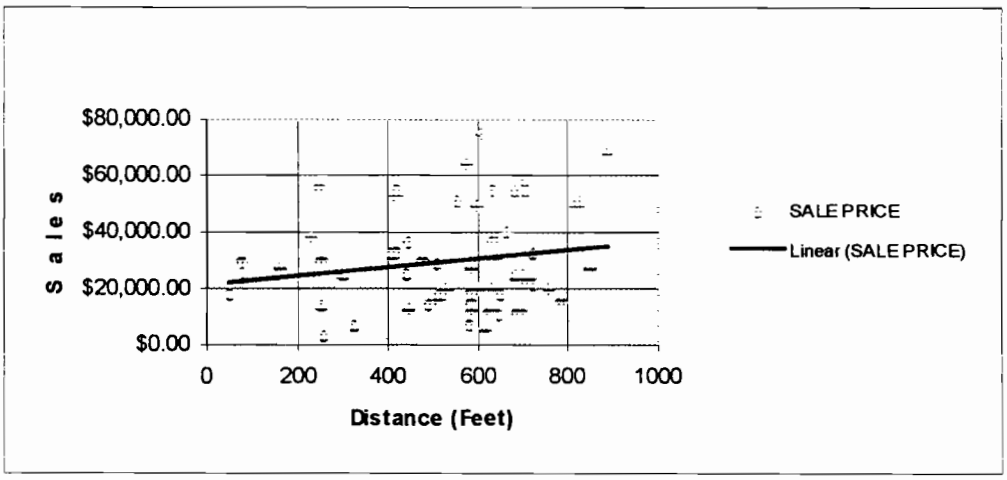


Figure 15: Relationship Between Sales Price and Distance to Garden

There are several independent variables, besides the distance variable, formulated and used in the analysis in an attempt to best describe residential sales price. These include: sales date, lot size, year built, square feet of living space, number of rooms, as well as four dummy variables: garage, fireplace, basement, brick and whether the sale took place before or after the garden was established. A dummy variable is a categorical variable that takes on only the values of 0 or 1. For example, the FIREPLACE dummy variable was assigned a value of 0 for not having a fireplace in the unit or 1 for having a fireplace in the unit.[11] All independent variables, except for the distance to

[11] See Chapter II - Figure 2 for values of all dummy variables.

garden variable and sales date variable were collected from the data supplied on parcel CAMA cards printed from the Hamilton County Auditor's office located in Cincinnati, Ohio.[12]

The average house in the study is 96.9 years old, has 1,4917 square feet of living space, and 6.3 rooms. Forty percent have either an attached or detached garage, 6 percent have fireplaces, 94 percent have basements and 25 percent are of brick construction.

Dependent Variable & Sales Information

The dependent variable, sales price, and the independent variable, sales date, were recorded from records obtained from the Hamilton County Auditor's Office and the Hamilton County Recorders Office. All sales information before 1980 was collected from the property transfer deeds.[13] To help control for present value discrepancies regarding sales price, the sales date was included in the analysis as an independent variable. Since all sales dates used in the analysis took place in the twentieth century, only the last two digits of the year were used in the analysis. For example a sale that occurred in 1980 was coded as an 80.

All residential properties used in this study have selling dates between 1960 and 1997. The average sales price for all properties during this time was $29,329.00. Forty-five percent of the sales occurred before the garden was built (1960-1985), 52 percent

[12] See Appendix B for sample of CAMA card.

[13] The Hamilton County Auditor's Computer system and data recording methodologies have experienced change over the past two decades. Due to these changes, not all information collected for this study was obtained from the CAMA cards printed from the auditor's system. For example, all sales prices and sales dates for years before 1980 were obtained from the Hamilton County Recorder's office. All properties between 1980 and 1993 were obtained from the Hamilton County Auditor's office data card files and all properties sold after 1993 were collected from the Auditor's printed CAMA cards.

sold after the garden was built (1987-1997) and 3 percent sold the year the garden was built (1986). The average selling price before 1986 was $18,561 and after 1986 it was $39,053.

The sales prices were calculated for the last five years prior to the garden built year (1986) and the first 5 years after. Between 1981 and 1985 the average selling price was $24,058 and between 1987 and 1991 it was $39,053. Using adjustment figures from the Consumer Price Index for each year, the average sales prices in 1990 dollars, were calculated (see Figure 16). Between 1981 and 1985 the average sales price was $4,499 or 20% less than the average sales price for 1987 through 1991.

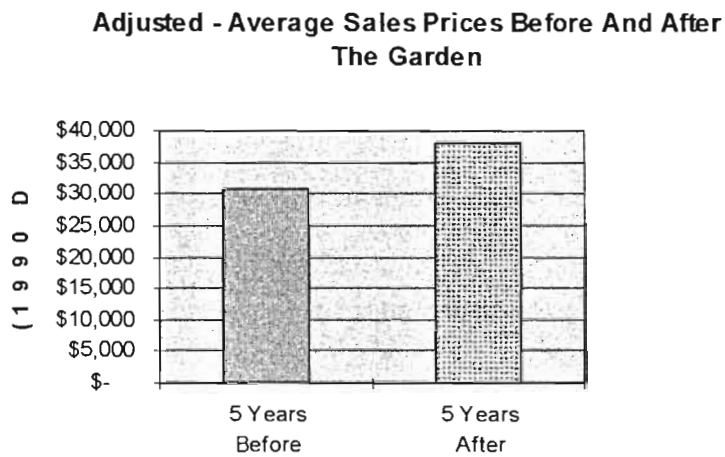


Figure 16: Average Sales Prices Before and After the Garden

CHAPTER 5

EMPIRICAL RESULTS

The primary focus of this study was to try to answer the question of whether or not the Madisonville vacant lot community garden has affected residential property values. The results associated with the regression model will ultimately help answer that question.

Regression

This study utilizes the ordinary least square method of regression to estimate the relationship between sales price and distance to a vacant lot community garden. As previously mentioned, a set of independent variables were also included to help explain sales price. These variables were necessary so that their effects would not be mistakenly attributed to the distance to garden variable. Using Microsoft Excel 7.0, Statistical Data Analysis, multiple regression was performed. An R^2 of .5900 was obtained with all 11 variables included in the equation (see Figure 17).

Regression Statistics	
Multiple R	0.76815538
R Square	0.59006269
Adjusted R Square	0.49987649
Standard Error	12169.9813
Observations	62

Figure 17: Regression Statistics

Several different variables were added to or deleted from the regression to examine the effect on the R^2 but most did not produce any significant change. The most noticeable change was produced with the addition of the GARAGE variable. Without GARAGE the R^2 was .5062 and with GARAGE it was .5900, therefore, it was included in the final regression.

Coefficients

There are several other variables, according to the regression results, found to affect residential sales prices in this study (see Figure 18). The results are generally, not entirely consistent with one's expectation regarding variable signs. YEAR BUILT positively affects price with a coefficient of $93.57. This was expected and one could

assume that this could at least partially, be due to inflation. However, since the year of the sale was also included in the regression inflation should be accounted for. ROOMS was found to have a $2280.70 increase for each additional room and GARAGE was found to affect price positively by $12,244.60. The most unexpected result was BASEMENT. It was expected that basement would positively affect price. However, the results show that BASEMENT had a $5,719.52 negative impact on residential sales price. The variable with the most impact on residential sales price was the before and after garden variable (B/A GARDEN). This variable was a dummy variable that identified the sale as occurring before the garden was built - before 1986 - or after the garden was built. According to the coefficient produced by the regression, sales that occurred after the garden was built were $21,003.51 higher than sales that occurred before the garden was built. Although this variable was expected to have a positive sign, the magnitude of the coefficient was not expected and may reflect the relatively small number of cases.

DISTANCE Variable

According to the regression results, distance from the community garden does have a negative effect on residential property values. Assuming all other variables being equal, there was a $8.57 decrease in sales price for every foot one moves away from the community garden. To illustrate this finding more clearly, consider the following example: assuming all other variables remain constant, the average residential property located at the average distance (525 feet) from the garden, at the average sales price ($29,329),

would sell for $2,785 more or a total of $32,114 if located at 200 feet from the garden. That same residential property, if located at 800 feet away would sell for $26,972.

Variables	*Coefficients*
Intercept	-184361.41
DISTANCE	-8.5674478
SALE DATE	0.12862422
LOTE SIZE	2.19397131
YEAR BUILT	93.5701963
SPACE	-1.3747357
ROOMS	2280.6983
GARAGE	12244.5932
FIREPLACE	1102.86093
BSMT	-5719.5178
BRICK	-441.85482
B/A GARDEN	21003.5131

Figure 18: Regression Coefficients

CHAPTER 6

CONCLUSIONS

At this point it seems appropriate to ask the question that provoked this study: Do community gardens affect residential property values? The conclusion cannot be made that all community gardens or even all community gardens in Cincinnati, Ohio affect residential property values. What can be concluded is that the results of this study provide evidence that the Madisonville vacant lot community garden has affected neighborhood residential property values. The results coincide with the hypothesized results that residential properties located near the garden lot sell for a higher price than ones located further away and that properties sold since the garden was built sell for higher prices. As reported earlier, this study has shown that the value of residential property decreases $8.57 every foot one moves away from the garden. To further substantiate this finding lets consider the before and after variable (B/A GARDEN) included in the regression. Although the DISTANCE variable is a very important finding, the $21,003.51 increase in sales prices for properties sold after the garden was built is equally important. The result suggests that the community garden not only affects residential property based on

proximity but it also has a positive effect on all sales that were made after the garden was built (1986). Furthermore, it strengthens the validity of the DISTANCE variable by emphasizing the fact that the community garden does have an effect on sales price. How far away this effect is evident is limited to the location of the property located furthest away. There are several factors not included in this study that could have individually or in combination affected the results.

Other recreational spaces, such as parks and other community gardens, could have affected the results of this study. It was recognized that residents from other jurisdictions have the opportunity to infringe on recreational spaces of other jurisdictions. However, based on observations from both city maps and county plat maps at the start of this study it was determined that no such spaces fell within the two block study area. That is not to say that a park or some other recreational space at a greater distance than two blocks were not present and could not have affected the results. The proximity to shopping centers and other public goods might have affected the results and were not considered in this study. However, based on the literature of previous similar studies these goods would seem to have little effect on this particular study. The fact that a community garden is a unique recreational space and is used primarily by nearby neighborhood residents and the fact that shopping facilities and other such public goods are more abundant than gardens, the assumption was made that residents would bid up or bid down residential property based on nearness to the garden and not other such goods.

As mentioned earlier, the total number of residential properties included in this study was initially higher, but because of the lack of sales information and the changing of

several properties from residential use to commercial use, several were excluded. The assumption cannot be made that the results of this study would have been the same if all properties were included or that it would be the same for rental properties.

The results of this study suggests that the Madisonville community garden has affected residential property values. It begins to evaluate a community garden's effect and raises several policy questions. If the value of residential property increases near a garden, is it recognized by policy makers as a tax generating public good? If more tax is being generated what does this say about small neighborhood recreational spaces and particularly community gardens? Furthermore, although the lot in which the garden is located is owned and donated by the City of Cincinnati and there is lost tax revenue due to this donation of city land, is it an investment by the city to generate higher tax revenues? Based on the literature surrounding the idea that many municipalities fail to recognize community gardens for their public good it seems appropriate to conclude that the City of Cincinnati does not recognize the Madisonville garden as an investment. However, assuming the results of this study are valid and despite the ignorance of the municipality, the donation of city land and the externality of increased property values - and increased tax revenue - it is an unrecognized investment. The increased tax revenue generated would seem to outweigh the money lost by the city if the lot remained vacant. It also saves the city clean up, maintenance and policing costs.

The findings in this study are consistent with the results found in other studies involving open space and residential property. Lillydahl, and Singell (1978), in their study of the effects of greenbelts on residential property values found a $4.20 decrease in sales

price for every foot from the greenbelt. There have been several studies similar to this study but never one involving a community garden.[14] This study is a step forward in documenting the effects of community gardens. However, it provides evidence that can only apply to the Madisonville garden. Additional studies are needed in order to begin to make any generalizations regarding community gardens' effects. A study of more than one garden in a geographic area will build on this foundation which when strengthened might provide the evidence and justification needed for larger state by state studies. After evaluating the results of this study - particularly the before and after variable - it is suggested that future studies examine more closely the before and after effects of gardens. It would be interesting to see a study comparing the results of two analyses for one garden: one addressing the sales data for before the garden was built and one addressing the data after the garden was built.

An important contribution that this study provides is an optimistic basis for others to study community gardens and their effects. Property values are only one aspect of research that needs to be studied further to begin to understand and document the effects of community gardens. According to the American Community Garden Association, the most important research topics include: how community greening projects relate to city open space plans and policies; what participatory planning and design approaches are most successful; how is community gardening being used as for self empowerment and what are the best ways to develop constituencies and research money sources. Understanding and documenting these effects are important because it provides an addition to the knowledge

[14] See Chapter 1 & 2 for similar research.

base from which planners, landscape architects and policy makers draw from when developing plans and policies that have an impact on city neighborhoods. It could provide the opportunity for community gardens to be recognized as a viable source to aid in community development, increase tax revenues and enhance recreational and open space systems.

The value of the Madisonville community garden to neighborhood residents is difficult, if not impossible, to measure. To fully understand and draw conclusions regarding the community garden's sociological effects and property value effects, requires further research. However, this study has demonstrated and documented sufficient effects to encourage further research.

APPENDIX A

Neighborhood Characteristics

Madisonville Garden - 1990 Census Tract Characteristics

1990 Census of Population and Housing
040 Ohio
050 Hamilton County
140 **Tract 55**

Total population	4,750
SEX	
Male	2,100
Female	2,650
AGE	
Under 5 years	388
5 to 17 years	997
18 to 20 years	168
21 to 24 years	203
25 to 44 years	1,373
45 to 54 years	359
55 to 59 years	182
60 to 64 years	194
65 to 74 years	492
75 to 84 years	292
85 years and over	102
Median age	33.1
Under 18 years	1,385
Percent of total population	29.2
65 years and over	886
Percent of total population	18.7
HOUSEHOLDS BY TYPE	
Total households	1,994
Family households (families)	1,129
Married-couple families	597
Percent of total households	29.9
Other family, male householder	70
Other family, female householder	462
Nonfamily households	865
Percent of total households	43.4
Householder living alone	801
Householder 65 years and over	452
Persons living in households	4,707
Persons per household	2.36
GROUP QUARTERS	

Persons living in group quarters	43
Institutionalized persons	34
Other persons in group quarters	9
RACE AND HISPANIC ORIGIN	
White	1,024
Black	3,699
Percent of total population	77.9
American Indian, Eskimo, or Aleut	5
Percent of total population	0.1
Asian or Pacific Islander	13
Percent of total population	0.3
Other race	9
Hispanic origin (of any race)	19
Percent of total population	0.4
Total housing units	2,167
OCCUPANCY AND TENURE	
Occupied housing units	1,994
Owner occupied	853
Percent owner occupied	42.8
Renter occupied	1,141
Vacant housing units	173
For seasonal, recreational, or occasional use	7
Homeowner vacancy rate (percent)	2
Rental vacancy rate (percent)	7.8
Persons per owner-occupied unit	2.57
Persons per renter-occupied unit	2.21
Units with over 1 person per room	107
UNITS IN STRUCTURE	
1-unit, detached	986
1-unit, attached	34
2 to 4 units	459
5 to 9 units	149
10 or more units	514
Mobile home, trailer, other	25
VALUE	
Specified owner-occupied units	717
Less than $50,000	392
$50,000 to $99,000	308

$100,000 to $149,000	14
$150,000 to $199,999	2
$200,000 to $299,999	1
$300,000 or more	0
Median (dollars)	47,900

CONTRACT RENT

Specified renter-occupied units paying cash rent.	1,091
Less than $250	498
$250 to $499	580
$500 to $749	13
$750 to $999	0
$1,000 or more	0
Median (dollars)	261

RACE AND HISPANIC ORIGIN OF HOUSEHOLDER

Occupied housing units	1,994
White	572
Black	1,413
Percent of occupied units	70.9
American Indian, Eskimo, or Aleut	3
Percent of occupied units	0.2
Asian or Pacific Islander	5
Percent of occupied units	0.3
Other race	1
Hispanic origin (of any race)	4
Percent of occupied units	0.2

INCOME IN 1989

Households	1,977
Less than $5,000	250
$5,000 to $9,999	357
$10,000 to $14,999	276
$15,000 to $24,999	389
$25,000 to $34,999	283
$35,000 to $49,999	233
$50,000 to $74,999	131
$75,000 to $99,999	33
$100,000 to $149,999	25
$150,000 or more	0

Median household income (dollars)	17,696

Families	1,114
Less than $5,000	88
$5,000 to $9,999	64
$10,000 to $14,999	147
$15,000 to $24,999	269
$25,000 to $34,999	199
$35,000 to $49,999	179
$50,000 to $74,999	110
$75,000 to $99,999	33
$100,000 to $149,999	25
$150,000 or more	0
Median family income (dollars)	24,360
Nonfamily households	863
Less than $5,000	162
$5,000 to $9,999	302
$10,000 to $14,999	120
$15,000 to $24,999	159
$25,000 to $34,999	68
$35,000 to $49,999	40
$50,000 to $74,999	12
$75,000 to $99,999	0
$100,000 to $149,999	0
$150,000 or more	0
Median nonfamily household income (dollars)	9,082
Per capita income (dollars)	9,320
INCOME TYPE IN 1989	
Households	1,977
With wage and salary income	1,174
Mean wage and salary income (dollars)	25,593
With nonfarm self-employment income	105
Mean nonfarm self-employment income (dollars)	21,766
With farm self-employment income	0
Mean farm self-employment income (dollars)	0
With Social Security income	880
Mean Social Security income (dollars)	6,769
With public assistance income	296

Mean public assistance income (dollars)	3,445
With retirement income	377
Mean retirement income (dollars)	7,472
POVERTY STATUS IN 1989	
All persons for whom poverty status is determine	4,764
Below poverty level	1,263
Persons 18 years and over	3,414
Below poverty level	724
Persons 65 years and over	892
Below poverty level	203
Related children under 18 years	1,350
Below poverty level	539
Related children under 5 years	353
Below poverty level	134
Related children 5 to 17 years	997
Below poverty level	405
Unrelated individuals	1,010
Below poverty level	359
All families	1,114
Below poverty level	209
With related children under 18 years	637
Below poverty level	196
With related children under 5 years	292
Below poverty level	108
Female householder families	418
Below poverty level	175
With related children under 18 years	311
Below poverty level	169
With related children under 5 years	134
Below poverty level	88
Percent below poverty level:	
All persons	26.5
Persons 18 years and over	21.2
Persons 65 years and over	22.8
Related children under 18 years	39.9
Related children under 5 years	38

Related children 5 to 17 years	40.6
Unrelated individuals	35.5
All families	18.8
With related children under 18 years	30.8
With related children under 5 years	37
Female householder families	41.9
With related children under 18 years	54.3
With related children under 5 years	65.7

Madisonville Garden - 1980 Census Tract Characteristics

1980 Census of Population and Housing
040 Ohio
050 Hamilton County
140 **Tract 55**

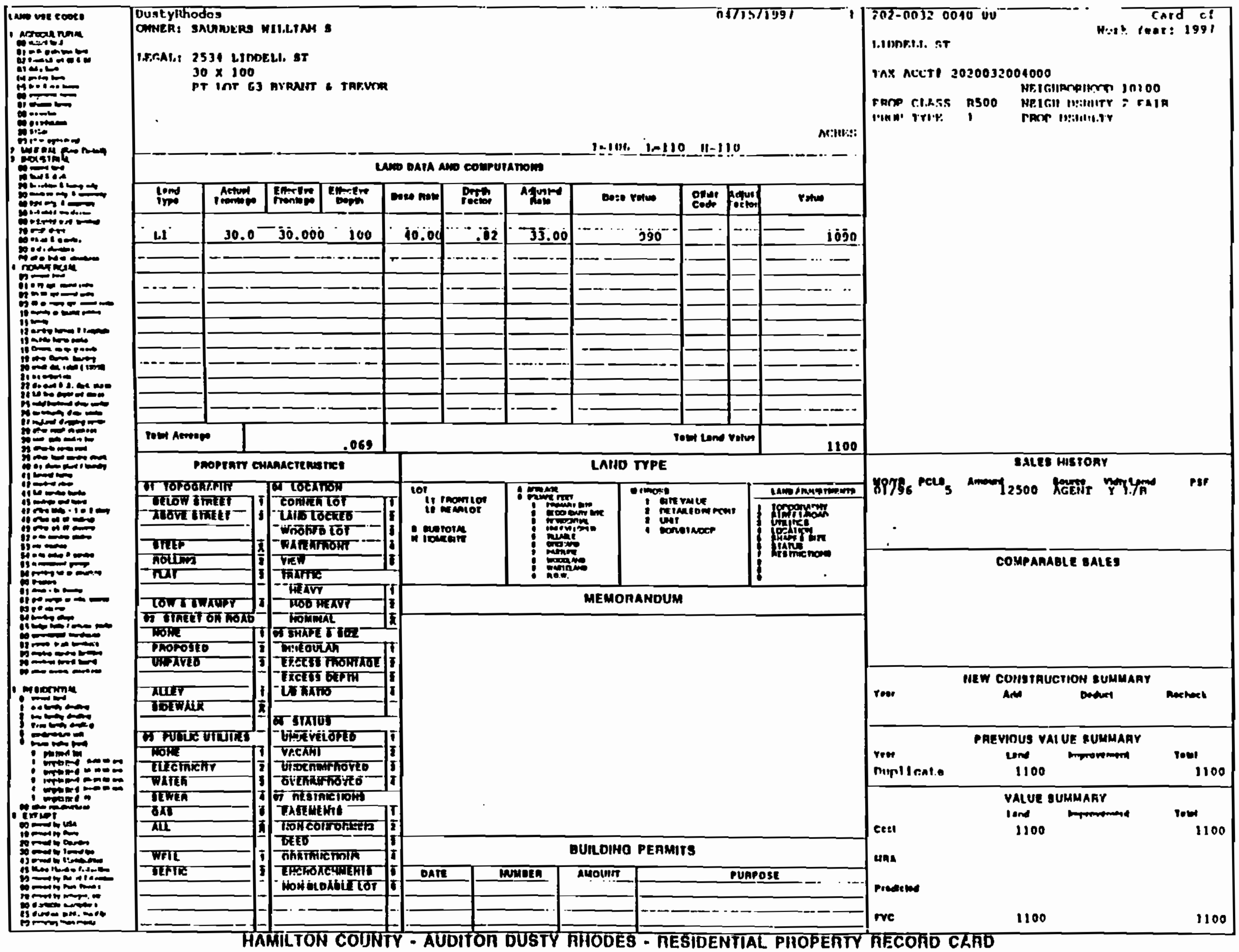
Total population	4,956
SEX	
Male	2,219
Female	2,737
AGE	
Under 5 years	394
5 to 9 years	397
10 to 14 years	356
15 to 19 years	441
20 to 24 years	431
25 to 34 years	758
35 to 44 years	410
45 to 64 years	431
55 to 64 years	566
65 to 74 years	461
75 years and over	339
Median age	30.2
Under 18 years	1,588
Percent of total population	32.0
65 years and over	800
Percent of total population	16.1
HOUSEHOLDS BY TYPE	
Total households	1,939
Family households (families)	1,191
Married-couple families	766
Percent of total households	39.5
Other family, male householder	
Other family, female householder	407
Nonfamily households	748
Percent of total households	38.5
Householder living alone	679
Householder 65 years and over	
Persons living in households	4,862
Persons per household	2.51

GROUP QUARTERS	
Persons living in group quarters	57
Institutionalized persons	37
RACE AND HISPANIC ORIGIN	
White	1,177
Black	3,742
Percent of total population	75.5
American Indian, Eskimo, or Aleut	9
Percent of total population	0.01
Asian or Pacific Islander	5
Percent of total population	0.001
Other race	23
Hispanic origin (of any race)	42
Percent of total population	
Total housing units	2,064
OCCUPANCY AND TENURE	
Occupied housing units	1,939
Owner occupied	880
Percent owner occupied	45.4
Renter occupied	1,059
Vacant housing units	124
For seasonal, recreational, or occasional use	1
Homeowner vacancy rate (percent)	
Rental vacancy rate (percent)	
Persons per owner-occupied unit (median)	2.37
Persons per renter-occupied unit (median)	1.71
Units with over 1 person per room	114
VALUE	
Specified owner-occupied units	725
Less than $50,000	632
$50,000 to $99,000	90
$100,000 to $149,000	2
$150,000 to $199,999	0
$200,000 to $299,999	0
$300,000 or more	0
Median (dollars)	$ 30,500
CONTRACT RENT	
Specified renter-occupied units paying cash rer	1,037
Median (dollars)	$ 156

RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	1,939
White	590
Black	1,335
Percent of occupied units	68.8
American Indian, Eskimo, or Aleut	5
Percent of occupied units	
Asian or Pacific Islander	
Percent of occupied units	
Other race	
Hispanic origin (of any race)	11
Percent of occupied units	
INCOME IN 1979	
Households	1,919
Less than $5,000	464
$5,000 to $9,999	367
$10,000 to $14,999	340
$15,000 to $24,999	484
$25,000 to $34,999	172
$35,000 to $49,999	83
$50,000 or more	9
Median household income (dollars)	$ 11,709
Families	1,156
Median family income (dollars)	$ 15,940
Mean family income (dollars)	$ 17,741
Per capita income (dollars)	$ 5,453
INCOME TYPE IN 1979	
Households	1,919
With wage and salary income	1,327
Mean wage and salary income (dollars)	$ 15,746
With Social Security income	709
Mean Social Security income (dollars)	$ 3,656
With public assistance income	248
Mean public assistance income (dollars)	$ 2,272
POVERTY STATUS IN 1979	
All persons for whom poverty status is determin	4,863
Persons 18 years and over	3,506
Persons 65 years and over	798

Related children under 18 years	1,325
Related children under 5 years	114
Related children 5 to 17 years	936
Unrelated individuals	930
INCOME IN 1979 BELOW POVERTY LEVEL	
All families	158
percent below poverty level	13.7
With related children under 18 years	100
With related children under 6 years	31
Female householder families	73
With related children under 18 years	311
With related children under 6 years	31
Percent below poverty level:	

Example of A CAMA Card - Hamilton County Auditor's Office


DustyRhodes
OWNER: SAUNDERS WILLIAM S
LEGAL: 2534 LIDDELL ST
30 X 100
PT LOT 63 BYRANT & TREVOR
04/15/1997
702-0032 0040 00
Card of
Work Year: 1997
LIDDELL ST
TAX ACCT# 2020032004000
NEIGHBORHOOD 10100
PROP CLASS R500
NEIGH DENSITY 2 FAIR
ACRES
LAND DATA AND COMPUTATIONS

Land Type	Actual Frontage	Effective Frontage	Effective Depth	Base Rate	Depth Factor	Adjusted Rate	Base Value	Other Code	Adjust Factor	Value
L1	30.0	30.000	100	40.00	.82	33.00	990			1090

Total Acreage .069
Total Land Value 1100
PROPERTY CHARACTERISTICS
01 TOPOGRAPHY
BELOW STREET
ABOVE STREET
STEEP
ROLLING
FLAT
LOW & SWAMPY
02 STREET OR ROAD
NONE
PROPOSED
UNPAVED
ALLEY
SIDEWALK
03 PUBLIC UTILITIES
NONE
ELECTRICITY
WATER
SEWER
GAS
ALL
WELL
SEPTIC
04 LOCATION
CORNER LOT
LAND LOCKED
WOODED LOT
WATERFRONT
VIEW
TRAFFIC
HEAVY
MOD HEAVY
NOMINAL
05 SHAPE & SIZE
IRREGULAR
EXCESS FRONTAGE
EXCESS DEPTH
L/B RATIO
06 STATUS
UNDEVELOPED
VACANT
UNDERIMPROVED
OVERIMPROVED
07 RESTRICTIONS
EASEMENTS
NON CONFORMERS
DEED
RESTRICTIONS
ENCROACHMENTS
NON BUILDABLE LOT
LAND TYPE
MEMORANDUM
BUILDING PERMITS
DATE
NUMBER
AMOUNT
PURPOSE
SALES HISTORY
MO/YR 01/96
PCLS 5
Amount 12500
Source AGENT
Valid Land Y 1/R
PSF
COMPARABLE SALES
NEW CONSTRUCTION SUMMARY
Year
Add
Deduct
Recheck
PREVIOUS VALUE SUMMARY
Year
Land
Improvement
Total
Duplicate 1100 1100
VALUE SUMMARY
Land
Improvement
Total
Curr 1100 1100
URA
Predicted
FVC 1100 1100
HAMILTON COUNTY - AUDITOR DUSTY RHODES - RESIDENTIAL PROPERTY RECORD CARD

DustyRhodes 04/15/1997

OWNER: SAUNDERS WILLIAM S

LEGAL: 2534 LIDDELL ST
30 X 100
PT LOT 63 BYRANT & TREVOR

ACRES:

I-106 L-110 H-110

702-0032 0040 00 Card of
Work Year: 1997

LIDDELL ST

TAX ACCT# 2020032004000
NEIGHBORHOOD 10100
PROP CLASS R500 NEIGH DENSITY 2 FAIR
PROP TYPE 1 PROP DENSITY

LAND USE CODES
1 AGRICULTURAL
2 MINERAL (See Detail)
3 INDUSTRIAL
4 COMMERCIAL
5 RESIDENTIAL
6 EXEMPT

LAND DATA AND COMPUTATIONS

Land Type	Actual Frontage	Effective Frontage	Effective Depth	Base Rate	Depth Factor	Adjusted Rate	Base Value	Other Code	Adjust Factor	Value
L1	30.0	30.000	100	40.00	.82	33.00	990			1090

Total Acreage .069 Total Land Value 1100

PROPERTY CHARACTERISTICS

01 TOPOGRAPHY		04 LOCATION	
BELOW STREET	1	CORNER LOT	1
ABOVE STREET	3	LAND LOCKED	2
		WOODED LOT	3
STEEP	X	WATERFRONT	4
ROLLING	2	VIEW	5
FLAT	3	TRAFFIC	
		HEAVY	1
LOW & SWAMPY	4	MOD HEAVY	3
02 STREET OR ROAD		NOMINAL	X
NONE	1	05 SHAPE & SIZE	
PROPOSED	2	IRREGULAR	1
UNPAVED	3	EXCESS FRONTAGE	2
		EXCESS DEPTH	3
ALLEY	1	L/B RATIO	4
SIDEWALK	X		
		06 STATUS	
03 PUBLIC UTILITIES		UNDEVELOPED	1
NONE	1	VACANT	2
ELECTRICITY	2	UNDERIMPROVED	3
WATER	3	OVERIMPROVED	4
SEWER	4	07 RESTRICTIONS	
GAS	5	EASEMENTS	1
ALL	X	NON-CONFORMING	2
		DEED	3
WELL	1	OBSTRUCTIONS	4
SEPTIC	2	ENCROACHMENTS	5
		NON-BUILDABLE LOT	6

LAND TYPE

LOT
L1 FRONT LOT
L2 REAR LOT
S SUBTOTAL
H HOMESITE

A ACREAGE
B SQUARE FEET
1 PRIMARY SITE
2 SECONDARY SITE
3 RESIDENTIAL
4 UNDEVELOPED
5 TILLABLE
6 ORCHARD
7 PASTURE
8 WOODLAND
9 WASTELAND
0 R.O.W.

G GROSS
1 SITE VALUE
2 DETAILED REPORT
3 UNIT
4 BOTUSTA/DCP

LAND ADJUSTMENTS
1 TOPOGRAPHY
2 STREET/ROAD
3 UTILITIES
4 LOCATION
5 SHAPE & SIZE
6 STATUS
7 RESTRICTIONS
8

MEMORANDUM

BUILDING PERMITS

DATE	NUMBER	AMOUNT	PURPOSE

SALES HISTORY

MO/YR	PCLS	Amount	Source	Vldty/Land	PSF
01/96	5	12500	AGENT	Y 1/R	

COMPARABLE SALES

NEW CONSTRUCTION SUMMARY

Year	Add	Deduct	Recheck

PREVIOUS VALUE SUMMARY

Year	Land	Improvement	Total
Duplicate	1100		1100

VALUE SUMMARY

	Land	Improvement	Total
Cost	1100		1100
MRA			
Predicted			
FVC	1100		1100

HAMILTON COUNTY - AUDITOR DUSTY RHODES - RESIDENTIAL PROPERTY RECORD CARD

APPENDIX B

Data & Analysis

Data Collected - Sales and Property Characteristics

PARCEL # **********	ASSESSED PRICE	SALES PRICE	SALES DATE	DISTANCE **********	LOT SIZE SIZE	YEAR BUILT	SPACE ********	ROOMS *********	GARAGE **********	FIRE-PLACE	BSMT ********	BRICK *******	B/A GARDEN
036-0002-0084-00	$40,100.00	$31,000.00	83	635	7405	1898	1352	5	1	0	1	1	0
036-0002-0085-00	$53,200.00	$54,500.00	88	682	8581	1931	1479	5	0	0	1	0	1
036-0002-0087-00	$38,900.00	$54,000.00	88	702	7405	1922	1087	5	1	0	1	0	1
036-0002-0095-00	$61,500.00	$75,000.00	96	610	9583	1895	2328	11	0	0	1	0	1
036-0002-0134-00	$17,600.00	$40,000.00	90	665	6055	1904	1066	5	0	1	1	0	1
036-0002-0145-00	$33,700.00	$12,000.00	85	693	3049	1915	1024	4	1	0	1	0	0
035-0002-0089-00	$39,100.00	$50,500.00	96	825	8146	1894	976	4	1	0	1	0	1
035-0002-0091-00	$36,500.00	$11,200.00	66	684	7754	1905	2106	7	0	0	0	0	0
035-0002-0093-00	$78,600.00	$68,000.00	90	887	7144	1977	1040	6	1	1	1	1	1
035-0002-0094-00	$39,800.00	$27,000.00	94	848	7144	1900	1002	4	0	0	1	0	1
035-0002-0095-00	$28,700.00	$49,900.00	93	816	3659	1905	1579	8	0	0	1	0	1
035-0002-0096-00	$42,300.00	$15,700.00	76	783	5053	1928	1423	6	1	0	1	0	0
035-0002-0097-00	$16,600.00	$21,500.00	92	722	8276	1902	805	4	0	0	1	0	1
035-0002-0100-00	$38,300.00	$24,500.00	88	718	4661	1912	1126	6	1	1	1	0	1
035-0002-0132-00	$39,300.00	$10,900.00	69	645	4966	1899	1280	7	1	0	1	0	0
035-0002-0133-00	$5,900.00	$5,500.00	94	614	4138	1917	684	4	0	0	1	0	1
035-0003-0060-00	$58,900.00	$12,000.00	91	584	7492	1890	2106	6	0	0	1	1	1
035-0003-0061-00	$30,100.00	$7,500.00	79	580	7492	1900	784	4	0	0	1	0	0
035-0003-0062-00	$37,400.00	$19,500.00	88	581	7492	1900	902	4	0	0	1	0	1
035-0003-0063-00	$36,900.00	$27,000.00	91	585	3746	1900	1512	5	1	0	1	0	1
035-0003-0064-00	$40,500.00	$49,000.00	97	595	7492	1900	1424	7	0	0	1	0	1
035-0003-0065-00	$41,000.00	$20,000.00	95	601	7492	1906	1296	7	0	0	1	0	1
035-0003-0066-00	$47,400.00	$13,000.00	75	626	10062	1880	1688	8	0	0	1	1	0
035-0003-0067-00	$64,500.00	$18,000.00	62	650	7492	1890	2130	7	1	0	1	1	0
035-0003-0068-00	$56,300.00	$24,500.00	86	681	7492	1969	1314	6	0	0	0	1	0
035-0003-0069-00	$59,000.00	$58,000.00	96	705	7492	1910	2305	8	1	0	1	1	1
035-0003-0070-00	$54,200.00	$33,000.00	87	417	11021	1866	1768	7	0	0	1	1	1
035-0003-0072-00	$42,300.00	$55,000.00	94	415	11238	1870	1432	5	0	0	1	1	1
035-0003-0077-00	$48,700.00	$16,500.00	78	510	7492	1867	1403	5	1	0	1	0	0
035-0003-0078-00	$30,700.00	$12,000.00	73	625	8015	1880	981	5	0	0	1	0	0

035-0003-0126-00	$21,600.00	$2,700.00	60	255	3615	1890	672	4	0	0	1	0	0
035-0003-0127-00	$21,700.00	$30,000.00	92	250	4182	1865	736	4	0	0	1	1	1
035-0003-0129-00	$40,600.00	$55,500.00	90	248	7187	1900	1382	7	0	0	1	0	1
035-0003-0133-00	$41,100.00	$13,600.00	62	250	4443	1885	1836	5	0	0	1	0	0
035-0003-0140-00	$36,400.00	$23,500.00	88	145	4008	1900	1632	6	0	0	1	1	1
035-0003-0145-00	$31,700.00	$6,500.00	64	325	3572	1916	1184	5	0	0	1	0	0
035-0003-0147-00	$37,100.00	$53,000.00	88	415	6011	1870	1551	8	0	0	0	0	1
035-0003-0148-00	$43,200.00	$13,000.00	83	445	6011	1880	1748	6	0	0	1	1	0
035-0003-0179-00	$34,300.00	$14,900.00	76	585	3746	1897	1342	6	1	0	1	0	0
035-0003-0202-00	$51,600.00	$32,000.00	84	405	3485	1870	2116	8	1	0	1	0	0
036-0003-0009-00	$46,800.00	$22,000.00	88	83	3528	1900	1782	8	0	0	1	0	1
036-0003-0010-00	$43,300.00	$22,500.00	82	79	3485	1889	1462	6	0	0	1	0	0
036-0003-0011-00	$49,700.00	$29,000.00	82	75	3659	1885	1690	7	0	0	1	0	0
036-0003-0012-00	$53,100.00	$18,000.00	82	50	5489	1897	2228	14	0	0	1	1	0
036-0003-0026-00	$51,900.00	$38,000.00	91	227	9932	1890	2641	11	0	0	1	0	1
036-0003-0027-00	$54,100.00	$24,500.00	86	300	9932	1890	1595	7	1	0	1	0	0
036-0003-0031-00	$50,000.00	$36,500.00	84	446	8407	1900	1664	6	1	0	1	0	0
036-0003-0056-00	$28,700.00	$20,000.00	83	632	4704	1885	720	4	1	0	1	0	0
036-0003-0064-00	$34,600.00	$19,800.00	84	527	7492	1885	896	4	1	1	1	0	0
036-0003-0063-00	$92,800.00	$14,500.00	68	490	7667	1885	2001	4	1	0	1	0	0
036-0003-0065-00	$63,100.00	$64,500.00	92	575	7492	1875	2132	9	1	0	1	0	1
036-0003-0067-00	$43,900.00	$25,000.00	85	440	7492	1900	1635	5	0	0	1	0	0
036-0003-0068-00	$47,400.00	$29,900.00	84	475	7492	1904	1330	8	0	0	1	0	0
036-0003-0069-00	$55,200.00	$18,000.00	72	510	7492	1873	1766	6	1	0	1	0	0
036-0003-0070-00	$62,500.00	$51,000.00	97	550	7492	1880	2139	9	1	0	1	0	1
036-0003-0072-00	$64,300.00	$36,900.00	88	632	9148	1900	2153	9	0	0	1	0	1
036-0003-0074-00	$55,400.00	$54,900.00	95	633	8059	1885	1428	5	1	0	1	1	1
036-0003-0076-00	$31,500.00	$32,500.00	89	720	3746	1895	882	4	1	0	1	0	1
036-0003-0090-00	$74,600.00	$27,500.00	75	160	5489	1905	3390	14	0	0	1	1	0
036-0003-0094-00	$40,500.00	$28,500.00	75	508	5184	1915	1301	5	1	0	1	1	0
036-0003-0077-00	$21,400.00	$20,000.00	94	760	2526	1895	1215	4	0	0	1	0	1
036-0003-0098-00	$39,200.00	$24,000.00	88	698	4400	1920	1158	5	0	0	1	0	1

Regression Results

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.768155384
R Square	0.590062694
Adjusted R Sq	0.499876486
Standard Error	12169.98129
Observations	62

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	11	10659345511	1E+09	6.54272	1.30173E-06
Residual	50	7405422231	1E+08		
Total	61	18064767742			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-184361.4121	175118.7855	-1.0528	0.2975	-536097.9879	167375.1638	-536097.9879	167375.1638
DISTANCE	-8.5674	10.6908	-0.8014	0.4267	-30.0406	12.9057	-30.0406	12.9057
SALE DATE	0.1286	0.3895	0.3302	0.7426	-0.6537	0.9110	-0.6537	0.9110
LOTE SIZE	2.1940	0.8162	2.6882	0.0097	0.5547	3.8333	0.5547	3.8333
YEAR BUILT	93.5702	92.1419	1.0155	0.3148	-91.5023	278.6427	-91.5023	278.6427
SPACE	-1.3747	5.5314	-0.2485	0.8047	-12.4849	9.7354	-12.4849	9.7354
ROOMS	2280.6983	1279.2099	1.7829	0.0807	-288.6714	4850.0680	-288.6714	4850.0680
GARAGE	12244.5932	3828.3777	3.1984	0.0024	4555.0671	19934.1194	4555.0671	19934.1194
FIREPLACE	1102.8609	6949.8303	0.1587	0.8746	-12856.2898	15062.0117	-12856.2898	15062.0117
BSMT	-5719.5178	7703.2484	-0.7425	0.4613	-21191.9540	9752.9183	-21191.9540	9752.9183
BRICK	-441.8548	3836.6355	-0.1152	0.9088	-8147.9671	7264.2575	-8147.9671	7264.2575
B/A GARDEN	21003.5131	4259.7727	4.9307	0.0000	12447.5044	29559.5218	12447.5044	29559.5218

RESIDUAL OUTPUT

Observation	*Predicted SALE PRICE*	*Residuals*	*Standard Residuals*
1	19680.03271	11319.96729	0.930154864
2	38106.61868	16393.38132	1.347034225
3	47304.61458	6695.385419	0.550155769
4	50450.29622	24549.70378	2.017234307
5	31951.74102	8048.258978	0.661320571
6	13850.89551	-1850.895513	-0.152086965
7	43483.71908	7016.280922	0.576523559
8	21227.03133	-10027.03133	-0.823915098
9	53400.63993	14599.36007	1.199620585
10	29287.33715	-2287.337148	-0.18794911
11	30697.80242	19202.19758	1.577832958
12	22254.99339	-6554.993393	-0.538619841
13	33239.2456	-11739.2456	-0.964606709
14	43540.9064	-19040.9064	-1.56457976
15	22700.6996	-11800.6996	-0.969656347
16	26753.21688	-21253.21688	-1.746363973
17	33834.87063	-21834.87063	-1.79415811
18	10955.10763	-3455.107629	-0.283904104
19	32214.73825	-12714.73825	-1.04476235
20	37781.07246	-10781.07246	-0.885874201
21	38618.3978	10381.6022	0.853049972
22	39226.04831	-19226.04831	-1.579792759
23	21594.14463	-8594.144626	-0.706175665
24	25419.48297	-7419.482965	-0.609654427
25	25958.21243	-1458.212434	-0.119820434
26	51456.70672	6543.293276	0.53765845
27	43334.20145	-10334.20145	-0.849155081
28	40452.5503	14547.4497	1.195355141
29	22067.12645	-5567.126445	-0.457447412
30	11573.06094	426.9390552	0.035081324

31	3571.430857	-871.4308575	-0.071604946
32	24470.78346	5529.216542	0.454332378
33	40666.8554	14833.1446	1.218830518
34	5720.816402	7879.183598	0.64742775
35	31432.28382	-7932.283824	-0.651790963
36	7069.731486	-569.7314862	-0.046814492
37	41514.75623	11485.24377	0.943735532
38	9981.012533	3018.987467	0.248068374
39	18314.62336	-3414.623365	-0.280577536
40	20637.98956	11362.01044	0.933609524
41	35670.1416	-13670.1416	-1.123267265
42	9172.759895	13327.24011	1.095091257
43	11209.55336	17790.44664	1.461830237
44	31320.25493	-13320.25493	-1.094517289
45	53382.72368	-15382.72368	-1.263989098
46	36066.85915	-11566.85915	-0.950441819
47	29937.33434	6562.665665	0.539250267
48	15498.26926	4501.73074	0.369904491
49	23406.71265	-3606.712645	-0.296361396
50	20747.92553	-6247.925528	-0.513388261
51	52040.58352	12459.41648	1.023782714
52	13524.01186	11475.98814	0.942975002
53	20824.32097	9075.67903	0.745743055
54	24128.27259	-6128.272588	-0.503556451
55	52947.994	-1947.993996	-0.160065488
56	45100.97849	-8200.978488	-0.673869441
57	45277.48981	9622.510193	0.790675841
58	34667.78502	-2167.785021	-0.178125584
59	29200.06226	-1700.062258	-0.139693087
60	21087.27141	7412.728588	0.609099423
61	19173.78574	826.214262	0.067889526
62	28219.11534	-4219.115339	-0.346682155

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