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GIS for Livable Communities: Examination of Community Perceptions of Assets, Liabilities and Transportation Improvements

September 2001

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16. Abstract

Urban dwellers navigate everyday journeys through a variety of transportation connections. Transportation planning can play an instrumental part in shaping livable community goals, as it is part of the built environment that citizens' encounter on a daily basis. This report examines the role that the built environment plays in the shaping of an individual's sense of community. Geographical Information Systems (GIS), can generate spatial maps of a citizens's interaction with the transportation environment. Combined with survey data, these maps offer information to community members and leaders that can help guide decision making about livable community goals. Riverside, California serves as a case study for this analysis. Based on a questionnaire and map survey, the following recommendations are made: encourage walking along and within the Magnolia Corridor; explore multimodal transportation options; examine traffic patterns in neighborhoods; develop small scale commercial activity; foster existing asset areas; consider high density residential design that unites the neighborhood; study housing stock redevelopment options; utilize GIS to involve all stakeholders. This case study illustrates how GIS can be used to illustrate and analyze citizens's interactions with the built environment.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY..... 1

1. GIS FOR LIVABLE COMMUNITIES..... 5
INTRODUCTION..... 5
RESEARCH PROJECT..... 5
METHODOLOGY..... 11
FINDINGS..... 13
Transportation Findings..... 14
Sense of Place Findings..... 23

2. RECOMMENDATIONS..... 27

3. CONCLUSION..... 29

APPENDIX A: MAPS..... 31
MAGNOLIA AVENUE AND THE SURROUNDING AREA..... 31
THE MAGNOLIA CORRIDOR..... 32
COMPOSITE NEIGHBORHOOD MAP WITH RESPONDENT'S HOME..... 33
COMPOSITE RESPONSES WHERE RESPONDENTS FREQUENT..... 34
INDEX FOR RESPONDENTS WHO WALK..... 35
COMPOSITE ASSETS MAP..... 36
COMPOSITE LIABILITY MAP..... 37
COMPOSITE TRAFFIC AND CONGESTION MAP..... 38
COMPOSITE UNSAFE MAP..... 39
AVERAGE NEIGHBORHOOD RESPONSE..... 40
COMMUNITY AND AVERAGE NEIGHBORHOOD RESPONSE..... 41

APPENDIX B: FIVE CITIES..... 43
AZUSA..... 45
BREA..... 46
CULVER CITY..... 46
POMONA..... 47
RIVERSIDE..... 47

APPENDIX C: SURVEY QUESTIONNAIRE..... 51

ENDNOTES..... 59

LITERATURE REVIEW..... 61

EXECUTIVE SUMMARY

The challenge today for decision-makers is to build connections in communities. Rather than viewing roads as fast-paced arterials, streets can be seen as providing urban dwellers with social, economic, and environmental connections. Citizens and policy-makers are searching for solutions to revitalize urban communities and make them more livable. The idea behind "livable communities" is to explicitly recognize the inter-relationships between social, economic, and environmental quality of neighborhoods by devising integrated policies and approaches for their development. From a research perspective, one dimension of this approach is to consider how the citizen perceives these integrated dimensions within the context of his or her on community, and the consequent implications these perceptions might have for policy. In this context, transportation improvements are considered an area that impacts the built environment, and hence worthy of analysis from a social-cognitive perspective.

Kevin Lynch first examined mental maps in the late 1950s and early 1960s. Lynch found predictability in the way people interact with the built environment, but without computers Lynch could not combine multiple maps and data to obtain a detailed picture of respondents' navigational choices in order to understand their interaction with the built environment. This research utilizes Geographical Information Systems (GIS) to compile information from citizens in order to understand the role of transportation improvements and choices in creating livable communities. Building upon research conducted in Hennepin County, Minnesota, this project examines the transportation and modal choices of citizens along the Magnolia Corridor in Riverside to determine how transportation and the built environment effect sense of place and sense of community.

This report examines the role that the built environment plays in the shaping of an individual's sense of community. New tools such as GIS, which can generate detailed spatial maps, can provide information to decision makers and stakeholders about the interactions with the built environment. Combined with survey data, these maps offer information to community members and leaders that can assist in planning more livable communities. These tools allow decision-makers to incorporate the community's sense of place and geographical spatial memories into the decision process. This allows for a

fuller picture of citizens' everyday encounters with the built environment, especially the transportation environment.

In the spring of 2000, citizens along the Magnolia Corridor in Riverside, California were invited either through a mailing, flyer or after a meeting to participate in a survey and mapping exercise. The diverse stretch of road traverses a variety of neighborhoods and demographic areas, while paralleling a major freeway; it connects the northeast end of the city, where the downtown area is located, with the southwest end. Sixty-six responses were collected, providing spatial, transportation, and demographic data; SPSS was used to analyze the survey data, and ArcView 3.2 was used to analyzed the digitized maps. (Maps can be found in Appendix A.) A snapshot of these citizens' interactions with the built environment and their perceptions of Magnolia Corridor emerges from analysis of the survey and GIS data.

Sense of Community

Analysis of the data reveals that a sense of community is high along the corridor, though there are some important sub-corridor spatial differences in perceived assets and liabilities. A majority of respondents reported that they felt part of their community, that their neighborhoods are safe and a good place to raise children. Respondents also considered walkable areas, such as the Wood Streets and commercial places, as assets. Liability areas include urban eyesores, such as commercial land and strip malls, and places that generate large inflows and outflows of traffic, such as schools and colleges. Transportation data indicate that people frequent areas along Magnolia Corridor both in and out of their geographically defined neighborhood. The majority of respondents commute to work by car. Impressively, there is positive response to walking with a number of respondents citing more sidewalks as a factor in encouraging pedestrian activity.

Based on the findings of this study, the following recommendations are made:

- Encourage walking along and within the Magnolia Corridor.
- Explore multimodal transportation options.
- Examine traffic patterns in neighborhoods.
- Develop small-scale commercial activity.
- Foster existing asset areas.
- Consider high density residential design that unites the neighborhood.
- Study housing stock redevelopment options.
- Utilize GIS to involve all stakeholders.

Encourage walking along and within the Magnolia Corridor.

There are indications that pedestrian activity exists. Policy should compliment this activity through a variety of different targets. Sidewalks, more cultural amenities, and commercial activities on the neighborhood scale can encourage walking activity. Local transportation improvements policy should build on the already strong levels of walking, especially in the Wood Streets area.

Explore multimodal transportation options.

Bus use in Magnolia Corridor is a mixed bag. Many respondents indicated that they did not take the bus and were not interested in taking the bus. Other alternative measures such as carpooling were mentioned as transportation modes. Policy might be better directed at encouraging multimodal options such as walking and bus use or biking and bus use.

Examine traffic patterns in neighborhoods.

The maps indicate that traffic congestion throughout the corridor does spill over into neighborhoods, destabilizing them. This is especially noticeable in areas near intersections that lead to the Riverside Freeway (SR-91). Traffic calming measures can help make these neighborhoods less appealing as shortcuts while at the same time stabilizing neighborhoods.

Develop small-scale commercial activity.

Commercial activity on a neighborhood scale can be beneficial. Encouraging small, local retailers and local restaurants that people in the neighborhood could frequent have the potential to revitalize an area. Finding the correct mix of commercial development can be difficult, but there are signs that people would frequent the right mix of local stores and local restaurants.

Foster existing asset areas.

Models of community livability already exist in the Magnolia Corridor. The Wood Streets area is one asset; the design, both of streets and neighborhoods, encourages walking and community interaction. Increasing connections to the community on the Riverside Community College campus can enhance the area. Traffic congestion from the college spills over into the neighborhoods creating negative externalities.

Consider high-density residential design.

Along the corridor there are multiple opportunities for infill projects. Some of these parcels are in areas zoned for high density residential. The maps indicate that there appears to be some negative responses to high-density residential parcels, which are not designed to compliment the neighborhood or the streetscape. High-density residential parcels provide the densities need for possible future transit options and proposed commercial uses. High density and mixed use development has the potential to vitalize some areas.

Study housing stock redevelopment options.

Some of the neighborhoods are showing their age. As first ring suburbs, they were developed years ago, and housing stock is beginning to deteriorate. Policy that would help homeowners to redevelop housing stock would prove not only beneficial to the neighborhood but to the tax rolls and the homeowner as well. Strong neighborhoods build not only economic strength for a region but build social capital.

Utilize GIS to involve all stakeholders.

GIS provides decision-makers and planners a new tool in which community preference can be visually represented. Often people have difficulty quantifying spatial patterns and opinions; GIS can alleviate this problem by providing citizens with a tool that represents their daily interactions with the transportation and built environment. As GIS becomes more accessible, all stakeholders can utilize this tool with survey data to inform the decision making process

The Magnolia Corridor is a unique thoroughfare connecting Riverside. It provides not only a street connection from northeast to southwest, but the wide diversity of neighborhoods that line the corridor create a distinctive environment in which the signs of a livable community are emerging. It also represented a unique opportunity to explore the use of GIS to uncover citizen preferences.

GIS FOR LIVABLE COMMUNITIES

INTRODUCTION

The Transportation Efficiency Act for the 21st Century (TEA-21) has created a set of challenges for those charged with implementing transportation policy. Specifically, TEA-21 pursues broader community and environmental goals by adopting a set of principles to guide implementation of federal transportation policy that extends beyond the traditional highway-construction approach.[1] TEA-21 recognizes that transportation is only one part of urban life and seeks to integrate transportation into urban life while pursuing goals of sustainability, economic development, global competitiveness, and increased multimodal options. Communities can use tools such as GIS to help achieve these transportation policy goals by providing planners, policy makers, and stakeholders with spatial data on community transportation preferences.

Poor transportation design can adversely effect a community. An individual's satisfaction with the built environment of urban life depends not merely on the ability to be transported from place to place but also on understanding the significance of various community destinations and the relationships among them — not just geographical relationships but economic, environmental, and social relationships. Understanding the transportation connections between and within communities can improve modal choice, destination choice, and land use. Poor transportation design in neighborhoods can sever communities from one another, providing little sense of common identity and little connection beyond well-traveled transportation corridors. Good community design can connect neighborhoods and provide residents with a more positive feeling about the public spaces they encounter each day. This case study will provide a model for other cities that wish to enact place-based planning strategies.

This research will explore how communities can plan transportation systems that match community preferences and build consensus by integrating data provided by community members into planning. Through the use of GIS to geocode data gathered from community surveys, policy makers, stakeholders, and planners can develop rich spatial maps, full of details about community travel patterns and areas in which community members consider part of their community.

RESEARCH PROJECT

The goal of this research project is to incorporate new technology tools into the transportation improvement process, thereby providing community members and policy-makers a tool that provides depth of information. Concurrently, this

project focuses on how these tools can be used to further livable community goals in an urban setting, because the method developed here can be used anywhere and by any group with access to GIS.

The Magnolia Transportation Corridor, as defined in this study, is approximately a 10-mile road in Riverside, California that runs from northeast to southwest, paralleling a major freeway.[2] The "Magnolia Avenue and Surrounding Area" map shows the study area. (See Appendix A for all maps.) The City of Riverside is divided the city into 26 neighborhoods; Magnolia Corridor bisects 4 of the neighborhoods: Wood Streets, Magnolia Center, Ramona, and Arlington. In the northeast end, the terminus of the study is Riverside Community College, and the southwest terminus is the Tyler Mall.

Street width varies along the corridor from a four-lane, tree-lined avenue in the north to a six-lane arterial in the south at the mall. In one section of the corridor there is a tree-lined median. In the Ramona area a frontage road along the Magnolia Corridor exists. A bike line traverses the Magnolia Corridor, and sidewalks exist along the corridor in some neighborhoods.

Figure 1. Magnolia Corridor in the Ramona Area

A land use map (titled "Magnolia Corridor") indicates that the area is a typical arterial street zoned into sections of commercial with low-density residential backing up to the commercial. Commercial areas alternate with residential areas along the Corridor; Magnolia Center and Arlington have concentrations of commercial zoning on Magnolia Corridor. The Wood Streets area, zoned low-density residential, is the only neighborhood without commercial areas in this study. There is also medium to high density zoning along the corridor, primarily in the Ramona neighborhood. Vacant parcels line the street towards the southwest end. There are no areas of public open space that front the corridor although some green space is preserved in the form of public facilities

and institutions such as schools. Industrial and agriculture zoning are among the land uses not found along the Corridor.

Figure 2. Example of the Streetscape in Wood Streets Area

Driving from downtown Riverside, the first area one encounters is the Riverside Community College. A large commuter campus with lush landscaping, the college generates traffic problems from students, many who arrive by car. Moving west, the college abuts the Wood Streets area. This architecturally distinct area is bifurcated by Magnolia. Railroad tracks and the Riverside Freeway line the southern edge of the neighborhood. Historic streetscaping and Craftsman-style bungalows are characteristics of this area. The neighborhood is well kept, and there is a fair amount of activity in the area.

Figure 3. Courtyard Scene from Riverside Community College

Continuing westward, the next neighborhood encountered is Magnolia Center. The commercial uses vary with a mixture of office and retail space. Once a thriving commercial district, a report commissioned by the city found that

gross sales in the Magnolia Center area declined by over 36 percent between 1992 and 1997.[3] Once a thriving retail area for Riverside, Magnolia Center has seen revenue shift toward more suburban areas and tax revenue, generated from sales, decline. With the decline in sales, store front vacancies have increased in the area. Located in the heart of this section, Riverside Plaza, a once vital shopping mall built in the 1950s has seen retail trends shift towards the Tyler Mall and other areas. The once vibrant shopping center is now an aging building with retail areas being used for purposes such as a neighborhood police station and a nail place. Current plans call for an extensive remodel with emphasis on attracting specialty stores like Crate and Barrel and possibly a movie theater. Another retail area known as the Brockton Arcade surrounds a parking lot that opens into Magnolia. The U-shaped retail building houses "Mom and Pop" stores such as a barber shop and a typewriter repair store, and a few restaurants. The commercial area has the dubious distinction of containing the "Flytrap," a section of road where five streets intersect creating traffic congestion because of its poor design and heavy use. Residential areas are located behind commercial sites.

Figure 4. Commercial Development in the Magnolia Center Area

Ramona is the next neighborhood along the corridor. It is a mélange of commercial and residential. The YWCA and the Ramona High School are located along the road as well as a variety of medium and high-density housing. The vacant lot at the corner of Adams and Magnolia has potential for development but currently is an urban eyesore. The Sherman Indian School also projects an unfriendly face to the Magnolia Corridor; the chain link fence, which follows the sidewalk, does not encourage community connections. Another educational institution, California Baptist University, faces the corridor in Ramona. Its landscaping is not well integrated into the streetscape.

In some sections single-family homes line the corridor. The majority of houses are well-maintained but lack the historical design found in Wood Streets.

Figure 5. Vacant Lot at Adams and Magnolia Intersection

Figure 6. California Baptist University Faces the Magnolia Corridor

Figure 7. Housing Stock in Ramona

The last neighborhood before the Tyler Mall and the terminus of this study is Arlington. This neighborhood has a distinctive character and was the focus of a city planning review entitled the *Arlington Community Study* in 1998. Arlington is intersected by Van Buren, which runs north south and generates a considerable amount of traffic. In the north, Van Buren connects the Pomona Freeway (SR-60) with the Riverside Freeway (SR-91) in the south. This traffic element connects various parts of the city but disconnects the economic and social vitality of an area by surrounding itself with strip commercial development, which encourages arrival by car rather than foot. The intersection is pedestrian unfriendly and congested at most hours of the day. At one survey meeting, Arlington residents voiced concern about declining housing stock and the desire to attract a big box retailer to the deserted County Hospital site. Recently Lowe's began construction on a home improvement center, generating tax revenue but at the same time generating more traffic. All along Magnolia, neighborhoods struggle with the issue of revenue generators such as Lowe's or revitalization of a mall and the traffic and congestion that result from these projects. The added congestion has a direct impact on livability. Housing stock in this neighborhood is of a variety of styles much like the diversity seen in Ramona.

Figure 8. Arlington Commercial District
The Bike Lane has Moved From the Road to the Sidewalk, Forcing Walkers and Bikers to Share the Sidewalk.

Figure 9. Housing in Arlington

The Magnolia Corridor provides a varied corridor in which to study the interaction of communities and the built environment. By using survey data and map data an interesting picture emerges.

METHODOLOGY

In the *Image of the City*, Kevin Lynch used maps to draw out people's navigational memories and travel patterns. Over 30 years later, changes in technology allow the researcher the opportunity to map responses, then combine the responses and link this information to survey data. The use of maps in this research provides visual data that can be extrapolated with survey data to provide layers of information about transportation habits.

During the spring of 2000, researchers held meetings along the Magnolia Corridor. Five meetings were held at various locations throughout the corridor in order to encourage participation. People who lived or worked within one mile of Magnolia Corridor were encouraged to participate. Meetings were advertised through a variety of methods including flyers and a mass mailing.[4] A Spanish-speaking researcher and Spanish language surveys were available. A total of 66 surveys were completed including over 300 maps.

Participants were asked to answer a questionnaire and complete six maps. (See Appendix C for a copy of the survey.) The 29 questions covered information about transportation patterns, sense of place, social, economic, and demographic data. Transportation questions asked about journey to work, journey to school, and journey to store patterns. Questions were also solicited about walking and bus use. A series of questions asked respondents to rate their sense of place or community. The last set of questions, which were optional, asked for information on demographic issues.

After filling out the questionnaire, respondents were asked to identify important places on six maps. Using ArcView, a base map of the Magnolia Corridor was created. The six color maps, each the same, were labeled with major street names and public places including schools and libraries. On the first map respondents defined their neighborhood by circling it. An X was used to denote where the person lived. On the second map survey takers were asked to mark and label with an X places that they frequent. The next map solicited information about areas that were congested or had parking problems. Maps 4 and 5 were marked to indicate places that respondents felt were assets and liabilities. The last map elicited responses about unsafe areas.

The maps that respondents created were digitalized. All the maps were scanned to create an image and then coded with their appropriate ID number and survey map in ArcView. Once the maps were digitalized into ArcView, Spatial Analyst was used to overlay multiple responses onto a single map. For each of the six survey maps, a composite map was created by combining all the individual surveys into a single digital map.[5] Spatial Analyst is able to associate survey questions with maps. Each answer provided by a respondent can be coded spatially by inserting that value into the respondent's neighborhood map. Thus, when all the survey values are combined and then segmented by neighborhood, an average response emerges for each geographical area on the map.

By using spatial data with traditional data, information about activities can be more fully utilized and analyzed. Spatial data analysis provides a layer of information that can help enlighten the decision making process and provide

visual information that may not be immediately intuitive when looking at tradition data. Spatial patterns including residents' navigational memories can be observed when utilizing spatial data analysis.

FINDINGS

GIS provides researchers with an opportunity to explore spatial data and present it in a visual manner. The GIS maps provide spatial detail lacking from survey results alone. By integrating spatial information with survey data, researchers can present a snapshot of transportation modes and choices of survey respondents. Inferences about interactions with the built environment can be gleaned from the information derived. For the Magnolia Corridor in Riverside, the data show interesting transportation patterns and highlight information about community livability.

Encouragingly, people are out and about in their neighborhoods and along Magnolia Corridor — going to the store and eating at neighborhood restaurants. The data indicate that people use alternative transportation modes to travel within the corridor. Most surprising is the high amount of walking that occurs in the area. Other interesting results are the use of ride sharing, especially to the store. Shopping outside of the neighborhood is a large trip generator, with a majority of people reporting that they do shop outside of their neighborhood at least once a week.

The northeast end of the corridor received the most positive responses in terms of assets areas, such as the Wood Streets area and Riverside Community College. People like areas that are reminiscent of small towns or Main Streets of yesteryear. The tree-lined Victoria Street with its small town feel also received positive responses. Not surprisingly, the Wood Streets area is a well-liked and often visited area with high levels of community satisfaction. Arbor-laced streets, edged with sidewalks, help to make this community livable by encouraging interaction through walking. Respondents had negative reactions to traffic generating areas and congestion — turning some assets into liabilities.

Figure 10. Intersection of Wood Streets Neighborhood with Magnolia

The average survey respondent is white, employed, and married. The respondent most likely commutes to work by car; the average commute is 21 minutes. Most homes report an average of 2.4 cars and a household size of 2.8. The average length of tenure in the neighborhood is 13 years.[6] Most respondents are single-family homeowners.

Data from the 1990 census indicate that the population of people living in a census block within one mile of Magnolia is 88,318. Of that population 63.3 percent describe themselves as Non-Hispanic white, while 25.8 percent describe themselves as Hispanic. The average household size is 2.9 persons with 57.8 percent of the households owning their own home. Most commuters drive alone to work (74.4 percent) while 15.7 percent carpool, 3.6 percent walk, 0.9 percent bike, and 2.4 percent work at home.

The "Composite Neighborhood" map indicates an approximate location of where respondents live. Housing locations throughout the Magnolia Corridor are represented. The map represents a geographic sense of neighborhood. On the survey map respondents indicated the area that they defined as their neighborhood. Most people define their neighborhood based on the street pattern. The northeast along the corridor has a higher response rate where the Wood Streets area and Riverside Community College are located, reflecting the larger number of respondents who live in the area. The Wood Streets typify the idea of an urban, livable community with architecturally distinct houses, shady lots, sidewalks for walking, and a strong sense of community. In general the map indicates that respondents live throughout the Magnolia Corridor and that their sense of neighborhood includes Magnolia Corridor.

Transportation Findings

In order to assess transportation patterns, survey takers were asked to check all

possible modes of travel to work, school and the store that they participated in during a one-week period. (See Table 1 below.) The majority (57.6 percent) drive a car to work. The most frequently indicated alternative mode is walking (10.6 percent) followed by carpooling (9.1 percent). About half of the respondents indicate that they attend school, and the mode most frequently utilized is auto (31.8 percent). When queried about transportation mode to a store, respondents usually travel by car (80.3 percent). Respondents walk (18.2 percent) and carpool (15.2 percent) to the store. These results indicate that there are a percentage of people utilizing alternative modes of transportation.

Table 1: Respondent Travel Data

Destination/Mode of Travel	Yes	No
Journey to Work in Past Week		
Drove a car to work	57.6	42.4
Carpooled or vanpooled to work	9.1	90.9
Rode the bus to work	4.5	95.5
Rode Metrolink or Amtrak to work	1.5	98.5
Walked to work	10.6	89.4
Bicycled to work	0.0	100.0
I work at home	7.6	92.4
I did not go to work last week	3.0	97.0
I do not work	19.7	80.3
Journey to School in Past Week		
Drove a car to school	31.8	68.2
Carpooled to school	3.0	97.0
Rode the bus to school	10.6	89.4
Rode Metrolink or Amtrak to school	0.0	100.0
Walked to school	12.1	87.9
Bicycled to school	0.0	100.0
I did not go to school last week	4.5	95.5

Table 1: Respondent Travel Data (Continued)

Destination/Mode of Travel	Yes	No
I do not go to school	47.0	53.0
Journey to Store in Past Week		
Drove a car to the store	80.3	19.7
Carpooled to the store	15.2	84.8
Rode the bus to the store	6.1	93.9
Rode Metrolink or Amtrak to the store	0.0	100.0
Walked to the store	18.2	81.8
Bicycled to the store	1.5	98.5
I did not go to the store last week	0.0	100.0

The "Composite Responses Where Respondents Frequent" map shows that the corridor is heavily traversed. Participants indicate that they shop in and eat in their neighborhoods on a weekly basis as well as go to stores outside their neighborhoods. Respondents reported that at least 57.6 percent of the time they go to a restaurant outside of their neighborhood at least once or twice a week; they also report shopping at nearly the same frequency outside their neighborhood (59.1 percent). But there are indications of strong neighborhood usage as people report shopping in their neighborhood one or two times a week (57.6 percent). Eating at a restaurant in one's neighborhood, interestingly, occurs at all levels, with 36.4 percent going one to two times a week, 27.3 percent going three to four times a week, and 19.7 percent going more than five times a week.

Figure 11. Popular Restaurant Located in the Magnolia Center Neighborhood

In the corridor people are active both within and outside their neighborhood. The "Composite Responses Where Respondents Frequent" map shows the area to which survey takers often travel. The northeast end appears to be a popular destination; besides Riverside Community College, Wood Streets neighborhood is located there. The Riverside Freeway appears to be a geographic and mental boundary, as people do not frequent areas south of it in the middle and western sections. South of the Riverside Freeway is known as the Casa Blanca neighborhood. The area frequented along Victoria has a similar feel to the Wood Streets. Other areas also frequented are commercial including the Tyler Mall and Magnolia Plaza.

Regardless of where people are going, the survey indicates that there is a strong inclination for people to walk in the Magnolia Corridor. (See Table 2 below.) Fifty percent of the respondents indicated that they already walked. When queried about what would increase interest in walking, respondents indicate that sidewalks (31.8 percent), more community amenities in the area (30.3 percent), and stores and restaurants (28.8 percent) will enhance the chance of walking. Crime and traffic patterns do not seem to impact attitudes about walking.

Table 2: Factors That Would Encourage Walking

Factors That Would Encourage Walking	Yes Response	No Response
More sidewalks	31.8	68.2
More parks and recreational areas within walking distance	30.3	69.7
More stores and restaurants within walking distance	28.8	71.2
Less automobile traffic	19.7	80.3
Less crime in my neighborhood	18.2	81.8
Slower automobile traffic	15.2	84.8
I already walk often	50.0	50.0

The “Index for Respondents Who Walk” map provides insight into who walks in the corridor. By combining respondents who checked “walk to work,” “walk to store,” and “I walk often,” the team developed an index. Scores closer to three indicate more walking. Although there are signs of walking throughout the Magnolia Corridor, the strongest sign of walking is observed in the northeast area in which the built environment is more conducive to walking. The commercial areas where the walkability index is higher are retail destinations in the Magnolia Center neighborhood that, unlike the Tyler Mall, tend to be accessible service-oriented stores.

Respondents were also asked what would encourage bus ridership. A little more than half indicated they were not interested in taking the bus, but for those that did take the bus, shorter waits (31.8 percent) and more hours of service (28.8 percent) are important. Crime and safety issues did not seem to influence people’s attitudes towards transit use.

Figure 12. Bus Stop in the Magnolia Center District

The "Composite Assets" map provides information about areas the community perceives as positive. These areas contribute to sense of place because they are areas that community members value. The map indicates an interesting mix of commercial and amenity areas that respondents marked as assets. Two retail commercial areas, Tyler Mall and Magnolia Plaza, are assets to some. Victoria, a less congested thoroughfare that parallels Magnolia, is also favorably mentioned. Higher educational institutions, Riverside Community College and California Baptist College, are represented. It is uncertain whether these areas are marked because of their mission or because of their campus environment or a combination of both. The strongest responses reinforce the idea that people like walkable, urban neighborhoods. The Wood Streets area and Riverside Community College are overwhelmingly perceived as community strengths.

The "Composite Liability" map, which indicates areas that people believe detract from their community, illustrates the maxim that one person's trash is another person's treasure. Respondents indicated that the airport, Tyler Mall, and Magnolia Corridor are liabilities; these are the same places that some people feel are assets. The areas that were most frequently mentioned as liabilities tend to be traffic generators and/or urban eyesores. This includes the Parkview Hospital, Ramona High School area, and Riverside Community College — all generators of significant traffic. Other areas that might be considered urban eyesores include the area by the train tracks, which abuts the Wood Streets neighborhood. Another urban area that receives considerable negative response is a higher density, economically and ethnically diverse neighborhood south of the Riverside Freeway known as Casa Blanca.[7]

Figure 13. Railroad Crossing Mentioned as a Liability

Figure 14. Apartment Housing Between Railroad Tracks and Wood Streets Neighborhood

Although the "Composite Assets" map and the "Composite Liability" map tend to be contradictory, the "Composite Traffic and Congestion" map provides some interesting insight into the contradiction. People enjoy the Wood Streets area; they frequent it often and that usage creates negative spillovers, such as traffic issues, that turn an asset into a liability. The same is true for retail areas; people enjoy the convenience and the mix of stores but dislike the traffic associated with a popular and successful retail area.

Traffic congestion is a problem along Magnolia Corridor. Areas of concern on the "Composite Traffic and Congestion" map include the "Flytrap," the intersection of Van Buren and Magnolia, and the Tyler Mall. The Flytrap, long a traffic nightmare because five roads intersect in one area, has a high number of negative responses. Three of the roads that intersect are major arterials: Magnolia; Brockton, which runs parallel to Magnolia and carries traffic that

avoids Magnolia; and Central, which is an east-west link and connects to the Riverside Freeway. The proximity of the Flytrap to the commercial areas in the Magnolia Center neighborhood contributes to the congestion. Areas near education institutions are congested. Schools are generators of significant amounts of coming-and-going traffic, especially Riverside Community College, which is a commuter campus. The map also indicates that Magnolia Corridor traffic has a negative impact on neighborhoods. Especially on roads that intersect with Magnolia and then lead to the freeway, traffic radiates out into the neighborhood, possibly because people are using neighborhoods as shortcuts. This traffic can destabilize neighborhoods, as they become unintended thoroughfares to the freeway, discouraging street activity such as walking.

Figure 15. Intersection of Magnolia and Van Buren

Figure 16. This Street is Located Just a Few Blocks From Van Buren. The Sign on the Tree Says "Slow Down Stupid! It's 25!"

Figure 17. Intersection of Five Roads, Known as the "Flytrap"

Although safety did not emerge as a major concern in the questionnaire section, respondents have definite perceptions about unsafe areas. A majority of respondents (53.1) disagreed with the statement that crime is a problem in the neighborhood. The majority of unsafe areas are almost exclusively south of Magnolia and to a great extent south of the Riverside Freeway. (See "Composite Unsafe" map.) Although people do not frequent the area south of SR-91, they do have ideas about safety. It is beyond the scope of this study to examine whether this perception is unfounded, but, nevertheless, the perception that the area is unsafe effects whether or not people frequent the area. The area behind Wood Streets and Riverside Community College is indicated as a liability and unsafe. The area, near the train tracks and behind

Riverside Community College and the Wood Streets neighborhood, does not have the same characteristics as the Wood Streets neighborhood. The area is located downhill from the Wood Streets and the housing units are apartments which are not well maintained, many located next to vacant lots.

Figure 18. A House in the Casa Blanca Area South of the Riverside Freeway

Sense of Place Findings

In general, the questions that asked about attitudes of community indicate that most people felt positive about the area. The results from these questions show high levels of satisfaction with their community and high levels of neighborhood cohesion. From these responses, residents seem to have a strong sense of place.

Forty-seven percent of the respondents felt that their neighborhood is improving. (See Table 3 below.) Most disagreed with the statement that crime is a serious problem. Schools are the only issue that people are ambivalent about. Forty-one percent of the respondents did not agree or disagree with the statement that the quality of public schools in the neighborhood is good, while thirty-nine percent agreed. Most people feel positive about the level of government services they receive with 37.8 percent agreeing, but again some ambivalence is reflected in 30.3 percent who had no opinion. Although most people indicate they would walk more in their neighborhood if more cultural amenities were available, 42.5 percent are satisfied with the quality of activities available. A strong majority, 66.7 percent, believes that their neighborhood is a good place to raise children and almost as many (65.2 percent) feel that they are a part of their community.

Table 3: Sense of Place Findings

Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
My neighborhood is improving.	4.5	10.6	31.8	40.9	6.1
Crime is a serious problem in my neighborhood.	16.7	36.4	24.2	15.2	4.5
The quality of public schools in my neighborhood is excellent.	9.1	13.6	40.9	24.2	7.6
I am satisfied with the quality of government services from the city.	9.1	18.2	30.3	34.8	3.0
I am satisfied with the quality of cultural activities in my community.	9.1	16.7	28.8	36.4	6.1
My neighborhood is a good place to raise children.	6.1	6.1	16.7	48.5	18.2
I feel that I am part of my community.	6.1	9.1	18.2	47.0	18.2

The survey maps provide information about areas that people believe are assets, liabilities, or other mapped features. By inserting data from the survey into the respondent's map, this information can be expanded. For example, a respondent provides the location of his/her perceived neighborhood, and that answer can be combined with the respondent's answer to the question "I am a part of my community." The "Average Neighborhood Response: Community" map illustrates the technique. A strong sense of community emerges in the Wood Streets, Riverside Community College, and Casa Blanca area. This contrasts to those in the Ramona area who do not have a strong sense of community. The Wood Streets area and Riverside Community College, which

rated high on the amenity scale and frequency map, may influence people's sociability and likeliness to associate in the community.

Figure 19. Neighborhood in the Ramona Area

Interesting geographical differences emerge with the "Average Neighborhood Response" map for the question "Is your neighborhood a good place to raise children?" The areas in which the response is positive tend to be away from the corridor itself. As mentioned earlier, traffic from the corridor spills over into neighborhoods making them unsuitable for children to play in front yards, cross streets, or ride bikes. The Ramona and Casa Blanca neighborhoods stand out as areas in which there is a negative response to the question. The correlation matrix below illustrates some of these relationships.

A correlation matrix was calculated between variables that measured sense of place in order to examine relationships. It is possible that the small survey number may make finding statistically significant relationships difficult, but it is hypothesized that positive results between some of the sense of place responses would occur. The question "Is your neighborhood a good place to raise children?" correlates positively with the question "Is the neighborhood improving?" and "Do you feel part of your community?" (See Table 4 below.) While this relationship is not too surprising, it is interesting that respondents who feel a part of the community have a stronger relationship with raising children than the quality of school or fear of crime. While correlations do not show causation, there does appear to be a positive link to being part of the community and raising children.

Table 4: Correlations of Sense of Place Findings

Pearson Correlation	Neighborhood is a good place to raise children	Neighborhood is improving	Part of Community	Schools are excellent	Crime is a problem
Neighborhood is a good place to raise children	1	.665**	.560**	.354**	-.379**
Neighborhood is improving	.665**	1	.370**	.350**	-.416**
Part of Community	.560**	.370**	1	.395**	-0.211
Schools are excellent	.354**	.350**	.395**	1	-.426**
Crime is a problem	-.379**	-.416**	-0.211	-.426**	1

*Significant at the 0.05 level (2-tailed).
**Significant at the 0.01 level (2-tailed).

Decades ago when Kevin Lynch finished his research, his maps were complied by hand. Today, GIS allows researchers to compile a vast amount of information about people's sense of place and their relationship with the built environment. The maps obtained from the Magnolia Corridor area along with the responses from the questionnaire provide an intriguing snapshot of citizens' perceptions and interaction with the built environment.

RECOMMENDATIONS

Based on results obtained from the survey and maps, the following recommendations are made.

Pedestrian activity should be encouraged. There are indications of strong walking activity that could be strengthened. Thirty percent of the people surveyed replied that sidewalks would increase walking. There are also indications that encouraging small local business activity would encourage walking as well. Local stores and restaurants geared to a community scale, which people could walk to, are possible commercial ideas that would encourage walking.

Focus on bus transit understates walking and other alternative modes. Previous reports on the Magnolia Corridor suggested a focus on bus use and increasing transit options, but this survey found mixed results regarding bus use. There is a large percentage of people who do not take the bus and indicate that taking the bus is not an option. Walking seems to be a strong alternative transit option, as well as carpooling. Although respondents did not mention biking, reconnaissance of the area did sight bikers. Some traffic calming measures that would increase walking could also benefit bikers.

The hand-lettered sign tacked to a tree on an Arlington street states “Slow down stupid! It’s 25.” The sign speaks volumes to the destabilizing nature of traffic in neighborhoods. The maps indicate that people frequent the Magnolia Corridor and the Traffic and Congestion map indicates that usage leads to traffic problems. Traffic congestion from the corridor radiates on to side streets and neighborhoods near the corridor. Traffic calming measures that would slow traffic down and stabilize these neighborhoods would not only ease the traffic issue but also help to build community.

Developing small-scale commercial activity can help to vitalize some areas. Commercial activities that are local in nature and geared to the neighborhood scale can encourage walking and neighborhood interaction. Finding the correct mix of commercial activity can be difficult, but pedestrian-oriented, human-scale development has become popular in recent years.

The Wood Streets area and northern section can be models for community livability. Policy should seek to build on existing assets such as the Wood Streets area. The Wood Streets area, with its pedestrian orientation, encourages

a sense of place. Although cited for its traffic congestion and mentioned by some as a liability, the Riverside Community College has the opportunity to open up a connection with the Magnolia Corridor. Most of the negative reaction to the college comes from nearby neighbors who must deal with congestion and parking hassles generated by the commuter campus; otherwise, the campus, which preserves open space, is an asset for the area.

There are several infill opportunities along the corridor that provide opportunities for high-density development. High-density development designed to encourage community can provide the needed population who would frequent local commercial establishments and perhaps utilize various proposed transit options. The maps indicate that there are some negative feelings to high-density areas that are perceived as liabilities. High density, mixed use that encourages livability is possible along the corridor.

In one survey meeting, a decades-old Arlington resident lamented about the decline of his neighborhood. He suggested that his neighbors were using code enforcement as a way to make unsightly neighbors fix up their property, but these actions, he commented, make neighbors suspicious of each other. Declining neighborhood stock is a problem for some neighborhoods along Magnolia Corridor. Policy to encourage housing stock redevelopment can not only build neighborhoods, but stabilize housing values.

GIS can be utilized as a community planning tool to help policy makers understand interaction with the built environment. The maps that focus on sense of place such as the community and school maps show pockets of strong community support and areas in which community building can be encouraged. This spatial information is not readily understandable for data results alone. GIS can involve all stakeholders in the decision making process.

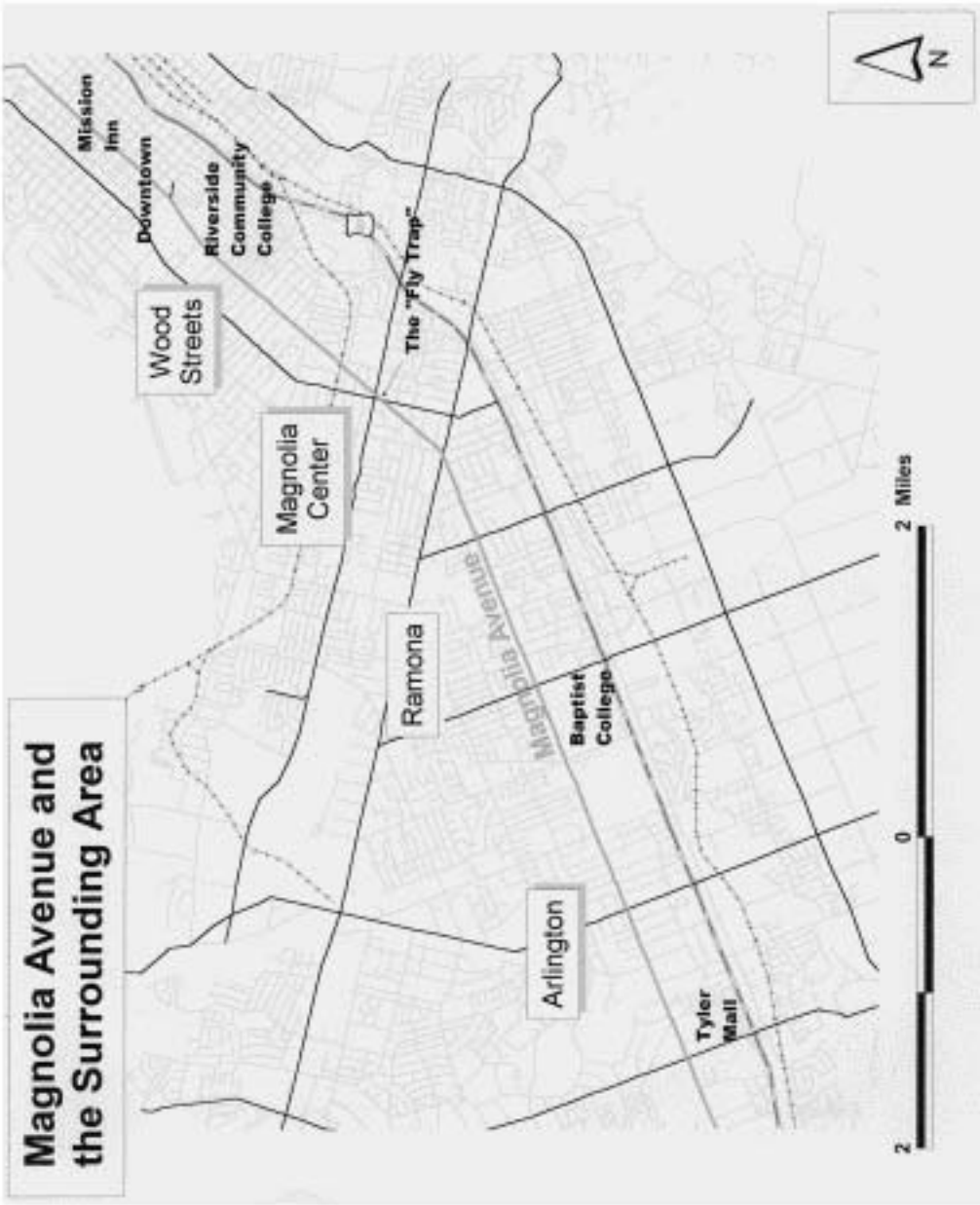
CONCLUSION

Urban communities face a mixture of social, economic and environmental issues. From declining housing stock that can destabilize neighborhoods and erode the tax base, to vacant properties of either built or unbuilt eyesores, cities struggle with ways to implement livable community goals. Transportation is an integral part of an urban dweller's life. Not only do roads provide connections for travel but also, as explored in this research, roads define neighborhoods and help or hinder community building. Better transportation planning, encouraged by TEA-21, can help alleviate some problems that communities face today by encouraging livable community goals.

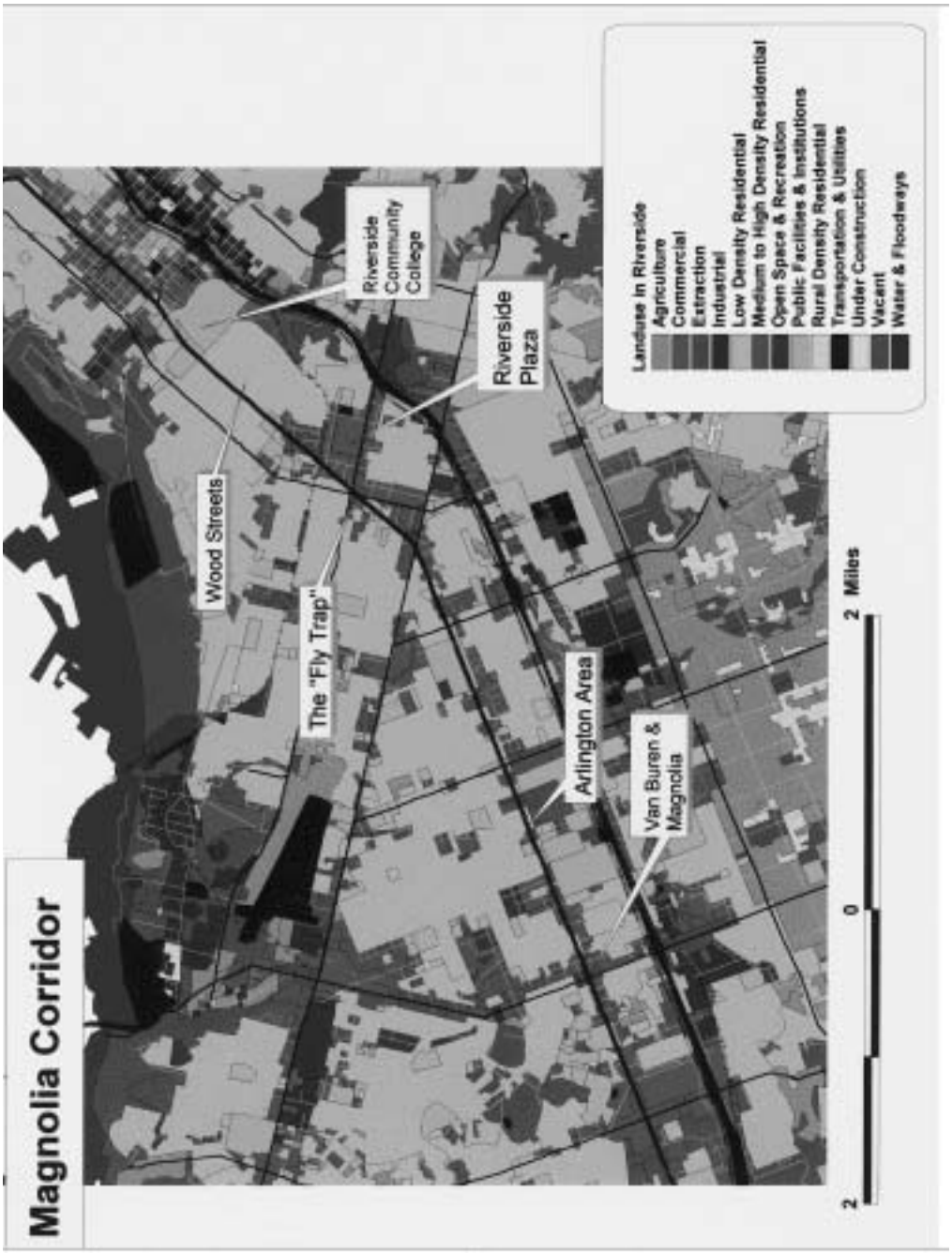
The spatial relationships that develop from the built environment are important to study in transportation planning. GIS has emerged as a tool that can help explore these relationships. GIS encourages urban dwellers to provide information about their daily travel patterns. These mental maps, combined with data available either from the U.S. Census Bureau or collected locally, quantify spatial patterns that are often difficult to observe. Stakeholders can use GIS in community planning to enliven the debate and provide more in-depth information about community and built environment interaction.

In the Magnolia Corridor this research finds that the underpinning for a viable, livable community exists. Policy can encourage this by building on community assets and understanding the relationship of Magnolia Corridor to surrounding areas. The distinctive neighborhoods that line the corridor all have liabilities that can be turned into assets. Transportation policy along the Magnolia Corridor has the opportunity to enhance place-building already underway.

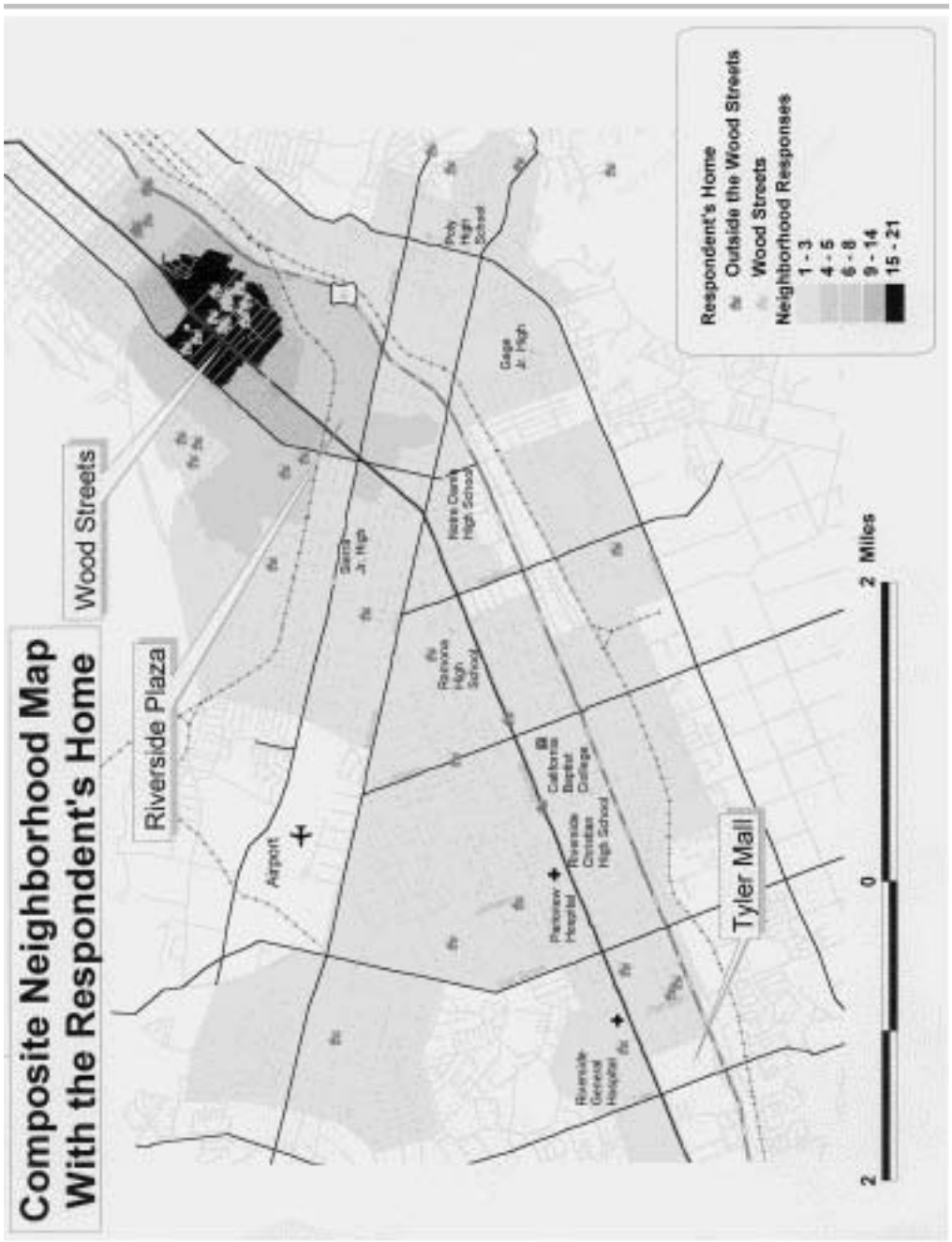
APPENDIX A: MAPS



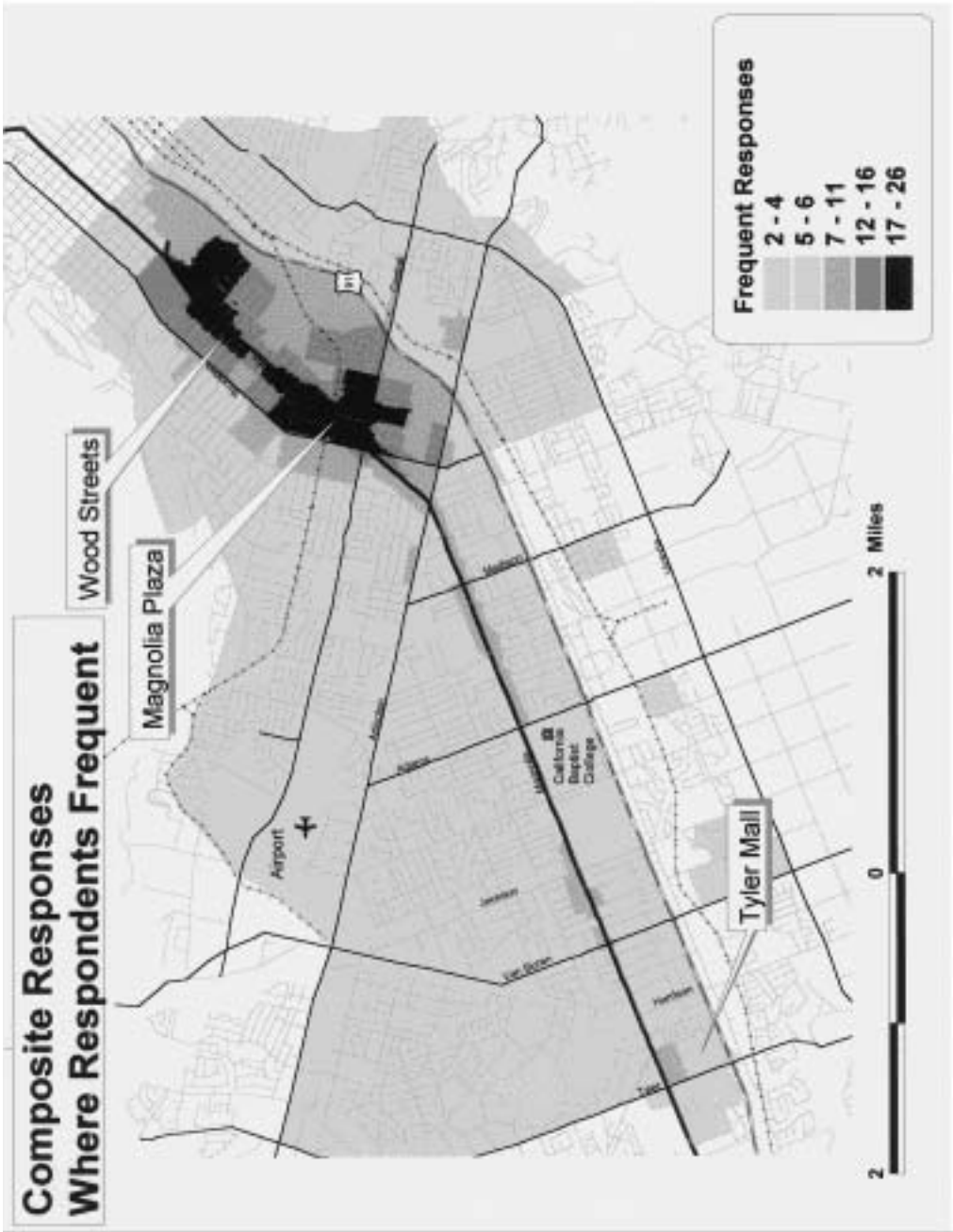
Magnolia Avenue and the Surrounding Area



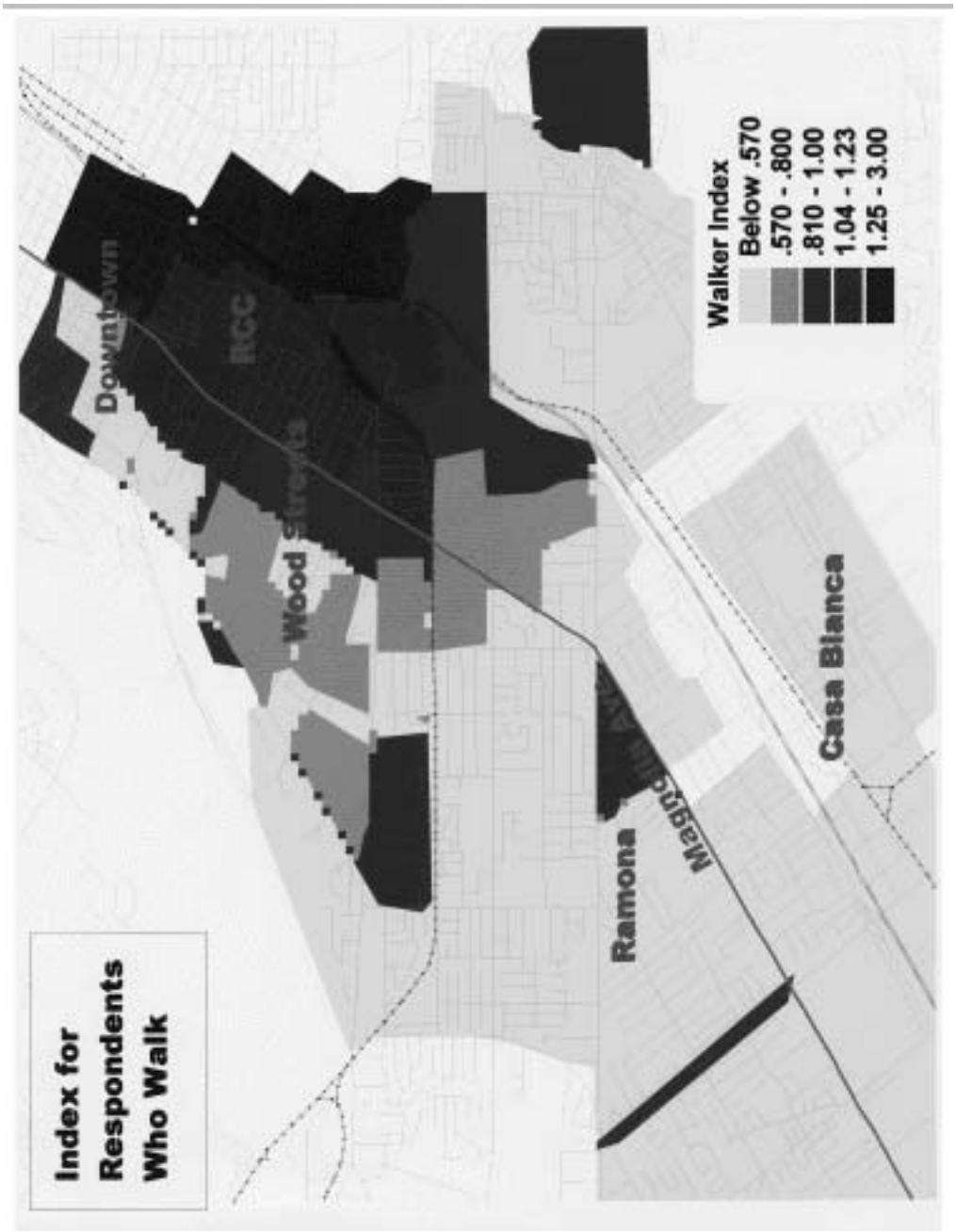
The Magnolia Corridor



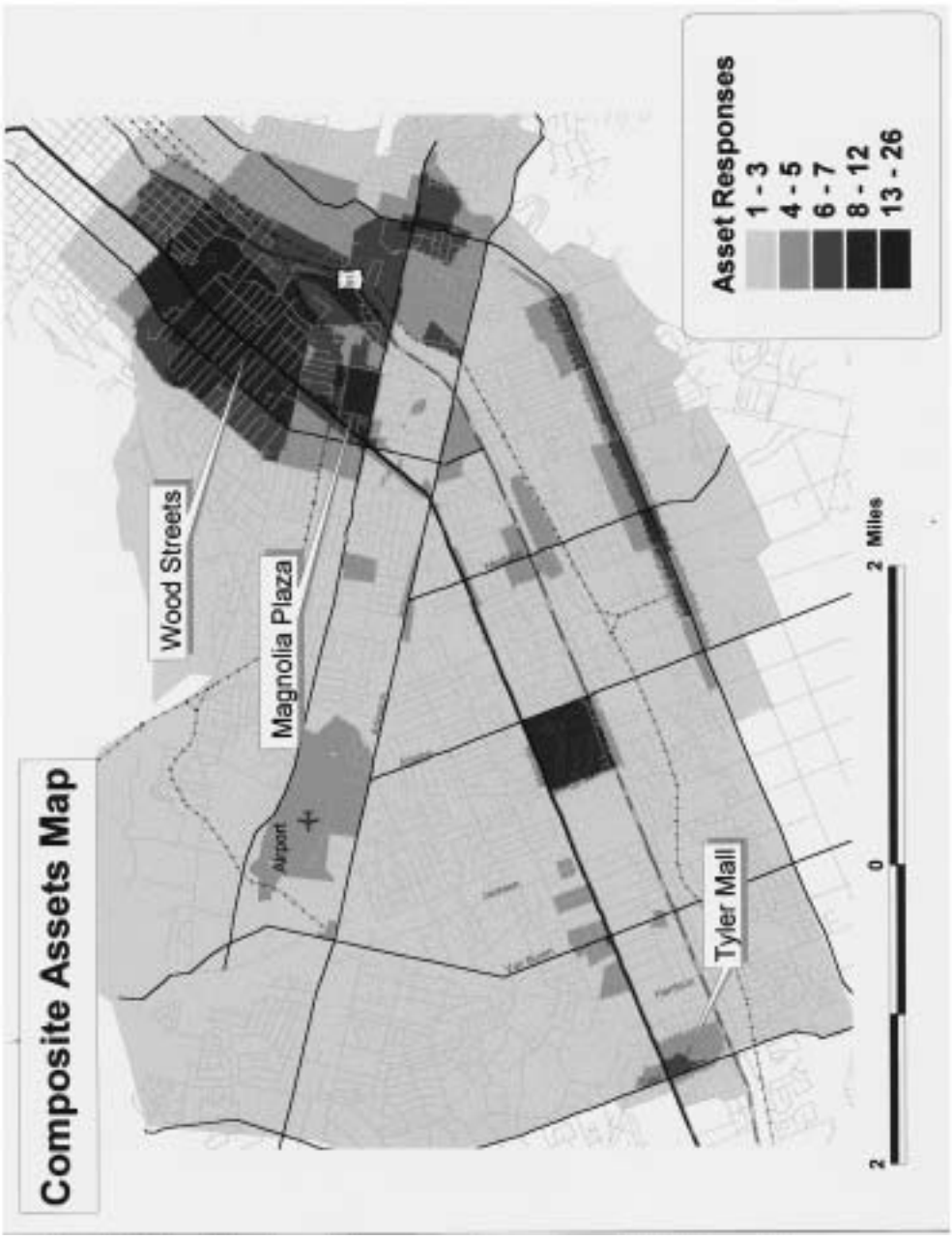
Composite Neighborhood Map With the Respondent's Home



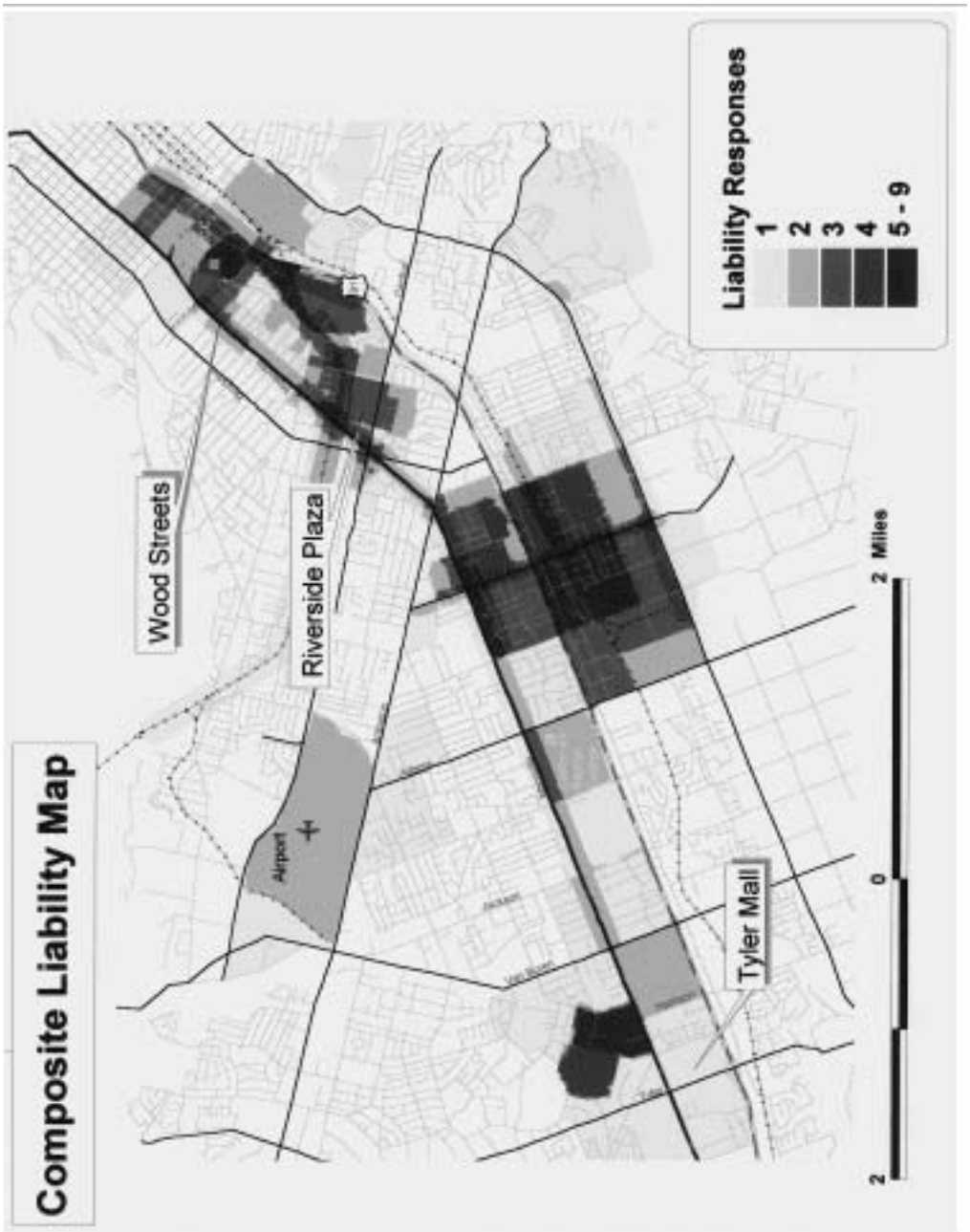
Composite Responses Where Respondents Frequent



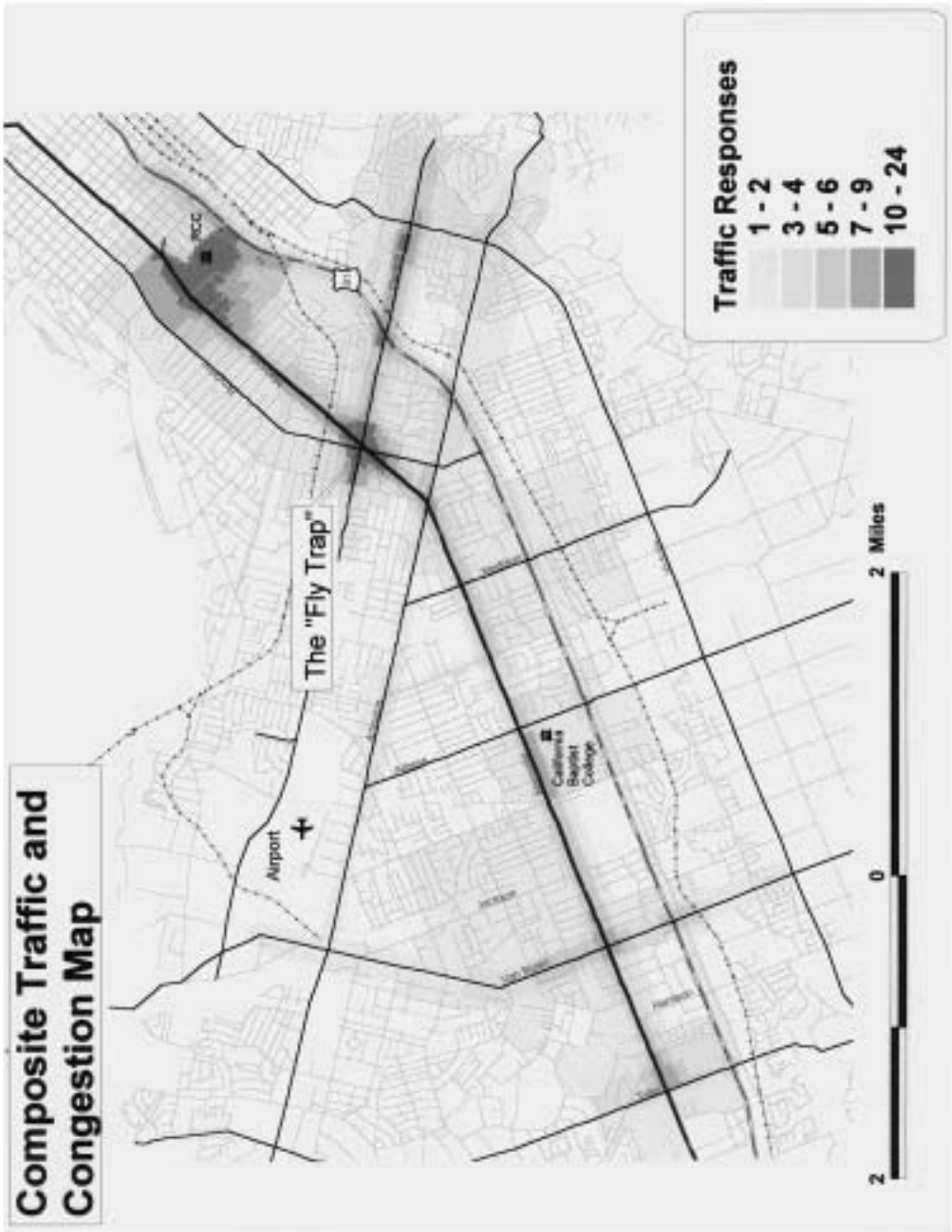
Index for Respondents Who Walk



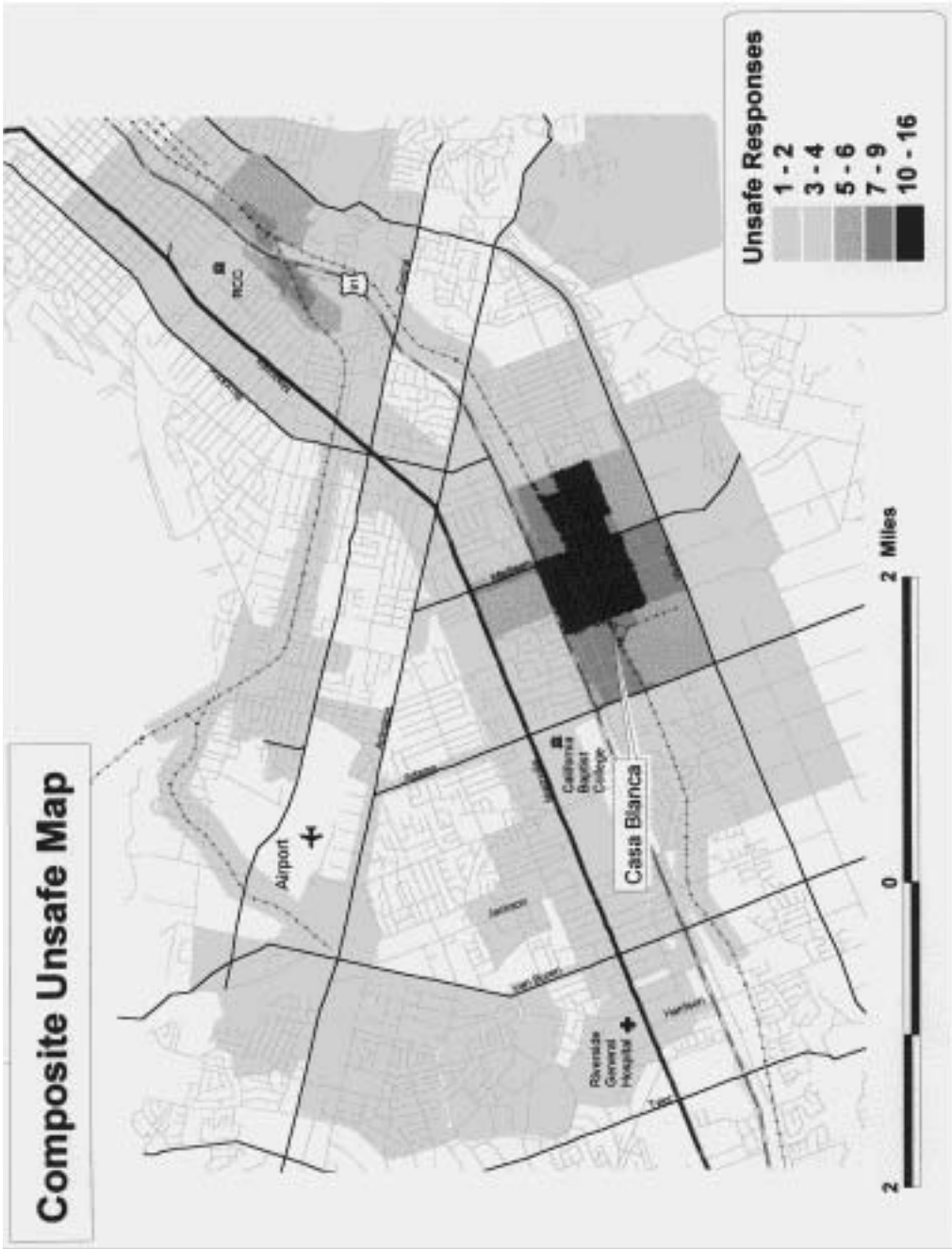
Composite Assets Map



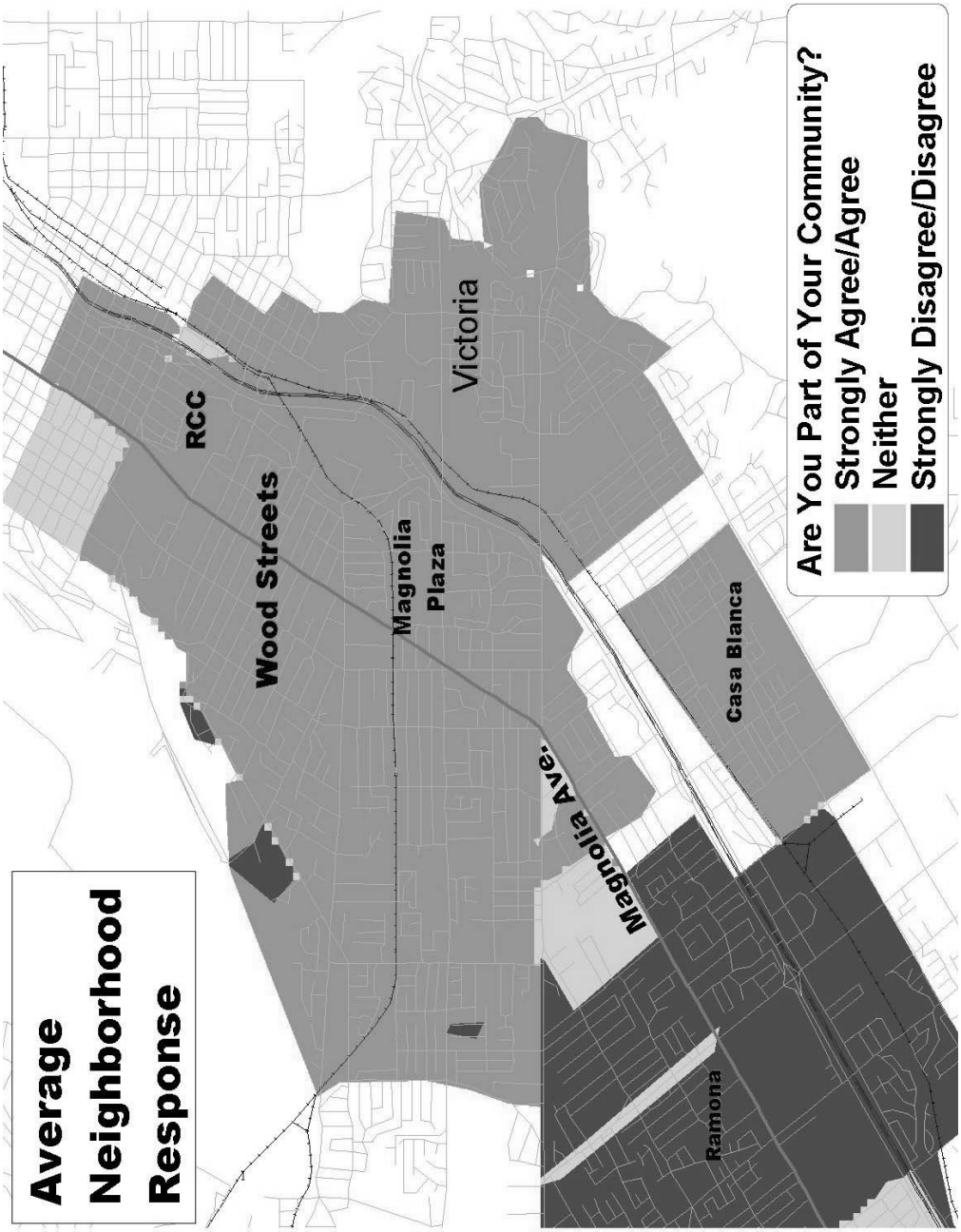
Composite Liability Map



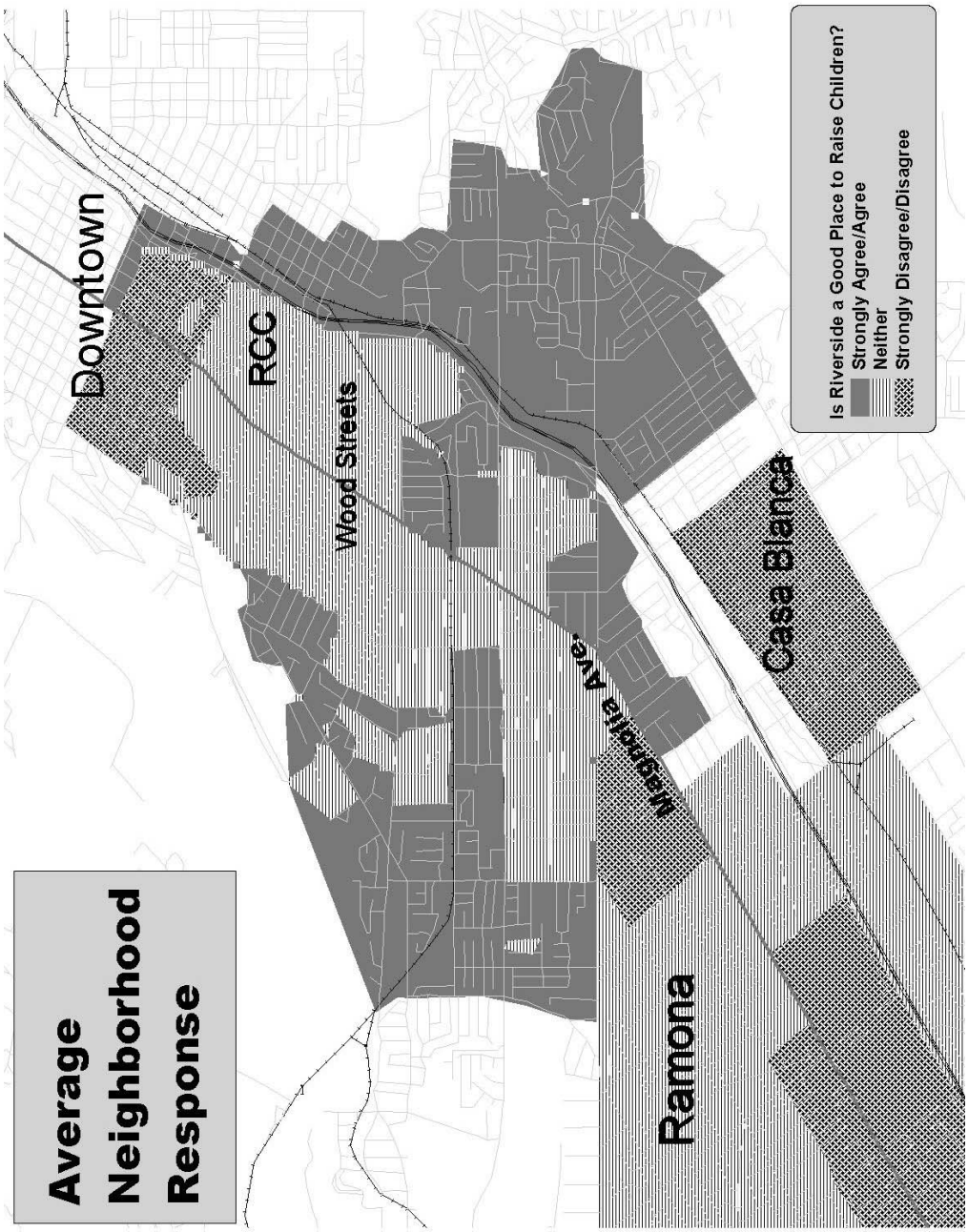
Composite Traffic and Congestion Map



Composite Unsafe Map



Average Neighborhood Response



Community and Average Neighborhood Response

APPENDIX B

From five cities in the Southern California region, Riverside was selected as the survey city. The five cities under review were Azusa, Brea, Culver City, Pomona, and Riverside. The first four can be considered first ring suburbs of Los Angeles. The area under study in Riverside is also a first ring suburb of Riverside. Of the cities under consideration, Pomona has the most astounding growth rate of a 51 percent increase in population from 1980 to 1992.[8] Culver City has the lowest rate of change with a population increase of only 2.1 percent. Culver City is the densest place in the study with 5,777 persons per square mile, while Riverside is the least dense with 2,915 persons per square mile. Culver City also has the highest percentage of persons over 65 (13.3 percent) while Pomona has the largest population of persons under 18 (32.8 percent). Pomona is the most ethnically diverse area while Brea is the least diverse. Interestingly, Azusa has the highest number of renters with 52 percent of the housing units representing rental units. The cities are a diverse group with a variety of projects underway that promote livability.

Table 5: Five City Comparison

	Azusa	Brea	Culver City	Pomona	Riverside
Housing Units % Built 1939 or Earlier	6.2	3.1	10.8	10.4	7.4
Housing Units % Built 1970 - 1979	20.9	35.7	23.4	12.5	23.2
Housing Units % Built 1980 - 1990	22.8	26.8	4.9	21.5	25.0
Population % Change 1980 - 1992	43.8	20.1	2.3	51.3	39.9
Land Area 1980 Square Miles	8.0	12.0	4.8	22.8	71.8
Land Area 1990 Square Miles	9.0	10.0	5.1	22.8	77.7
Median Age	27.0	33.5	36.3	26.8	29.0
Married-Couple Families % of Total Households	50.5	58.9	44.0	54.7	54.3
Non-Family Households % of Total Households	28.0	29.5	40.7	24.6	28.4
White % of Total Populations	66.0	87.0	69.2	57.0	70.8
Black % of total population	3.8	1.1	10.4	14.4	7.4
American Indian % of Total Population	0.7	0.4	0.6	0.6	0.8
Asian or Pacific Islander % of Total Population	6.6	6.2	12.0	6.7	5.2
Hispanic Origin (any race) % of total population	53.4	15.4	19.8	51.3	26.0

Each city has various aspects of livability and transportation programs underway. Criteria for city selection included a review of the city's current programs and their GIS capabilities. (See Table 6 at the end of Appendix B for a GIS comparison of cities.) After review, Riverside was selected as the survey city based on GIS capabilities and interest in the Magnolia Corridor.

AZUSA

Incorporated in 1898, Azusa, "The Canyon City," is nestled at the foot of the San Gabriel mountain range. Within the past few years, the city has spent $1.8 million to revitalize the downtown.

Its most contentious issue is growth in the foothills of the San Gabriel Mountains, where the city has enacted growth controls. In July of 1999 residents voted down a proposal to turn the 520-acre Monrovia Nursery into an upscale 1,602 home development by Lewis Homes. The Rosedale development would have included 14 acres of parks and 225 acres of open space. Residents cited issues of increased traffic and pollution in voting down the zoning request, which was approved by the City Council.

Azusa has a fair amount of GIS data, but there are significant gaps. Azusa is the only city that has traffic volume data, which are difficult to obtain from sources outside the city. In addition, geocoded data on the street right-of-ways provides better detail data than simply street centerlines. Azusa lacks land use, general plan and zoning data. Such data are valuable for assessing the city design and urbanization. A general plan can be used to assess potential growth capability and land use can be used to assess current load capacity. Azusa also lacks economic GIS data.

Azusa hardware/software capability is fairly developed, using both ArcView and ArcINFO on a Wintel platform. Azusa is the only city using AutoCAD MAP, a product from AutoDesk that integrates CAD (computer aided design) with GIS.[9]

Overall, Azusa's GIS hardware/software resources are robust but lack GIS data layers. The exclusion of land use, general plan and zoning data limits the amount of analytical results.

BREA

Once a city of oil fields, Brea, located in northeast Orange County, was incorporated in 1917. Brea has recently undergone a revitalization program to

enhance the community's livability. Development of the hillsides surrounding the city remains a major development issue. In July 1999, a visioning meeting was held, and citizens indicated a strong desire to protect nearby open space. Other city programs encourage mulitmodal transportation options. The Van Go Program, which utilizes "smart technologies" to improve efficiency, encourages citizens to call and request a ride in the Brea area.

Brea has also enacted a downtown redevelopment plan that will spend over $100 million dollars to revitalize downtown. The 25-acre redevelopment area in the heart of Brea's downtown seeks to create a "Main Street" atmosphere in a mixed-use development. Through a variety of housing options from loft-style to bungalow-style homes, the city encourages a mixture of income levels. Transportation design encourages walkability and shared parking avoids large parking lots. The retail and commercial area house a mix of different establishments from restaurants to movie theaters.

The city of Brea does have land use, general plan and zoning data as well as other expected GIS data. Street centerlines and age of housing by parcel are common and valuable GIS data. The city of Brea, furthermore, has location of accidents and type of mode involved in GIS format.

The city of Brea uses ArcView on Windows95 platform. Brea combines ArcView with ESRI's Mapobjects to allow multiple city agencies to access GIS data over the intranet. While multiple people in various departments handle these duties, Brea does not have a full-time GIS staff person. Lack of personnel devoted to GIS may demonstrate a lack of coordination of GIS resources. However, there is a fair amount of coordination to disseminate geographic information over the intranet.

CULVER CITY

Know as the "Heart of Screenland," Culver City in recent years has focused on attracting new media. Incorporated in 1917, it lies between downtown Los Angeles and the beach city of Venice.

The city has encouraged some infill development. One project developed 57 homes. With strong ties to the entertainment industry, the city has focused development on renovating space that would be attractive to new media startups. One such development attracted 30 new companies and 2,000 employees. Other city-lead projects include a $7.1 million streetscape project and the Paseo project, which will design walking paths through the downtown

area.

Culver City has land use, general plan and zoning data as well as street data. Schools and parks are also included in Culver City's database. Culver City also has educational assessment data. Its GIS resources also include population, housing values, and income data, drawn from the 1990 census.

Culver City has both ArcView and ArcView running on NT workstations. The city also has one to three full time GIS personnel.

POMONA

Pomona lies on the western edge of Los Angeles County. Its northern and southern edges are bounded by major freeways.

Pomona has a variety of programs aimed at community vitality. The Neighborhoods in Progress program provides low- or no-cost loans for interior and suburbs projects. There is also a grant program to help senior citizens bring their homes up to code. Pomona has also revitalized its downtown with a mix of antique shops along with live-and-work lofts; on the weekends a farmer's market sells produce to shoppers.

The city of Pomona contracts out to ACS Enterprise Solutions for its GIS resources. It is unclear how this relationship effects the dissemination of data within the city's agencies, but the potential for conflict should be noted. The city of Pomona is also unique since ACS has been using a GIS product GEN map. ACS responded that they were migrating to ESRI products on NT workstations. This conversion is preferable since ESRI products are the standard for GIS. ACS did not provide a timetable nor indicate difficulties for this conversion. While neither may be a problem, there is clearly a potential for difficulties. The GIS data include land use, general plan and zoning information but little else.

RIVERSIDE

Riverside lies 70 miles east of Los Angeles. Formerly orange groves, the area has grown from an edge city to a metropolis.

Currently the city is revising its land use plan to be more "livable." All stakeholders agree that the current land use rate is high. There has been agreement to increase densities, set aside land for conservation and open space, and encourage market incentives along with regulation. Downtown revitalization is also occurring. Within the past few years, the Mission Inn, an historic hotel, has been refurbished; other improvements to the downtown area

include reducing parking spaces to make the area more walkable.

The city of Riverside is the most capable GIS of all the cities surveyed. The city has land use, general plan, zoning and street data but also has many other GIS layers. Riverside's street data includes street widths that can provide information about traffic calming effects. Riverside is the only city to have crime data. These data are extremely difficult to obtain at a geographic level smaller than city or ZIP code. Furthermore, Riverside has GIS data for "crime free apartments," although more information is needed to assess the value of this data. Riverside is also the only city to report current year population data. Riverside also responded with a robust list of economic data including: unemployment, income, jobs, and housing value data. However, Riverside did not list the source or date of this data.

Riverside has over 10 full-time employees working with GIS data. Its hardware and software are with both ArcView and ArcINFO running on UNIX, PC/95, and PC/NT machines. Additionally the city uses ESRI's Map Objects.

One outstanding feature of the City of Riverside is its GIS capability via its web page. Much of the information about Riverside is currently available for viewing on the web. This includes population projections by census block group, parcel information, building footprints, and much more.

Table 6: Five City GIS Comparison

	Azusa	**Brea**	**Culver City**	**Pomona**	**Riverside**
Average daily traffic volume	Yes 1999				
Bike paths	Yes 1996-99	Paper			
Streets		Yes center-lines	Yes 1999		Yes
Width of streets					Yes
Width of right-of-ways					Yes

Table 6: Five City GIS Comparison (Continued)

	Azusa	Brea	Culver City	Pomona	Riverside
Traffic accidents location		Yes			
Automobile deaths/ injuries		Yes			
Pedestrian deaths/injuries		Yes			
Bicycle & other deaths/ injuries		Yes			
Land use		Yes-parcel	Yes 1999	Yes	Yes
Zoning		Yes-parcel	Yes 1999	Yes	Yes
General Plan		Yes-parcel	Yes	Yes	Yes
Current year population		1990 census	Yes 1990 tracts		Yes 1998
Crimes against person					Yes
Crimes against property					Yes
Location of environmental hazards					Yes
Education assessment			Yes 1999		
Location of public and private schools					Yes Public
Age of housing		Yes-parcel			Yes
Gated communities		None			
Location of liquor stores					Yes
Other					Crime-free apartments

Table 6: Five City GIS Comparison (Continued)

	Azusa	**Brea**	**Culver City**	**Pomona**	**Riverside**
Housing Values		Yes	Yes 1990 tracts		Yes
Employment/ Unemployment			Yes 1990		Yes
Household Income Data			Tracts		Yes
Jobs					Yes
Other					Yes
Historical places					Yes
Parks	Yes 1996-99		Yes 1998	Yes	Yes
Community Meeting Places	Yes 1996-99				
Software	ArcView ArcINFO AutoCAD MAP	ArcView ESRI Map-Objects	ArcView ArcINFO	GENmap to ESRI Map-Objects	ArcView ArcINFO Map Objects
Hardware	PC	PC		UNIX to PC	UNIX, PC
OS	NT	Win95	NT	UNIX to NT	UNIX, NT, Win95
Personnel	1-3 F/T	no F/T	1-3 F/T		Over 10

APPENDIX C

SURVEY QUESTIONNAIRE

Please answer the following questions. All information will be kept confidential and is for research purposes only.

1. Please check all of the following activities that you did last week.

- ❑ Drove a car to *work*
- ❑ Carpooled or vanpooled to *work*
- ❑ Rode the bus to *work*
- ❑ Rode Metrolink or Amtrak to *work*
- ❑ Walked to *work*
- ❑ Bicycled to *work*
- ❑ I *work* at home
- ❑ I did not go to *work* last week
- ❑ I do not *work*

2. Please check all of the following activities that you did last week.

- ❑ Drove a car to *school*
- ❑ Carpooled to *school*
- ❑ Rode the bus to *school*
- ❑ Rode Metrolink or Amtrak to *school*
- ❑ Walked to *school*
- ❑ Bicycled to *school*
- ❑ I did not go to *school* last week
- ❑ I do not go to *school*

3. Please check all of the following activities that you did last week

- ❑ Drove a car to a *store*
- ❑ Carpooled to a *store*
- ❑ Rode the bus to a *store*
- ❑ Rode Metrolink or Amtrak to a *store*
- ❑ Walked to a *store*
- ❑ Bicycled to a *store*
- ❑ I did not go to a *store* last week

4. What factors would increase the likelihood of your walking more in your neighborhood? Please check all responses that apply.

- ❑ Less automobile traffic
- ❑ Slower automobile traffic
- ❑ Less crime in my neighborhood
- ❑ More sidewalks
- ❑ More parks and recreational areas within walking distance
- ❑ More stores and restaurants within walking distance
- ❑ I already walk often
- ❑ I am not interested in walking in my neighborhood
- ❑ Other_____

5. What factors would increase the likelihood of your taking the city bus more often? Please check all responses that apply.

- ❑ Cleaner buses
- ❑ Shorter waits at the bus stop
- ❑ More hours of service
- ❑ Greater service area
- ❑ Better information on bus schedules

- ❑ Better security around the bus stop
- ❑ More safety on the bus
- ❑ I already take the bus often
- ❑ I am not interested in taking the bus
- ❑ Other_____

6. Do you own or rent your home?

- ❑ Own
- ❑ Rent

7. Which best describes the building you live in?

- ❑ Mobile home
- ❑ Single family house
- ❑ Duplex
- ❑ A building with 3 to 4 apartments
- ❑ A building with 5 to 9 apartments
- ❑ A building with 10 to 19 apartments
- ❑ A building with more than 20 units
- ❑ Other_____

For <u>Statements 8 through 14 below</u>, please check the box that best represents your opinion of each statement.

Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
8. My neighborhood is improving.					
9. Crime is a serious problem in my neighborhood.					
10. The quality of public schools in my neighborhood is excellent.					
11. I am satisfied with the quality of government services from the city.					
12. I am satisfied with the quality of cultural activities in my community.					
13. My neighborhood is a good place to raise children.					
14. I feel that I am part of my community.					

15. How often do you go to a restaurant in your neighborhood?

- ❑ More than 5 times a month
- ❑ 3 to 4 times a month
- ❑ 1 to 2 times a month
- ❑ Never

16. How often do you go to a restaurant outside your neighborhood?

- ❑ More than 5 times a month
- ❑ 3 to 4 times a month
- ❑ 1 to 2 times a month
- ❑ Never

17. How often do you shop in your neighborhood?

- ❑ More than 5 times a week
- ❑ 3 to 4 times a week
- ❑ 1 to 2 times a week
- ❑ Never

18. How often do you shop outside of your neighborhood?

- ❑ More than 5 times a week
- ❑ 3 to 4 times a week
- ❑ 1 to 2 times a week
- ❑ Never

19. How many minutes does it take you to get to work one-way?_____

20. How many automobiles are there in your household?_____

21. How many adults and children reside in your home?_____

22. How many children 18 or younger live in your home?_____

23. How many years have you lived in your neighborhood?_____

The following questions are optional. All answers are confidential.

24. What is your education level?

- ❑ Eight years of school or fewer
- ❑ Some high school
- ❑ High school graduate
- ❑ Some vocational, technical, or business school
- ❑ Certificate or two-year degree
- ❑ Some college
- ❑ Bachelor's degree
- ❑ Professional or advanced degree
- ❑ Decline to answer

25. What is your marital status?

- ❑ Never married
- ❑ Living with partner
- ❑ Married
- ❑ Widowed
- ❑ Divorced
- ❑ Separated
- ❑ Decline to answer

26. What is your current employment status?

- ❑ Not employed
- ❑ Looking for work
- ❑ Employed part-time
- ❑ Employed full-time

- ❑ Retired
- ❑ Decline to answer

27. What is your age?

- ❑ Under 25 years old
- ❑ 25 to 40 years old
- ❑ 41 to 65 years old
- ❑ Over 65 years old
- ❑ Decline to answer

28. What race or ethnicity best describes yourself?

- ❑ African American/Black
- ❑ Asian/Pacific Islander
- ❑ Hispanic/Latino(a)
- ❑ Native American
- ❑ White (Non-Hispanic)/Caucasian
- ❑ Other race/ethnicity_____
- ❑ Decline to answer

29. What approximately is your total annual household income?

- ❑ Less than $24,999
- ❑ $25,000 to $44,999
- ❑ $45,000 to $74,999
- ❑ $75,000 to $99,999
- ❑ $100, 000 to $124,999
- ❑ Over $125,000
- ❑ Decline to answer

ENDNOTES

1. Under TEA-21, the Transportation Enhancement Program and the Transportation and Community and System Preservation Pilot Program encourage livable communities goals. The Transportation Enhancement Program, funded by a ten percent set aside from the Surface Transportation Program, includes projects that encourage multimodal options, enhance landscaping, restore historical transportation landmarks, mitigate pollution from water runoff, and provide educational information for bikers and walkers. The Transportation and Community and System Preservation Pilot Program encourages communities to develop livable communities through transportation projects. Eligible applicants include Metropolitan Planning Organizations (MPOs), local, and/or state governments. Projects that mitigate the environmental costs of transportation, provide alternatives to infrastructure development, supply jobs, and encourage the increased efficiency of the transportation system meet the guidelines. Between 1999-2003 the program is authorized for $120 million

2. A study by Moule and Polyzoides Architects and Urbanists, *Magnolia / Market Corridor Study,* was completed in September 1999. This well-researched report evaluates the overriding issues of urban development along the Magnolia Avenue / Market Street corridor. The corridor wide findings follow. For land use issues the study finds that retail should be specific and non-competing, entertainment areas should not be spread throughout the corridor but located in a strategic area, office space should be carefully evaluated for niche markets, existing infill sites should be used to create high density housing opportunities. Transportation recommendations include making Magnolia a local transit corridor, placing equal emphasis on all transportation modes including alternative options, continuing with a four lane arterial, installing traffic calming measures, adding express bus service, and encouraging a “park once” system. The authors recommend attention to the public realm through open space and design consideration and historical preservation. Landscape recommendations include unifying the corridor through landscape design, planting trees where none exist, and introducing pedestrian amenities such as lighting. Taken in sum, the authors argue for a new urbanist-type development, which focuses on human scale design and livable community goals.

3. Smith, Kennedy Lawson, "Magnolia Center Commercial District: Retail Development Strategy," http://www.pe.net/~mltew/mcpa0924.htm (1 June 2001), Economic Environment for Retailing in Riverside.

4. Meetings were held in the Wood Streets area, Riverside Community College, YWCA, Parkview Hospital, and First Christian Church. The Wood Streets survey was conducted after a neighborhood association meeting; the church meeting occurred after Sunday night service. Meetings at Riverside Community College, Parkview Hospital, and the YWCA were publicized through flyers and a postcard mailing. At meetings that were publicized (Riverside Community College, Parkview Hospital, and the YWCA), respondents were offered a $5 food coupon for completing the survey.

5. Spatial Analyst in ArcView 3.2 creates a value for each map pixel on the overlay. Each pixel is given a value of one for each of the six composite maps. For the maps representing values from the written questionnaire, each pixel represented the numerical value for the respondent for the appropriate question.

6. One respondent reported 40 years and another reported 50 years. The median is 7 years.

7. Casa Blanca is a community that emerged from the settlement of citrus workers, predominately of Mexican ancestry, in the Riverside area. It is bounded by SR-91, Victoria, Jefferson, and Mary avenues. The small single family lots are mixed in with areas of medium and high density zoning. The housing stock has begun to deteriorate. The neighborhood suffers from crime, especially gang-related. The City of Riverside has committed to an economic development program in the area. The building of a Home Depot has been touted as the beginning of a economic revival.

8. Data are available from the U.S. Census website.

9. While GIS software such as ArcView and ArcINFO can import/export CAD images, AutoCAD MAP provides an easy interface between GIS and CAD data.

LITERATURE REVIEW

Al-Kodmany, K. (1999). "Using Visualization Techniques for Enhancing Public Participation in Planning and Design: Process, Implementation and Evaluation," *Landscape and Urban Planning* 45(1): 37-45.

This paper describes the process of using GIS, artists' sketches and computer-generated photos to enhance the participation process. The paper argues that these techniques were very effective in enhancing participation. GIS and artist's sketches were used in the identification process while photo manipulation was employed during the problem solving process. GIS was very important for providing large amounts of raw data in a process that was understandable for all participants. For example, it was able to illustrate a cluster of accidents where sidewalks were not available. The freehand artists' sketches provided notes and an immediate visual picture to design issues. Computer manipulation was able to provide detailed realistic information about planning and design changes that would occur.

Anselin, L. (1998). "GIS Research Infrastructure for Spatial Analysis of Real Estate Markets." *Journal of Housing Research* 9(1): 113-133.

The author argues for a research agenda in real estate that accounts for the use of GIS. Because location, a geographic feature, is so important in real estate research, it is argued that research should incorporate more spatial modeling. New techniques in statistics make this possible along with computer software.

Benfield, F. K., M. D. Raimi, et al. (1999). *Once There Were Greenfields: How Urban Sprawl is Undermining America's Environment, Economy and Social Fabric.* New York, National Resources Defense Council.

This book examines the issue of sprawl. It argues that smart growth can help alleviate some of the problems with sprawl such as traffic and air pollution, and declining quality of place. The authors argue for strong central cities and infill, transit oriented development, protection of open space, controlling big box retailers, and improving suburban work areas.

Bernick, M. and R. Cervero (1996). *Transit Villages for the 21st Century.* New York, McGraw-Hill.

"Transit Villages" examines the role transit development can play in building a sense of place as well as reducing congestion when an area is structured around

transit. Transit villages have a number of elements: walkability, multimodal options, and mixed use that make them successful places to live and work. In order for transit villages to be successful the authors argue that the following tools are needed (although all are not applicable to every situation): market-based plan, land assembly, infrastructure investment, shared parking, expedited permits and reviews, write-down of land costs, direct financial participation.

Bernstein, S. (1999). *Using the Hidden Assets of America's Communities and Regions to Ensure Sustainable Communities.* Chicago, Center for Neighborhood Technology.

The paper argues that communities must build upon existing urban infrastructure to revitalize areas. The author identifies the following as assets of cities: purchasing power, concentrated workforce, mass transit, accessibility, under-utilized land, under-utilized infrastructure, the assembly of rights-of-way, efficient resource use, bio-diversity and natural capital. Barriers in cities include disinvestments from urban to suburban areas, failure to price development correctly, rapid change of pace, inequity, and non-recognition of assets of place. Intangible assets are social capital and place. Higher densities encourage learning and diversity.

Calthorpe, P. (1993). *The Next American Metropolis: Ecology, Community and the American Dream.* New York, Princeton Architectural Press.

Calthorpe argues for a regional approach to planning which incorporates the city, the suburbs and the environment. By realizing that the issues facing metropolitan areas are regional, innovative solutions can be found. Calthorpe provides specific guidelines for planning. He most coherently argues for transit-oriented development (TOD). TOD development is a mixed use area of residential and commercial uses with transit at the core. His focus on incorporating and preserving the environment is enlightening.

Calthorpe, P. (1994). "The Region." *The New Urbanism: Toward Architecture of Community.* P. Katz. New York, McGraw-Hill:xi-xvi.

Calthorpe argues for a regional design approach that incorporates boundaries, public spaces, public transit, and population diversity. Calthorpe writes "a regional system of open space and transit complemented with pedestrian-friendly development patterns can help revitalize an urban center at the same time it helps to order suburban growth." By balancing growth and infill, a new

urban form can emerge that is livable.

Can, A. (1998). "GIS and Spatial Analysis of Housing and Mortgage Markets." *Journal of Housing Research* 9(1): 61-86.

This article discusses the uses of GIS in research of housing markets. Geography is a major component of housing and neighborhood patterns, but its incorporation into housing and mortgage research has been minimal. Lack of computer tools and data are issues that are currently being overcome through the use of GIS technology. The role neighborhoods play in housing outcomes is an important research area. There are four factors which effect neighborhoods: accessibility, physical environment, social and economic issues, and level of public service. These factors in turn influence larger factors: supply and demand for housing in an area, variation in housing price, variation in foreclosure. By using exploratory spatial data analysis (ESDA) and confirmatory data analysis (CDA) techniques, these factors can be modeled and studied. GIS can also help research as a visual tool, integrator of data, and provide the interface for spatial modeling programs. The article closes with examples of research using spatial analysis.

Cervero, R. and P. Bosselmann (1998). "Transit Villages: Assessing the Market Potential Through Visual Stimulation." *Journal of Architectural and Planning Research* 15 (3): 181-96.

Cerveco and Bosselman find that people may be willing to trade higher densities, which would support transit oriented development, if more amenities such as open space and commercial services are included. Access to a rail stop was also an important amenity. By using a visual simulation technique, the authors asked respondents to rate four housing density scenarios: 12, 24, 36, or 48 dwelling units per acre (DUA). Holding architectural style constant, the 12 and 24 densities were presented without open space and amenities. The 36 and 48 DUA were presented with open space and amenities. Overall the 36 DUA was preferred.

Crane, R. (1996). "Cars and drivers in the new suburbs: linking access to travel in neo-traditional planning." *Journal of the American Planning Association* 62 (1): 51-65.

Crane sets out to challenge the notion that neo-traditional land uses will result in less automobile travel. Neo-traditional planners advocate changes to the built design such as gridded street layout, traffic calming measures, mixed land

use, and multimodal options. Crane argues that by increasing access, especially if the cost to the driver decreases, trip demand will increase, thereby, increasing the number of trips.

Downs, A. (1994). *New Visions for Metropolitan America.* Washington, D.C., The Brookings Institution.

Downs examines the issues of growth in cities. It focuses on the results of rapid growth on inner cities. Downs identifies the dominant vision, which has impacted growth. The vision of low density, auto-oriented suburbs, and edge cities has combined to lead to metropolitan growth problems. Downs offers an alternative vision of higher residential densities, growth boundaries, alternative transportation modes, and some form of metro governance. In his last chapter he examines the political obstacles and feasibility to his alternative vision.

Downs, A. (1998). "How America's Cities are Growing: The Big Picture." *Brookings Review.* 16 (4): 8-12.

This article defines nine traits of sprawl (outward land use, low density development, leapfrog development, divided jurisdictions, auto use, lack of central planning, strip development, fiscal disparity, and lack of low income housing) and then proposes alternative growth scenarios. He argues that sprawl concentrates poverty in the inner city. For Downs the answers lie in growth boundaries, regional coordination, regional tax sharing, regional transportation planning, and regional enforcement against discrimination.

Duany, A. and E. Plater-Zyberk (1994). "The Neighborhood, the District and the Corridor." *The New Urbanism: Toward an Architecture of Community.* P. Katz. New York, McGraw-Hill xvii-xx.

The authors believe that the key building block of any community is the neighborhood. They propose some basic principles that good neighborhood design is built upon. A neighborhood should have defined boundaries. Another principle is that the best size for a neighborhood is a five-minute walk from the center to the edge. Each neighborhood should sustain a variety of uses to promote population diversity. Traffic should be connected by an interlocking grid of blocks for smooth flow and multiple routes. Lastly, a neighborhood should have well-designed public spaces and civic buildings that are placed in locations that connect the community.

Fulton, W. (1996). *The New Urbanism: Hope of Hype for American Communities*. Cambridge, Lincoln Institute of Land Policy.

Fulton makes a solid argument for new urbanism as a way to revitalize communities. He examines the fundamentals of new urbanism and finds that the concentration on mixed use, transit oriented development, open space and civic design can guide community development.

Fulton, W. (1997). *The Reluctant Metropolis: The Politics of Urban Growth in Los Angeles*. Point Arena, CA, Solano Press Books.

This fascinating book is an analysis of growth in Los Angeles. It historically examines how Los Angeles grew both physically and politically. There are many well documented stories of urban growth and development in the Los Angeles basin.

Fulton, W., T. A. Horan, et al. (1998). "Putting it all Together: Using the ISTEA Framework to Synthesize Transportation and Broader Community Goals." Claremont, Claremont Graduate University Research Institute.

This research identifies five elements of the Integrated Policy Framework in which it is argued that ISTEA enhancements operate. The elements are community design, alternative transportation, greenspace, economic development, and governance. The paradigm is applied to the Midtown Greenway in Minneapolis. Through the use of GIS the value of the ISTEA enhancement as well as the five elements are studied. Maps generated by local residents provide in-depth visual information about community preferences and the greenway development. The maps were used to help suggest future policy goals.

Gaudette, D. (1999). "First Ring Suburban Development from 1945-1965: A Twin Cities Case Study Against National Trends." *Design Center for American Urban Landscapes*, University of Minnesota: 1-42.

This report analyzes the growth patterns of first ring suburbs in the Minneapolis-St. Paul area. It examines the growth through three areas: housing and neighborhoods, corridors, and natural systems.

Gurwitt, R. (1998). "The quest for common ground." *Governing*. 11 (9): 16-18.

This article profiles examples of cities that are trying to manage growth. The article highlights the struggle that first ring suburbs endure as growth occurs at the edges. Examples are given from St. Louis, Cleveland, and Chattanooga.

This article also argues for a regional approach to growth management.

Handy, S. L. (1996). "Urban Form and Pedestrian Choices: Study of Austin Neighborhoods." *Transportation Research Record* 1552: 135-144.

This research examined six different neighborhoods in Austin, Texas, to assess whether urban form encouraged walking. A model of walking was proposed that delineates between walking as strolling, and walking to a destination or for a purpose. It was hypothesized that urban form may influence the strolling behavior, as the reason to walk for destination walking is more complex and often situational based. The research found that individual choice was the most important factor influencing walking. Urban form plays a secondary, but influential role, in walk-to-destination behavior. Walk-to-destination was most influenced by distance. The research argues that policy to encourage walking should occur as residents value the option of walking.

Hempel, L., G. McMurran, et al. (1999). "GIS Applications and Sustainable Communities." Claremont, Claremont Graduate University.

This paper provides examples of how GIS can be used with sustainable community projects to provide communities with information on the economy, equity, environment, and indicator analysis. GIS can provide important information about space and place, and with the integration of variables or indicators, can provide a complex overview of community. Examples of how cities have used GIS data for economic purposes include Vallejo, which has an interactive website featuring planning information. Equity mapping can provide insights about housing and other amenities. There are many examples of GIS use as an environmental tool. Santa Monica has created a database of trees, and other research about the impact of oil spills on wetlands is being developed.

Hiss, T. (1990). *The Experience of Place*. New York, Knopf.

This author makes an impassioned argument for the importance of place.

Institute, E. L. (1998*). Linking Tax Law and Sustainable Urban Development: The Taxpayer Relief Act of 1997*. Washington, D.C., Environmental Law Institute.

Changes to the taxes collected on capital gains from the sell of homes will help revitalize and develop urban areas. The report argues that the older tax code encouraged "trading up" and out. The older tax code encouraged exurban development and the development of new land, while at the same time

reducing vital neighborhoods as people moved up. This report argues that under the new law as many as 100,000 inter-metro moving households may choose to move closer to central cities; 140,000 households may elect to move inward in intra-metro moves.

Kathlene, L. and J. Wallick (1999). "Linking socio-political behavior to the built environment: theoretical and methodological advances." Paper prepared for the Annual Meeting of the Association for Public Policy Analysis and Management.

The authors argue that the built environment effects civic engagement and political participation. Two neighborhoods, one urban and one suburban, in Lincoln, Nebraska are examined. The authors argue that diversity stimulates political participation and that a diverse built environment contributes to a diverse economic environment, which leads to a varied social and active social environment. The research tests the hypotheses: mixed use neighborhoods will have more daily interaction, mixed used neighborhoods will have more satisfaction with levels of government service, diverse neighborhoods will have higher levels of political participation, and civic engagement will be positively correlated with democratic process. The built environment was assessed on measures derived from Edmond Fowler (1992): intelligent spaces, spatial orientation, and personal identification. Other factors from Kunstler and Jacobs are included: sidewalks, public space, limited setbacks, neighborhood greenspaces, mixed use, small blocks, variety of building ages, density, and diversity. Suburban neighborhoods definition tends to be larger and to be based on patterns of auto use or development. Urban area residents have neighborhood boundaries which varied but are based on social interaction and destinations. Suburban residents also did not frequent neighborhood business as much as expected, and they are less comfortable with areas that are different from where they live.

Katz, P. (1994). *The New Urbanism: Toward Architecture of Community.* New York, McGraw-Hill.

Katz and fellow architects argue for the planning movement known as New Urbanism. Strategies explored in the book include a more pedestrian-friendly, transit-oriented development. New Urbanism hopes to replicate the small town or community of yesteryear by planning with scale, mixed-use, and public spaces as key components.

Kotkin, J. (1999). “The Valley Unmasked.” *Los Angeles Times*, Los Angeles, M1.

Kotkin writes on the changes undergoing the San Fernando Valley. Once a suburb, its problems are increasingly urban.

Kunstler, J. H. (1993). *The Geography of Nowhere: The Rise and Decline of America’s Man-Made Landscape*. New York, Simon & Schuster.

Kunstler examines suburban life and finds that the car culture has had a detrimental impact on the American society.

Kunstler, J. H. (1996). *Home From Nowhere: Remaking Our Everyday World for the Twenty-First Century.* New York, Simon & Schuster.

This is Kunstler’s second book in which he examines America's urban landscape. Kunstler argues in this book that the suburbs and car culture have a negative effect on how we live. Urban forms will make a comeback because they promote a sense of place and community that people long for. Kunstler believes a sense of place can be created by changing zoning codes that currently promote separation of activity and taxing the land, not the building. Many of Kunstler's ideas embody the spirit of new urbanist planning and design.

Loukaitou-Sideris, A. (1999). “Hot spots of bus stop crime: the importance of environmental attributes.” *Journal of the American Planning Association* 65(4): 395-411.

The researcher seeks to answer the question of whether the built environment affects crime at bus stops. Loukaitou-Sideris gathered data about criminal activity at bus stops in Los Angeles. She identified 10 bus stops with very high criminal activity and 4 bus stops nearby that had less criminal activity. Through observations at bus stops, a survey of the built environment, a random survey of passengers, and interviews with officers, the researcher finds that the built environment does contribute to criminal activity at bus stops. Specifically, bus stops that were not maintained, near alleys (which are used as escape routes), and those that lacked commercial activity and public phones, are more likely to be crime ridden. Negative land uses such as liquor stores and vacant lots also contributed to high crime bus stops. The researcher noted that criminal activity varied depending on the built environment. For example, pickpockets prefer narrow sidewalks; widening sidewalks could lessen this type of activity. The research presented suggests that the built environment

plays an important role in the safety and function of a bus stop.

Lynch, K. (1960). *The Image of the City.* Cambridge, MIT Press.

In this path-breaking work, Lynch examines mental images or maps people have of their city in order to assess one's understanding of, and interaction with the built environment. Lynch found that in people's mental image of the city five elements appeared. Paths are the way in which most people navigate through a city. Edges are boundaries. Districts are elements that people understand as an organizing area. Nodes are places where paths meet; they provide a place in which to cross between elements. Lastly, landmarks are elements that are reference points. Taken together, these elements form a pattern or a mental image in which people navigate.

In designing urban areas, Lynch identifies 10 themes that can aid urban design and facilitate navigation through the elements. Singularity (contrast between object and its surroundings) helps people to identify elements. Form simplicity is another important design aid. Continuity of edges and patterns can also guide design. Dominance of one part over another allows the image to stand out. Clarity of joints indicates an interconnection between elements. Directional difference can help structure large-scale urban design. Visual scope gives depth and meaning to spaces. Motion awareness can help people when navigating areas. Tine series between objects means that there is some linkage between the two. Names and meanings should be connected to help aid navigation. In sum, Lynch finds that one's interaction with the built environment is very important and that urban design can aid in making this a positive experience.

Moule and Polyzoides Architects and Urbanists (1999). "Magnolia / Market Corridor Study." Los Angeles.

This well-researched report evaluates the overriding issues of urban development along the Magnolia Avenue / Market Street corridor. The findings are corridor-wide and also broken down into nodes (areas which are similar to neighborhoods as defined by the City of Riverside). Corridor-wide recommendations follow. For land use issues the study finds that retail should be specific and non-competing, entertainment areas should not be spread throughout the corridor but located in a strategic area, office space should be carefully evaluated for niche markets, existing infill sites should be used to create high density housing opportunities. Transportation recommendations

include making Magnolia a local transit corridor, placing equal emphasis on all transportation modes including alternative options, continuing with a four lane arterial, installing traffic calming measures, adding express bus service, and encouraging a park-once-system. The authors recommend attention to the public realm through open space and design consideration and historical preservation. Landscape recommendations include unifying the corridor through landscape design, planting trees where none exists, and introducing pedestrian amenities such as lighting. Taken in sum, the authors argue for a new urbanist type development, which focuses on human scale design and livable community goals.

Nasar, J. and D. Julian. (1995). "The Psychological Sense of Community in the Neighborhood (Neighborhood Sense of Community Scale)." *Journal of the American Planning Association* 61: 178-84.

In order to assess sense of community, a reliable and valid instrument must be developed. This study discusses the developing and testing of an 11-question test. The questionnaire was tested in two areas. One was an area of mixed-use, with the assumption being that mixed-use neighborhoods have higher interactions and therefore more likelihood of neighborhood feeling. The other test occurred in and apartment area where one apartment had a courtyard setting while the other had an interior corridor. Mixed-use areas did have a significantly higher sense of community. Married couple and couples with children also had a higher sense of community. Lastly, apartment dwellers in a courtyard setting had a higher sense of community. The authors urge further testing of the instrument.

Orfield, M. (1999). "Commentary: The Trouble with Sprawl." *Star-Tribune.* Minneapolis.

Orfield argues for curbing growth in the Minneapolis region. He asserts that schools, the indicators of a community's health, show that poverty has become more concentrated in inner suburban areas. Orfield discusses the impact of suburban growth on communities and infrastructure as the suburbs attract jobs, high-end homes, and infrastructure. Orfield feels that regionalism (smart growth, tax-based sharing, and regional governance model) is the answer to the area's problems. He argues that the Met Council should be elected and the urban growth boundaries become fixed.

Porter, M. E. (1995). “The Competitive Advantage of the Inner City.” *Harvard Business Review* 73(May-June): 55-70.

Porter argues for an economic strategy to revitalize the inner city. The competitive advantage of the inner city is to encourage clusters that can take advantage of the local workforce and existing infrastructure. He finds that social programs must support a strategy of redevelopment and not be the focus.

President’s Council on Sustainable Development (1999). *Toward a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century.* Washington, D.C., President's Council on Sustainable Development.

The Council recommends five strategies to strengthen metropolitan and rural communities. The five areas of sustainable community development are green infrastructure; land use and development; community revitalization and reinvestment; rural enterprise and community development; and material reuse and resource efficiency. Green infrastructure strategies seek to protect and provide open space areas for a variety of uses. Land use and development strategies focus on smart growth initiatives, encouraging communities to study sprawl growth patterns that could be inefficient. The report also calls for communities to focus on inner ringer suburbs and central cities through community revitalization and reinvestment. It points out the advantages of infrastructure and diversity already available in distressed communities. The Council also suggests strategies for preserving farmland and rural communities. The Council advocates material reuse and resource efficiency through recycling and reuse of materials. Deconstruction and eco-industrial parks are two policies that support material reuse and recycling. The report cites three actions that would support the five strategies. Information and technical assistance is important. Economic and financial assistance should be employed to encourage these strategies. Local capacity and public-private partnerships are a key component to successful metropolitan and rural development strategies.

Talen, E. (1995). *Visualizing Fairness: Equity Maps for Planners.* Morgantown, VA, Regional Research Institute.

This paper discusses how GIS can be used by planners to provide equity maps, which are useful in determining the placement of public resources. Talen argues that equity mapping through use of data and GIS can provide planners with information about allocating resources and another tool for measuring

equity. By producing maps which visually show allocation of public resources and demographic information, planners are better informed.

United States Department of Transportation (1996). *Planning, Developing, and Implementing Community Sensitive Transit.* Washington. D.C., FTA.

Examination of the impact of transit on livable communities.

Zaddack, G. N. (1998). "Real Estate Applications for GIS: a Review of Existing Conditions and Future Opportunities." *Real Estate Issues* Winter: 13-16.

This article reviews the ways GIS is being used in the real estate field. Pin maps provide a visual map of an area. Trade area definitions provide information on the customer base, transportation systems, population densities, and home ownership patterns. Raster Imagery allows GIS to provide in-depth knowledge of land use. GIS can provide information on site cloning for businesses wishing to expand. Based on current market information GIS can help business identify future expansion sites.