STAKEHOLDERS' PERCEPTIONS OF PEDESTRIAN ACCESSIBILITY TO GREEN INFRASTRUCTURE: FORT WORTH'S URBAN VILLAGES

by

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ABSTRACT

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by

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Green infrastructure refers to a strategically managed network of natural and open spaces that provides ecological benefits for human and wildlife populations in urbanized areas (Benedict and McMahon, 2006; Sandstrom, 2002; Weber, Sloan, and Wolf, 2005). Recent studies demonstrate a relationship between green infrastructure, and human and ecological health in urbanized areas (Tzoulas et al. 2007; Wilson, 1986; Louv, 2008). By strategically increasing density and a mix of uses in existing, sparsely populated urban areas, the "urban village" model developed by the City of Fort Worth presents the opportunity to incorporate accessible green infrastructure in an urban environment in order to promote human health and ecological benefits within a pedestrian friendly, sustainable environment (Aldous, 1992; The Congress for New Urbanism, 2009). The Commercial Corridors Task Force in its Final Report (2002), listed as a criterion for urban village designation, parks and open space, in addition to public improvements and historic building stock. Very little is known however, about the availability *and* accessibility of green infrastructure in Fort Worth's urban villages.

This research examined stakeholders' perceptions of pedestrian accessibility to green infrastructure (parks, trail connections, natural and open space networks and therefore, a more comprehensive understanding beyond parks and open space) within the urban villages as well as, a walkable distance beyond their perimeter. The accessibility factors used in this research focused primarily on distance, safety and physical barriers which are considered three of the most critical factors according to Van Herzele and Wiedemann (2002). Face-to-face interviews with individuals from the City of Fort Worth's planning department, neighborhood leaders and design professionals were conducted. Additional information regarding perceptions of pedestrian accessibility was obtained through passive field observation techniques (Marcus and Francis, 1998). Fort Worth's open space structure was assessed through Geographic Information Systems (GIS) in order to determine location and availability of green infrastructure. Transcripts of the interviews provided a narrative for analysis. Respondents' views were analyzed according to the constant comparative method (Merriam 1998).

The findings of this research illustrated that although the stakeholders gave varying responses concerning the role and the importance of the parameters of accessibility (distance, safety and physical barriers), collectively, they affirmed the vital need for pedestrian accessible green infrastructure within and surrounding Fort Worth's urban villages. While the City rightly focused on economic redevelopment in its initial urban villages redevelopment plan, the findings suggested that the current scope of economic redevelopment needs to be expanded to include a more comprehensive understanding of the importance and role of green infrastructure.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The term green infrastructure was first coined by Little (1990) regarding the creation of a "regional green infrastructure" through the use of comprehensive urban, greenway systems or networks. These networks could be based on natural landforms, or be "simply an opportunistic assemblage of greenways and open spaces of various kinds…" (Little, 1990, p.5). Little (1990) traced the origins of the greenway movement from Olmsted, Howard, MacKaye, McHarg, to Lewis and Whyte (Little, 1990, p.7-24). The concept of urban greenways however, has since evolved from the simple creation of linkages for parks and surrounding residential neighborhoods. Today the concept includes an emphasis on, "Ecologically significant corridors, usually along rivers and streams and (less often) ridgelines, to provide for wildlife migration and 'species interchange,' nature study, and hiking" (Little, 1990, p.5).

Green infrastructure can also be described as a "process" in which open spaces and networks are strategically planned and managed at all spatial scales for optimal ecological and human benefit. Unlike other conservation strategies, green infrastructure planning recognizes the importance of and the need for both natural and open space networks, in addition to land development for human populations. Today rapid urbanization into former green fields and the densification of these areas threaten human and ecological health (Tzoulas, et al. 2007). Low-density development has fragmented the landscape, displaced native species, and disrupted ecosystem functions all while consuming vast quantities of land (Weber et al. 2005).

1.1.1 Background

The North Central Texas Council of Governments (NCTCOG) calculates that by 2030 the North Central Texas population (sixteen counties) will increase from an estimated 6.5 million

to nearly 9.5 inhabitants. By 2050 that number will reach nearly 12 million (NCTCOG, 2008, p. 4*).* Just as metropolitan cities, towns and villages around the country and abroad (see Maryland, Raleigh, North Carolina, Portland, Oregon, the U.K, et al.) grapple with the effects of urban sprawl, air and water pollution, shrinking natural and degraded landscapes, so too is the North Texas region. Since 2004, Vision North Texas (VNT) in conjunction with NCTCOG, The University of Texas at Arlington and the Urban Land Institute has provided a regional forum for citizens and stakeholders in the North Central Texas area to discuss anticipated changes in growth. Topics currently under review include natural assets in addition to such issues as nutrition, housing, transportation, water resource management, and sustainable urban development.

The City of Fort Worth has been recognized by the North Central Texas Council of Governments (NCTCOG) for its Urban Village redevelopment program (2003 CLIDE Award Winner, Planning and Policy). Currently, there are sixteen, designated urban villages within its central city. The City's strategy for their renewal includes capital improvement, economic investment and revised zoning to accommodate mixed land-uses. In-depth marketing and economic analyses, community workshops, and master planning have been conducted for thirteen of these villages (Commercial Corridors Revitalization Strategy: Final Report of the Commercial Corridors Task Force, 2002; *hereinafter referred to as,* "The Final Report").

Of the sixteen urban villages only three can be said to be mostly complete or nearly so. Five others are in varying stages of completion. The other eight urban villages have had little to no, economic redevelopment at this time.

1.2 Problem Statement

In recent years there has been a "reconsideration of the interdependence between people, their health, and their physical and social environments" (Maller, Townsend, Pryor, Brown and St. Leger, 2005, p 46). As an emerging concept for urban densification, the urban village and the health benefits associated with access to nature have become inextricably

intertwined (Aldous, 1992; Duany Plater-Zyberk, 2009; West Fork Trinity River Regional Inventory and Analysis Studio Report, 2009). In its Charter for New Urbanism, CNU linked the importance of the natural environment to the built environment. "We stand for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy" (The Congress for New Urbanism, 1996). Furthermore, the Canons of Sustainable Architecture and Urbanism, a companion to the Charter for New Urbanism actively promote awareness of habitat destruction and offer operating principles that take into account "…stewardship of all land and the full range of human settlement: water, food, shelter and energy… and simultaneously engage urbanism, infrastructure, architecture, landscape design, construction practice and resource conservation at all scales…" (CNU, 2010).

This research builds upon the existing literature on the importance of accessible green infrastructure in urban environments. The literature indicated that three of the most significant factors for use of urban green spaces are distance, safety, and physical barriers (Van Herzele and Wiedemann, 2002). As Fort Worth's urban villages have recently been redesigned, they offer landscape architects a unique opportunity to study stakeholders' perceptions of pedestrian accessible green infrastructure with the City's originally stated goals in relationship to these three factors. Ultimately, stakeholders' perceptions of pedestrian accessibility to green infrastructure impact the design of the public realm.

The purpose of this research is to examine stakeholders' perceptions of pedestrian accessibility to green infrastructure in Fort Worth's urban villages in order to promote human and ecological health in dense environments. This research focuses on three significant factors for pedestrian accessibility to urban green spaces: distance, safety, and physical barriers which are indicated as three of the most critical aspects of pedestrian accessibility (Van Herzele and Wiedemann, 2002).

1.3 Research Questions

The research questions in this study are:

(1) What are stakeholders' perceptions regarding pedestrian accessibility from Fort Worth's urban villages to green infrastructure, and their importance to human and ecological health in dense urban environments?

- What are stakeholders' perceptions regarding geographic distance, and their impact on pedestrian accessibility to green infrastructure?
- What are stakeholders' perceptions regarding safety and their impact on pedestrian accessibility to green infrastructure?
- What are stakeholders perceptions regarding physical barriers (e.g. six-lane highways, inadequate cross-walks), and their impact on pedestrian accessibility to green infrastructure?
- It is also the intent of this research to highlight the relevance of accessible green infrastructure in dense urban environments to the profession of landscape architecture.

1.4 Research Methods

Face-to-face interviews with three stakeholder groups were conducted: with individuals from the City of Fort Worth, professional designers, and neighborhood leaders. These individuals were selected based on their experience and knowledge and/or on their involvement with the urban villages development program. Additional information regarding perceptions of accessibility was obtained through passive field observation techniques (Marcus et al, 1998). Geo-spatial information regarding Fort Worth's open space structure and connectivity was assessed using Geographic Information Systems.

An interview protocol was developed to gather information about the respondents' perceptions of accessibility to green infrastructure. The first set of questions established

respondents' professional backgrounds. The second set of questions asked by the researcher dealt with the urban village and green infrastructure concepts. These were asked to establish respondents' knowledge and perceptions of urban villages and green infrastructure, and their importance to human and ecological health. Next, a series of questions on distance, safety, physical barriers and their effect on pedestrian accessibility were asked of each of the respondents. The fourth set of questions asked respondents to consider two big picture questions. The first asked respondents about the provision of accessible green infrastructure at the neighborhood, city, and regional scale; the second asked if there were any other important issues at the larger, regional scale.

The interview tapes were transcribed by a professional transcription service. The transcripts were analyzed to identify the experts' perceptions of pedestrian accessibility to green infrastructure in dense urban environments. Initially, all respondents' views were examined as one group. Subsequently, each set of perceptions was analyzed separately and then a comparison was made between the groups using Merriam's (1998) constant comparative method. An additional comparison was made between decision-makers' perceptions and the current urban village master plans available on line at the City's web site.

1.5 Definitions of Key Terms

Accessibility. Accessibility refers not only to proximity, but also to the number and location of access points, the perception of personal safety, and physical and/or psychological barriers that limit access to green infrastructure. Other attributes include size, attractiveness, space, nature, culture and history, quietness and facilities (Van Herzele and Wiedemann, 2003).

Form-Based Development. New Urbanists have developed an alternative system for the zoning and design of communities. A Form-Based Code (FBC) fosters

predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. They are regulations, not mere guidelines. The code is adopted into city or county law. Form-based codes are an alternative to conventional zoning. Such a code typically includes both explanatory and regulatory graphics and illustrations (Form-Based Codes Institute, 2009).

Green Infrastructure. Green infrastructure is "…an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife" (Benedict and McMahon, 2006, p.1).

NCTCOG. *"The North Central Texas Council of Governments* (NCTCOG) is a voluntary association of, by and for local governments, and was established to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development. NCTCOG's purpose is to strengthen both the individual and collective power of local governments and to help them recognize regional opportunities, eliminate unnecessary duplication, and make joint decisions" (NCTCOG, 2010).

New Urbanism. "The principles of urbanism can be applied increasingly to projects at the full range of scales from a single building to an entire community…and are applied at the full range of densities from small towns, to large cities" (The Congress for New Urbanism, 2010). They include walkability; connectivity; mixed-use and diversity; mixed housing; quality architecture and urban design; traditional neighborhood structure; increased density; green transportation; sustainability; and quality of life.

Perception. "The objective of perception is to present our brain with a coherent and meaningful picture of the outside world and to give each object its place in an organized whole" (Coeterier, 1996, p.28).

Smart Growth. Smart growth is a unified development ordinance (Duany, Plater-Zyberk & Company, 2009) that makes development decisions predictable, fair and cost effective. It encourages compact building design, and a range of housing opportunities and choices. It fosters walkable neighborhoods and distinctive communities with a "spirit of place," and includes a range of transportation choices. It encourages community and stakeholder participation. Additionally, Smart Growth principals strengthen and direct development towards existing communities while preserving open space, farmland, natural beauty and critical environmental areas (www.epa.gov, 2009).

Transit-Oriented Developments. "A transit-oriented development (TOD) is a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car" (Calthorpe, 2003, p.56).

Urban Village. An urban village is a community that is defined by a mixture of land uses; compact size (forty acres or less); is accessible to various forms of transit (pedestrian and bike trails, ample sidewalks for pedestrian use, light or commuter rail, and buses); is built to human scale; contains mixed housing for various socio-economic groups; provides local employment opportunities and access to parks and recreation within a walkable distance (CNU, Neal, 2003, Aldous, 2002).

Vision North Texas. Vision North Texas (2008) is a partnership of private, public, and academic organizations working to increase awareness about the growth expected in North Texas and to involve people and organizations in initiatives that accommodate that growth successfully and sustainably. The three charter members are the North Central Texas Council of Governments (NCTCOG), University of Texas at Arlington (UTA) and the Urban Land Institute (ULI), in addition to other local and regional partners and sponsors (Vision North Texas, 2008, p.1).

Walkability. Walkability is generally considered a one-quarter to one-half mile walking distance. Calthorpe (1993) describes it as an average two-thousand feet radius and refers to it as a "comfortable walking distance (+/- 10 minutes) for the majority of people" (Calthorpe, 1993, p.56).

1.6 Limitations and Significance

This study focused on stakeholders' perceptions of pedestrian accessibility to green infrastructure in Fort Worth's urban villages. The City of Fort Worth does not refer to its Trinity River Vision Master Plan, its Parks, Recreation and Open Space Master Plan, or the Forestry Department's current reforestation projects as "green infrastructure." These plans nonetheless contain many of the requisite attributes of green infrastructure according to Benedict and McMahon's definition (Benedict and McMahon, 2006, p. 3).

This research has been conducted during a still, relatively brief timeframe since the urban villages development program was established. There is still much to be learned as these urban villages continue to benefit from renewed economic development, economic investment and tax incentives. Their reconnection to the larger urban fabric of the City as Fort Worth continues its central city reinvestment, will provide landscape architects and allied professional's valuable

information in the design and planning of accessible green infrastructure within dense, urban environments.

The term, green infrastructure has been widely used by environmental scientists and planners. Based on a review of the literature it does not appear to be in common usage by the landscape architecture profession at this time, although the concept of green infrastructure is widely understood.

Not all respondents were familiar with term, green infrastructure. All however, understood the importance and relevance of parks, trails, natural, and open space networks in dense urban environments. Respondents acknowledged the vital importance of human health benefits provided by pedestrian accessible green infrastructure. Only five of the fifteen experts however, mentioned the *ecological* health benefits available to urban populations through the use of *ecological functions* such as stormwater management or air and water remediation.

It should be noted, regarding urban ecological systems (e.g. green infrastructure) Tzoulas et al. (2007) point out that the complexities of human and ecological interaction need to be more adequately and comprehensively addressed by the various professions. The authors suggest that in order to accomplish this effectively a more interdisciplinary approach will need to taken to "…integrate biological, social and other sciences to provide a better understanding of the challenges of land use planning and management" (Tzoulas et al. 2007, p.168). In spite of the difficulties of bridging the gap between different scientific traditions, methods, and theories Tzoulas *et al*. recommend that such an approach is necessary in order to meet the challenges of land use planning.

This research provides data for a better understanding of the importance of pedestrian accessibility to green infrastructure in dense, urban environments, and of the difference between the stakeholders' perceptions and the built, and soon-to-be-built environment.

1.7 Assumptions

For this research it was assumed that those within the City of Fort Worth's Planning Department, the design professionals and neighborhood leaders involved in the urban village redevelopment program were aware of the importance of pedestrian accessibility to parks, trails, natural and open space networks in dense urban environments.

1.8 Summary

This chapter has detailed the background for this research. The following chapter focuses on the value of the human and ecological benefits of green infrastructure. This includes a brief review of the importance of pedestrian accessibility to green infrastructure in terms of distance, safety and physical barriers. An overview of the urban village model and of Fort Worth's urban villages development program will conclude this chapter. Subsequent chapters present the researcher's methodology, results and discussion of interviews with stakeholders, key findings, conclusions, and suggestions for future research.

CHAPTER 2

LITERATURE REIVEW

2.1 Introduction

This chapter presents a review of research and literature that concentrates the importance and benefits of green infrastructure and the necessary "preconditions" for the use of green infrastructure. In addition it includes a brief history of the urban village model and an overview of Fort Worth's strategy for its urban villages redevelopment program. The section concludes with a presentation of three urban village examples that illustrate current levels of development. This provides the basis for understanding key stakeholders' perceptions of pedestrian accessibility to green infrastructure within and surrounding the urban villages, as well as providing a rationale for the value of this research to the profession of landscape architecture and allied professions.

2.2. Green Infrastructure

2.2.1 Ecological and Human Health Benefits

Green infrastructure and "green space" are not interchangeable terms. The term "green space" has traditionally been used to refer to parks and other open spaces in urban areas. Sandstrom (2002) however, uses the term "green infrastructure" rather than *green space* because it connotes "multiple purpose" and "in current efforts to achieve sustainable urban development, 'green infrastructure' has the same dignity as 'technological infrastructure' has had in traditional urban planning" (Sandstrom, 2002, p.375). While the concept of green infrastructure includes parks, recreational fields, and other green spaces, the emphasis is on the importance of open and green space as parts of interconnected systems that are protected

and managed for the ecological and human benefits they provide (Benedict and McMahon, 2006).

"As more and more of the world's people have most of their direct experiences with nature in urban settings, the native species occurring there and the habitats and ecosystems that support them will assume ever greater importance" (Miller, 2008, p.114). The rate of open space conversion in the United States exceeds population growth. From 1982 to 1997 the nation experienced a forty-percent increase in urbanized land, despite the fact that population grew only seventeen percent (Benedict and McMahon, 2006, p.6). Because it is estimated that by 2025 over half of the world's population will live in urbanized areas that consume twice as much land as today (Miller, 2008), the concept of green infrastructure provides an ecological framework for sustainable urban development. Urbanized areas are currently susceptible to flooding, air and water pollution, the effects of urban heat islands, the loss of habitat and native species of plants and animals (Sandstrom, 2002; Miller, 2008; Weber, et al. 2005).

> Green infrastructure helps to sustain forests, farms, and other working lands and allows natural systems to function as intended, saving communities millions of dollars in flood mitigation, water purification, and a host of other savings resulting from avoiding expensive man-made solutions (Benedict and McMahon, 2006, p.57).

Other ecological benefits provided by green infrastructure include wildlife corridors, and carbon sequestration through reforestation. Beyond providing critical habitat for animal and plant species, trees clean the air by removing pollutants such as "…nitrogen dioxide, sulfur dioxide, carbon monoxide, and ozone, and store or sequester carbon in wood" (Benedict and McMahon, 2006, p.62). Wetlands provide habitat, filter pollutants, act as natural basins, replenish ground water, stabilize shorelines, sediment and nutrient retention, climate change mitigation, and water purification.

In addition to the ecological benefits provided by green infrastructure, the "biophilia hypothesis" proposed by Wilson (1986) suggested that,"…there exists an innately emotional affiliation of human beings to other living organisms" (Wilson, 1986, p.249). As human beings have evolved over the course of millennia our existence depended on an "…intimate association with other natural organisms and upon the "…exact learned knowledge of crucial aspects of natural history (Wilson, 1986, p.250). Like the concept of green infrastructure, biophilia relies on the preservation of a diversity of species. Even though the concept of biodiversity remains controversial, Wilson has asserted that the need to understand the importance between human nature and the diversity of species is urgent now more than ever with the rapid disappearance of "the living part of the environment" (Wilson, 1986, p.256).

Viewed as a "living part of the environment" Benedict and McMahon's (Benedict and McMahon, 2006, p.59) proposed sustainability pyramid illustrates the importance and benefits of green infrastructure that serve as the foundation for human existence.

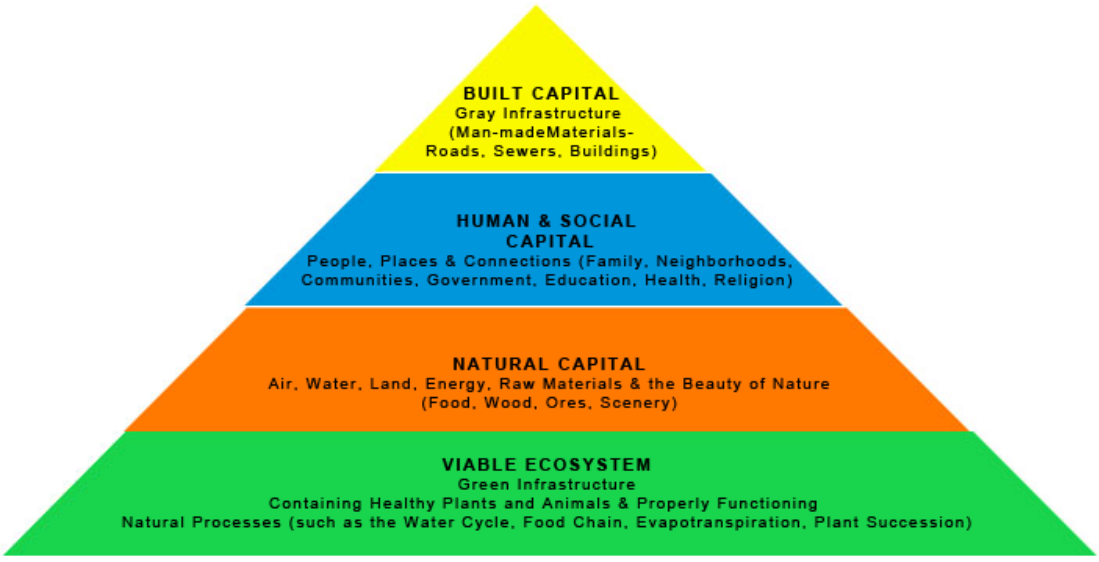

Figure 2.1 Sustainability Pyramid (Source: Benedict and McMahon, 2006, p. 59)

The economic value of green infrastructure is not inconsiderable. As one example Benedict and McMahon cite the City of New York. The Environmental Protection Agency issued an order to the City to build a water filtration plant estimated at six to eight billion dollars. Instead the City spent one-and-half billion dollars on land acquisition in upstate New York in order to protect the two-thousand square-mile Catskill/Delaware Watershed from which it gets its water (Benedict and McMahon, 2006, p.71). This approach suggested that green infrastructure planning committed *before* future development will save city, state and federal agencies millions of dollars in environmental remediation costs. This strategy to protect watersheds using a similar approach has been used across the country as well as in other countries.

Tourism is another economic benefit provided by green infrastructure. Millions of dollars are spent visiting national and state parks for their scenic beauty as well as opportunities for recreation including hiking, biking, hunting, and fishing. Urban greenways also provide recreational opportunities such as nature viewing, biking and walking. In another example Benedict and McMahon cite Augusta, Georgia's riverfront restoration. An initial investment of eight-million dollars has yielded one-hundred and ninety-eight million dollars in new commercial investments. This in turn has provided Augusta with increased tax and business revenues (Benedict and McMahon, 2006, p.73).

In terms of health overall, green infrastructure provides everyday recreational opportunities for "walking, exercising, playing and social interaction," is an important element of city structure, cultural identity, and historical heritage and collectively improve the quality of life (Sandstrom, 2002, p. 382-385). In the North Texas region sports and recreational fields are widespread. Many of recreational fields are within community and regional level parks. While these alone are not considered green infrastructure they form a portion of the green infrastructure fabric.

Findings in a recent study completed in Atlanta indicate "that creating walkable environments may result in higher levels of physical activity and less driving and in slightly lower obesity prevalence for those preferring walkability" (Frank*, Saelens, Powell, and Chapman, 2007, p.1898*). In two recent nationwide surveys in Holland, people who lived within one to three kilometers of green space reported significantly better health than those without such access, after researchers controlled for socioeconomic status, age, and other factors. Overall contact with nature seems an important component of a healthy, wholesome life (Frumkin *a*nd Louv, 2007, p.3).

"Increasingly, empirical evidence indicates that nature provides restorative experiences that directly affect people's psychological well-being and health in a positive way" and that access to nearby nature reduces the stress of contemporary urban environments (Gidlof-Gunnarsson and Ohrstrom, 2007, p. 115). In urbanized areas parks serve as primary sources of human contact with nature. The salutary benefits of walkable neighborhoods and districts are well documented in the literature. Accessibility to parks, trails and open space networks from an urban village is essential to improving health among residents and users. While studies in the field of socio-ecological theory are still limited, a causal relationship appears to exist between nature and overall physical and mental health and well-being (Maller, Townsend, Pryor, Brown, and St. Leger, 2005). In fact the authors suggest that "Having nature in close proximity, or just knowing it exists, is important to people regardless of whether they are regular 'users' of it" (Maller, Townsend, Pryor, Brown, and St. Leger, 2005, p. 50).

The provision of accessible green infrastructure available to the public within and surrounding mixed-use developments (e.g. Fort Worth's urban villages) is in line with health strategies recommended by the Centers for Disease Control (CDC). The Centers' *Recommended Community Strategies and Measurements to Prevent Obesity in the United States* lists eight strategies for encouraging physical activity and limiting sedentary lifestyles (CDC, Morbidity and Mortality Weekly Report, 2009). Strategy 21 [sic] specifically addresses the

issue of community re-zoning for “mixed use that specifically combines residential land use with one or more commercial, institutional, or other public land uses” (CDC, Morbidity and Mortality Weekly Report, 2009). The urban village is a mixed-use development.

The matrix below (Table 2.1) lists the essential elements of green infrastructure given by five of the author’s used in this research. McHarg (1969) introduced the concept of physiographic determinism, that is, that natural processes should determine how and where development occurs (McHarg, 1969, p. 81). The criteria he established for land use evaluation are reflected in the work of the other more recent authors. After the Rio Earth Summit in 1992 the Swedish government passed legislation designed to focus on the importance of green space in and around urban areas. Sandstrom (2002) subsequently used criteria established by the Swedish National Board of Housing, Building and Planning for the evaluation of green plans in seven Swedish cities (Sandstrom, 2002, p.374). Weber et al. (2005) have documented Maryland’s Green Infrastructure assessment tool. Benedict and McMahon (2006) partnered with The Conservation Fund and the Urban Land Institute to document the importance of establishing green infrastructure as an innovative tool for land use planning. And finally, Tzoulas et al. (2007) presented a comprehensive literature review in order to establish a more interdisciplinary research approach to green infrastructure planning.

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Table 2.1 Literature Review of Green Infrastructure

MCHARG (1969)	SANDSTROM (2002)	WEBER *et al.* (2005)	BENEDICT *et al*. (2006)	TZOULAS, et al. (2007)
Ecology as planning principle	*Recreational, parks, and open spaces*	*Distribution of natural features*	*Protected and managed network of natural and open spaces*	*Coherent planning entity*
Physiographic determinism (Optimum pattern of development)	*Maintains biodiversity*	*Provides ecosystem services*	*Ecosystem conservation*	*Natural, semi-natural and artificial networks*
Physiographic principles for conservation and development	*Enhances historic and cultural traditions*	*Forests, wetlands, and streams*	*Woodlands, wetlands, trails, parks, rivers, and grasslands*	*Multifunctional ecological systems at all spatial scales*
Growth without despoliation	*Improves climate, air quality and noise reduction*	*Provides marketable goods & services*	*Restored ecological systems*	*Quality as well as quantity*
Planned growth	*Element of urban structure and urban life*		*Working lands, trails and other recreational features, cultural and historic sites.*	*Integration between urban development, nature conservation and public health*
	Diversity of Species, Ecosystems and Landscapes		*Contribute to the health and quality of life*	*Ecological diversity*
	Provides biological solutions (e.g. stormwater management, waste water treatment)			*Alleviates habitat fragmentation*

Table 2.2 below, illustrates the significant intersection between criteria given by each of the five authors. This table clearly demonstrates the similarity of criteria among the various authors.

Table 2.2 A Comparison of Green Infrastructure Criteria

GREEN INFRASTRUCTURE CRITERIA	MCHARG (1969)	SANDSTROM (2002)	WEBER et al. (2005)	BENEDICT et al. (2006)	TZOULAS et al. (2007)
Preserves Ecological Functions/Maintenance of Biodiversity/Provides Ecosystem Services	X	X	X	X	X
Environmental quality – improved climate/water/noise /aesthetics	X	X	X	X	
Biological solutions to technical problems – e.g. stormwater management	X	X	X	X	
Cultural identity – awareness of the history/culture of the city		X		X	
City structure – an important element of urban structure/urban life		X		X	
Provide areas for recreation & everyday public life; Forests, wetlands, trails, parks, rivers, grasslands, cemeteries, and other open spaces	X	X	X	X	X
Strategically planned and managed for integration between urban development, nature conservation and public health	X	X	X	X	X
Maintains integrity of habitats; Quality as well as Quantity	X	X	X	X	X
Preserves lands for marketable goods (e.g. food production, forest products)	X	X	X		

The preceding section highlighted numerous ecological and human health benefits of green infrastructure. The following section continues the discussion of pedestrian accessibility to green infrastructure in relation to distance, safety and physical barriers that facilitate or impede accessibility in urban environments.

2.3 Accessibility

2.3.1 Distance, Safety and Physical Barriers

Based on previous studies Van Herzele and Wiedemann (2002) have designed a "monitoring tool for the provision of accessible and attractive urban green spaces" (Van Herzele and Wiedemann, 2002, p. 109). The authors suggested that accessibility and attractiveness are necessary "preconditions" for use of urban green spaces. Five basic principles were used in the development of an indicator for monitoring the use of green space. These include:

1) "Citizen-based" green spaces that reflect the local, urban population's point of view"
2) "Functional levels" of green spaces provided at street, neighborhood, city and regional levels
3) "Preconditions for use" including proximity, accessibility, surface, safety and barriers
4) "Variety of qualities" within green spaces that provide a variety of experiences close to home and work
5) "Multiple-use" green spaces that provide opportunities for use that while not necessarily intended, contribute to quality of life

As described, Van Herzele and Wiedemann (2002) have suggested that distance, safety and physical barriers are necessary "preconditions for use" of urban green spaces. If these "preconditions" are not met, users will not be attracted to green space (Van Herzele and Wiedemann, 2002, p.110). Of these preconditions, distance to green space appears to be the single most important factor for its use. Neighborhood parks should be within a five minute walk "if they are to be perceived as accessible (Van Herzele *et al.,* 2002, p. 111). Accessibility

includes proximity to green infrastructure in addition to safety, and the lack of physical barriers such as railways, highways, main thoroughfares and quality of surfaces.

The study of personal safety in urban park environments has been documented by Jacobs (1961) and others. Commenting on safety in neighborhood parks Jacobs (1961) suggested that many neighborhood parks suffer from the same negative problem as that of deserted or underutilized streets, namely, a lack of eyes (Jacobs, 1961, p. 95). Effective, popular streets, parks, neighborhoods and other destinations attract residents and visitors alike because they are perceived as safe and inviting for their singular attributes.

These “preconditions for use” of urban green spaces, distance, safety and physical barriers were used as parameters of accessibility in this research.

2.3.2 Attractiveness

Based on previous literature Van Herzele and Wiedemann (2002) established five parameters for the evaluation of the attractiveness of urban green spaces:

1) Space: spaciousness, perceived or actual
2) Nature: a range of green spaces, from species-rich areas to urban parks
3) Culture and history (agricultural and forested lands, but also designed historical features such as squares, buildings, statues, and cultivated parks
4) Quietness: not only the level of decibels, but the context of sound in a particular environment
5) Facilities: those features which support activities such as paths, children’s areas, toilets and ball fields

While initially compiled for the evaluation of green spaces within Belgian landscapes, these parameters are useful as broad indicators of “dominant qualities” and were referred to by several stakeholders to evaluate accessible green infrastructure within Fort Worth’s urban environment.

2.4 Perception

2.4.1 Introduction

Although this variable was found to be an important element of accessibility in other studies, and is worth special mention as yet, another parameter, this factor was not prioritized explicitly in this research due to the methodological framework set forth earlier in this research.

Coeterier (1996) summarized twenty years of research in the area of landscape perception (For a complete discussion see *Dominant attributes in the perception of the Dutch Landscape, 2006)*). Coeterier described eight interrelated environmental attributes that not only determine perception but that also act as qualities that determine landscape perception and evaluation. He described unity and use as predominant attributes that determine the significance of the other attributes (Coeterier, 1996, p.28, 32). These and management of landscape, another of the eight attributes informed this research on the subject of pedestrian accessibility to green infrastructure within and surrounding Fort Worth's urban villages.

Perception has both integrative and differentiating aspects, which means that we take in the "whole" of a particular landscape before we perceive the details. Furthermore, Coeterier (1996, p.28) described the objective of perception as a mental construct that presents "…our brain with a coherent and meaningful picture of the outside world and…give[s] each object its place in an organized whole." In other words, the character of the whole is perceived based on the meaning of individual parts. Users have a clear expectation for each type of landscape. "If the parts fit together and it functions as a whole it has the quality of unity "(Coeterier, 2006, p. 30). However, "When a landscape adopts the elements of another landscape type, it is both corrupted and levelled" [sic] (Coeterier, 1996, p.31). As Coeterier explained, a cow located in a meadow has a particular meaning, but a cow located in a park has another meaning entirely.

The application here of the perception of unity as an attribute of use, suggested that if human beings have a "biophilic" affiliation to other living organisms (Wilson, 1986, p. 249) then it follows that without other living organisms, (both human and biotic) the urban landscape is

therefore not unified, but “corrupted and levelled” [sic] (Coeterier, 1996, p. 31). If the viewer’s perception is “corrupted and levelled” this in turn influences how the viewer determines and evaluates the landscape and specifically whether or not he chooses to use it.

Another attribute for the perception and evaluation of landscape is “management” which Coeterier (2006) described as having three aspects: the level of maintenance, its regulation of use (rules, perceived freedom and safety); and available facilities for use (Coeterier, 2006, p.37). As this research examined safety and physical barriers (in addition to distance) as impediments/facilitators of accessibility to green infrastructure within and surrounding Fort Worth’s urban villages, this suggests that if the user does not perceive a sense of “unity” and “management” (safety) between landscape and the urban villages accessibility is effectively restricted.

2.5 The Urban Village

2.5.1. A Brief Review of the Urban Village

Although the term “urban village” has been in use for many years, it gained new currency in the United Kingdom during the late 1980’s (Franklin and Tait, 2002). “The Prince of Wales, a keen critic of contemporary architecture, introduced the phrase *urban village* in *A Vision for Briton* where he states ‘I am hoping that we can encourage the development of urban villages in order to reintroduce human scale, intimacy and a vibrant street life’” (Franklin and Tait, 2002, p.257). However, long before the 1980’s the sociologist/city planner and critic of urban renewal, Gans (1962) used it to distinguish between two types of urban environment within an immigrant community in Boston’s West End, “The urban village represents an adjusted place, where ethnic migrants have sought to adapt their essentially non-urban culture to the urban setting, while the urban jungle represents a maladjusted place: a ‘Skid Row’ of transients, psychopaths, criminals, and prostitutes” (Franklin and Tait, 2002, p.255).

While Gans (1962) used these terms to describe the quality of social life within an immigrant community, not as physical constructs, *urban village* has nonetheless come to signify

an ambiguously problematic, urban design term. Franklin and Tait (2002), argue "that far from 'fixing a world' the term is equivocal - its meaning fluid, its application contestable – and that herein lies both its strength and its weakness" (Franklin and Tait 2002, p.252). They further suggest that its meaning is totally dependent upon the context in which it is used and on the knowledge, role and interests of the individual reflecting on the term.

Given the difficulty for professionals to identify unequivocally an *urban village,* it is not surprising that a search of the University of Texas at Arlington Libraries' online catalog, a subject heading search for "Urban Villages in the United States" yields only ten matches, five of which are irrelevant. However, the concept of accessible, pedestrian friendly villages that connect to neighborhood services; to other neighborhoods; to public transportation; to parks and open space is well documented (Franklin and Tait, 2002; Aldous, 2002; Neal, 2003; Calthorpe, 1993; Duany Plater-Zyberk, 2009; Congress for New Urbanism, 2000).

In order to pursue his vision of urban renewal The Prince of Wales assembled developers, builders, architects, and planners to discuss how urban environments could be made to resemble the traditional high-quality urban places of the past. This led to the formation of the Urban Villages Group which travelled [sic] throughout the UK and abroad to visit places that appeared to "work." The Group subsequently published its findings in the Urban Villages Report (Franklin and Tait, 2002, p. 257). While there was disagreement over the label *urban village*, the Report set forth features for development that included mixed-use, a maximum area of 100 acres (40 hectares) so that every facility is within walking distance, a population of 3000-5000 people; be pedestrian friendly with adequate public transport; offer mixed tenure housing; possess a varied townscape and a sense of place [sic]; foster community commitment and be sustainable (Neal, 2003). Aldous (1992) described the urban village as:

> Small enough for everything to be within walking distance, small enough for people to know each other by sight, name, association, and to have that working basis of common experience and common assumptions which gives strength to a community…large enough to support a wide range of activities, uses and facilities…an [approximate] 1:1

ratio between jobs and residents…opportunities to live and work within walking distance and [provide] a variety of housing types… (Aldous,1992, p.30).

The figure below (Figure 2.2) is a conceptual urban village proposed by the Urban Villages Group assembled by the Prince of Wales.

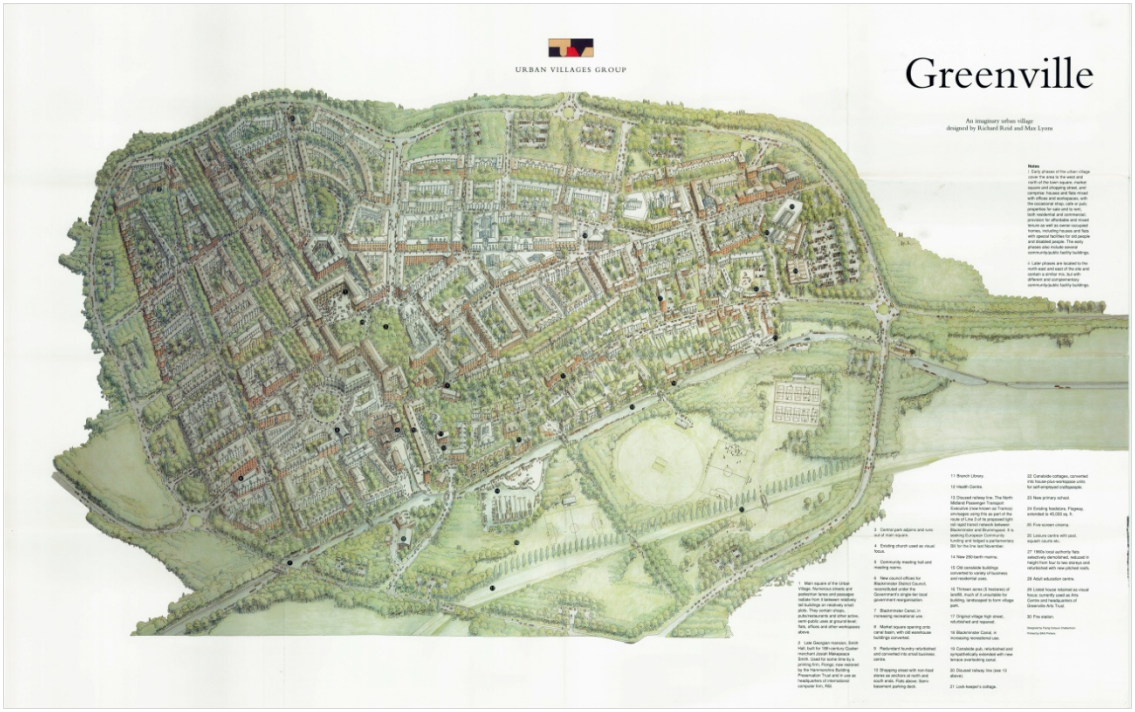


Figure 2.2 Conceptual Urban Village of Greenville,
The Urban Villages Group, 1989 (Aldous, 1992).

Since the early 1990's, much like the Urban Villages Group, The Congress for New Urbanism has advocated "walkable, neighborhood-based development as an alternative to urban sprawl…a multi-disciplinary approach to restoring our communities" (The Congress for New Urbanism, 2009). In addition to advocating walkability New Urbanism principles promote connectivity between neighborhoods and communities (*e.g.,* TOD's), diversity, mixed land uses, mixed housing, quality architecture and urban design. Other aspects include traditional

neighborhood development (TND's), increased density, green transportation, sustainability, and quality of life. In order to increase density and mixed land use, form-based codes are used "to foster predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. They are regulations, not mere guidelines" (Duany, Plater-Zyberk & Company, 2010).

2.5.2 The Urban Village in Fort Worth, Texas

Like other metropolitan areas within the United States, Fort Worth has suffered from the phenomenon of "urban sprawl." In 2001, the Fort Worth City Council committed itself to a new community vision and a set of Strategic Goals that would set the City on a course for socio-economic diversity and prosperity by the year 2020 (The Final Report). One of the proposed strategic goals included a comprehensive effort to revitalize the central city. Recent trends indicated that revitalized, central commercial corridors were emerging as regional destinations. It appointed the Commercial Corridors Task Force to examine its central commercial corridors for opportunities to revitalize specific areas within them. These corridors and areas are principally located within Loop 820.

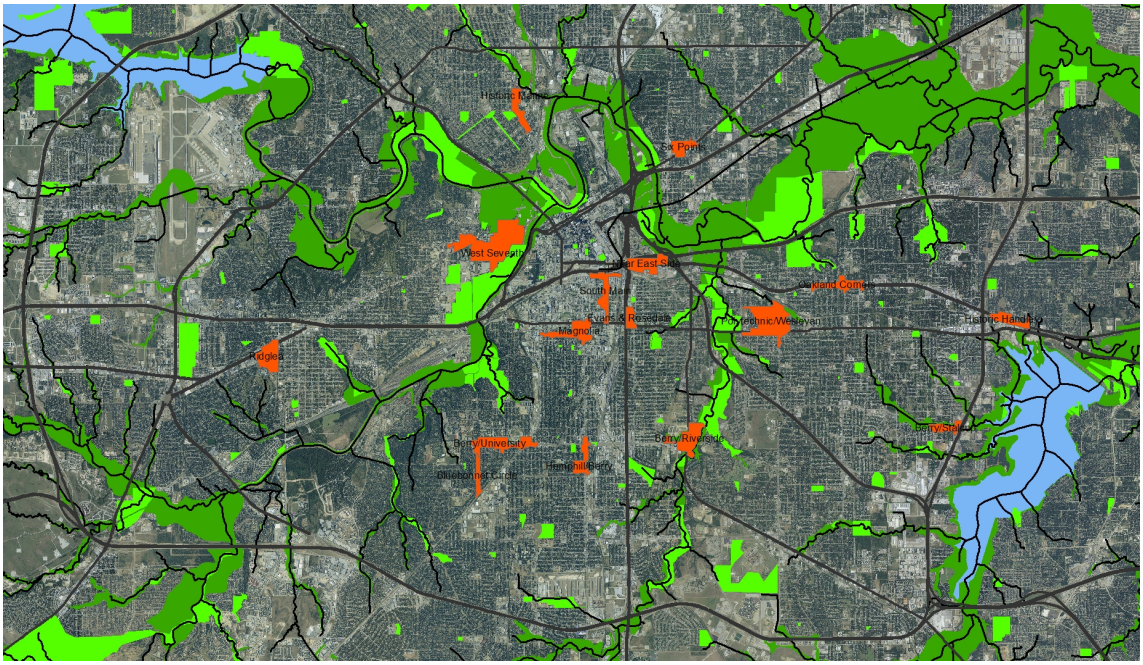


Figure 2.3 Fort Worth's Sixteen Urban Villages and Green Infrastructure (GIS Map).

The Task Force identified existing compact, mixed-use areas within the central city that would benefit from increased economic investment. It believed that by encouraging redevelopment in these areas or *urban villages*, through tax incentives, capital improvements for infrastructure, mixed-use zoning in order to support pedestrian access, and increased access to public transit, a strengthened community image, or 'sense' of place [sic] would be enhanced. The mission of the Task Force was "*to create economic development opportunities in selected commercial corridors that can be measured by increases in employment, tax base, and business growth and quality-of-life improvements, particularly in low and moderate income areas"* (The Commercial Corridors Task Force, 2001; p.4; *emphasis in original*).

The Final Report lists criteria for urban village designation and includes:

1) The presence of market opportunities in the near and long term.

2) An upward trend in local investment.

3) The ability to create mixed-use activity centers, emphasizing live/work/play opportunities with multi-modal access

4) Demonstrated community need, both perceived and quantified, and the presence of unified, energetic stakeholders.

5) Compatibility with the City's Comprehensive Plan.

6) Physical environment including parks and open space, public improvements, historic building stock.

7) Potential for creating key entryways or gateways into development areas.

Of these criteria the researcher used physical environment including parks and open space (see number six) as the beginning point for this research regarding stakeholders' perceptions of pedestrian accessibility to green infrastructure in Fort Worth's urban villages.

The following urban villages and images were chosen to illustrate three current levels of economic redevelopment and capital improvements. Parameters for village selection included proximity to green infrastructure, existing diversity of park types in close proximity to the villages and the larger green network; and a variety of villages that demonstrated three levels of "technical infrastructure" progress on the ground: 'mostly complete,' 'partial completion,' and 'no visible progress.'

2.5.2.1 Berry/Riverside Urban Village

Berry/Riverside has a variety of available green infrastructural components within one-quarter to two to three miles: Cobb Park, Sycamore Park, the municipal, Sycamore Creek Golf Course, and Ellis Neighborhood Park. Cobb Park is its most dominant natural feature and borders a large portion of the urban village. Sycamore Creek, a tributary of the Trinity River meanders through the Park and provides a substantial wildlife corridor for this area and the region. As the Park is situated within the flood plain it is but a portion of the larger natural fabric. The current master plan for its redevelopment includes accessible pedestrian and equestrian trails from the adjacent neighborhoods, signage, redesigned entrances, athletic fields, and areas

for nature study and exploration. Figure 2.5 illustrates current stream restoration efforts in the Park.

Ellis Park is further south and is approximately one-quarter mile walking distance from the center of the urban village, the intersection of East Berry Street and Riverside Drive. There is no visible activity in the Park but it too, connects directly with the larger riparian corridor of Sycamore Creek.

The Berry/Riverside Urban Village master plan (Figure 2.4, below) is from 2007. There has been little to no economic reinvestment in the urban village itself (Figure 2.6) or within the general vicinity.

Figure 2.4 Master Plan (2007) for Berry/Riverside Urban Village
(Source: City of Fort Worth, Planning and Development Department)

Figure 2.5 Cobb Park, 2010, Stream Restoration

Figure 2.6 Intersection of East Berry Street at Riverside Drive. No visible signs of economic development.

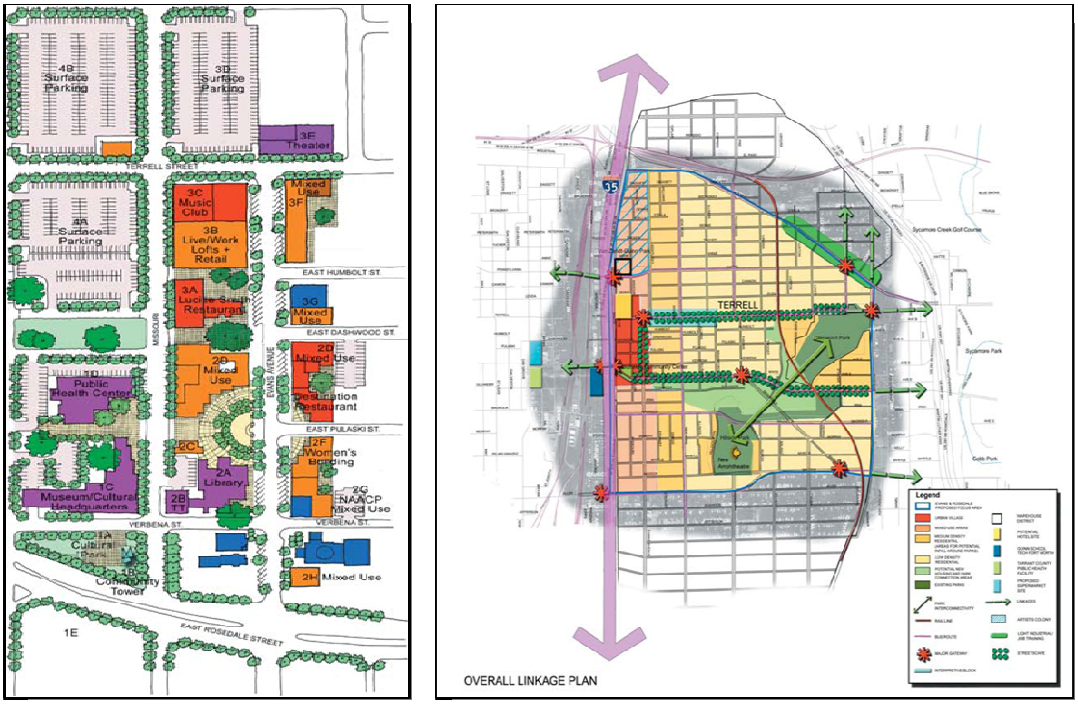
2.5.2.2 Evans/Rosedale Urban Village

The available green infrastructural components that are pedestrian accessible to the Evans/Rosedale urban village are Van Zandt-Guinn, Hillside and Glenwood Neighborhood Parks. A future pedestrian linkage beyond the urban village to Glenwood Park is visible in the extended master plan (Figure 2.7 (b)). It should be noted that of the thirteen urban village master plans available on the City's web site, only the Evans/Rosedale and Historic Marine urban villages demonstrate these pedestrian linkages to the larger green infrastructural components beyond the smaller, neighborhood parks.

Hillside Neighborhood Park is well situated in the midst of the surrounding neighborhood and is easily accessible. It is one-mile away from the urban village and because of its position at the top of the hill looks toward downtown Fort Worth. Glenwood Park (Figure 2.8) is mostly inaccessible from the Evans/Rosedale urban village and from much of the surrounding neighborhoods. It is blocked on its west side because of the railroad tracks. The extended master plan however, clearly shows a future pedestrian path from the Evans Avenue Plaza to the Park via Terrell Street.

The following figure (Figure 2.7) illustrates Evans/Rosedale's first phase (a) and extended linkage plans (b). Figures 2.9 and 2.10 demonstrate recent (2010) signs of progress of the urban village's economic redevelopment.

In contrast to Berry/Riverside, Evans/Rosedale has experienced economic redevelopment. The Evans Avenue Plaza, a focal point for the community has been completed. The Ella Mae G. Shamblee Branch Library has been completed and has become a center of activity. The Hazel Harvey Peace Center for Neighborhoods has also been completed and includes offices for the City's Code Compliance Department and a Neighborhood Policing District (NPD) storefront among other offices.



(a) (b)

Figure 2.7 Evans/Rosedale. (a) First Phase/Master Plan (2005)
(b) Extended Master Plan (Linkage Plan)
(Source: City of Fort Worth, Planning and Development Department)

Figure 2.8 Glenwood Park (one mile from Evans/Rosedale Urban Village

Figure 2.9 Evans Avenue Plaza (2010)

Figure 2.10 Evans/Rosedale Urban Village (2010)

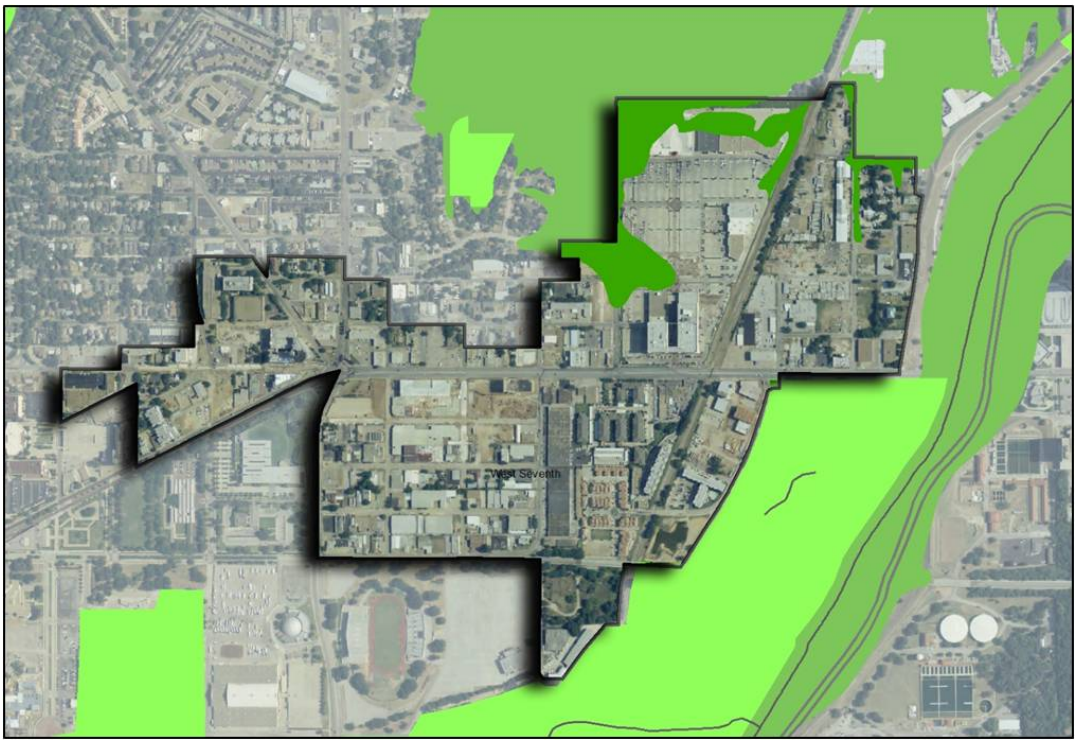


Figure 2.11 Map of West Seventh with urban village boundaries illustrates the urban village in relation to the nearby green infrastructure components. The lighter green areas are designated parks while the darker green areas are within the flood plain.

2.5.2.3 West Seventh Urban Village

West Seventh, the third urban village, has a substantial amount of accessible, natural and man-made green infrastructural components as well as neighborhood parks, entertainments venues such as the Will Rogers Memorial Center Complex, The Botanic Gardens and Heritage Park which is currently threatened with extinction. The Trinity Park borders the urban village on its east side and is its dominant natural area available for recreation. It is a local and regional destination. It has extensive jogging, bike and pedestrian trails that connect to the larger Trinity Trail System, a duck pond, and generous areas suitable for many types of recreation.

The West Seventh urban village itself has had a substantial amount of economic redevelopment and capital improvements. New apartments, a cinema, restaurants, bars, retail and a local gym are recent additions. The Montgomery Plaza, a luxury residential complex of

condominiums and retail has also recently opened. West Seventh has also benefitted from its proximity to downtown Fort Worth, and the Cultural District. These have been key destinations not only for those living in the West Seventh urban village or in nearby neighborhoods, but for the City and the regional in general. There is no record of a master plan for West Seventh on the City's urban villages web site. Figures 2.13 and 2.14 illustrate current levels of economic redevelopment.

Figure 2.12 Trinity Park.

Figure 2.13 West Seventh urban village.

Figure 2.14 View east towards West Seventh urban village.

2.6 Access to Green Infrastructure in Urban Villages

As outlined in the preceding sections, the potential ecological and human health benefits of green infrastructure in a dense urban environment such as in Fort Worth's urban villages are manifold. The map of Fort Worth's urban villages and surrounding green infrastructure (Figure 2.3) illustrates graphically the challenges the City will face however, in providing pedestrian accessibility to green infrastructure within and surrounding its urban villages. In at least six of the villages the availability of green infrastructural components is minimal. In at least four of the villages immediate accessibility is limited because of the existence of six lane highways or as in the case of Historic Handley, a four-lane highway and a power plant block access to Lake Arlington. Access to Lake Arlington is also blocked from the Berry/Stalcup urban village by overgrown brush and incompatible land uses. South Main and the Near East Side urban villages are blocked by Interstate Highway 30. It is a major obstacle between the urban villages and the Trinity River even though South Main urban village is less than two miles away and the Near East Side is less than one-half mile away. The City of Fort Worth provides and maintains neighborhood, community and regional level parks and recreational fields. It is currently implementing its master plan for Gateway Park along the Trinity River. This will provide an ecologically rich environment for humans *and* wildlife. The City is also in the process of implementing a new street car system in order to increase pedestrian accessibility and limit the use of the automobile by providing an additional transportation option.

2.7 Summary

Chapter Two reviewed the literature and research regarding the importance of green infrastructure in urban environments as well as, the necessary "preconditions for use" of urban green space that influence pedestrian accessibility. A brief history of the urban village and a review of the development of Fort Worth's urban villages were also included. The concluding overview of three of Fort Worth's sixteen urban villages were chosen to illustrate the three levels

of proximity and accessibility to green infrastructure and current levels of urban village economic redevelopment efforts. Chapter Three reviews the methodology used for this research.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter focuses on the methodological underpinnings of this research. This research is primarily informed by qualitative research methods (Lincoln and Guba, 1985), data gathering and analysis techniques (Merriam, 1998). Three methods of inquiry were adopted in this research to collect the information needed and to answer the research question. The three methods used: an analysis of the urban villages in relation to green infrastructure using Geographic Information Systems; passive observation (Jacobs, 1961) of selected urban villages and face-to-face interviews with urban village stakeholders.

3.2 Qualitative Approach

Lincoln and Guba (1985) offer *maximum variation sampling* as a more effective and naturalistic method of inquiry rather than using random or representative sampling techniques. “In naturalistic investigations, which are tied so intimately to contextual factors, the purpose of sampling will most often be to include as much information as possible, in all of its various ramifications and constructions.” This then allows for more specificity rather than generalizations about the data. Furthermore, a characteristic of maximum variation sampling is that it offers the possibility of “selecting each unit of the sample only after the previous unit has been tapped and analyzed” (Lincoln and Guba, 1985, p.201).

Interviews were conducted with three separate groups in order to triangulate respondents’ perceptions (Taylor and Bogdan, 1998). Open-ended questions were designed to elicit conversational responses regarding respondents’ perceptions of pedestrian accessibility to green infrastructure. The researcher analyzed the interview transcripts; the data were compiled and sorted into groups. These groups of data, or categories, were concepts indicated by the

data that surfaced repeatedly during the interview conversations. These concepts informed respondents' perceptions regarding pedestrian accessibility to green infrastructure. These were compared to the pre-established parameters (Van Herzele and Wiedemann, 2002) of distance, safety and physical barriers using the constant comparative method (Merriam, 1998).

3.3 Research Design

First, a basic Geographic Information Systems (GIS) analysis of Fort Worth's existing green infrastructure in relation to the sixteen villages was conducted. Second, individual urban villages were selected for further study based on a purposive sampling technique, *maximum variation sampling* (Lincoln and Guba, 1985). Third, a series of semi-structured, face-to-face interviews were used to collect respondents' perceptions of pedestrian accessibility to green infrastructure. Three groups were primarily interviewed: city planners based on their professional involvement with Fort Worth's urban villages development program; experienced design professionals familiar with urban design and public space planning; and neighborhood leaders who participated in the master planning process or who are currently involved with urban village redevelopment.

After a comprehensive review of the City of Fort Worth's urban village master plans available on-line, a table of known variables was compiled (See Appendix A for a partial listing). This table, and the GIS map (Figure 2.3) which documents the availability, proximity and location of open space structure around and within the villages, was combined with maximum variation sampling to initially select three of the villages for passive observation. This allowed the researcher to document unique village variations that emerged in a sampling of the villages, and the opportunity to gather sufficient information before proceeding to the next level of inquiry.

Prime locations for observation of users were scouted in advance. This provided a real-life snap-shot of how and if users were accessing nearby parks, trails, recreational areas, and any other open, green spaces (See APPENDIX C).

An introductory set of profile questions was asked of each respondent to establish her/his level of experience. As a group these respondents represented the necessary constituencies: the City at the policy level, which includes three senior planners who form the "urban villages team"; the assistant City Manager of Fort Worth; and another city planner in private practice who has worked as an urban and regional planner in the North Texas area and across the country. At the neighborhood level, the five residential advocates interviewed are all currently involved and vocal in Fort Worth's urban villages redevelopment program. Finally, five experienced urban designers with a minimum of seventeen years experience, and in at least three cases over thirty years, were interviewed. Among them they have local, regional, national and international experience.

3.4 Interview Protocol

Face-to-face interviews were conducted using a semi-structured, conversational approach. Respondents were not limited by the interview script. After identifying which of the villages would be studied, City planners intimately familiar with the urban village's redevelopment program were contacted and appointments were scheduled for data collection. Other interviews with design professionals and those leaders who participated in the master planning process for their neighborhood were also pre-arranged and conducted.

All interviews were digitally recorded using an Olympus Digital Voice Recorder. These digital files were then sent via a file transfer protocol (FTP) to a Santa Monica, California based company, Verballink.com for transcription. Transcriptions were sent to the researcher via e-mail as Microsoft Office Word documents.

3.5 Research Questions

At the beginning of each interview a land use map of the City of Fort Worth with urban villages and surrounding green infrastructural components was shown to each of the respondents (Figure 3.1). The following introductory statement was then read by the researcher to each of the respondents:

I have identified several prominent issues that are routinely considered during the planning and design process of connecting parks, trails and other open space networks to their communities. In this research these elements (parks, trails, and open space networks) are broadly defined as green infrastructure. I would like to ask you a few questions about your knowledge and perceptions regarding pedestrian accessibility to green infrastructure in Fort Worth's urban villages.

A series of profile questions was asked including respondents' name, educational and professional background. Their responses were used to gauge participants' level of experience and familiarity with the concepts. Next, two introductory questions were asked to establish respondents' conceptual understanding of an urban village and green infrastructure.

1. Are you familiar with the *urban village* concept? Please explain your understanding.
2. Are you familiar with the term *green infrastructure*? Please explain your understanding.

A statement read by the researcher was used to either confirm, or to flesh out respondents' conceptual understanding of green infrastructure:

The literature indicates that in addition to the qualities/items you've mentioned green infrastructure is considered a network of strategically managed, protected and connected green spaces. This network of green space provides ecological and human health benefits in urbanized areas. It should function as a framework for conservation and development.

The researcher explained that there are several key issues regarding *distance, safety, physical barriers,* and pedestrian accessibility. With that understanding established, the third set of questions dealt with pedestrian accessibility:

1. Considering Fort Worth's urban villages what is a comfortable, walking distance to green infrastructure?
2. What attributes of distance influence pedestrian accessibility to green infrastructure from the urban villages?
3. What attributes of safety influence pedestrian accessibility to green infrastructure from the urban villages?
4. What attributes of physical barriers influence pedestrian accessibility to green infrastructure from the urban villages?
5. Beyond distance, safety, and barriers are there any other impediments or facilitators of *pedestrian* accessibility to green infrastructure in urban village settings that are important?

This fourth and final set of questions asked respondents to think about the "big picture."

1. Beyond money, what facilitates the provision of accessible green infrastructure at the street, neighborhood, city, and regional levels?

2. Broadly speaking, urban villages and pedestrian access to green infrastructure are location and site specific. They are part of the City's approach to improve urban living in its central city and provide a more desirable and healthier environment. At the larger city or regional level what other issues should be addressed?

3.6 Research Sample

The research sample consisted of Fort Worth's sixteen designated, urban villages. Located within Loop 820 (with the exception of Historic Handley village) they are within a five mile radius of downtown Fort Worth. They are within close proximity to each other and fall within a relatively small study area. In addition, these villages as a group provide a unique opportunity to study recent trends such as increased densification, infill redevelopment, and economic

redevelopment on a comprehensive scale within a large metropolitan area (The City of Fort Worth was ranked nationally (2007) as the seventeen largest city). The decisions made by stakeholders during the urban village redevelopment process will impact how and if resident's access and use green infrastructure in the foreseeable future.

Maximum variation sampling based on the GIS map and on information found on the City's Urban Village's website initially yielded three villages for passive observation. Parameters for village selection included proximity to green infrastructure, existing diversity of park types in close proximity to the villages and the larger green network; and a variety of villages that demonstrated three levels of "technical infrastructure" progress on the ground: 'mostly complete,' 'partial completion,' and 'no visible progress.' Over the course of this research passive observation was completed for a total of nine of the villages (see APPENDIX C)

Participants for this research were contacted based on the researchers' involvement as a student and graduate research assistant at The University of Texas at Arlington; the researcher's participation in Vision North Texas; conversations with City senior planners, and through the City's Urban Village's web site. An initial written request via email was made to potential participants (see APPENDIX B). Those who chose to participate were subsequently met at their preferred location for the interview. Ultimately, fifteen respondents were interviewed.

3.7 Bias and Error

Potentially, it was early in Fort Worth's urban village redevelopment process for a full evaluation of their connection to green infrastructure. It can also be argued that as many of the urban villages have had little redevelopment at this time, it was an excellent opportunity to evaluate urban village progress in light of stakeholders' perceptions of the importance of pedestrian accessible, urban green infrastructure. Currently, there are a total of sixteen villages only thirteen of which have master plans. The City may yet add more to the list. It should be noted that the difference between what is shown in a master plan and what is ultimately built is often as result of changing economic, practical, and design considerations.

One criticism of qualitative research is that as the investigator is the primary instrument for data collection and analysis, the research is subject to human error and bias. The researcher completed this study in fulfillment of the requirements for a degree in landscape architecture and does have a bias towards pedestrian accessible, ecologically diverse, urban green infrastructure. This should be taken into consideration in the evaluation of the results and implications in the following two chapters.

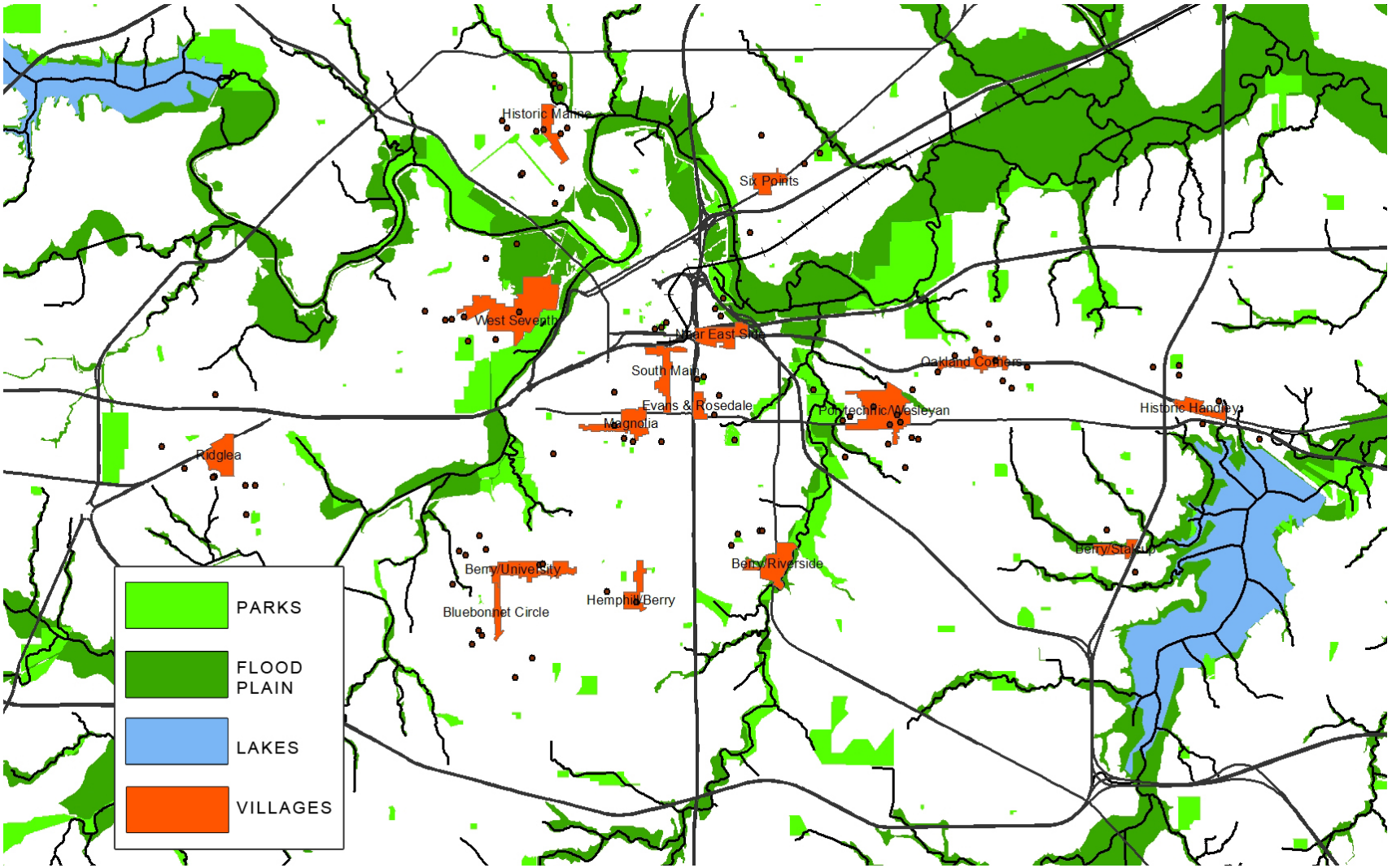


Figure 3.1 Land use map of Fort Worth, Texas with green infrastructure and villages

CHAPTER 4

ANALYSIS AND FINDINGS

4.1 Introduction

This chapter focuses on the findings of this research. The chapter begins with an explanation of the analysis techniques used for the interviews. It then highlights findings from the interviews by concentrating on each of the broader questions established for the interviews which are: the informants profile (see below, Table 4.1), their understanding of green infrastructure and the urban village; their responses to factors of pedestrian accessibility; and finally, the broader questions that focus on the provision of pedestrian accessible green infrastructure at the city and regional levels. Secondary data and observational data collected in this research will be used to further illustrate the themes that emerged from the interviews.

4.2 Analysis of the Interviews

Transcripts were analyzed according to Merriam's (1998) constant comparative method. The conversations and data indicated favorable responses from the experts on the importance of pedestrian accessibility to green infrastructure within and surrounding Fort Worth's urban villages. Only six of the respondents had heard the term, *green infrastructure,* but all understood the importance of parks, trails and other open space networks in urban environments. While respondents acknowledged the human health benefits of pedestrian accessible, urban green infrastructure, only five stakeholders mentioned the human benefits of urban *ecological functions* such as stormwater management or air and water remediation.

The researcher began by sorting units of data into groups in order to construct categories or themes representative of recurrent patterns (Merriam, 1998). "These categories or themes are 'concepts indicated by the data (and not the data itself)…In short, conceptual categories and properties have a life apart from the evidence that gave rise to them'" (p.179).

The researcher examined the transcripts for the stakeholders' perceptions of pedestrian accessibility to green infrastructure using the established parameters (Van Herzele and Wiedemann, 2002) of distance, safety and physical barriers. These units of data were collected and sorted into various tables for review and formulation of concepts. The data were examined in two separate ways. First the data were examined across the three groups according to each question (See APPENDIX D). Secondly, they were examined individually as groups and then compared according to Merriam's (1998) constant comparative method.

4.2.1 Respondent Profile

The researcher interviewed three senior planners from the City of Fort Worth who were, and continue to be directly involved with the urban villages program; and an assistant city manager (formerly Director of Planning). The urban villages development program was initiated in the Planning Department under his guidance in 2000. One other planner who works as a consultant with individual city governments and with regional organizations such as Vision North Texas and the North Central Texas Council of Governments was also interviewed. Other respondents included five neighborhood leaders who participated in the urban villages development program during the master planning process, and who continue their involvement. Five urban designers (one architect, three landscape architects and one landscape designer) were also interviewed. Three of them had no direct participation in the urban villages program, but are experienced designers. Two others were directly involved with the design of the urban village master plans (see Table 4.1 below).

Table 4.1 Respondent Profile

	Name	Employer	Position	Urban Village Participation	Years of Experience	Educational Background
1	Fernando Costa	City of Fort Worth	Assistant City Manager	Yes	34	City/Regional Planner Civil Engineer
2	Patrina Newton	City of Fort Worth	Senior Planner	Yes	24	Regional Planner
3	Scott Bellen	City of Fort Worth	Senior Planner	Yes	10	City Planner
4	Arty-Wheaton Rodriguez	City of Fort Worth	Senior Planner	Yes	7	Regional Planner
5	Karen Walz	Vision North Texas Strategic Community Solutions	Project Manager Principal	Yes	30	City Planner
6	Anonymous	Retired	Homeowner	Yes		Nurse
7	Carl Pointer	Retired	Homeowner	Yes	30	City Employee Lay Minister
8	Paul Paine	Fort Worth South, Inc. (non-profit business association)	President	Yes	27	Retired Colonel, U.S. Air Force
9	Mike Brennan	Fort Worth South, Inc. (non-profit)	Planner	Yes	10	Regional Planner
10	Marlene Beckman	Associated Businesses of the Cultural District, Inc. (non-profit)	Chairman	Yes	25	Certified Public Accounting
11	Jim Richards	Townscape, Inc.	Principal	No	30	Landscape Architect
12	Dennis Jerke	Urban Planning Solutions	Principal	No	31	Landscape Architect
13	Mark Bowers	HOK Architects	Director of Planning	Yes	30	Landscape Architect City Planner
14	Don Raines	Wallace, Roberts & Todd	Associate	No	17	Landscape Designer
15	Gordon Marchant	Komatsu Architecture	Project Manager	Yes	40	Architect

All respondents were familiar with the concept of pedestrian-friendly, mixed-use, urban village environments. It was suggested that because of the lack of availability of green infrastructure within and surrounding several of the villages, other models of accessibility and modes of transportation be used in order to extend pedestrian access. With the exception of one respondent, all others applied the same measure of accessibility that is generally considered pedestrian-friendly, (*i.e.,* one-quarter to one-half mile or between a five and ten minute walk) to accessible green infrastructure within and surrounding the urban villages. Another respondent ventured to say that up to three-quarters of one mile was still a comfortable walking distance. This is consistent with Van Herzeles' and Wiedemanns' (2002, p. 111) findings that if green infrastructure is to be perceived as accessible it needs to be within a five minute walk. Responding to separate questions regarding attributes of distance, safety, and physical barriers, invariably numerous respondents cited sidewalk and road conditions in addition to safety for each of the questions.

Passive observations of the villages as well as the review of the master plans illustrated that if pedestrian accessibility is to be extended to green infrastructure then there exists a gap between the perception of the ideal and eleven of the current urban village master plans.

The following segment provides an overview of the respondents' perceptions according to each interview question concerning pedestrian accessibility from Fort Worth's urban villages to green infrastructure, and its importance to human and ecological health in dense urban environments.

4.2.2. The Urban Village

As this research focuses on pedestrian accessibility to green infrastructure within and surrounding Fort Worth's urban villages this question was asked to establish respondents understanding of the urban village. As stakeholders who participated on Fort Worth's urban

villages development program or who have had experience designing similar environments, all understood the concept of the urban village. One senior planner with the City of Fort Worth, and a member on the "urban village team," described the villages in terms of his involvement with the program saying that his involvement was primarily "with the capital projects strategy…capital improvements, streetscape improvements, and economic incentives." Another senior planner, described the urban villages development program as "…one of the City's main strategies for revitalizing the central city." A third senior planner and another member of the team stated that his involvement has been primarily on economic and community development. The City's Assistant City Manager and a city planner, described the urban villages as " …mixed-use, pedestrian-oriented…that stemmed from a desire by the City Council and many community leaders to revitalize distressed commercial districts throughout Fort Worth." He went on to stress that the effort behind the village program stemmed from a desire to shift the manner in which the City pursued redevelopment saying, "Rather than replicating what we view as a failed model of auto-oriented, linear commercial corridors, we decided that we would pursue what's really a more historical model, the way that the great cities of the world have built for centuries…higher density mixed-use development, access to public transportation and an environment that's friendly to pedestrians."

One landscape architect and urban designer described the urban village as an "energy center within the city distinct from the downtown where you would both take advantage of existing and encourage new higher densities, mixed uses, walkability. Kind of a twenty-four hour live/work/play is the cliché." Another landscape architect and urban designer described urban villages as, "Part of the new urbanism approach to urban planning…villages are mixed-use, higher density developments that are interconnected and …self-sustaining from a residential and commercial perspective and [are] located at critical transportation connections, typically, to minimize the impact on the environment and to enhance the sustainability of a community."

One neighborhood leader (who chose to remain anonymous) described the urban village as a vehicle for economic development saying "[It is a]…whole new avenue for neighborhoods… to make it more accessible to what you need in the neighborhood, such as libraries, stores…things of that sort." Another neighborhood leader said, "An urban village is a sustainable development centered around [sic] multi-use [sic] development…accessible by foot… [and it] incorporates intimacy between major transportation avenues and pedestrian traffic. It brings into play streetscaping and other type(s) of landscaping adjustments that will make the village more urban friendly, more pedestrian friendly." A third neighborhood leader reiterated the landscape architect's view of the urban village concept, by saying it "Promotes living, working, and entertainment within the same area."

4.2.3 Green Infrastructure

Respondent's familiarity with the concept of green infrastructure varied. The range included those who had never heard of the concept and did not hazard a response, to those who generally understood it to mean "…connecting people to green spaces and also bringing green into the urban environment via streetscaping or landscaping…" Another city planner, and the lead consultant for the regional visioning team, Vision North Texas, described green infrastructure as "…usually [considered as] the natural systems within an urban area that are used to provide services and assets that would otherwise be provided by what's called gray infrastructure, pipes, pavement and so forth." She described *services* as that which, "… broadly [speaking]… provides drainage services, recreational services, air quality assistance and so forth."

All of the designers were familiar with the concept of green infrastructure. Four of the respondents in this group have participated at various levels and/or contributed to Vision North Texas' *North Texas 2050* and are experienced urban designers. One urban designer's response was indicative of the level of understanding by the landscape architects that green infrastructure is, "…primarily the urban open spaces, natural and manmade that typically, are

connectors or are interconnected and that relate to the urban watersheds and water systems, and they're all linked together by drainage corridors and stream systems. The manmade green infrastructure is everything from utility easements, to trail systems, to parks, that are placed in and around the city. So, it's how…all of those systems connected." Another neighborhood leader thought the concept referred to LEED (Leadership in Energy and Environmental Design) certification standards for buildings. However, a few minutes later he suggested that the public, the City, and designers should think creatively about what constitutes green space and how we go about providing it, suggesting that green roofs were one possible option. It should be noted that the LEED rating system awards points for the use of green roofs. This may have lead to his initial response. Another neighborhood leader and a former City of Fort Worth planner, indicated he understood the concept although was unsure where he had seen the term, green infrastructure. He cited Boston's Emerald Necklace as an example of a regional greenbelt that could be considered as part of urban green infrastructure. One neighborhood leader described green infrastructure as, "Parks, green spaces along rivers, green spaces along downtown that may be planned."

In discussing the urban village and its relationship to green infrastructure one designer highlighted the National Park Service standards for the neighborhood, city, community, and regional parks that date back to the 1960's. This concept of providing so many acres of park per so many residents regardless of their location (*e.g.,* inner cities or suburban areas) "…may have served the city well for a while, but I don't know that they necessarily serve the urban village concept …well."

When pressed to describe a new model, he immediately pointed to Peter Calthorpe's involvement in a local project, known as the Viridian. It is a mixed-use development on land immediately adjacent to the Trinity River in Arlington, Texas. Even more important is its proximity to the River Legacy Greenway, a thirteen-hundred acre regional recreational, educational and natural resource. Describing the project, he suggested that because of its

location and the fact that it has good arterial connections and the potential for future transit "…it's the trifecta! So I think that's the new model."

4.2.4 Pedestrian Accessibility: Distance

With the exception of one respondent, all others viewed pedestrian accessible green infrastructure as being within one-quarter to three-quarters of one mile. One former city planner and neighborhood leader, suggested that the difference between one-quarter and one-half mile was "…not a big deal…depend[ing] on the level of intensity of development…if you're walking along a street that is active and interesting … [it is] psychologically not very different than walking one quarter-mile." One of the landscape architects and urban designer described a comfortable walking distance to green infrastructure as being similar to pedestrian accessibility in transit-oriented developments (TOD's) "…What I mean by that would be, if you could walk within a quarter-mile on neighborhood streets in a nice sidewalk environment to get to a trail or to take your bicycle, I think you…[would be] in good shape, although with a bicycle it could be more like one-half mile…but beyond that I think people would have a tendency to stay on their neighborhood streets walking around their block for exercise…" One urban designer suggested that while in a transit environment such as a TOD, thirteen-hundred feet, or a ten minute walk was the norm, "…from a green infrastructure standpoint, I think that distance goes much further…somewhere in the range of one-half to three-quarters of one mile would be the furthest somebody would like to walk until they reached their destination."

This is only a small sample of responses. However, overall respondents' views on distance suggest that stakeholders' perceptions of pedestrian accessibility to green infrastructure are just as important and necessary as access to retail, transportation, and entertainment.

4.2.5 Pedestrian Accessibility: Attributes of Distance

The Assistant City Manager, while affirming the general consensus that one-quarter to one-half mile was a comfortable walking distance to green infrastructure, emphasized that it

was equally important to take into consideration and understand that, "…the quality of the walking experience form one point to another is arguably even more important than the distance itself." This statement reflected the importance of the streetscape as an integral part of the pedestrian experience. While the literature (Van Herzele and Wiedemann, 2002) states that distance is the single most important attribute for pedestrian accessibility to green infrastructure, this statement suggests that distance can be overcome in vibrant urban settings. It was also consistent with other respondents' views, who described the streetscape as an important attribute of distance, safety *and* physical barriers; as an attribute *beyond* distance, safety and physical barriers, as well as, an attribute *beyond* money.

Not surprisingly, respondents cited road and sidewalk conditions as the primary attributes of distance for pedestrian accessibility to green infrastructure. Road conditions included traffic, the quality of the street grid, the width and condition of the road, intersections, and vehicular speed. Six lane highways were considered difficult, uninviting, and because of their sheer width formidable in terms of crossing distance. Closely associated with road and sidewalk conditions, the streetscape was also mentioned as an attribute of distance. Respondents noted sidewalk width and climate, another often cited attribute; trees for shade and as added "friction" to slow traffic; on-street parking as an additional physical barrier against traffic; perceived crime and level of "street life," or activity, were all considered attributes of distance that impact the streetscape either positively or negatively.

One neighborhood leader and resident of Berry/Riverside, viewed traffic as a primary attribute of distance for pedestrian accessibility to green infrastructure. However, he added that "pedestrian zones" and sidewalks were needed to accommodate pedestrians, and in particular, children and the "mobility impaired" in order to overcome the obstacles presented by road way conditions. He cited the need for better way finding and multiple entry points into Cobb Park and the Trinity Trail system for pedestrians and bicyclists alike. In the Evans/Rosedale village,

another neighborhood leader and resident (anonymous) summed up attributes of distance by saying “Traffic, and…high crime.”

In addition to traffic most respondents cited climate and the importance of shade for pedestrian accessibility to green infrastructure. One landscape architect expanded on this view pointing out that the Texas heat was an important attribute of distance for pedestrian accessibility. He cited the need for “comfort or rest stations” for all pedestrians but the disabled in particular, along trail connections during the hot summer months. These stations would provide water and shade, “…so that if you exceeded the five-minute walk in order to make a connection from an urban village …it doesn’t become a health risk.” One urban designer, speaking of the importance of pedestrian accessibility and the experience of walking responded in this way, “It’s important that the act of walking is an experience into itself, and that…you could never appreciate where you are on this planet unless you have the ability to walk it, or to experience it, and using all of your senses.”

This research suggests distance and pedestrian accessibility to green infrastructure is affected not just by proximity, but by the “quality of the experience.” Distance is affected by the perception of safety or the lack thereof and impacted by hazardous streets, sidewalks, and climate. A vibrant urban experience on the other hand that serves as either a backdrop to, or as a contiguous destination to green infrastructure mitigates distance.

4.2.6 Pedestrian Accessibility: Attributes of Safety

Road and sidewalk conditions were also mentioned as primary attributes of safety for pedestrian accessibility to green infrastructure. This is consistent with Jacobs’ (1961) view, “Streets and their sidewalks, the main public places of a city, are its most vital organs” (Jacobs, 1961, p.29). A neighborhood leader echoed that view of streets as important public spaces. As an example, he cited Oleander Walk which was an alley that has now been redesigned as a public residential walk between homes. It includes lighting, trees, paving, and accommodates vehicles. Thus, Oleander Walk put “eyes on the street,” it provided a public setting for residents

to come together, and by extension, served as a conduit for a sense of community. Other conditions related to streets include traffic volume and speed. Vehicles moving at high velocities were viewed negatively in terms of safety, in particular for children and the disabled. The availability and/or continuity of sidewalks were considered inhibitors of accessibility to green infrastructure in terms of safety. Speaking of crumbling sidewalks and about needed improvements, a senior planner suggested that residential neighborhoods traditionally have a "tighter grid" and are therefore perceived as less daunting. With added improvements and beautification, residential pedestrians "will feel a little bit more comfortable" using them in order to access the villages and green infrastructure.

Street and sidewalk width were closely associated with pedestrian safety. Narrower streets and wider sidewalks that foster more intimate streetscapes are seen as important attributes of safety. One landscape architect emphasized the importance of the *perception* of safety. Increased sidewalk width was described not only as a protective physical barrier between pedestrians and vehicles, but as one that also increases the perception of safety. Features such as street furniture, trees, lighting and/or bollards are perceived as additional layers of safety. Appropriate lighting, multi-modal options, including dedicated pedestrian and bicycle trails were viewed as facilitating attributes of safety. Crosswalks, in particular were cited as facilitating or impeding a sense of pedestrian safety. A neighborhood leader suggested that walkability could be enhanced if engineers were more flexible regarding mid-block crosswalks and the use of center lane islands for pedestrian refuge. Mixed-uses and higher densities were also viewed as vital for safety. This is consistent with the majority of respondents' views of streetscape as a mitigator of distance. This was variously described as, "eyes on the street" and/or as "street life." Jacobs (1961) championed the concept that a "fine-grained diversity" of uses and people is central to safety in order to combat crime through natural surveillance.

Again, respondents were primarily focused on hazardous streets and sidewalks. This is consistent with Jacobs' views that streets and sidewalks are the city's most "vital organs" (Jacobs, 1961, p.29).

4.2.7 Pedestrian Accessibility: Attributes of Physical Barriers

Streetscape, road and sidewalk conditions were also mentioned as primary attributes of physical barriers for pedestrian accessibility to green infrastructure for many of the reasons cited above. As one senior planner pointed out, the urban villages are all located along major arterial roads. Funding is limited so the City provides crosswalks and pedestrian refuge wherever possible, but safe crossings remain problematic. Speaking of long blocks as having a negative effect on pedestrian accessibility, one landscape architect mentioned short blocks as an antidote. Alternatively, he recommended additional connectivity within the street network. Other, more obvious physical barriers mentioned by respondents included, railroad tracks, highways, bridges, and the Trinity River. Not as obvious perhaps, but "…how the area looks," including aging infrastructure and the lack "quality entrances" into Cobb Park at Berry/Riverside were cited by a senior planner as physical barriers to accessibility. As she explained, "And maybe that's not a physical barrier but I think that does keep people away." One neighborhood leader echoed her view regarding "quality entrances." Speaking of the Trinity Trail he remarked, "…it's a wonderful trail! Access is terrible, horrible." As he explained, public funding is limited so the strategic location of trails and access points into Cobb Park need to be where the highest concentration of use exists (*e.g.,* playgrounds, picnic areas). He views this as a key to increasing pedestrian accessibility into area parks.

Another mitigator of physical barriers for pedestrian accessibility to green infrastructure is the availability of higher density at nearby intersections or contiguous to transportation hubs. Sufficient neighborhood retail services or mixed-uses as a source of neighborhood activity are therefore viewed as generators for increased pedestrian activity and the use of green infrastructure. As one of the senior planners said about the Evans/Rosedale urban village,

without sufficient neighborhood retail and other services there were few compelling reasons for pedestrian activity. Area churches, the new Shamblee Public Library and the recently opened Hazel Harvey-Peace Center have demonstrated encouraging signs of having increased neighborhood activity. Transportation, including commuter rail and the soon to be implemented, streetcar initiative were viewed as potential sources of activity, increased pedestrian connections, and mobility options.

Societal conditions were viewed, not surprisingly, as important deterrents to pedestrian accessibility. A senior planner mentioned transient populations in both the Near Eastside and South Main villages and the perception of crime as a physical barrier. Speaking of pedestrian accessibility to green infrastructure one landscape architect suggested that economically depressed neighborhoods or "unsafe kinds of adjacencies" created for the pedestrian an "uncomfortable situation."

Streets and sidewalks again featured prominently in respondents' perceptions of physical barriers and pedestrian accessibility to green infrastructure. Insufficient street connectivity, railroad tracks, bridges, the Trinity River, the level of attractiveness of and the availability of entrances into major park destinations like Cobb Park; personal safety and aging infrastructure were all mentioned as physical barriers. This suggests that through a comprehensive effort, needed improvements will improve pedestrian accessibility.

4.2.8 Attributes Beyond Distance, Safety and Physical Barriers

This questioned focused on impediments and/or facilitators of pedestrian accessibility to green infrastructure beyond distance, safety and physical barriers. The Assistant City Manager spoke of the importance of the quality of origin and destination saying, "Obviously, for someone to want to walk from an urban village or any point of origin to a park or a trail there's got to be something at the destination that makes it attractive….the vitality or the effectiveness of both origin and the destination are important to generate pedestrian activity between those two points."

One city planner also alluded to the quality of destination by suggesting that an impediment for the user is not knowing what to expect at the destination point, "…so there is less interest in going, less momentum or less motivation to get to the green space….people just don't know what they can find when they go there. So, that's a problem." She suggested that events such as concerts provide the public with an occasion to explore different travel routes. She saw this as an opportunity to expand perception of a given area by increasing the public's familiarity with it. Programming, way finding, public education and marketing are also important and increase "…awareness that there is something to do there."

The former city planner focused on the importance of a mix of uses essential to vibrant urban areas. As he pointed out, walkability alone is insufficient to stimulate pedestrian activity for eighteen to twenty-fours per day. Village areas and green infrastructure alike need to be populated and active so that residents and visitors feel safe. Echoing the theme of safety, one neighborhood resident and leader's response to this question was expressed simply with one word, safety. She was very reluctant to walk from the Shamblee Public Library where the interview took place to Hillside Park, less than one mile away saying, "I don't feel safe. No. No way."

One of the two landscape architects who worked on the urban village master plans, in discussing the original program for four of the villages, (Ridglea, Hemphill/Berry, University/Berry and Bluebonnet Circle) said the initial focus was on encouraging more urban redevelopment. Sidewalks and other pedestrian areas were looked at in terms of providing internal circulation within the study areas. As a result, speaking of connecting the villages to other areas beyond that internal circulation he said, "…because of the limits of budget, as well as the limits of the actual study areas, we didn't look at, 'How do you actually make those connections?'" To take it to the next level, he suggested locating the green infrastructure and connecting it through urban village neighborhood streets and sidewalks. Sidewalks in particular

he said need to be evaluated in terms of location, availability and conditions such as discontinuity.

In conclusion, safety continues to feature prominently as a major attribute that impedes or facilitates pedestrian accessibility to green infrastructure and that *beyond* safety, there are few considerations. To paraphrase one respondent who spoke about the importance of urban design in response to this same question, who said that all the money in the world would be misspent if "we don't have the right ideas," appears to also be true regarding safety. Beyond distance and physical barriers, pedestrian activity and accessibility to green infrastructure depend on the quality of the destination and origin. This suggests that increased economic activity through mixed-uses, adequate housing and needed park renovations are necessary to attract sufficient activity to the urban villages. And just as important, the necessary connections to green infrastructure and the larger urban fabric beyond each urban village's internal circulation will need to be made.

4.2.9 The Big Picture: Beyond Money

This question asked respondents to consider the facility of providing accessible green infrastructure at all scales, up to and including the regional level. A senior planner for the City of Fort Worth recognized the importance of connections from the villages and neighborhood parks to the larger regional green infrastructure. He suggested that cooperation with the North Central Texas Council of Governments (COG), the Tarrant Regional Water District and other organizations has been beneficial for the region. He expressed his appreciation for COG saying it was an asset for the region. He pointed to community outreach efforts by City staff to local bicycle groups about Veloweb deficiencies, and that that has increased regional awareness for necessary bicycle connections.

One landscape designer and passionate advocate of the Trinity River and about increasing awareness of how natural systems operate answered this question by saying, "I think it's very important…that the experience of green infrastructure go back into the neighborhood –

much further back." He suggested that other options including public transportation would provide a more communal experience for citizens and therefore, reduce the reliance on private, motorized vehicles.

Another landscape architect and urban designer stressed the role of policy and leadership at the city level, and the value of walkability in the marketplace. That said, "pushback" by developers and the public will likely continue because of the unfamiliarity of walkable, mixed-use environments. About developers he went on to say, "I'm not talking about money so much as developers' perceptions that…walkability is enough of a value-added factor that it's worth their while to pursue as a product in the marketplace." About the public, he suggested that, "…educating by demonstration to people that it's okay to walk places…If you provide the infrastructure, if you provide the safety, if you mitigate the climate, all those types of things, [you can demonstrate] …why this is a great thing, what types of lifestyles are possible with all that…with the first couple of really good projects, the really good pilot projects."

Echoing his view one city planner suggested that political will at the policy level was key to implementing village connections to green infrastructure. Specifically, she mentioned the importance of advocacy by the Fort Worth City Council and staff for those connections and the role they can play in a community. Policy, the level of support and integration of the objectives of green infrastructure into all other activities of the local government were also needed. Participation and advocacy by the private sector and/or nonprofit organizations are also necessary. She cited the Katy Trail in Dallas as an example of the kinds of development that are needed in order to change perception. Local businesses and owners who were initially resistant to the Trail, saying it would jeopardize property values, have now embraced it and prominently use the Katy Trail as a marketing tool.

One neighborhood leader and resident of Berry/Riverside stressed the importance of public participation and perception. Cobb Park has been perceived as a dangerous area and during its redesign there was intense neighborhood interest. "Ultimately, the success or the

failure of this park system, this green space is going to involve how the public perceives it and how the public uses it. And we're battling perception." During the early phases of the master planning process for Cobb several hundred residents attended the public meetings and are still participating on a regular basis.

Participation by both the private and public sectors featured prominently in respondents' perceptions regarding attributes of pedestrian accessibility beyond money to green infrastructure. Public policy and political will at the city and regional levels were also viewed as necessary for implementing village connections to green infrastructure.

4.2.10 The Big Picture: At the Regional Level What Other Issues Should be Addressed?

This final question asked respondents to consider other issues important at the City or regional levels. A senior planner suggested that commuter rail connections are necessary to connect citizens beyond the central city to the largest parks along the Trinity River. Beyond getting Fort Worth residents to and from work, commuter rail connections would also extend accessibility to top destinations in the region.

One neighborhood leader also mentioned transportation as a regional necessity. She pointed out that in other cities like New York, rail was widely available and that if it was available here it would improve accessibility.

One of the landscape architects recommended an ongoing evaluation of pedestrian and bicycle routes to and through the regional green infrastructure saying, "Have we designated the wrong routes as on-street routes? Are people really using these [routes] or others?" He suggested that it was more important to focus on these connections rather than others into downtown and elsewhere, and that the use of neighborhood streets as preferred pedestrian routes was a possibility. "We still have a long way to go to connecting facilities within the green infrastructure. The green areas that have been set aside don't necessarily have the infrastructure in place yet." Beyond that he advocated a "hierarchy of pedestrian spaces," and connections to local communities and other cities regionally via the green infrastructure.

The former city planner cited the need for safer cross-walks, in particular across six lane roads like West Seventh In order to improve pedestrian accessibility to the Trinity River. Other pedestrian improvements include better access from nearby developments surrounding Trinity Park. He also pointed to a need for more accessible bicycle trails and public transportation in order to expand the pedestrian zone beyond one-quarter mile.

In this final "big picture" question regarding attributes of pedestrian accessibility to green infrastructure at the regional level transportation, both commuter rail and pedestrian and bike trails were frequently cited. In areas that lack a variety or diversity of parks and open space types, the data indicate that public transportation is the preferred option over the use of the automobile (for a complete list of attributes, see APPENDIX D).

4.3 Summary of Findings

4.3.1 Introduction: Themes

Broadly speaking, nine preliminary themes were formulated from the data as they related to stakeholders' perceptions of pedestrian accessibility to green infrastructure. They were the following:

- The Benefits of Green Infrastructure
- Streets, Sidewalks, and Street Life
- Connectivity
- Multi-Modal Transportation Options
- Policy
- Societal Issues
- Urban Design
- Land Use
- Public Participation

These nine themes were further consolidated into five umbrella, or broad themes: policy, public participation, urban design, physical conditions, and societal conditions (see Figure 4.1). These are discussed below.

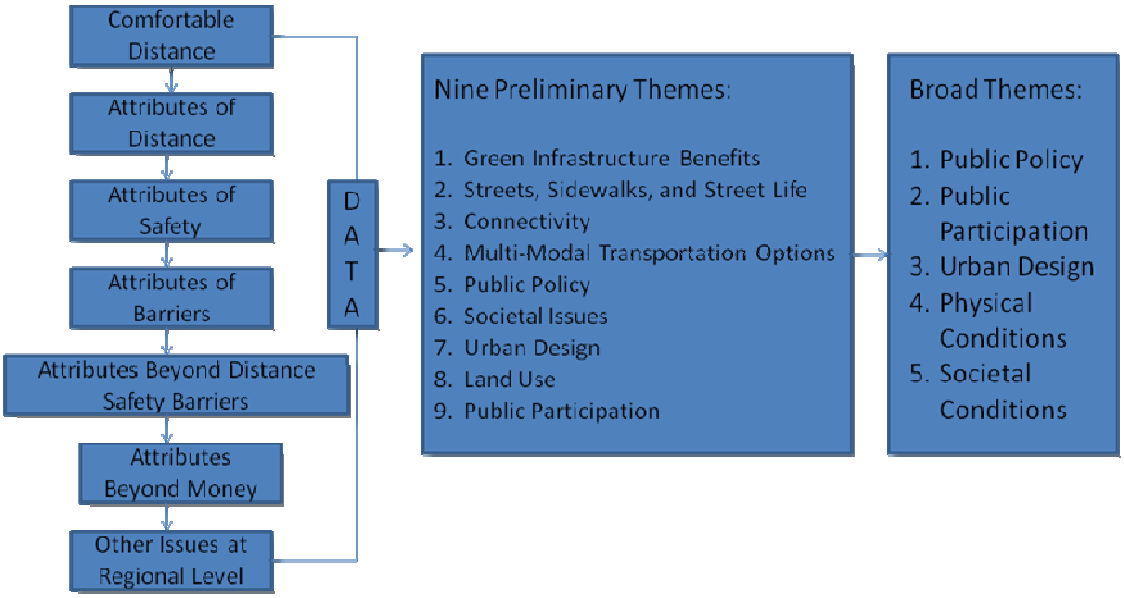


Figure 4.1 Construction of Themes

4.3.1.1 Public Policy

A recurring theme throughout the interviews related the value of green infrastructure to the importance of and the need for public policy. It was cited as an attribute *beyond money, and beyond all other issues at the larger city or regional levels.* At the regional level, City of Fort Worth officials, designers, and one planner mentioned the value of, and role of the North Central Council of Governments. The recently completed *North Texas 2050* (2010) outlines the preferred scenario of growth for the region. This scenario begins with the recognition of the value of preserving the region's *natural areas* or green infrastructure and includes, "...the identification of important natural assets and an investment framework using alternative energy

sources, LEED building standards and conservation to make more effective use of natural resources…" (*North Texas 2050,* p.17, 2010).

One of the landscape architects distilled the vision behind policy level decision-making as a "holistic approach" that examines how systems work in tandem with each other:

> You have to look at how the circulation and transportation systems, the green infrastructure, the urban villages, and how surface water systems all link and tie together…It can't be done in an isolated kind of fashion. It has to be done holistically, so that the whole community is interconnected. And then regionally, that community is connected to the region, so it can't be done with blinders on and just focused on one specific neighborhood.

One neighborhood leader also focused on vision saying, "I think having the vision available to everyone so that everyone is thinking along the same lines. It's a vision that is really easy for people to understand as long as they know where we should be headed."

Connecting health issues with the availability and accessibility of green infrastructure at the policy level, a senior planner with the City observed that the less economically developed areas of the City lack nutritious food. Suggesting that its citizens are disadvantaged without access to fresh fruits and vegetables, she also pointed to the fact that the City no longer has a public health department. In the past the health department conducted studies throughout the City which then verified pockets of disease, and higher rates of obesity and/or diabetes. Considering education and public awareness, she recommended fostering institutional cooperation between the hospitals, the school districts, and the City. She foresaw the solution not only through economic redevelopment of these areas - increased neighborhood retail services, grocery stores, farmer's markets and the like, but also through pedestrian connectivity.

4.3.1.2 Public Participation

Public participation was mentioned by respondents as an attribute *beyond distance, safety, and physical barriers, as* an attribute *beyond money, and beyond all other issues at the*

larger city or regional levels. It was described variously as “community involvement,” “public input about desires,” “activism” or as “stakeholder participation.”

Interestingly, respondents in each of the three study groups mentioned bicyclists as an important constituency for local and regionally connected trails both through natural and urban landscapes. Another city planner remarked that the City has specifically reached out to the bicycle community and recreationalists to identity deficiencies in the City’s portion of the Veloweb so that it can create more effective connections at the regional level. Both he and one of the urban village designers mentioned the need to provide bridges that better accommodate pedestrians and bicyclists for a more seamless experience. One of the neighborhood leaders has been a cyclist for thirty some years in the City and in the region. She suggested that ongoing trail improvements will improve the cyclist’s experience.

Speaking of citizen participation one senior planner at the City remarked, “I think, you know… citizen desires come to mind and making their desires known, what their needs are.” Today the internet facilitates citizen input and that, “… definitely, the views and sentiment of citizens and what their needs are will help facilitate bringing more open space, you know green infrastructure online.” One of the landscape architects pointed to the young and the older, retiring populations that have been active demanding “quality of life” facilities including access to green infrastructure, trail systems and outdoor recreational facilities. He suggested that these facilities “…meet the standards of communities that attract those populations.” He cited other popular cities, Austin, San Francisco, Boston, and Raleigh-Durham, known for the quality of their natural environments, outdoor amenities, and facilities that provide a higher quality of life and that are seen as highly desirable communities.

4.3.1.3 Urban Design

Public policy and public participation are not simply precursors to urban design, but rather, form a trifecta with urban design. This theme was embodied in the previous policy

section by one neighborhood leaders' statement regarding the importance of all parties; the city, the public, and designers participating and understanding the direction of the vision.

The Assistant City Manager put it this way, "It's a lot about design of buildings and public spaces. It's about urban design. For a long time [we] subconsciously adopted a kind of suburban model that emphasized automobile circulation to the detriment of pedestrians, and that's had profound negative consequences for cities of all kinds. In recent years we've come to realize the magnitude of those mistakes and endeavored to reverse them through more enlightened design decisions, more enlightened policies." He went on to say that no amount of money will work unless we have the "right ideas." Without those, the money will simply not be well spent.

Connectivity at all scales including multi-modal opportunities was a theme echoed throughout the researchers' conversations. Connectivity, or the lack thereof, not only between the urban villages but from them to the green infrastructure was another attribute used by respondents to answer four separate questions. It was considered as an attribute of *physical barriers*, and as an attribute *beyond distance, safety and other physical barriers*. It was also included as an attribute *beyond money,* and *other important issues at the larger city or regional levels.* Speaking in regard to the latter, the Assistant City Manager suggested that in the region improved "connections between higher density live/work environments and green space…go hand-in-hand to create livable communities…evident in the City's comprehensive plan... and much of it in the work of Vision North Texas…"

4.3.1.4 Physical Conditions

Although closely related to urban design, the term here is used to describe physical conditions that impede or facilitate pedestrian accessibility. The list of attributes given by respondents that form the basis for this theme was extensive. These included street conditions (edge conditions, width, availability of adequate crosswalks, vehicular speed); sidewalk conditions (width, shade; deterioration of, lack of continuity or simply non-existent);

neighborhood blight; way finding; availability of mixed-uses and attendant level of pedestrian activity; lighting; beautification; and to a lesser degree, topography. These attributes were included as *attributes of distance, safety, physical barriers, and as attributes beyond each of those; as an attribute beyond money and as important issues at the larger city and regional levels.* Connectivity was again an important attribute in each of the previously mentioned categories. The need for multiple connections, gateways and other neighborhood access points into all levels of green infrastructure (parks, trails, natural and open space networks) was repeatedly cited.

4.3.1.5 Societal Conditions

The reality of crime as well as the perception of crime are attributes mentioned in all categories, *distance, safety, physical barriers, and as attributes beyond each of those; as an attribute beyond money and as important issues at the larger city and regional levels.* Respondents in each of the three groups had a good understanding of strategies used to combat crime through the use of lighting, increased "eyes on the street," intensity of density and mixed-uses. They also understood the importance of cooperation and coordination between public agencies and non-profit groups and the need for addressing social issues. Addressing the issue of revitalization and redevelopment in the central city, a city planner remarked how coordination between the City and the police department reflected their similar goals of increased safety and pedestrian activity.

One landscape architect went further. Again, speaking of the understanding of a "holistic approach" and the importance of adjacencies to urban villages he pointed out that crime "…is a real factor that impacts the success of this kind of connectivity and the success of green infrastructure." As a planning and social issue, "Linking to green infrastructure through high crime areas and through poor economic zones is a real problem" that has to be solved by improving those neighborhoods using a holistic approach.

Collectively, these five umbrella concepts: *public policy, public participation, urban design, physical conditions, and societal conditions* embody the "enlightened design decisions and policies" the Assistant City Manager spoke of while discussing the facilitation of providing green infrastructure at all scales - neighborhood, city, and regional levels. Reflecting on the difference between the previous, decades old suburban model of urban design for inner cities and how North Texas and the City of Fort Worth in particular are now approaching it, he stated, "...we are coming to appreciate the importance of connecting our urban places with green infrastructure and the need to incorporate green infrastructure into those places to make them more livable."

These five themes in turn, generated three key findings.

4.3.2 Triangulation of Data across Three Groups of Respondents

After a comprehensive review of all of the data, the researcher assembled tables for each group of respondents: the public sector, neighborhood leaders and designers. Each of the respondent's perceptions is listed according to each question. This enabled the researcher to compare the data between the three groups using the same five themes from the first table: policy, public participation, urban design, physical conditions and societal conditions (see below Tables 4.2 - 4.4, Respondents' Perceptions).

4.3.2.1 Triangulation of Data: Discussion

Unsurprisingly, City officials focused on public policy more than designers and neighborhood leaders. Public participation was mentioned in each group of respondents however, at the City level it was a priority. Based on the researcher's interviews with this group, interaction with the public is an essential tool for gauging public interest, needs, and desires. This was reflected in public participation in the master planning process for the urban villages. Without their involvement the City risked public apathy.

Urban design was raised four times in each of the groups. This included improved connectivity from the villages to green infrastructure, as well as, within the villages themselves,

the redesign of streets to accommodate the pedestrian, the use of consulting and design firms, way finding, redesigned park entrances, and community vision. This was significant in light of the role designer's play in the design of the public realm. While it was not surprising that designers' perceive their role as necessary, it was revealing to discover that neighborhood leaders also recognized the contribution made by the design professions.

Not surprisingly, issues having to do with physical conditions such as traffic, sidewalk conditions, climate, air quality, lack of available green infrastructure, and streetscape were mentioned an almost identical number of times by each group. Societal issues, including crime, poor economic conditions, transients, patterns of development based on race, and blight were raised by City officials and neighborhood leaders more often than in the design group.

Table 4.2 Respondents' Perceptions: City of Fort Worth, Public Sector

CITY OF FORT WORTH and PUBLIC SECTOR	DISTANCE	ATTRIBUTES OF DISTANCE	ATTRIBUTES OF SAFETY	ATTRIBUTES OF PHYSICAL BARRIERS	BEYOND ALL	BEYOND MONEY	OTHER IMPORTANT ISSUES
Respondent FC	1/4 - 1/2 Mile	Quality of the Pedestrian Experience	Increase Density & Eyes on the street & Lighting	Sidewalk Conditions & RR tracks, HIGHWAYS	Vitality or Effectiveness of both Origin and Destination to Generate pedestrian activity btw 2 points	Urban Design, Enlightened Design Decisions, Policies	Vision North TX Taking Steps Regionally to Emphasize Preservation of Natural Assets and Increased Access
Respondent PN	1/4 Mile	Sidewalk Conditions, Climate, Street Network, Tighter Grid, Neighborhood Retail, Traffic	Road Width, Vehicular Speed, Sidewalk Conditions	Sidewalk Conditions, Attractiveness, Lack of Retail, Lack of Quality Park Entrances, Blight, Lack of Activity; Lack of Available GI	Public Transportation, Funding	Citizen Desires, Citizen Engagement, Transparency	Institutional Cooperation, Public Awareness of Healthier Lifestyle, Economic Development, Better Access to Nutritious Food
Respondent SB	1/4 Mile	The Challenge of Retrofitting an Urban Environment, Non-ADA Compliance, River, RR Tracks, Bridges, Transient Populations, Perception of Crime, Increase Neighborhood Services. Eyes on Street	Lighting	Sidewalk Conditions, Transportation, Redesign of Streets to Accommodate Pedestrians, Streetscape	Improved Connectivity to GI from Villages, Possibility of Multiple connections, Public Participation	Education of City Staff, Council, about Bicycle Connections to Trail Systems, and Connecting to Parks	Pedestrian Connections Between Villages and Beyond on Larger Scale, Coop with COG, Tarrant Reg. Water Dist, Community Outreach to Cycle & Recreational Enthusiasts, Bridge Connections, Veloweb Connections
Respondent AWR	1/4 Mile	Climate, Streetscape,	Dedicated Sidewalks, Bike Lanes, Streetscaping to Improve Safety	Safe Crosswalks, Pedestrian Refuge, Funding, Multi-Modal Options	Increased Pedestrian Activity through Mixed-Uses,	Change in Philosophy, Focus Primarily on Pedestrian instead of Automobile	Commuter Rail, for Destination Spots and to the Office
Respondent KW	1/4 - 1/2 Mile, Depends on Particular Activity, Quality of the Pedestrian Experience	Perception of Safety, Availability of Safe Trail or Path Beyond Traffic Lanes, Quality of the Pedestrian Experience	Traffic, Perception/Actual Personal Safety	Availability of Paths or Sidewalks, Fences	Quality of the Pedestrian Experience, Appealing & Inviting, Awareness or Lack of Knowledge Regarding Availability of Activities, (Recreational or Entertainment) Way-Finding	Political Will & Support, How well Integrated are the Objective of GI into all other activities of local Governments., Private Sector, Non-Profits, Marketing of Pedestrian Access to GI as Value Added Factor, COG Support	Transportation, Perception & Recognition of the urban village & GI as Highly Desirable will Increase Success of Villages and Region

Table 4.3 Respondents' Perceptions: Designers

DESIGNERS	DISTANCE	ATTRIBUTES OF DISTANCE	ATTRIBUTES OF SAFETY	ATTRIBUTES OF PHY BARRIERS	BEYOND ALL	BEYOND MONEY	OTHER IMPORTANT ISSUES
Respondent JR	1/2 Mile	Highways, Edges, Climate,	Traffic, Crime, Eyes on the Street, Lighting	Long Blocks, Pass through between buildings Connectivity of Street Network	Traffic, Climate	Policy Level Understanding of Importance of Walkability as Value Added Factor, Visibility of Pilot Projects	Historic Approach to Green Infrastructure Planning no Longer Adequate, New Model that includes Green Infrastructure, Transit, Arterial Access
Respondent DJ	1/2 Mile 5 Minutes	Traffic, Climate, Rest Stops	Lighting, Increasing Pedestrian Activity	Traffic, Crosswalks, Intersections, Topography, Unsafe Adjacencies	Funding - Public/Private	Activism by Younger/Older Populations	Holistic Approach to Planning City/Regionally Circulation, Transportation, Green Infrastructure, Urban Village's, Surface Water, Improve Poor Economic Zones adjacent to GI, Conservation, Economy, Environmental, Social, & Cultural Value
Respondent MB	1/4 - 1/2 Mile	Road Conditions, Lack of Connectivity Between Villages, Crosswalks	Actual & Perceived, Improved Streetscape, Wider Crosswalks, Trees	Create On Street Connections Through Neighborhoods, Sidewalk Evaluation	Sidewalk Connections	Public Education & Funding for Healthier lifestyles, Connections still made Connecting Facilities w/in GI	On-Street Programs for Bikes and Evaluation of Routes - Hierarchy of Pedestrian Spaces, Connections to other Communities/Cities Regionally, NCTCOG
Respondent DR	1/2 - 3/4 Mile, 1,300'	Safety, Lack of Barriers	Traffic	Aesthetics, Climate, View Corridors, Variety of Pedestrian Experience	Crosswalks with Pedestrian Refuge, Gray Infra should be Perpendicular to Destinations, Street Orientation, Layout of Cities, Importance of everyone reach GI, Wind/Solar Patterns	Extension of GI into Neighborhoods, Multi-Modal Options, Shared Public Experience, Public Education of the Importance of GI, Better Understanding of Natural World	Protection of Rural Agriculture, Urban Ag, Wind, Solar, H20 Collection, Reduction of Carbon Footprint
Respondent GM	5-10 Minutes	ADA, Connectivity Attractiveness Gateway Nodes Quality of Destination	Lighting, Signage Way Finding, Bike Trails Sidewalk Conditions,	Increase Opportunities for Live Work and Play "Eyes on the Street" Boulevards Public Private Partnerships (e.g. golf course as greenway connection)	Attractiveness Inviting	Take Advantage of Existing Opportunities Connectivity	Improved Public Transportation (e.g. commuter rail and proposed streetcar system)

Table 4.4 Respondents' Perceptions: Neighborhood Leaders

NEIGHBORHOOD LEADERS	DISTANCE	ATTRIBUTES OF DISTANCE	ATTRIBUTES OF SAFETY	ATTRIBUTES OF PHY BARRIERS	BEYOND ALL	BEYOND MONEY	OTHER IMPORTANT ISSUES
Anonymous	2 Miles	Traffic Volume, High Crime	Traffic, Crime	Sidewalk Discontinuity, Lack of Bike Trails	Safety	More Police Presence	Transportation, Rail
Respondent CP	1/4 Mile	Traffic, Pedestrian Zones, Signage, Bike Trails, Lighting, Sidewalks	Speed Limits, Enforcement. Lighting	ADA non-Compliance of Sidewalks, Strategic Access to Areas of Higher Need Use	Pedestrian Friendly Environments, Way-finding, Entry Points to Parks, Landscaping, Trails, Paths, Pavilion, Marketing of Available Activities, Lighting, Private Funding	The Use of Consulting & Design Firms, Public Process, Participation	How Park land is Developed has been Affected by Location within City - Racism?
Respondent PP	5 Minute Walk	Traffic, Need Streetscape Improvements, Streets as Public Space Help Create Community	Crosswalks, Flexibility about Mid-Block Placement, Pedestrian Refuge	Streetscape Improvements, Lighting, Traffic, Crosswalks, Wide Boulevards, Air Quality, Noise Reduction Mass Transit	Challenges of Infill Development & Land Costs, Availability of Shared Uses (Parking), Rooftops as Part of GI	Vision and Public Understanding of Mixed-Uses & its Advantages in Creating Pedestrian Comfort, Community Involvement	Integration Between GI & Villages for Pedestrians, Bikes, Trails to Historic Monuments, Creative ways of Bike/Car Sharing
Respondent MBe	1 Mile	Safety	Safety, Sidewalks, Crosswalks, Traffic Velocity	Difficult Intersections, Discontinuity of Sidewalks	Climate, Air Quality	Vision	Air Quality , Public Transportation
Respondent MBr	1/4 - 1/2 Mile Depending on Intensity of Development, Level of Interest	Multiple Connections to Destinations	Cars/Traffic, Needed Streetscape Improvements	Poor Street Connectivity, Highways, RR Tracks, Lighting	Mixed-Uses, for Increased Activity	Development Standards	Safe Crosswalks, Accessible Trails for pedestrians & Bikes to & From Villages, Public Transportation - Expand Pedestrian Zone

4.3.3 Key Findings

The following three findings are discussed in detail below.

- Green infrastructure as generator of environmental, social, economic and visual values
- Quality of the pedestrian experience
- Community involvement/participation matters

4.3.3.1 Green Infrastructure as Generator of Environmental, Social, Economic and Visual Values

Vision North Texas in conjunction with its regional partners (NCTCOG, UTA, ULI and others) have concluded that the viability of the region's future begins with the conservation and preservation our natural assets *(North Texas 2050,* 2010*)*. The respondents in this research's three study groups have affirmed the importance of and the need for accessible green infrastructure in dense urban environments. One of the landscape architects addressing the importance of the various roles of green infrastructure stated it eloquently:

> I'm very clear about the thesis that relate[s] to the value of green infrastructure, and it isn't just for [the] environmental and social value that it generates, but it does generate economic value and visual value as well…it's really a quadruple net value that is created by green infrastructure, so there's a lot of research that points to the economic value associated with it as well.

Referring to the social value of green infrastructure, one landscape designer spoke of the significance of green infrastructure in this way, "…it's a very necessary type of infrastructure from this century on, because people need to be able to associate green infrastructure as important to their daily lives…that it's a necessary part of our life…it's not just a corridor that is a nice place to be… [but rather] inherent to who we are and how we recreate…how we commute, and how we perceive the world." He bemoaned the fact that many of our children have no

concept of how natural systems operate. He mentioned in particular the short-sighted idea, that if you want water you simply open a faucet, failing to recognize how that occurs.

4.3.3.2 Quality of the Pedestrian Experience

As highlighted earlier, the quality of the pedestrian experience cannot be underestimated. Not only does it help mitigate distance, a variety of stimuli enriches the pedestrian experience and provides an arena for recreation, public gathering, community, and shared experiences. Closely related to the pedestrian experience is the value of quality of life. Mentioned in the literature, as well as within *The Final Report* (2002), the idea of quality of life was prevalent throughout the researchers' conversations with respondents. Respondents were eager for the experience of walkable, pedestrian-friendly environments that accommodated not only the automobile, but other multi-modal options including streetcars, commuter rail, and bicycles. These last were seen as useful for extending the pedestrian realm beyond one-quarter mile, and contributing to the reduction of automobile use.

4.3.3.3 Community Involvement

The importance of community involvement was evident throughout the researchers' conversations with respondents. In each of the three study groups, through their participation in this research, in their observations, and in their own work as professionals in the public sector, as designers, or neighborhood leaders, they have all championed and actively worked toward the improvement of their communities.

Together, these three findings illustrated not only the importance and value of each, but reflected the level of understanding of the manner in which not just the City of Fort Worth, but the entire North Texas region will need to reconsider its relationship with green infrastructure in relation to the anticipated changes in growth. This has already begun at the regional scale with Vision North Texas.

CHAPTER 5

CONCLUSIONS

5.1 Introduction

The purpose of this research was to discover stakeholders' perceptions regarding pedestrian accessibility from Fort Worth's urban villages to green infrastructure, and its importance to human and ecological health in dense urban environments. As was discussed in the literature review, the urban village model represents an opportunity to increase urban density within older, sparsely populated areas such as Fort Worth's central city in order to create pedestrian friendly, sustainable environments. This presents the opportunity to evaluate, protect, and in some cases restore urban natural habitats and the ecological functions they have historically provided for the benefit of human and wildlife populations.

Linking parks, greenways and trails to each other and to neighboring communities provides humans with opportunities for recreation and nature study. Preservation of ecologically significant corridors and habitats provides areas for wildlife migration and "species interchange." The linkage of parks, trails, greenways, neighborhoods, communities and important habitats to each other increases beneficial opportunities for both humans and wildlife. Preservation of riparian corridors and flood plains allow ecological systems to function and provide stormwater management; improve air and water quality, climate, and aesthetics. The Trinity River and its creeks in Fort Worth are important elements of the City's structure. The River and its flood plain provide areas for everyday recreation, wetlands, trails, parks, grasslands and other open spaces. The preservation and management of green infrastructure provides marketable goods such a wood and food products. Strategically planned and managed green infrastructure creates a more sustainable integration between urban development, nature conservation and public health.

Fort Worth's commitment to revitalize its central city in anticipation of increased density in the near future; its concern for the quality of life of its citizens; and its ability to manage the complexities of resource management and preservation, led to a comprehensive evaluation of its historic "energy centers." These centers became known as urban villages. Fort Worth understood the need for economic redevelopment, capital improvements and revised zoning in order to accomplish its ambitious goals. Substantial resources were marshaled; a task force was assembled; comprehensive plans envisioned and put into place; consultants hired; funds acquired; zoning laws and ordinances adopted; master plans for these villages completed; and ultimately, some of the physical improvements are currently in various stages of implementation. In light of these comprehensive efforts, the researcher undertook this investigation to examine the City's urban villages in relation to pedestrian accessibility to green infrastructure.

The three stakeholder's groups interviewed for this research have uniformly affirmed the importance of pedestrian accessibility to green infrastructure within and surrounding Fort Worth's urban villages. Various attributes of distance, safety and physical barriers were viewed by the experts as critical to the pedestrian experience, and were highlighted by the experts as critical to the pedestrian experience.

Pedestrian accessibility to green infrastructure was considered by all to be approximately within one-quarter to one-half mile. This is consistent with the literature that a "walkable" distance is the single most important factor for use of green infrastructure. It is interesting to note that respondents in each of the three groups applied the same standard used to assess accessibility in urban environments (*e.g.,* TOD's, TND's) to accessible green infrastructure. The data show that the quality of the experience also mattered in terms of the pedestrian's willingness to travel further. Multi-modal options such as bicycles, streetcars, and commuter rail were viewed as important tools for extending the pedestrian realm. This is noteworthy because it suggests that the availability of mobility options offers the pedestrian the

opportunity to leave the car at home. It was also noted that the role of urban design, specifically as it relates to the "vitality or effectiveness of both origin and destination," was viewed as essential to the pedestrian experience.

Safety and physical barriers were overwhelmingly seen as important facilitators or impediments for pedestrian accessibility to green infrastructure. Pedestrian safety however, was viewed as embodying an additional factor, that of perception. Whether actual or perceived, personal safety was cited as a primary determinant for pedestrian accessibility.

Interestingly, when asked about attributes of distance that influence pedestrian accessibility to green infrastructure, several respondents focused instead on issues of safety and physical barriers. Others responding to the question of attributes of safety spoke of physical barriers. This has led the researcher to conclude that parameters of distance, safety, and physical barriers are intimately connected and that each one in turn influences the other.

Finally, the Commercial Corridors Task Force (2002) included parks, open space, public improvements, and historic building stock in its list of criteria for urban village designation. Taking into account the availability (or lack thereof) of a variety of green infrastructure types in relation to at least seven of the urban villages, new models of accessibility are needed for the future success of the villages. This research suggests that based on stakeholders' perceptions of pedestrian accessibility to green infrastructure in terms of distance, safety and physical barriers, the City of Fort Worth will need to take the next step to fully integrate pedestrian accessibility to green infrastructure within and surrounding its urban villages. This suggests that the amount of available green infrastructure within and surrounding the urban villages will need to be increased in order to connect them directly to a variety of green infrastructure types.

5.2 Suggestions for Future Research

Respondents easily made the connection between green infrastructure and human health. Trails and other pedestrian corridors were viewed in terms of providing avenues for exercise and recreation. Walking to destinations such as neighborhood retail services for everyday needs was also viewed as desirable and necessary for increased pedestrian activity and interest in nearby green infrastructure. What was less clear was the majority of respondents' perceptions regarding the connection between human and ecological health. Based on the literature, it is widely believed that improved pedestrian accessibility to green infrastructure will increase the public's appreciation and understanding of the need for quality habitats for urban wildlife species, *and* human populations; and improve the "quality of life" for each. On this basis, another study should be undertaken to further clarify this point.

Both the City of Fort Worth officials and neighborhood leaders have been focused on economic revitalization for the urban villages and hence the City's central city. As one of the village designers pointed out, the next step will need to be made in order to make the actual connections from the villages to the available green infrastructure. Vision North Texas has made initial recommendations for this at the regional scale. However, only two of the village master plans available on the City's web site clearly demonstrate pedestrian connections beyond their internal circulation. Mapping the region's green infrastructure and truly connecting Fort Worth's urban villages and other dense urban pockets will provide ample opportunities for future research. The role of human preferences in the design of urban environments and how those preferences relate to the condition of urban biosystems is another area for future research.

The role of the bicycle community's participation and vocal support of continuous trails throughout the region is another avenue for future research. As a group they have aggressively pushed local cities for increasing the availability, connectivity, and the need for bicycle trails in

their communities. The Katy Trail and the regional Veloweb are examples of the importance of this growing constituency.

5.3 Implications for Landscape Architecture

Redevelopment of Fort Worth's urban villages demonstrates the many rich opportunities available for landscape architects in the region. In the areas of urban design, environmental planning, and public policy landscape architects have the ability to influence and shape public policy and the urban environment. As increased density in the region continues and a greater burden is placed on its natural resources, landscape architects have the ability to work with local city governments and public agencies to design improved ecological functions and management strategies for these resources.

As one respondent with over thirty years of experience in urban design suggested, accessible green infrastructure generates environmental and social value in addition to, economic and visual value. Respondents clearly expressed the desire and the need for available and accessible green infrastructure in an urban environment. Several respondents mentioned such cities as Seattle, Austin and Portland that have actively promoted bicycle and pedestrian accessible green infrastructure. These cities are considered top destinations for many reasons including the strategic management of their natural resources. In the North Texas region this process is just beginning. This is another opportunity for landscape architects to take the lead in the identification and mapping of our natural resources for their environmental, social, visual and economic value.

APPENDIX A

GREEN INFRASTUCTURE VARIABLES

FOR EACH URBAN VILLAGE

VILLAGE NAMES	Green Infrastructure Items	Parks, Gardens, Plazas, Cemeteries	Type	Distance	Flood Plain	Riparian Corridor	Natural/ Semi Natural	Outdoor Sports Facilities
Six Points								
	Riverside Park	Yes	Community	Within 1 mile	Yes		Yes	Yes
	Louella Bales Baker Park	Yes	Neighborhood	Within 1 mile				
	Greenway Park	Yes	Neighborhood	Within 1 mile	Yes			
	Sylvania Park	Yes	Community	Within 1 mile				Yes
	Andrew 'Doc' Sessions						Yes	
	Pioneer's Rest Cemetery	Yes	Special Use	Within 2 miles			Yes	
	Oakwood Cemetery	Yes	Special Use	Within 1 mile			Yes	
Polytechnic Wesleyan								
	6 parks				Yes			
	Sycamore Golf Course w/in mile	Yes	Special Use	Within 2 miles	Yes			Yes
	Sycamore Park	Yes	Large Recreation	Within 1 mile	Yes	Yes	Yes	Yes
	Polytechnic Wesleyan Campus		Special Use	Within 1/2 mile				Yes
	Titus Paulsel Park	Yes	Neighborhood	Within 1 mile	Yes	Yes	Yes	
	Cobb Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	
	Englewood Park	Yes	Neighborhood	Within 2 miles				
	Normandy Place	Yes	Neighborhood	Within 2 miles				
	Meadowood	Yes	Neighborhood	Within 2 miles				
	Hall-Tandy Triangle	Yes	Neighborhood	Within 1/2 mile				
	Glenwood Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
Oakland Corners								
	5 Parks w/in 1 mile	Yes						
	Sycamore Golf Course w/in mile	Yes	Special Use	Within 3 miles	Yes			Yes
	Sycamore Park	Yes	Large Recreation	Within 3 miles	Yes	Yes	Yes	Yes
	Tandy Hills Nature Area	Special Use	Within 2 miles	Yes		Yes	G97	
	Tandy Hills Park	Yes	Special Use	Within 2 miles			Yes	
	Stratford Park	Yes		Within 1 mile		Yes		

	Sagamore Hills	Yes	Neighborhood	Within 2 miles				
	Normandy Place	Yes	Neighborhood	Within 1 mile				
	Oakland Lake Park	Yes	Community	Within 2 miles		Yes	Yes	
	Meadowood	Yes	Neighborhood	Within 2 miles				
	Gateway Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Meadowbrook Golf Course	Yes	Special Use	Within 3 miles				
Historic Handley								
	Lake Arlington Golf Course	Yes	Special Use-City	Within 2 miles	Yes			Yes
	Handley Park	Yes	Neighborhood	Within 1 miles				
	Meadowbrook Golf Course	Yes	Special Use	Within 2 miles				Yes
	Sandy Lane Park		Neighborhood	Within 3 miles				
	Eugene McCray Community Center Park	Yes	Neighborhood	Within 3 miles	Yes	Yes	Yes	
	Lake Arlington	Yes	Community	Within 2 miles	Yes	Yes	Yes	Yes
Berry Stalcup								
	5 Parks w/in 2 miles	Yes			Yes			
	Wildcat Branch Creek	Yes	Neighborhood	Within 1/2 mile	Yes	Yes		
	Wm McDonald Park	Yes	Neighborhood	Within 1 miles	Yes			
	Lake Arlington	Yes	Community	Within 2 miles	Yes	Yes	Yes	Yes
	Eugene McCray Community Center Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Eugene McCray Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Marie F. Pate Park	Yes	Neighborhood	Within 2 miles				
	Bunche Park	Yes	Neighborhood	Within 2 miles				
Near East Side								
	4 Parks w/in 1 mile	Yes			Yes			
	Sycamore CK. Golf Course	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	Yes
	Sycamore Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Water Gardens	Yes	Special Use	Within 1 mile				
	Will Roger Memorial Center Complex	Special Use	Within 2 miles				Yes	Yes
	Hamon Field Park	Yes	Community	Within 1 mile				Yes
	Van Zandt-Guinn Park	Yes	Neighborhood	Within 1 mile				
	Glenwood Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Gateway Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes

	Trinity Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	
Evans Rosedale								
	Evans Ave Plaza	Yes	Neighborhood	Within 1/2 mile				Yes
	Dashwood Park	Yes						
	Glenwood Park	Yes	Neighborhood	Within 1 mile	Yes	Yes	Yes	
	Hillside Park	Yes	Neighborhood	Within 1/2 mile			Yes	Yes
	Sycamore Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Sycamore CK. Golf Course	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	Yes
	Van Zandt-Guinn Park	Yes	Neighborhood	Within 1/2 mile			Yes	
	Southside Community Center Park	Yes	Neighborhood	Within 1/2 mile				Yes
Berry Riverside								
	Cobb Park	Yes	Large Recreation	Within 1/2 mile	Yes	Yes	Yes	Yes?
	Glen Gardens Golf Course	Yes	Private	Within 1-2 miles	Yes		Yes	Yes
	Morningside Middle School Park	Yes	Neighborhood	Within 1/2-2 miles				
	Ellis Park	Yes	Neighborhood	Within 1/4-1 mile	Yes	Yes	Yes	
	Harvey Street Park	Yes	Neighborhood	Within 1-2 miles				
	Echo Lake Park	Yes	Private Open Space	Within 1/2 mile	Yes	Yes	Yes	Yes
	Carter Park	Yes	Community	Within 1-2 miles	Yes	Yes	Yes	Yes
	Rolling Hills Park	Yes	Large Recreation	Within 2-3 miles				Yes
	Sycamore Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Sycamore CK. Golf Course	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	Yes
South Main								
	Van Zandt-Guinn Park	Yes	Neighborhood	Within 1 mile				
	Proposed Athletic/Entertainment	Yes	Neighborhood	Within 1/2 mile				Yes
	Water Gardens	Yes	Special Use	Within 1 mile				
	Will Roger Memorial Center Complex	Yes	Special Use	Within 2 miles			Yes	Yes
	Hillside Park	Yes	Neighborhood	Within 1 mile				Yes
	Glenwood Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Hamon Field Park	Yes	Community	Within 2 miles	Yes			Yes
	Trinity Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	
	Sycamore Park	Yes	Large Recreation	Within 3 miles	Yes	Yes	Yes	Yes
	Sycamore CK. Golf Course	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	Yes

	Harrold Park	Yes	Neighborhood	Within 2 miles				
Magnolia								
	Fire Station Community Center Park	Yes	Neighborhood	Within 1 mile				
	Fire Station Park	Yes	Neighborhood	Within 1 mile				
	Fairmount Park	Yes	Neighborhood	Within 1 mile				
	Hillside Park	Yes	Neighborhood	Within 2 miles				Yes
	Trinity Park	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Sycamore Park	Yes	Large Recreation	Within 3 miles	Yes	Yes	Yes	Yes
	Sycamore CK. Golf Course	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	Yes
	Glenwood Park	Yes	Neighborhood	Within 2 miles	Yes		Yes	
Hemphill Berry								
	Capps Park	Yes	Neighborhood	Within 1/2 mile				
	Jennings-May-St..Louis Park	Park	Neighborhood	Within 1/2 mile				
	Echo Lake Park	Yes	Private Open Space	Within 1 mile	Yes			
	Worth Heights Ball Field	No	City	Within 2 miles				Yes
Bluebonnet Circle								
	Bluebonnet Circle Park	Yes	Special Use	Within 1/2 mile				
	Worth Hills Park	Yes	Neighborhood	Within 1 mile				
	Overton Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Kellis Park	Yes	Neighborhood	Within 2 miles	Yes	Yes	Yes	
	Rosemount Park	Yes	Community	Within 3 miles				Yes
Berry University								
	TCU grounds/facilities	Yes					Yes	
	Fort Worth Zoo	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	
	Forest Park Mini Train	Yes	Large Recreation	Within 2 miles	Yes	Yes	Yes	Yes
	Log Cabin Village	Yes	Special Use	Within 2 miles	Yes	Yes	Yes	
	Overton Park	Yes	Neighborhood	Within 3 miles	Yes	Yes	Yes	
Ridglea								
	Ridglea Country Club	Yes					Yes	
	Lake Como Park	Yes	Community	Within 1 mile	Yes	Yes	Yes	
	Como Community Center Park	Yes	Neighborhood	Within 1 mile				Yes
	Morris Berney Park	Yes	Neighborhood	Within 1/2 mile				
	North Z Boaz Golf Course	Yes	Special Use	Within 2 miles				Yes

	Ed K. Collet	Yes	Neighborhood	Within 2 miles	Yes			Yes
	Chamberlin Park	Yes	Neighborhood	Within 1 mile				Yes
W. 7th								
	Will Roger Memorial Center Complex	Yes	Special Use	Within 1/2-2 miles			Yes	Yes
	Heritage Park	Yes	Large Recreation	Within 1-2 miles	Yes		Yes	
	Linwood Park	Yes	Neighborhood	Within 1/2-1 mile	Yes		Yes	
	Botanic Garden	Yes	Special Use	Within 1/2-2 miles	Yes	Yes	Yes	
	Rockwood Park	Yes	Community	Within 1-3 miles	Yes	Yes	Yes	Yes
	Rockwood Golf Course	Yes	Special Use	Within 1-3 miles	Yes	Yes	Yes	Yes
	Trinity Park	Yes	Large Recreation	Within 1/2-1 mile	Yes	Yes	Yes	
	Monticello Park	Yes	Neighborhood	Within 1-2 miles				
	Water Gardens	Yes	Special Use	Within 2-3 miles				
	Burk Burnett Park	Yes	Special Use	Within 1-2 miles				
	Pioneer's Rest Cemetery	Yes	Special Use	Within 1-2 miles			Yes	
	Oakwood Cemetery	Yes	Special Use	Within 2-3 miles			Yes	
Historic Marine								
	Marine Creek Linear Park	Neighborhood	Within 3 miles	Yes		Yes	Yes	
	Marine Park	Yes	Neighborhood	Within 1/2 mile				
	Saunders Park	Yes	Neighborhood	Within 1 mile	Yes			
	Northside Park	Yes	Neighborhood	Within 2 miles				Yes
	Far Northside Park	Yes	Neighborhood	Within 5 miles				Yes
	Fort Worth Stockyards	Special Use	Within 1 mile					Yes
	Rodeo Park	Yes	Neighborhood	Within 2 miles				Yes
	Lincoln Park	Yes	Neighborhood	Within 2 miles				Yes
	Trail Drivers Park	Yes	Community	Within 2 miles				
	Buck Sansom Park	Yes	Community	Within 3 miles	Yes	Yes	Yes	Yes
	Pioneer's Rest Cemetery	Yes	Special Use	Within 2 miles			Yes	
	Oakwood Cemetery	Yes	Special Use	Within 1 mile			Yes	

APPENDIX B

WRITTEN REQUEST FOR INTERVIEW AND
INTERVIEW QUESTIONS

Written Request for Interview: (via email)

February 10, 2010

Dear….

I am graduate student at the University of Texas at Arlington. Currently, I am finalizing my graduate studies in landscape architecture. In order to complete my thesis I am seeking to interview City personnel, professional designers and neighborhood leaders who have knowledge and experience in the area of urban design and planning, and/or who participated in the urban village program.

Specifically, my topic is *Stakeholders' Perceptions of Pedestrian Accessibility to Green Infrastructure: Fort Worth's Urban Villages.* If you agree to participate, I will need approximately thirty minutes of your time. I am happy to meet you at your convenience at your preferred location.

The format for this interview will consist of my asking you to review a map(s) of Fort Worth's urban villages. I will then ask you a series of questions regarding your perceptions of pedestrian accessibility to green infrastructure in relation to the villages. You will be voice recorded; however, you will be identified only if you agree. Otherwise you may remain anonymous. You will be asked to sign a consent form affirming your willingness to participate. You may withdraw from the study at any time without penalty.

Thank you. I look forward to hearing from you.

Sincerely,

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INTERVIEW QUESTIONS

I have identified several prominent issues that are routinely considered during the planning and design process of connecting parks, trails and other open space networks to their communities. In this research these elements (parks, trails, and open space networks) are broadly defined as green infrastructure. I would like to ask you a few questions about your knowledge and perceptions regarding pedestrian accessibility to green infrastructure in Fort Worth's urban villages.

Part 1.

PROFILE QUESTIONS:

- Please state your name.
- What is your educational background?
- What is your professional background?
- In the event that this research is published or presented at a conference do you wish to remain anonymous?

Part 2.

The first set of questions has to do with concepts.

- Are you familiar with the urban village concept?
- If so, what is your understanding? Please explain.
- Are you familiar with the term green infrastructure?
- What is your understanding of green infrastructure? Please explain.

Part 3.

The literature indicates that in addition to the qualities/items you've mentioned green infrastructure is considered a network of strategically managed, protected and connected green

spaces. This network of green space provides ecological and human health benefits in urbanized areas. It should function as a framework for conservation and development.

There are several key issues on pedestrian accessibility. Below is a series of questions regarding *distance, safety, physical barriers, and pedestrian accessibility* to green infrastructure from Fort Worth's urban villages.

- Considering Fort Worth's urban villages what is a comfortable, walking distance to green infrastructure?
- What attributes of distance influence pedestrian accessibility to green infrastructure from the urban villages?
- What attributes of safety influence pedestrian accessibility to green infrastructure from the urban villages?
- What attributes of physical barriers influence pedestrian accessibility to green infrastructure from the urban villages?
- Beyond distance, safety, and barriers are there any other impediments or facilitators of *pedestrian* accessibility to green infrastructure in urban village settings that are important?

Part 4.

Finally, I have two big picture questions.

- Beyond money, what facilitates the provision of accessible green infrastructure at the street, neighborhood, city, and regional levels?
- Broadly speaking, urban villages and pedestrian access to green infrastructure are location or site specific and are part of the City's approach to improve urban living in its central city and provide a more desirable and healthier environment. At the larger city or regional level what other issues should be addressed?

- Again, in the event that this research is published or presented at a conference do you wish to remain anonymous?

APPENDIX C

PASSIVE OBSERVATIONS

PASSIVE OBSERVATION

Weekdays between 11:30am – 3:30pm

Conducted between January and February, 2010

Selected Villages:

West Seventh	Evans/Rosedale	Berry/Riverside	Historic Handley
Berry/Stalcup	Hemphill/Berry	Berry/University	Bluebonnet Circle
Ridglea			

West Seventh: No Master Plan available on line.

Commercial Activity: New, and ongoing construction. Vibrant, thriving and close to downtown. Newly renovated Montgomery Plaza is bustling with activity around shops, restaurants, condo's and major retailers directly behind and connected to the Plaza. Still maintains a few funky spots. West 7th Street is a six lane highway and presents a major barrier for pedestrians.

Residential Activity: Many new townhouses, condo's and existing townhome development in the area. Older residential neighborhoods are located ten to fifteen minutes away on foot except for heavy traffic lanes. Residents from nearby downtown apartments walk and cycle cross bridge to reach Trinity Park. During the day there appears to be a lot foot traffic surrounding the new fitness center located in the village. New movie house is centrally located in district.

Residential Aspect: Older neighborhoods surrounding Linwood Park appear to be lower income. Some are well kept. No sidewalks. New areas within village itself appear to house young professionals and probably a few empty nesters.

Green Infrastructure: Linwood Park looked rather desolate in the middle of the day during school hours. Trinity Park is the largest draw in the areas and no doubt attracts residents and visitors alike. Many joggers, single women in particular indicate a level of

safety, cyclists, mothers singly and in groups visible with small children at the Duck Pond. The overall level of activity was remarkable even on an overcast day. On a sunny day, young single girls taking pictures of themselves in what appeared to be prom dresses under the railroad trestle also seemed to indicate a measure of security. On a separate day, a large group of families where sliding a hill on cardboard boxes. In short, Trinity Park appears to be a major draw for the area and maintains a light level of activity even during the week in the middle of the day.

Barriers: The Cultural Center is within walking distance and if not for the difficulty of having to navigate a five point crosswalk would be easily accessible for pedestrians. W. 7th is currently scheduled for renovation, streetscaping, and the addition of a streetcar. More entrances into Trinity Park from the village would make it that much more accessible for pedestrians.

Evans/Rosedale: Master Plan

Commercial Activity: At this time it appears very limited. A new storefront sits empty. The nearby office of the NAACP has some visible activity. The presence of several area churches no doubt increase pedestrian traffic during services. The new Shamblee Library and Hazel Harvey- Peace Center seem to have increased pedestrian activity. The Library was bustling. A few pedestrians were visible during the day in the village.

Residential Activity: With the exception of two young men in a vehicle purportedly looking for a friend in the neighborhood, I saw no one. On the second visit I noticed a few cars in front of the Hillside Recreation Center.

Residential Aspect: The neighborhood consists of lower and middle class homes. Hillside Park is the centerpiece and sits high upon a promontory with a spectacular view to downtown Fort Worth. There was also a creek at the foot of the park and a baseball diamond across the street. There was neighborhood pedestrian access from nearby Rosedale Avenue. I felt comfortable walking the mile to Hillside Park from the village

until I was accosted a second time by a pair of young men in a vehicle. I walked with a camera on my shoulder. I saw no one in the streets. After stopping to ask me again, if I knew someone they were looking for, the driver warned about the danger in the neighborhood. He told me I should have a cell phone in case I needed to call for help. I left quickly after that.

Green Infrastructure: Hillside Park is well situated in the neighborhood. The creek at the foot of the hill appeared to be used as the trash cans adjacent to the picnic tables was full. Except for a modest amount of trash it was a lovely spot. After the creek passed under the street is was channelized in an open concrete lined canal complete with a pedestrian bridge from Rosedale Avenue. Glenwood Park is only a mile from the center of the village itself. The extended master plan for the village indicates a tree-lined connection between it and Glenwood. Glenwood Park sits on a beautiful piece of land with the creek running through it until it too becomes channelized under the street. It has a relatively new playground, although in the middle of a weekday, it was empty. I saw only one male pedestrian crossing the park on foot. I left quickly.

The village centerpiece is the recently completed Evans/Rosedale Plaza. The village is traditionally an African-American community and was the home of many prominent teachers, politicians and musicians. The hope is that for the future, the village will become a magnet for jazz and African-American culture.

Barriers: Berry Street is currently under construction. It too will become a six lane highway and potentially formidable for pedestrians. Safety, or the lack of it is most certainly a barrier. The area has suffered from economic divestment for many years and is also a barrier. At this time there are few reasons to visit the village.

Berry/Riverside: Master Plan

Commercial Activity: None to speak of.

Residential Activity: A lot of seemingly unemployed individuals (men and women) in the middle of the day in the parking lot at Cobb Park. Safety is an issue. The poorly educated will have a tough time finding meaningful employment.

Residential Aspect: Mixed areas of low and middle income. Some newer homes have been recently built. Predominantly African-American neighborhood.

Green Infrastructure: With the exception of Trinity Park at West 7th Cobb Park provides a greater amount of green infrastructure of any of the villages. The Cobb Park master plan includes recreational ball fields and many more amenities. Currently it does not feel safe. Vegetation looked a little too overgrown.

Barriers: Lack of lighting, safety, and insufficient "eyes on the street." Safety is most certainly a barrier. This area has long been neglected economically. At this time there is no reason for anyone other than residents to visit this areas beyond going to Cobb Park. And again, safety or the perception of a lack of personal safety is a problem.

Historic Handley: No Master Plan available on line.

Commercial Activity: Linear commercial center along Lancaster Rd. A few historic buildings are in front of a quiet residential area. Multiple antique shops, dry cleaners, offices, a lounge, a lodge, a tattoo parlor and a fancy cake shop. No pedestrians.

Residential Activity: Residents visible included two residents sitting in morning sun on front porch, a man walking his two dogs, and one recreation employee. One gentleman was hitting golf balls across the baseball field.

The parking lot was mostly full at the Handley-Meadowbrook Recreational center. It was filled with senior citizens working on crafts at tables. Recreational Center included a baseball diamond, a playground with swings and slides, and a football stadium across the street, a covered pavilion with playground.

One visible pedestrian-made trail along western edge of Recreational center baseball field. Streets and sidewalks are in fairly good condition for walking. Some street work was in progress along Church Street.

Residential Aspect: Mostly neatly kept homes. Modest income homes.

Green Infrastructure: At the south end of middle school field at Church Street demolition crews were removing condemned (?) homes? Mature Post Oak trees were still in place. An ideal location for a small neighborhood wooded area.

Handley-Meadowbrook Recreation Center had no continuous path or trail around park, but a worn path along the western edge of the field is visible on orthographic maps (Google and GIS).

Lake Arlington is practically inaccessible. It is not presented as an amenity. No pedestrian connections, trails or paths visible to the Lake.

Barriers: The Union & Pacific railroad line and the power plant blocking access to Lake Arlington. Not much of a crosswalk or pedestrian access across Lancaster Avenue toward the Lake.

***Berry/Stalcup**:* Master Plan

Commercial Activity: Sparse and of low quality

Residential Activity: Numerous pedestrians.

Residential Aspect: Lower income homes than Handley, but the homes are neatly kept. A few newer homes are visible. Neighborhood appeared to be predominantly African American. A few boarded up and/or foreclosed properties. Many small churches.

Green Infrastructure: The trailer park is the closest to the mature trees and surrounding Lake Land. Master plan hints at connection to the Lake.

Wildcat Branch Creek is contiguous to neighborhood and runs parallel to Berry St. Narrow in some places and contains trash and debris. The Creek could provide a neighborhood amenity as shown in the master plan.

William. McDonald Park had one car parked in lot, but no one was visible. I wondered about my safety. The neighborhood next door (affordable homes with programming for children and GED for adults) was gated and separate from the park. The park includes a playground and a concrete path around park.

Barriers: Loop 820 is a visual/physical barrier to Lake Arlington. No pedestrian connections, trails or paths visible to the Lake. Safety is most certainly a barrier. This area has long been neglected economically

Hemphill/Berry: Master Plan

Commercial Activity: Thriving, if of lower quality

Residential Activity: Kissing teens under the pavilion and another group of teens sitting at the picnic table.

Residential Aspect: Large, older homes in need of some repair, but consists of good housing stock. New sidewalks lead to Capps Park. Mexican-American and Anglo?

Green Infrastructure: Capps Park provided a ball field, sculpture, a mid-century pavilion in good shape and a tennis court (s). Nothing else is available within one mile. The Park is highly visible, from Berry St. and surrounding streets. Accessible and safe.

Barriers: None on the south side of Berry Street but to the north the Street presents 4-6 lanes of traffic.

Berry/University & Bluebonnet Circle: Master Plans Available

Commercial Activity: Unified look and quality along Berry – lights, sidewalks and streets, lighting, storefronts. Thriving business sector due to TCU. Bluebonnet Circle also has mostly occupied storefronts.

Residential Activity: Many pedestrians along Berry St in the middle of the afternoon. Nearly a dozen pedestrians along the path in Overton Park walking and jogging; in groups and singly. The Park definitely felt safe.

Residential Aspect: Homes are in good shape. Student housing is available close by to middle and upper class residences.

Green Infrastructure:

Overton Park is unique in this sample of six villages in that it is accessible and centrally located; has “eyes on the street,” paths, bridges and is well tended.

Foster Park is located on a highly visible corner. Contains a large pond with fowl. One mother and her two children visited in addition to a set of parents and their two children. The Park continues across the street and a trail connects to Overton Park trail; parking is available in both locations.

TCU Campus Facilities: Plenty of recreational value, but is a private university.

Worth Hills Park: Left over green space?

Barriers: None for immediate residents of Overton Park but it’s 1.5- 2.0 miles away from the centers of Berry/University and Bluebonnet Circle.

APPENDIX D

ATTRIBUTES

ATTRIBUTES OF DISTANCE	Condition of Sidewalks	Road Conditions (e.g. Traffic, Quality of Grid, Width, Speed)	Streets that Accommodate both Vehicles and Pedestrians	Safety	Availability of Green Infrastructure	Streetscape	Climate
ATTRIBUTES OF SAFETY	Adequate Sidewalks	Road Conditions (e.g. Traffic, Quality of Grid, Width, Speed)	Beautification Attractiveness Increases Comfort Level	Safety Actual & Perceived	Creating "Use"	Pedestrian & Bicycle Trails	Multi-Modal Options
ATTRIBUTES OF PHYSICAL BARRIERS	Adequate Sidewalks	Road Conditions (e.g. Traffic, Quality of Grid, Width, Speed)	Trees as Buffers, Added Friction	Unsafe Adjacencies Security	Availability of Green Infrastructure	Streetscape	Lack of Neighborhood Retail Services
BEYOND DISTANCE, SAFETY & PHYSICAL BARRIERS	Increase Street Level Activity	Creative Thinking about Providing Green Infrastructure (e.g. green roofs)	Infill Redevelopment	Shared Land Use (e.g. Parking)	Publicity of Available Public Amenities	Public/Private Partnerships	Land Costs
OTHER ATTRIBUTES BEYOND MONEY	Creative Thinking About What Constitutes Green Space	Public Education Healthier Lifestyles	Education of Public & City officials Regarding Connectivity	Urban Design Change in Philosophy	Quality of Urban Buildings and Public Spaces	Enlightened Design Decisions and Enlightened Policies	Walkability as a Value Added Factor visible to the Public & Developers
OTHER ATTRIBUTES AT THE REGIONAL LEVEL	Route Evaluation & Improvements for Pedestrians & Bicycles to Connect to GI	Streets as Trails	Hierarchy of Open Spaces & Connections	Holistic Thinking	Societal Conditions	Connection of Historical Sites to Parks, Trails and other Destinations	Racial Intolerance?
ATTRIBUTES OF DISTANCE	"Eyes on the Street"	Way finding	Trees	Edges	Rest Stations to Mitigate distance & Weather	Neighborhood Retail Services	Quality of the Pedestrian Experience
ATTRIBUTES OF SAFETY	Street Life "Eyes on the Street"	Erroneous Perceptions by Engineers Regarding Mid-Block Crosswalks	Lighting	Street Life "Eyes on the Street"	Safety in Numbers		
ATTRIBUTES OF PHYSICAL BARRIERS	Visual/Actual Connectivity	Pedestrian & Bicycle Trails	Difficult Intersections	Multi-Modal Transportation	Beautification Attractiveness of Gray Infrastructure	Topography	Roads, Rivers, Bridges, RR Tracks
BEYOND DISTANCE, SAFETY & PHYSICAL BARRIERS	Connectivity	Funding to Make Connections Clean, Safe, Inviting	Climate	Mixed-Use Zoning	Private Funding		

OTHER ATTRIBUTES BEYOND MONEY	Vision & Corresponding Ability to Communicate that Vision	Hiring of Specialized Consultants	Community Participation	Public Input About Desires	Public Participation	Activism	Constituencies (e.g. young professionals & seniors)
OTHER ATTRIBUTES AT THE REGIONAL LEVEL	Multi-Modal Opportunities for Connectivity Between Villages and Green Infrastructure	Green Infrastructure as Connectors	Commuter Rail Connections	Re-Examination of Street Grid to create Pedestrian /Bike pass-through	Conservation	Connectivity	
ATTRIBUTES OF DISTANCE	Quality of Origin and Destination	Multiple Access Points to GI	Surmounting Street Width	Funding	Crime	Erroneous Perceptions by Engineers Regarding Street Width	
ATTRIBUTES OF SAFETY							
ATTRIBUTES OF PHYSICAL BARRIERS	Quality Park Gateways	Neighborhood Blight	ADA Compliance for the Mobility Impaired	Additional Capital Improvements	Social Conditions (e.g. crime, transients	More Police	
BEYOND DISTANCE, SAFETY & PHYSICAL BARRIERS							
OTHER ATTRIBUTES BEYOND MONEY							
OTHER ATTRIBUTES AT THE REGIONAL LEVEL							
ATTRIBUTES OF DISTANCE	Short Blocks	Perception of Street as "Public Space"	Streets as Places for Shared Community Activities	Erroneous Perceptions by Engineers Regarding Street Width	Streets as Providers of Outdoor Activities for the Public		
ATTRIBUTES OF SAFETY							
ATTRIBUTES OF PHYSICAL BARRIERS	Considering Limited Fund: Access Points where needed the most	Air Quality					

BEYOND DISTANCE, SAFETY & PHYSICAL BARRIERS							
OTHER ATTRIBUTES BEYOND MONEY							
OTHER ATTRIBUTES AT THE REGIONAL LEVEL							

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BIOGRAPHICAL INFORMATION

Petrine M. Abrahams was born in Los Angeles, California to immigrant parents from Costa Rica, Central America. Travelling as a child between a thoroughly modern First World city and one on the cusp of modernity left her with a deep appreciation for cities and the natural world.

After graduating from high school in San Jose, Costa Rica and on vacation in New York City, with no money or plans, she enlisted in the United States Army on a lark. She was stationed in Frankfurt, Germany as a radio, teletype, and Morse code operator in the 143rd Signal Corp of the Third Armored Division. She had the good fortune of travelling to over fifteen countries while in Europe.

Petrine graduated with a BFA from the University of Texas at San Antonio. She has lived in Dallas, Texas with her husband for many years while raising their three sons. After purchasing land on the edge of the Dallas escarpment, she decided on another lark to attend graduate school to earn a degree in landscape architecture. Never did she imagine that that lark would send her on another journey of a lifetime.