**THE RELATIONSHIP BETWEEN QUALITY OF LIFE
AND LEED-ND CERTIFIED / CERTIFIABLE NEIGHBORHOODS**

A Master's Thesis

presented to

the Faculty of California Polytechnic State University,

San Luis Obispo

In Partial Fulfillment

of the Requirements for the Degrees

Master of City and Regional Planning /

Master of Science in Engineering (Transportation Planning Specialization)

by

Stephanie Timm, LEED AP

June 2010

© 2010
Stephanie Timm
ALL RIGHTS RESERVED

COMMITTEE MEMBERSHIP

TITLE: The Relationship Between Quality of Life and LEED-ND Certified / Certifiable Neighborhoods

AUTHOR: Stephanie Timm

DATE SUBMITTED: June 2010

COMMITTEE CHAIR: Dr. Umut Toker, Associate Professor

COMMITTEE MEMBER: Dr. Adrienne Greve, Associate Professor

COMMITTEE MEMBER: Paul Wack, Professor

ABSTRACT

The Relationship Between Quality of Life and LEED-ND

Certified / Certifiable Neighborhoods

Stephanie Timm

The United States Green Building Council (USGBC) has developed a rating system that examines the sustainability of neighborhoods. They have specifically stated that that LEED-ND certified neighborhoods will protect and enhance residents' overall health, the natural environment, and quality of life. This study uses relevant quality of life indicators that are commonly identified by social scientists as accurate interpreters of the various quality of life domains to determine if there is, in fact, a relationship between LEED-ND and quality of life. Four of the ten domains examined were found to be related to LEED-ND certified/certifiable neighborhoods, thus, to a certain extent, LEED-ND certification does increase quality of life as compared to traditional suburban neighborhoods.

Keywords: LEED-ND, Green Neighborhoods, Quality of Life, Sustainability Assessment

ACKNOWLEDGMENTS

First and foremost, I would like to thank my committee chair, Dr. Umut Toker, for his continuous support, encouragement, and guidance throughout the entire duration of researching and writing this thesis. Without his consistent willingness to help, I know I could not have completed this on time or to the high standard it eventually reached. I truly could not have asked for a better supervisor. Because Umut made this process so positive and interesting, I now have the desire to continue conducting research in this subject area.

Dr. Adrienne Greve and Professor Paul Wack were also incredibly instrumental in making this research process an incredibly rewarding and pleasurable experience. Both always had their door open and were willing to discuss everything from the best way to quantitatively evaluate my data, to how to reach my ultimate professional goals. Their guidance and support will always be remembered and appreciated.

Although she was not directly involved in this research effort, I would like to thank Carol Florence for being an incredible mentor and amazing example of a strong woman in planning. Throughout the two years I worked at Oasis Associates, Inc. I have been witness to her consistent drive and demand for the best quality work. These professional attributes will forever stick with me, and emulating her hard work has helped “get me through” the process of writing a thesis.

I will never be able to thank my parents, Judee and Howard Timm, enough for their undying love, support, and advise. Luckily for me, both have been through writing a thesis/dissertation before, which gave them the ability to offer great recommendations and complete understanding. Both are incredible parents *and* professionals - a combination that makes them amazing role models and two people I will always look up to and strive to make proud.

I owe my deepest gratitude to Max Pike for being supportive and helpful every step of the way – from stuffing envelopes until 5:30am to understanding when I had to hole myself up to finish a section. While I knowingly and willingly signed up to complete a thesis, I am aware that he did not; and as my roommate and partner I know he became a little bit more involved in this process than he would have originally liked. His easygoing and good-natured attitude got both him and me successfully through the dual degrees and the thesis in two years.

Lastly, I would like to thank the Cal Poly City and Regional Planning Department for supporting this project financially. The “learn by doing” education I have received at this institution will be invaluable to my professional success, while the lessons learned from the professors, professional planners, and fellow students that I have met through this program will never be forgotten.

TABLE OF CONTENTS

<u>DESCRIPTION</u>	<u>PAGE</u>
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTERS:	
1. INTRODUCTION.....	1
2. LITERATURE REVIEW	
2.1. LEED-ND.....	4
2.2. Quality of Life.....	12
3. METHODOLOGY	
3.1. Overview.....	34
3.2. Methods	
3.2.1. Case Study Selection.....	34
3.2.2. Operationalization of Terms.....	40
3.2.3. Instrument Design.....	42
3.2.4. Data Collection Protocol.....	43
4. SELECTED CASE STUDIES	
4.1. City of Orange	
4.1.1. Depot Walk.....	46
4.1.2. Suburban.....	51
4.2. Pasadena	
4.2.1. Paseo Colorado.....	55
4.2.2. Suburban.....	59

5. FINDINGS	
5.1. Sample Description.....	63
5.2. Objective Dimension.....	65
5.3. Subjective Dimension.....	68
6. CONCLUSIONS	
6.1. LEED-ND Contributions to Quality of Life.....	115
6.2. Quality of Life Domains Not Addressed By LEED-ND.....	118
6.3. Recommendations and Action Items.....	118
7. REFERENCES.....	121
APPENDICES	

LIST OF TABLES

TABLE	PAGE
TABLE 1	LEED-ND PREREQUISITES.....7
TABLE 2	ATTRIBUTES ASSOCIATED WITH QOL ATTRIBUTES.....22
TABLE 3	INDICATOR CATEGORIES..... 24
TABLE 4	DOMAINS AND INDICATORS EXAMINED BY MOLLENKOPF ET AL (2004)..... 30
TABLE 5	POTENTIAL CASE STUDY SITES..... 39
TABLE 6	INDICATOR ANALYSIS.....41
TABLE 7	SURVEY INSTRUMENT SECTIONS.....43
TABLE 8	DEPOT WALK SERVICES.....50
TABLE 9	ORANGE SUBURBAN SERVICES..... 55
TABLE 10	PASEO COLORADO SERVICES..... 58
TABLE 11	PASADENA SUBURBAN SITE SERVICES..... 61
TABLE 12	OBJECTIVE INDICATOR MEASUREMENT65
TABLE 13	OBJECTIVE MOBILITY INDICATORS.....66
TABLE 14	OBJECTIVE SERVICES INDICATORS67
TABLE 15	PASEO COLORADO CRIME INCIDENTS..... 68
TABLE 16	SUBJECTIVE ANALYSIS SURVEY RESPONSE RATES.....69
TABLE 17	QUALITY OF LIFE INDICATORS THAT RELATE TO LEED-ND NEIGHBORHOOD FORM..... 117

LIST OF FIGURES

FIGURE	PAGE
FIGURE 1	LEED-ND SYSTEMS AS OF 2010.....5
FIGURE 2	SCHEMATIC DEPICTING NEIGHBORHOOD CASE STUDY COMPARISON.....35
FIGURE 3	PASEO COLORADO IN PASADENA CALIFORNIA..... 36
FIGURE 4	SANTANA ROW IN SAN JOSE CALIFORNIA..... 37
FIGURE 5	CITY HEIGHTS URBAN VILLAGE IN SAN DIEGO CALIFORNIA.....37
FIGURE 6	TASSAFORONGA VILLAGE IN OAKLAND CALIFORNIA.....38
FIGURE 7	DEPOT WALK IN ORANGE CALIFORNIA..... 38
FIGURE 8	LOCATION OF CASE STUDY SITES WITHIN ORANGE CALIFORNIA.....46
FIGURE 9	LOCATION OF DEPOT WALK WITH RELATION TO TRANSPORTATION OPPORTUNITIES.....48
FIGURE 10	SERVICES NEAR DEPOT WALK.....49
FIGURE 11	SERVICES WITHIN ½ MILE RADIUS OF DEPOT WALK.....49
FIGURE 12	SUBURBAN CASE STUDY SITE IN ORANGE CALIFORNIA..... 51
FIGURE 13	LOCATION OF ORANGE SUBURBAN CASE STUDY WITH RELATION TO TRANSPORTATION OPPORTUNITIES..... 53
FIGURE 14	LOCATION OF PASEO COLORADO WITH RELATION TO TRANSPORTATION OPPORTUNITIES..... 56
FIGURE 15	PASEO COLORADO SITE MAP..... 58
FIGURE 16	LOCATION OF PASADENA SUBURBAN CASE STUDY WITH RELATION TO TRANSPORTATION OPPORTUNITIES..... 60
FIGURE 17	SENSE OF COMMUNITY INDICATOR 1 (AGREEMENT)..... 71

FIGURE 18	SENSE OF COMMUNITY INDICATOR	
	1 (IMPORTANCE).....	72
FIGURE 19	SENSE OF COMMUNITY INDICATOR 2.....	73
FIGURE 20	PROSPERITY INDICATOR 1 (AGREEMENT).....	75
FIGURE 21	PROSPERITY INDICATOR 1 (IMPORTANCE).....	75
FIGURE 22	PROSPERITY INDICATOR 2 (AGREEMENT).....	77
FIGURE 23	PROSPERITY INDICATOR 2 (IMPORTANCE).....	77
FIGURE 24	MOBILITY INDICATOR 1 (AGREEMENT).....	79
FIGURE 25	MOBILITY INDICATOR 1 (IMPORTANCE).....	79
FIGURE 26	MOBILITY INDICATOR 2 (AGREEMENT).....	80
FIGURE 27	MOBILITY INDICATOR 2 (IMPORTANCE).....	81
FIGURE 28	MOBILITY INDICATOR 3 (AGREEMENT).....	82
FIGURE 29	MOBILITY INDICATOR 3 (IMPORTANCE).....	83
FIGURE 30	MOBILITY INDICATOR 4 (AGREEMENT).....	84
FIGURE 31	MOBILITY INDICATOR 4 (IMPORTANCE).....	84
FIGURE 32	SERVICES INDICATOR 1 (AGREEMENT).....	86
FIGURE 33	SERVICES INDICATOR 1 (IMPORTANCE).....	87
FIGURE 34	SERVICES INDICATOR 2 (AGREEMENT).....	88
FIGURE 35	SERVICES INDICATOR 2 (IMPORTANCE).....	89
FIGURE 36	SERVICES INDICATOR 3 (AGREEMENT).....	90
FIGURE 37	SERVICES INDICATOR 3 (IMPORTANCE).....	91
FIGURE 38	SERVICES INDICATOR 4 (AGREEMENT).....	92
FIGURE 39	SERVICES INDICATOR 4 (IMPORTANCE).....	93
FIGURE 40	SECURITY INDICATOR 1 (AGREEMENT).....	94
FIGURE 41	SECURITY INDICATOR 1 (IMPORTANCE).....	95
FIGURE 42	PASEO COLORADO PEDESTRIANS.....	96
FIGURE 43	PASADENA SUBURB SITE LACK OF PEDESTRIANS.....	96
FIGURE 44	SECURITY INDICATOR 2 (AGREEMENT).....	97
FIGURE 45	SECURITY INDICATOR 2 (IMPORTANCE).....	98
FIGURE 46	SECURITY INDICATOR 3 (AGREEMENT).....	99
FIGURE 47	SECURITY INDICATOR 3 (IMPORTANCE).....	99
FIGURE 48	SUSTAINABILITY INDICATOR 1 (AGREEMENT).....	101
FIGURE 49	SUSTAINABILITY INDICATOR 1 (IMPORTANCE).....	101
FIGURE 50	SUSTAINABILITY INDICATOR 2 (AGREEMENT).....	103
FIGURE 51	SUSTAINABILITY INDICATOR 2 (IMPORTANCE).....	103

FIGURE 52	SUSTAINABILITY INDICATOR 3 (AGREEMENT).....	104
FIGURE 53	SUSTAINABILITY INDICATOR 3 (IMPORTANCE).....	105
FIGURE 54	SUSTAINABILITY INDICATOR 4 (AGREEMENT).....	106
FIGURE 55	SUSTAINABILITY INDICATOR 4 (IMPORTANCE).....	107
FIGURE 56	SUBJECTIVE WELLBEING INDICATOR	
	1 (AGREEMENT).....	108
FIGURE 57	SUBJECTIVE WELLBEING INDICATOR	
	1 (IMPORTANCE).....	109
FIGURE 58	SUSTAINABILITY INDICATOR 5 (AGREEMENT).....	112
FIGURE 59	SUSTAINABILITY INDICATOR 5 (IMPORTANCE).....	112
FIGURE 60	PROSPERITY INDICATOR 2 (AGREEMENT).....	114
FIGURE 61	PROSPERITY INDICATOR 2 (IMPORTANCE).....	114

Chapter 1

Introduction

The human built environment has evolved dramatically over thousands of years. From the ancient cities of Mesopotamia and Harappa, to the sprawling suburbs constructed post World War II, to the technologically driven and densely populated cities that are possible today, it is clear that the human population has strived to achieve an urban form that is both enjoyable to live within and is able to function efficiently in a variety of capacities. Suburban development was largely a response to the overcrowding, lack of sanitation, and associated high transfer rate of disease that characterized many cities in the mid-19th century to early 20th century. It was thought that a dramatic reduction in housing density would improve health and overall quality of life by providing residents with plentiful light, fresh air, and a quiet/ non-crowded neighborhood.

Much of the recent city planning and urban development literature rejects the suburban form due to its contribution to increased vehicle miles traveled (which increases greenhouse gas emissions and contributes to global climate change), increased habitat destruction, lack of social contact, and lack of green infrastructure/building (Calthorpe, 1993; USGBC, 2010c). As such, a form of more compact development that is characterized by increased walkability, a mix of different uses, and accessibility to public

transportation was introduced as an alternative to the traditional suburb (i.e., Smart Growth and New Urbanism).

The United States Green Building Council (USGBC) developed an internationally recognized green building certification system called Leadership in Energy and Environmental Design (LEED) in 1998. Although this certification system traditionally focused on individual buildings (e.g., new construction, existing buildings, homes, etc.), their newest rating system, Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) is meant to identify neighborhoods that meet “high levels of environmentally responsible, sustainable development” (USGBC, 2010b). The USGBC collaborated with both the Congress for the New Urbanism (CNU) and the Natural Resource Defense Center (NRDC) to develop this assessment system that integrates the principles of smart growth, urbanism, and green building (USGBC, 2010b). Thus, using the LEED-ND assessment criteria, a traditional suburban neighborhood would not be able to attain enough credits to become LEED-ND certified.

The USGBC states that LEED-ND certified neighborhoods will protect and enhance residents’ overall health, the natural environment, and quality of life. The purpose of this study is to determine if there is, in fact, a relationship between LEED-ND and quality of life. This analysis will be carried out with use of relevant quality of life indicators that are commonly identified by social scientists as accurate interpreters of the various quality of life domains. Ultimately, the findings of this study will be used to develop recommendations for both planning practitioners (who might advocate using LEED-ND as a benchmark within their respective jurisdictions’ land use policy) and the

USGBC (to improve upon the most recent LEED rating system). Additional research opportunities will also be identified.

Chapter 2

Literature Review

2.1 LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN FOR NEIGHBORHOOD DEVELOPMENT (LEED-ND)

2.1.1 LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED) OVERVIEW

The United States Green Building Council (USGBC) was formed in 1993. Five years later, in August 1998, the organization launched LEED Version 1.0 as a way to meet the need for a system to define and measure “green buildings.” This initial LEED Pilot Project Program was extensively modified and then re-released as LEED Version 2.0 in March 2000, followed by LEED Version 2.1 in 2002, LEED Version 2.2 in 2005, and LEED Version 3.0 in 2009. As of 2010, LEED has become an internationally recognized green building certification system that provides “third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts” (U.S. Green Building Council, 2010d).

As LEED has evolved and matured, the program has undertaken new initiatives. In addition to a rating system specifically devoted to building operational and

maintenance issues (LEED for Existing Buildings: Operations & Maintenance), LEED addresses the different project development and delivery processes that exist in the U.S.

building design and construction market, through rating systems for specific

building typologies, sectors, and project scopes: LEED for Core & Shell, LEED for New Construction, LEED for Schools, LEED for Neighborhood Development, LEED for Retail, LEED for Healthcare, LEED for Homes, and LEED for Commercial Interiors (U.S. Green Building Council, 2010d).

Figure 1: LEED rating systems as of 2010. USGBC, 2010c, retrieved 3 June 2010 from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222> and further manipulated by author.

2.1.2 LEED FOR NEIGHBORHOOD DEVELOPMENT

The LEED for Neighborhood Development Rating System (LEED-ND) is a collaborative effort between the USGBC, Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC). These three organizations have integrated the principles of green building, new urbanism, and smart growth into a certification system for neighborhood design. This rating system attempts to ensure that the location and design of all certified projects meet high levels of environmentally responsible and sustainable development (US Green Building Council, 2010b).

The registration for LEED for Neighborhood Development pilot projects began in early 2007 in order to test the first rating system developed. A total of 239 LEED neighborhood development projects (206 from 39 different U.S. states and 33 from 5 subsequent countries) registered as pilot projects for LEED-ND certification (U.S. Green Building Council, 2010e). Approximately 91 percent of these pilot projects are located in urban areas¹. Two Public Comment Period Drafts of the rating system were distributed from November 17, 2008 to May 1, 2009. Over 5,000 comments were received on the first draft, resulting in significant modifications, while the 1,400 comments received on the second draft did not result in significant modifications. The final rating system (i.e., LEED 2009 for Neighborhood Development) was approved by the LEED-ND consensus body, which was formed between December 18, 2008 and February 15, 2009. The USGBC is continuing to pursue designation of LEED-ND as an American National Standard.

2.1.3 DIMENSIONS, STAGES, AND CERTIFICATION LEVELS OF LEED-ND

The LEED-ND 2009 rating system evaluates projects on five distinct dimensions: smart location and linkage (SLL); neighborhood pattern and design (NPD); green infrastructure and buildings (GIB); innovation and design process (IDP); and Regional Priority Credit. The smart location and linkage criteria focus on developing projects on sites that would have immediate access to public transportation, bicycle infrastructure, and housing/jobs, while not significantly impact existing habitat. Neighborhood pattern and design criteria focus on implementation of specific neighborhood design methods

¹ Urban areas are defined as having 50,000 or more people.

that would increase overall walkability, connectivity, and access for residents and visitors (in addition to local produce, community outreach, etc). Green infrastructure and buildings examine individual building's design; site location; and water, energy, and material use efficiency. The innovation and design process dimension provides an opportunity to earn additional points exemplary performance above requirements for a certain criteria or for criteria that are important, but not specifically addressed elsewhere in the rating system. Lastly, the Regional Priority Credit encourages strategies that address geographically specific environmental, social equity, and public health priorities. The pilot version of the LEED-ND rating system varies slightly from the approved 2009 version in that this Regional Priority Credit dimension is not included.

Fulfillment of twelve mandatory prerequisite criterions (nine for the pilot version) (Refer to Table 1) and a total of 40 points are required to be met for LEED-ND certification. Projects that accrue more points can be rewarded with LEED-ND silver (50+ points), gold (60+ points), or platinum certification (80+ points) (U.S. Green Building Council 2010c).

Table 1: LEED-ND Prerequisites		
	Pilot Version	2009 LEED-ND Rating System
Smart Location and Linkage		
SLL Prerequisite 1	Smart Location	Smart Location
SLL Prerequisite 2	Proximity to Water and Wastewater Infrastructure	Imperiled Species and Ecological Communities Conservation
SLL Prerequisite 3	Imperiled Species and Ecological Communities	Wetland and Water Body Conservation
SLL Prerequisite 4	Wetland and Water Body Conservation	Agricultural Land Conservation
SLL Prerequisite 5	Agricultural Land Conservation	Floodplain Avoidance
SLL Prerequisite 6	Floodplain Avoidance	--
Neighborhood Pattern and Design		

NPD Prerequisite 1	Open Community	Walkable Streets
NPD Prerequisite 2	Compact Development	Compact Development
NPD Prerequisite 3	--	Connected and Open Community
Green Infrastructure and Buildings		
GIB Prerequisite 1	Construction Activity Pollution Prevention	Certified Green Building
GIB Prerequisite 2	--	Minimum Building Energy Efficiency
GIB Prerequisite 3	--	Minimum Building Water Efficiency
GIB Prerequisite 4	--	Construction Activity Pollution Prevention

Due to the fact that LEED-ND projects may require long periods of time to complete construction, there are three possible stages within the LEED-ND certification process. Stage 1 consists of an optional pre-review that is available, but not required for projects at any point before the entitlement process begins. The indicated Level of Certification in this pre-review will represent the anticipated certification level in latter stages. Stage 2 certification is required for all LEED-ND projects and entails the certification of an approved plan required after the project has been granted any necessary approvals and entitlements to be built to plan. Stage 3 (i.e., the final stage) is the certification of the completed neighborhood development which is available and required when construction is complete or nearly complete.

2.1.4 SUGGESTED BENEFITS OF LEED-ND

The USGBC, NRDC, and CNU have outlined various benefits that neighborhoods built to achieve LEED-ND certification are likely to experience. These benefits include increased quality of life, encouragement of healthy lifestyles, reduced urban sprawl, and protection of threatened species. These benefits (as stated by the aforementioned agencies) will be discussed further below.

Quality of Life

The USGBC states that the LEED-ND rating system “recognizes development projects that successfully protect and enhance the overall health, natural environment, and **quality of life** [emphasis added] of our communities”(U.S. Green Building Council 2009h). Thus, the rating system would meet one component of the USGBC’s mission - to improve quality of life (U.S. Green Building Council 2010g; U.S. Green Building Council 2010f). Similarly, the NRDC claims that the LEED-ND standards are objective tools used to evaluate how projects will influence quality of life (Natural Resources Defense Center 2009a).

Encourage Healthy Living

Many LEED-ND standards emphasize the need for compact, walkable, connected, and mixed-use neighborhoods. Various studies have shown that people increase walking and biking activities when they live in mixed-use neighborhoods within walking distance of shops and services. This increase in activity is believed to improve human cardiovascular/respiratory health and reduce the risk of hypertension and obesity (U.S. Green Building Council, 2010b; Center for Disease Control, 2009).

Reduction of Urban Sprawl

The U.S. Green Building Council states that LEED-ND certified communities could reduce the impacts of urban sprawl (i.e., unplanned, uncontrolled spreading of urban development into areas outside of the metropolitan region). LEED-ND certified neighborhoods are mainly able to reduce sprawl by locating compact development close to existing town and city centers that have good transit access. Conversely, those neighborhoods that don’t exhibit LEED-ND characteristics, or “credits,” can fall into the

category of typical sprawling development, which is commonly classified as low-density housing and commercial uses located in automobile-dependent areas. This type of development can harm the environment by consuming farmland, forests, and wildlife habitat; degrade water quality through destruction of wetlands and increased stormwater runoff; and pollute the air with increased automobile travel (U.S. Green Building Council 2010b).

Protect Threatened Species

In addition to reduction in urban sprawl, the U.S. Green Building Council claims that the compact development patterns and location of sites within or adjacent to existing development minimizes habitat fragmentation and helps preserve areas for recreation (U.S. Green Building Council 2010b).

2.1.5 LEED-ND CRITIQUES

The U.S. Green Building Council exclusively outlines the positive impacts that LEED-ND certified developments will have on a community, individuals, the local environment, etc. Despite the relatively recent inception of the evaluation system, critiques of LEED-ND pilot projects and processes have been published (Garde, 2009). For instance, Garde (2009) found in a survey of LEED-ND pilot projects that many respondents believed the rating system had significant limitations. Specific limits included the requirements working against projects in rural areas (i.e., areas that have zoning regulations which don't permit high density projects) and burdensome paper work (p.16). In addition, many of the development goals that LEED-ND certification aspires to, such as compact and "sustainable" development, have also been debated (US Green Building Council 2010b; Newman, 2005).

As of 2010, there is not a complete consensus as to what makes a given neighborhood “sustainable” or how its overall sustainability should be measured (Garde, 2009). Urban intensification or compactness, however, is often regarded as the crucial paradigm to be applied to achieve “sustainable development” (Howley, P., Scott, M., and Redmond, D., 2009, p. 848; Beatley, 1995, p. 384). Although there is some agreement about the positive impacts compact cities offer, it should be noted that there are gaps in the studies, and the evidence is inadequate and sometimes even contradictory (Newman, 2005; Garde, 2009).

While it is true that a greater proportion of individuals are currently both living and working in cities than ever before, it should be acknowledged that a smaller proportion of people are living and working in central cities; more and more individuals are choosing to live in the outskirts of cities and rural or suburban areas (Howley, P., Scott, M., and Redmond, D., 2009, p. 848). Thus, the U.S. Green Building Council’s claim that LEED-ND projects (i.e., a form of compact development) will improve quality of life does challenge the low-density living situations many United States residents are choosing for themselves. Neuman (2005) states that we must be “cautious in accepting claims that livability is greater in one form of human settlement over another because many of the same desirable qualities found in low-density residential suburbs can also be found in the densest cities (e.g., greenery, sense of safety, good schools, quiet streets can be found in places such as Barcelona and San Francisco as well as low density neighborhoods). Livability is not only a matter of urban form, but also a matter of personal preference” (p.16).

2.2 QUALITY OF LIFE

2.2.1 OVERVIEW

Social scientists first began to investigate defining and measuring “quality of life” (QOL) using a variety of different perspectives in the 1930s. In fact, William Ogburn’s 1933 report, *Recent Social Trends*, which was produced for use by the Hoover administration, is said to have played a major role in the emergence of social indicators and the QOL movement (Massam, 2002, p. 250). By the 1960s and 1970s, specialized journals (e.g., *Social Indicators Research*) and advancements in computing power encouraged collection and evaluation of data on socioeconomic status, education, housing, and neighborhoods (Haas 1999, p. 216; Massam, 2002, p. 250; Veenhoven, 1996, p. 2; Grasso & Canova, 2008, p. 3). One of the main aims of *Social Indicators Research* was to develop a social equivalent to the economists’ Gross National Product (Veenhoven, 1996, p. 2). Much of this research has brought public attention to changing adverse living conditions and specific societal problems (e.g., poverty, human rights, etc.) (Massam, 2002, p. 250).

Since that time, QOL has been evaluated at a variety of different scales (e.g., individual, neighborhood/community, state, national) by means of four different approaches - subjective, objective, multidimensional, and economic. The most widely accepted evaluation of QOL is the multidimensional approach, which incorporates both objective and subjective indicators. Many researchers also have concluded that these indicators should be weighted by a personal set of values (Felce & Perry 1995, p. 60)

The relation between QOL and development patterns can, and should be examined on various different scales, as to encourage positive change. Current patterns of

development in the United States are commonly described as socially and psychologically stifling (Beatley, 1995, p. 387). For instance, at the neighborhood scale, it has been found that neighborhood features do affect life satisfaction through a satisfaction hierarchy (i.e., neighborhood satisfaction, housing satisfaction, home satisfaction, and community satisfaction) (Sirgy & Cornwell, 2002, p. 89). Transportation, housing, and service usage are also strongly interrelated and influence quality of life (Cvitkovich, & Wister, 2001, p. 809).

Quality of life has also become a potent marketing tool for neighborhoods and cities around the world. Marketing campaigns put forth by local governments, developers, and builders use the term “quality of life” to promote a specific region, city, type of housing, or style of living. Publications such as *Money* magazine and various websites that announce the latest QOL rankings of US cities, local governments, and chambers of commerce have commonly enticed these entities to update their brochures and call press conferences to reflect any positive attributes reported (Epley & Menon, 2007, p. 282). Furthermore, quality of life has been shown to have broader implications for migration patterns, economic growth, and environmental sustainability of communities and regions (McCrea, Stimson, and Western, 2005, p. 124).

This section will first examine and clarify the terminology associated with QOL, then it will analyze the four different approaches used in its evaluation – the objective approach, the subjective approach, the multidimensional approach, and the economic approach. Lastly, the most common methodologies and methods that each approach used will be discussed.

2.2.2 DEFINITION OF TERMINOLOGY

Quality of life is a complex, multifaceted concept that continues to defy completely consensual definition due to the fact that it is a multidisciplinary term with a range of different applicable theoretical models and academic orientations (Felce & Perry, 1995, p. 52; Haas, 1999, p. 215). It is important to distinguish the differences between the several different terms that are commonly used interchangeably with QOL in order to properly operationalize the concept. Often studies are conducted in which wellbeing or satisfaction with life is measured and results are incorrectly reported as interpretations of QOL. Thus, QOL will be distinguished from three concepts with which it is frequently confused: wellbeing, satisfaction with life, and livability (Haas, 1999, p. 217).

Quality of Life

The majority of social researchers suggest that quality of life is a multidimensional evaluation of current life circumstances that should be measured by a combination of both subjective and objective indicators (Haas, 1999, p. 219; Felce & Perry, 1995, p. 60; Massam, 2002, p. 251). This evaluation should be in the context of both the culture and value systems that the individual, or group of individuals, hold (Felce & Perry, 1995, p. 60). Phrases such as “general welfare,” “welfare,” and “common wealth” have also been used to describe QOL (Epley & Menon, 2007; Christoph & Noll, 2003, p. 521).

Wellbeing

Social researchers most frequently define wellbeing, or “subjective wellbeing,” as the subjective component of quality of life; in fact, many researchers will go as far as

saying that it is the primary indicator of QOL. Wellbeing is generally thought of as peoples' emotional and cognitive evaluations of their lives - both at a specific moment and for longer periods (Diener, Oishi, and Lucas, 2003, p. 403). It is common knowledge that every person's moods, emotions, and self-evaluative judgments fluctuate over time; thus, researchers study both these fluctuations and examine the longer-term mean level differences that exist between individuals and societies (Diener, Oishi, and Lucas, 2003, p. 404).

The term "wellbeing" or "subjective wellbeing" is often incorrectly used interchangeably with QOL in everyday life (Haas, 1999, p. 217). It should be noted that wellbeing fails to consider objective components of quality of life, which are considered to be critical in effective evaluation (Haas, 1999, p. 217).

Satisfaction with Life

Satisfaction with life is purely a subjective measure, and is one component in the evaluation of wellbeing. Thus, satisfaction should also be considered one attribute of QOL (Haas, 1999, p. 218). Satorius (1987) specifically defines satisfaction as "the achievement of a goal or the sense of approaching it" (p. 19).

Livability

In simple terms, livability is the degree to which the provisions and requirements of a given environment fit the needs and capacities of its citizens (Veenhoven, 1996, p. 8). Hence, livability is often defined as an objective component of quality of life that can be measured using objective indicators and secondary data (Myers, 1988, p. 353). Veenhoven (1996) acknowledges that it is obvious any society must provide basic needs such as 'food' and 'shelter' [livability measures] however, subjective bio-psychological

needs such as a sense of 'security', 'identity' and 'meaning' are also important (p. 8). Overall, QOL is an important measure of the livability of many locations, however, the reverse is not necessarily true (i.e., livability is an important measure of QOL)(Epley & Menon, 2008, p. 284; Diener, Oishi, and Lucas, 2003, p. 417).

With respect to U.S. Green Building Council's statement declaring LEED-ND projects examples of "sustainable development," it should be noted that livability is not necessarily synonymous with sustainability. Livability commonly focuses on conditions within a specific area or region, whereas sustainability may be very large in scale (Howley, Scott, and Redmond, 2009, p. 850).

2.2.3 QUALITY OF LIFE APPROACHES

There are multiple approaches for the evaluation of quality of life, many of which are more or less effective depending upon scale; culture; and a given society's/individual's values, aspirations, and expectations. The most common approaches include (Felce & Perry 1995, p. 54; Borthwick-Duffy, 1992):

1. QOL defined as the quality of one's life conditions (i.e., objective);
2. QOL defined as one's wellbeing, or satisfaction with life conditions (i.e., subjective);
3. QOL defined as a combination of both life conditions and wellbeing, or satisfaction, with life conditions (i.e., combination of objective and subjective or multidimensional); and,
4. QOL defined by a single monetary measure (i.e., economic).

The following analysis will examine the main components and elements that comprise each of these four approaches.

Objective Approach

The Objective Approach (i.e., Social Indicators Approach) to evaluating QOL entails summing a variety of objectively measurable life conditions (indicators) experienced by an individual or a society. These objective factors are related to either physical or material aspects of quality and are commonly divided into two sub-classifications—those related to consumption and others related to available resources (Epley & Menon, 2007, p. 282). The approach attempts to assess the individual's level of living in a way that considers the individual's evaluation of his or her own situation as little as possible (Grasso & Canova, 2008, p. 3). An individual or society's quality of life can then be further examined by comparing their position to a similarly measured entity. Objective domains mainly focus on societal and economic living conditions such as crime rates, pollution levels, and housing costs, however, physical health, personal circumstances (e.g., wealth, living conditions, etc.), social relationships, and functional activities / pursuits may also be examined (Grasso & Canova, 2008, p. 3; Felce & Perry, 1995, p. 54; Mccrea, Stimson, and Western, 2005, p. 123).

Many social researchers who support this approach argue its validity with the claim that no citizen has the right to satisfaction with life, but only the right to life and equality of opportunity (Felce & Perry, 1995, p. 54). Grasso and Canova (2008) claim that the objective approach to measuring quality of life should be used when its results will impact policy-making. The authors claim that the goals of policy-making should be expressed based upon factual elements, and not in terms of an individual's capability to

achieve their “life projects.” Thus, the government should make basic liberties, rights, goods and services available to citizens, which will allow them to pursue their own ends (p. 4).

Subjective Approach

The subjective approach evaluates quality of life by measuring an individual’s subjective response to life conditions, or subjective wellbeing (SWB). This evaluation can include an individual’s emotional reaction to events, their moods, and judgments they form (i.e., emotional component) about their life satisfaction, fulfillment, and satisfaction with specific domains such as personal relationships and work (i.e., cognitive component) (Diener, Oishi, and Lucas, 2003, p. 405). QOL is most commonly evaluated by measuring the cognitive component of SWB with life satisfaction surveys and satisfaction levels of various different life domains.

Satisfaction with specific life domains has been shown to contribute to overall life satisfaction and should not be considered less ‘scientific’ than economic or objective approaches (Veenhoven, 1996; Sirgy et al., 2002; Mccrea, Stimson, and Western, 2005, p. 123; Grasso & Canova, 2008, pp. 2-3; Epley & Menon, 2007, p. 282; Diener, Oishi, and Lucas, 2003, p. 405). A specific study did show the degree to which people reported fulfilling the specific domains (i.e., autonomy, growth, relationships, purpose in life, environmental mastery, and self-acceptance) was correlated with their reported life satisfaction (Diener, Oishi, and Lucas, 2003, p. 405).

Broadly speaking, SWB concerns the study of what many people commonly call happiness, satisfaction, or attainment of the “good life.” A definition of the “good life”

has been debated for centuries; yet one conclusion that has consistently emerged is that the “good life” is marked by overall happiness (although there are many definitions of “happy”). Diener, Oishi, and Lucas (2003) consider positive SWB to be one necessary component of the “good life” and “good society,” yet make clear that SWB itself is not totally sufficient (pp. 405-407). For instance, a person or society that has a highly evaluated SWB might have some essential ingredients to a high quality of life entirely absent (e.g., fairness) (Diener, Oishi, and Lucas, 2003).

Many social researchers have criticized the sole use of subjective indicators as a way to measure quality of life (Felce & Perry 1995, p. 54). The majority of these critics claim that subjective reports of wellbeing may be measuring internal dispositions more than the external conditions associated with quality of life. Additionally, significant life events may vary the results of reported wellbeing (Edgerton, 1990; Felce & Perry 1995, p. 55). Most importantly, critics note that the individual’s subjective response is not an expression of preference under the conditions of free choice, unconstrained opportunity, equality of expectation, and a standard comparative frame of reference. For example, similar living conditions can, and have been, evaluated very differently – certain individuals living in bad conditions report being satisfied, while people who are privileged have reported being very dissatisfied (Christoph & Noll, 2003, p. 521). Thus, QOL defined as synonymous with personal satisfaction can encounter significant problems in measurement (Felce & Perry 1995, pp. 56-57; Grasso & Canova, 2008, pp. 2-3; Diener, Oishi, and Lucas, 2003).

Multi-Dimensional Approach

The Multi-Dimensional Approach to evaluating quality of life uses both objective and subjective indicators, thus combines the important aspects of life conditions and satisfaction into one cohesive evaluation tool (Felce & Perry, 1995, p. 54; Borthwick-Duffy, 1992; Haas, 1999, p. 216; Cummins, 1992). Many social researchers argue that the multi-dimensional approach has a greater potential to accurately depict an individual or society's quality of life; however, objective indicators should be considered supplementary to the more important subjective indicators (Haas, 1999, p. 216; Felce & Perry, 1995, pp. 57-58; Christoph & Noll, 2003, p. 521). Thus, the individual's personal autonomy to either maintain or modify their quality of life is the principle consideration (Felce & Perry, 1995, pp. 54-55).

Economic Approach

The Economic Approach uses a single monetary measure (such as per capita income) to evaluate quality of life. Various studies have, in fact, shown that per capita income is highly correlated to quality of life, which has consequently lead some researchers, government officials, etc. to make it a proxy for QOL (Grasso & Canova, 2008, p. 22; Epley & Menon, 2008,); however, ever since research in the 1960s first incorporated this approach as a way to evaluate quality of life it has been criticized for being too confining (Epley & Menon, 2008, p. 282; Grasso & Canova, 2008, p. 2). Grasso & Canova (2008) state that income should be regarded as a means to achieve an acceptable standard of living, rather than an end in itself. The economic approach does not encompass important quality of life dimensions such as health, education, social bonds, longevity, employment, environmental conditions, safety, and civil and political

freedoms. Furthermore, this income-based approach does not take into account the diversity among human beings (Grasso & Canova, 2008, p. 22).

2.2.4 METHODOLOGY AND METHODS USED FOR QUALITY OF LIFE EVALUATION

Each of the four aforementioned approaches to evaluating quality of life have been measured in various manners. Table 2, originally compiled by Myers (1988) and subsequently modified with current research, depicts how each approach (i.e., subjective, objective, multi-dimensional, and economic) are most commonly measured, the statistical means used in their analysis, how they have been used in the past, and what the main implications are associated with each. This will be followed by a more in-depth discussion of the methodology and methods used within the most current quality of life research in the realm of each approach.

Table 2: Attributes Associated with QOL Approaches					
Approach	Origin	Measurement	Statistical Means	In past has directed attention to	Political and economic implications
Objective (Livability Comparison)	Journalism, geography, other	Shared, objective characteristics of communities using secondary data	Additive combinations of objective indicators using weights supplied by researcher judgment	Which places are 'better' or 'worse'	Has aided competition for relocating firms/workers
Subjective (Personal Wellbeing)	Sociology and psychology	Determinants of life satisfaction based on personal interviews or surveys	Regression models estimating weighted contribution to self-evaluations of different life domains to overall satisfaction	Personal characteristics and private life	Local government cannot help much
Multi-dimensional (Combination of livability comparison and personal wellbeing)	Has been recommended for urban planners	Local trends in components of quality of life using secondary data and personal interviews/surveys	Objective indicator profile of changing community character and subjective citizen assessment of each separate factor	Which factors are growing better or worse – emphasis on the future and citizen priorities	Highlights local problems and goals related to development process
Economic (Wage Differential)	Economics	Disamenity compensation using secondary data	Regression Models estimating weighted contribution of objective amenities to wage differentials between places	Which places must pay higher wages	Indicates lower/higher cost of doing business
<i>Source: Myers 1988; Massam, 2002</i>					

Objective Operationalization

Operationalization of the objective approach to measuring quality of life entails utilizing a list of relevant dimensions that are associated with specific objective indicators. Often times there is considerable overlap among researchers on relevant domains for assessment (Felce & Perry, 1995, p. 60). These objective domains measure concrete examples of the built environment, natural environment, economy, and social dimensions. For example, the crime domain might examine an indicator that evaluates the number of burglaries in an area (Massam, 2002, p. 267). These indicators are most often determined with secondary data. Often times, an importance weight will be assigned to each of these indicators, followed by dimension quantification and calculation of a sum that will signify the area's overall QOL (Epley & Menon, 2008, p. 284).

Domain and Indicator Selection

Grasso & Canova (2008) use the objective approach (or as they call it, the social indicator approach) to measure the quality of life between nations in the European Union.

The domains examined included:

1. Economic resources and consumers' conditions;
2. Employment and working conditions;
3. Education and access to schooling;
4. Health and access to medical care;
5. Family and social relations;
6. Housing and amenities;
7. Culture and recreation;
8. Security for life and property; and,

9. Political resources and participation.

Within these dimensions, 27 different indicators were identified. These include, but were not limited to, gross domestic product per capita, total employment rate, total public spending on education (as a percentage of GDP), incidence of tuberculosis, total major thefts recorded, control of corruption, percent of renewable electricity on gross electricity consumption, research and development expenditure, and recreation and culture expenditure (p. 9). In addition, Hancock et al. (1999) has outlined a variety of indicators, many of which can be measured objectively, in Table 3.

Table 3. Indicator Categories	
Sustainability	Education
Energy Use	Early Childhood Development
Water Consumption	Education / School Quality
Renewable Resource Consumption	Adult Literacy
Waste Production and Reduction	Lifelong Learning
Local Use	Governance
Ecosystem Health	Voluntarism / Association Life
Viability	Citizen Action
Air Quality	Human and Civil Rights
Water Quality	Voter Turnout
Toxics Production and Use	Perception of Government Leaders / Services
Soil Contamination	Healthy Public Policy
Livability	
Housing	Health Status
Density	Quality of Life
Community Safety and Security	Well-being
Transportation	Life Satisfaction
Walkability	Happiness
Green / Open Space	Mastery / Self-esteem / Coherence
Smoke-free Space	Disability / Morbidity
Noise Pollution	Stress / Anxiety
Conviviality	Other morbidity/disability measures
Family Safety and Security	Health Utility Index
Sense of Neighborhood	Mortality
Social Support Networks	Overall mortality rate
Charitable Donations	Infant mortality rate
Public Services	Suicide rate
Demographic	Prosperity

Equity	A Diverse Economy
Economic-disparity	Local Control
Housing Affordability	Employment / Unemployment
Discrimination and Exclusion	Quality of Employment
Access to Power	Traditional Economic Indicators
<i>Source: Hancock et al., 1999</i>	

Data Collection

In order to obtain appropriate information relative to each decided-upon indicator, secondary data is most often collected. Grasso & Canova (2008) attained secondary data from the World Bank – World Development Indicators, Eurostat, the World Bank, and the Organization for Economic Co-Operation and Development (OECD).

Statistical Analysis

Grasso & Canova (2008) measured quality of life by calculating specific “factor loadings” associated with each indicator. These “factor loadings” confirmed the reliability of indicator choice – those that had the expected positive sign when they were supposed to contributed positively to the quality of life and have, while those with a negative sign were expected to have a negatively affect. QOL was measured by weighting the specific indicators selected, which, in turn, formed a QOL index. This index was then ordered from the lowest values of QOL to the highest (p. 15).

Subjective Operationalization

The subjective approach to evaluating quality of life is similar to the objective approach in that domains and their associated indicators are initially identified. Unlike objective indicators, subjective indicators are evaluative statements of an individual’s sense of wellbeing or satisfaction with a certain aspect of life (Christoph & Noll, 2003, p. 523). Thus, while an objective indicator might measure the number of burglaries within a

certain area to obtain information associated with crime, the subjective indicator would measure residents' attitudes toward crime in the neighborhood. These subjective indicators require data derived from personal interviews and surveys (Massam, 2002, p. 267).

Domain and Indicator Selection

Overall life satisfaction is most often reflected by satisfaction with many different life domains; those domains deemed most important by the researcher should be used (Sirgy & Cornwell, 2002, p. 91; Felce & Perry, 1995, pp. 54-55; Christoph & Noll, 2003, pp. 521-540). Different subjective domains and indicators should be selected according to the research interest of the study being carried out. Thus, a set of specific domains and indicators that are appropriate for a quality of life study that will be related to neighborhoods may be completely different from a QOL study that will be related to health.

Most often, domains examined fall into the categories of physical, psychological, social, and spiritual dimensions (Haas, 1999, p. 219). Examples of these specific domains include material comforts, health, work, recreation, learning, creative expression, living situation, relations with family, social relations, leisure, finances, safety, religion, marriage, standard of living, housing, neighborhood interaction, transportation, crime, access, and education (Felce & Perry, 1995, pp. 54-55; Mccrea, Stimson, and Western, 2005, p. 132; Christoph & Noll, 2003, pp. 521-540).

Sirgy & Cornwell (2002) determined the specific domains to be used for their subjective quality of life analysis by conducting a pretest of 39 faculty and staff (asking

to rank the importance of thirty-four domains) and examining existing literature on the subject. Using this technique, twenty domains were deemed important enough to include within their study (p. 91). Furthermore, Cvitkovich and Wister (2001) established that weighting indicators, according to the subjective prioritization of the individual, improves the prediction of wellbeing compared to other models that only use objective measures and a single domain (p. 809). The researcher can also assign importance weights (Epley & Menon, 2008, p. 284). Similarly, Cvitkovich & Wister (2001) conducted a literature review to determine what domains would best describe person-environment interactions. Three domains, each with three sub-domains, were identified - a structural domain (composed of housing, neighborhood, and community subdomains); a social support domain (composed of family, friends, and neighbors; and a services domain (composed of home care, community agencies, and medical services) (p. 814).

Data Collection

Mccrea, Stimson, and Western (2005) were able to collect data regarding overall quality of life within the Brisbane-South East Queensland, Australia region with the use of a multi-domain survey (i.e., satisfaction with housing, neighborhood, employment situation, money available to them personally, time to do things, relationship with partner, relationship with children, independence or freedom, and life as a whole). The satisfaction measures used in the study were single item measures with a 5-point scale where '1' represented 'very dissatisfied' and '5' represented 'very satisfied.' The same 5-point scale was used to ask each individual to rate his or her overall quality of life, which was then used as a proxy satisfaction measure (pp. 131-133).

Cvitkovich & Wister (2001) used a scale ranging from 0 to 10 to measure the degree in which each indicator (associated with every identified sub-domain) met their survey participants' needs. A prioritization scheme was produced by having each participant rank these needs (sub-domains) according to importance for life satisfaction. These sub-domain scores are then weighted according to their priority and summed (p. 814).

Statistical Analysis

The majority of researchers using the subjective approach to measure quality of life analyze their data using regression models (i.e., coefficients of determination – R^2) (Christoph & Noll, 2003, pp. 521-540). General satisfaction is most commonly the dependent variable correlated with specific satisfaction domains (Christoph & Noll, 2003, p. 535).

Howley, Scott, and Redmond (2009) used a logistic regression model to determine how the perception of various neighborhood attributes and socio-economic variables influenced neighborhood satisfaction. This specific logistic regression model predicted the effect of various neighborhood attributes and socio-economic characteristics on the individuals' probability of being satisfied versus less satisfied with their neighborhood. The dependent variable was satisfaction and independent variables included various domain-specific indicators (p. 855).

The descriptive analysis conducted by Cvitkovich & Wister (2001) examined survey participants' characteristics relative to two transportation variables. A regression analyses was then carried out to examine the correlation between variables and to reveal

the contribution of variables in predicting variance in the dependent variable (life satisfaction). Finally, bivariate analysis was used to reveal any differences in prioritization of environmental needs relative to the transportation variables (p.814).

Multi-Dimensional Operationalization

The multi-dimensional approach to quality of life evaluation usually includes the measurement of the objective status of life domains and the individuals' satisfaction with them. Each individual surveyed is also often asked to rank the importance of each domain (Doi, Kii, and Nakanishi, 2008, p. 1101).

Domain and Indicator Selection

There is considerable overlap among researchers on relevant domains for assessment, thus many of the domains and indicators examined within the multi-dimensional approach are often examined within both the objective and the subjective approaches (Felce & Perry, 1995, p. 60).

In their evaluation of how environmental resources impact the living conditions of older adults in various European countries, Mollenkopf et al. (2004) provides empirical evidence on differing conditions in rural and urban areas and examines how these respective characteristics are reflected in older people's subjective evaluations (pp. 3-7). Their main research interest was to determine which predictor variables (apart from demographic, economic, and health) explain variance in general life satisfaction. The indicators used include aspects of immediate environment (housing and mobility); services, culture, and security in the living area; social environments; economic situation; and person-related factors such as health (See Table 4)(p. 4).

Table 4: Domains and Indicators Examined by Mollenkopf et al. (2004)	
<i>Domain</i>	<i>Indicator</i>
Sample Description	Number of participants
	Gender
	Age
	Education
Housing	Type
	Ownership
	Basic Housing Comforts
	Satisfaction with Housing
Mobility	Satisfaction with living area
	Car in Household
	Good Transport Options
	Satisfaction with Public Transport
Services	Satisfaction with Mobility
	Medical Amenities Available
	Services and Shops Available
	Number of Available Services
Culture	Satisfaction with Services
	Cultural Amenities Available
	Natural Environmental Conditions
	Performed Cultural Activities
Security	Performed Nature-related Activities
	Satisfaction With Leisure Possibilities
	Feeling Secure at Night
	Single Households
Social Environment	Number of Children
	Diversity of Social Network
	Most Important Confidant Less than 15 Minutes Away
	Proximity of Friends/Kinship
Economic Situation	Performed Social Activities
	Employment
	Income per Person
	Satisfaction with Financial Situation
Health	Activities of Daily Living
	Satisfaction with Health
Subjective QOL	Satisfaction with Life

In their description of a method to assemble cross-sectional indicators, Epley & Menon (2007) use the similar domains of crime, health, employment, education, and recreation to evaluate QOL (p. 290). In addition to the safety, economic opportunity, and

service/cultural opportunity domains already mentioned, Doi, Kii, and Nakanishi (2008) also include spatial amenity and environmental benignity (p. 1104).

Data Collection

The multi-dimensional approach most frequently uses both primary and secondary data for its analysis. Mollenkopf et al. (2004) uses both standardized questionnaires and available secondary data to provide empirical evidence on differing conditions in rural and urban areas and how these respective characteristics are reflected in older people's subjective evaluations (p. 3).

Statistical Analysis

Mollenkopf et al. (2004) uses multiple regression analysis for each of the distinct regions they studied. This method enabled the exploration of both objective conditions and their subjective evaluations that were then used to explain variance in general life satisfaction. Their first analysis examined the demographic, health, and objective environmental predictor variables, while their second analysis considered the variables together with appropriate domain specific evaluations. The study found that adding subjective evaluations to the regression model increased the explained variance substantially in all areas (by at least 15 percent and up to 48 percent), which indicates that objective facts alone do not suffice in explaining life satisfaction (p. 25).

Epley & Menon's (2007) cross-sectional indicator analysis requires the assignment of ranking scores to each of the chosen indicators. These scores are equal to the number of metro areas studied (e.g., the study of four metro areas would call for scores that range from one to a maximum of four). A group of people shall then examine each metro area under each indicator, and each area is given a score from high (e.g., 1) to

low (e.g., 4) and summed accordingly (must be reached by consensus). This consensus vote represents a consensus opinion as to the most preferred and the least preferred, at a specific moment in time. The score represents a relative opinion among the four metro areas. The highest ranking and most preferred “community quality of life” will have the minimum number of assigned points summed as indicated by the following equation (p. 290):

$$\text{Highest (Community QOL)}_z = \min \sum_{t=1}^z (\text{rs})_t$$

Z = most preferred metro area

t = Metro areas - number of metro areas used in the analysis (t = 1 to maximum z).

rs = Rank score - rank score reflecting the total points assigned to each indicator for each metro area

Economic Operationalization

The Economic Approach most commonly directly correlates a single monetary to quality of life. Thus, those nations with the highest gross domestic product (GDP) (measured at a national scale) or highest personal income (measured at the individual level) will have the highest quality of life (Grasso & Canova, 2008, p. 22; Epley & Menon, 2008).

2.2.5 CONCLUSION

The U.S. Green Building Council has claimed that living within a LEED-ND certified project will increase ones’ quality of life. After examining the existing quality of life literature, it becomes reasonable to question whether the USGBC’s claim is simply rhetoric used to increase the ranking systems’ profitability and desirability, or if it is actually grounded by a QOL analysis that is agreed upon by the majority of social

researchers. Currently, there is conflicting evidence on the merits of “smart growth” and similar projects with regard to quality of life (Massam, 2002, p. 257).

Chapter 3

Methodology

3.1 OVERVIEW

The relation between LEED-ND certified/certifiable neighborhoods and quality of life will be examined using a comparative case study methodology. The research process will entail selecting appropriate case study neighborhoods, determining feasible indicators, developing an instrument, developing a data collection protocol, and determining an appropriate method of data analysis.

3.2 METHOD

Case Study Selection

Four total case study neighborhoods located within southern California will be examined; two will exhibit characteristics that would elicit the highest LEED-ND certification possible (i.e., LEED-ND certified/certifiable case study), while the remaining two case studies will exhibit characteristics that would achieve the smallest amount of LEED-ND points possible (i.e., non-LEED-ND certifiable case study or suburban neighborhood). The LEED-ND certifiable/certified case studies will first be identified and then paired with a non-LEED-ND certifiable case study that will be located within the same jurisdiction and be similar demographically (see Figure 2). Special

attention will be given to ensure the case study neighborhoods chosen do not have significantly different household incomes, being that income is often used as a proxy of quality of life in coarse-grained analysis, and any significant variation could potentially skew the results (Grasso and Canova, 2007, p. 2).

Due to the fact that as of March 1, 2010 there have been no fully constructed, stage three certified LEED-ND pilot project neighborhoods in California, this study will not require the LEED-ND certifiable case studies to have achieved official certification through the USGBC. Rather, point attainment for these neighborhoods will be analyzed and determined with reference to the *LEED-ND Pilot Version Rating System*. Although the newest (and official) version of the rating system, *LEED 2009 for Neighborhood Development*, was launched April 29, 2010, an adequate number of fully constructed neighborhoods that would fulfill all of its prerequisites and attain the specified number of points for certification were not identified. This was largely due to the *LEED 2009 for Neighborhood Development* rating system requiring at least one certified green building on-site.

Figure 2: Schematic depicting how neighborhood case study comparison.

Potential LEED-ND Case Studies

Following review of sustainable neighborhood literature, a total of five Californian case study sites were analyzed for their conformance with LEED-ND prerequisites, total potential point attainment, and survey feasibility. These case study sites included Paseo Colorado in Pasadena, Santana Row in San Jose, City Heights Urban Village in San Diego, and Tassaforonga Village in Oakland California. A preliminary review of LEED-ND point attainment was examined for each of these sites, along with background information including number of units, monthly rents, land uses, location, and project completion dates (See Table 5 on page 39 for summary). Brief descriptions of the sites examined are included below.

Paseo Colorado, Pasadena

Paseo Colorado was completed in 2001 and is known as a three-square-block mixed-use “urban village” located in the downtown area of Pasadena, California. The project replaced Plaza Pasadena, a failed inward-oriented

indoor mall, which had occupied the site since 1980 (Hormann, 2009). Today Paseo Colorado is open-air mix of retail space,

restaurants, entertainment uses, and housing, with specific uses including a grocery store, cinema, health spa, fitness center, and 393 rental units (see Figure 3). It is also notable that the project is situated within a half mile of two light-rail stations along the Los

Figure 3: Paseo Colorado in Pasadena, California. JP Hotels (2010). Retrieved 3 June 2010 from <http://jp.hotels.com/3/hotelimages/s/076000/076509A.jpg>

Angeles Metropolitan Transportation Authority's Gold Line (Urban Land Institute, 2002).

Santana Row, San Jose

Santana Row is a mixed-use project consisting of retail stores, restaurants, residential units, and a hotel in San Jose, California (see Figure 4). The project opened in 2006 following remediation (the project site was a former greyfield) and construction at the intersection of Stevens Creek and Winchester Boulevards. Santana Row includes 514 residential units, over 70 retail stores, and approximately 65,000 square feet of office space.

Figure 4: Santana Row in San Jose, California. Santana Row (2010). Retrieved 3 June 2010 from http://www.santanarow.com/images/uploads/contact_main.jpg

Certification is currently pending on a LEED-Core and Shell office building located on-site (Santana Row, 2010 and Urban Land Institute, 2004).

City Heights Urban Village, San Diego

City Heights Urban Village is an eight-square-block mixed-use redevelopment project in the Mid-City area of San Diego that was completed in 2008 (see Figure 5). The project transformed an area containing a multitude of rundown houses and businesses into a vital, walkable community center consisting of a police substation,

Figure 5: City Heights Urban Village in San Diego, California. MC-Architects (2010). Retrieved 3 June 2010 from http://www.mc-architects.com/City_Heights_Urban_Village.html#

community center, retail center, library, recreation center, a Head Start children's center, elementary school, office building, and residential townhouses. The "village" provides

retail, recreational, and community services for this lower-income community with many immigrants (Urban Land Institute, 2008).

Tassafaronga Village, Oakland

Tassafaronga Village is a LEED-ND Gold Stage 2 certified neighborhood located in the southern end of Oakland (under the *LEED-ND Pilot Rating System*). This project was completed in April 2010 and consists of affordable apartments, townhomes, a large public plaza, medical clinic, and open spaces on a total of 7.5 acres (see Figure 6). In addition to LEED-ND certified plans, all buildings were designed to achieve LEED for Homes Platinum certification (currently registered).

Figure 6: Tassafaronga Village in Oakland, California. DB Architects (2010). Retrieved 3 June 2010 from http://www.dbarchitect.com/project_detail/2/Tassafaronga%20Village.html

Depot Walk, City of Orange

Depot Walk is a LEED-ND Certified Stage 2 neighborhood located in the City of Orange (under the *LEED-ND Pilot Rating System*). This project was completed in 2007 and consists of 30 townhomes and two live-work units on a total of 1.82 acres (see Figure 7). In addition to LEED-ND certified plans, all buildings have achieved LEED for Homes Silver certification.

Figure 7: Depot Walk in Orange, California. Olson Homes (2010). Retrieved 3 June 2010 from <http://olsonhomes.com/find/community/greenLeed/greenLeed.aspx?codeTitle=depotwalk#>

<i>Table 5: Potential Case Study Sites</i>					
	Paseo Colorado	Santana Row	City Heights Urban Village	Depot Walk	Tassaforong Village
Location	Pasadena, CA	San Jose, CA	San Diego, CA	Orange, CA	Oakland, CA
Address	280 E Colorado Blvd Pasadena, CA 91101	Stevens Creek and Winchester Blvds. San Jose, CA 95128	4380 Landis Street San Diego, CA	561 West Maple Ave. Orange, California 92868	968 81st St Oakland, CA 94606
Project Type	Mixed-Use	Mixed-Use (built on greyfield site); LEED silver building on-site	Mixed-Use	Residential	Mixed Income Housing Development
Land Uses	Residential, commercial, office	Residential, commercial, hotel	Commercial, residential, community facilities	Residential	Residential, Medical Clinic
Site Size	10.9 acres	42 acres	37.6 acres	1.82 acres	7.5 acres
Office Space (Square Feet)	--	65,000 sf	117,700 sf	--	--
Retail Space (Square Feet)	565, 972 sf	680,000 sf (70 retail stores)	108,900 sf	--	--
Residential Units	387	514	116 (91 affordable units)	32	179 (60 affordable apartments, 77 affordable townhomes in 13 buildings, 20 unit affordable apartment building, 22 for sale townhomes)
Rent vs. Owned	All Rental	295 rented / 219 owned	All rental	All Owned	157 rental / 22 owned
Monthly Rent per unit (current): Studio 1-Bedroom 2-Bedroom 3-Bedroom 4-Bedroom	\$1540 \$1505 \$2205 -- --	-- \$2,177 \$2,871 \$4625 --	-- -- 6 units 79 units 6 units	\$475,000 - \$550,000	Affordable
Date Completed	2001	2006	2008	2007	April 2010
Notes				LEED ND Certified – Stage 2	LEED ND Gold – Stage 2

Operationalization of Terms

All of the quality of life indicators identified in Mollenkopf et al. 2004 and Hancock et al., 1999 were initially analyzed to be studied within each case study neighborhood. This included 17 distinct domains, which include livability, conviviality, equity, prosperity, governance, subjective quality of life, disability/morbidity, sample description, housing, mobility, services, culture, security, social environment, economic situation, health, and sustainability. Exactly 76 specific indicators that correspond to these domains could potentially be discovered using either primary or secondary data sources.

The quality of life indicators selected to evaluate the four case study neighborhoods were chosen on the basis of being both accessible within the study's timeframe and relevant to the neighborhood scale. Therefore, the 76 above-mentioned indicators were filtered based upon study objectives and accessibility within the study's allotted time period. Although a mortality domain was identified in Hancock et al., 1999 (with specific indicators including overall mortality rate, infant mortality rate, and suicide rate), these indicators were not included within this specific study. This determination was made due to the fact that the LEED-ND certifiable case studies examined are relatively new constructions (built prior to 2000), thus the long timeframe (several decades) needed to measure mortality is not possible within the identified study areas. In addition, mortality is most commonly measured on a large scale (i.e., nationally), making the collection of accurate data at the neighborhood scale that is required for the study infeasible.

Hancock et al., 1999 also identified viability as a domain related to quality of life, with specific indicators including air quality, water quality, toxics production/use, soil contamination, and overall ecosystem health. Every one of these indicators requires measurement at the regional scale; for example, the measurement of the air quality within a three-block neighborhood would be more affected by its regional surroundings than the neighborhood itself. Therefore, these indicators will not be examined objectively within the case study neighborhoods because they exceed the appropriate scale of the study. In order to reduce the amount of time needed to complete the survey, and thus increase the total response rate, the total number of indicators used to measure each domain were then reduced to a total of 43 (see Table 6).

Table 6: Indicator Analysis	
<i>Domain</i>	<i>Indicator</i>
Sense of Community	I am interested in what goes on within my community.
	I feel like I belong within my community.
	I agree with the values and beliefs held by the majority of people within my community.
	I feel my voice is heard when I want changes within my community
Housing	I am satisfied with the housing conditions I currently reside within.
	I am satisfied with the living area within my personal household.
	The housing within my neighborhood is affordable.
Prosperity	I am satisfied with the economic value of my home.
	I am satisfied with the socio-economic status of my neighborhood.
	I am satisfied with the improvement efforts in my neighborhood.
	I am satisfied with the availability of job opportunities within my neighborhood.
	The job I have is stable and secure.
	I work in a safe environment.
	I have a good balance of work and non-working life.
	I am satisfied with the number of hours I work each week.
Health	I am satisfied with the income and benefits offered by my employer.
	I do not feel stressed / anxious often.
	I am satisfied with my personal health.
Mobility	I own or have easy access to a car.
	There are many transportation options near my neighborhood.
	There is a lot of vehicular traffic in and adjacent to my neighborhood.
	I regularly use the bicycle paths/lanes/routes near my neighborhood.

	I use the public transportation systems near my neighborhood often.
	I am satisfied with the public transportation options within my neighborhood.
Services	There are medical amenities that are accessible to my neighborhood.
	There are many shops/services within ½ mile radius of my neighborhood.
	I am satisfied with the number of services located within ½ mile radius of my neighborhood.
	I am satisfied with the number of different services located within ½ mile radius of my neighborhood.
	I am satisfied with the number of recreational possibilities within ½ mile radius of my neighborhood.
Culture	I regularly participate in recreational activities (e.g., art tours, hiking, biking, farmers markets, concerts, etc.)
Security	My family and I feel completely safe within the neighborhood we live within.
	I feel safe within my neighborhood at home during the day.
	I feel safe on my neighborhood block at home during the day.
Sustainability	I actively try to reduce the amount of air pollution I emit (from vehicle use, electricity use, etc.)
	I actively try to use energy that is produced from renewable resources.
	I actively try to reduce the amount of fresh water I use.
	I actively try to reduce the amount of waste I produce.
	I actively try to buy local products / produce.
	I actively try to recycle.
Subjective Wellbeing	I am satisfied with my life.
	I have high self-esteem.

Instrument Design

A self-administered survey was developed and distributed via first class mail to all residents living within the boundaries of the selected case studies. This survey addressed all subjective indicators identified within Table 6. Value judgments (i.e., importance) were incorporated to all applicable questions within the survey in order to standardize the respondent's frame of reference. For example, the survey might ask to rank satisfaction with public transportation *and* to rank the importance of public transportation to their overall satisfaction with life.

The survey was split into seven distinct sections – demographic information, environment, community, housing, employment, personal, and open-ended questions. All questions (besides the four open-ended questions) asked the respondent to identify their agreement with each statement, and how important the statement was to them on a five-point Likert scale. Thus, the agreement section ranged from strongly disagree to strongly agree (i.e., strongly disagree, disagree, neutral, agree, strongly agree), while the importance section ranged from not important at all to very important (i.e., not important at all, unimportant, doesn't matter, important, very important). A total of 52 questions were asked, as identified in Table 7.

Table 7: Survey Instrument Sections		
<i>Section</i>	<i>Number of Questions</i>	<i>Indicators Covered</i>
Demographic	6	Sample Description, Sense of Community
Environment	13	Mobility, Services, Security
Community	6	Sense of Community, Prosperity
Housing	4	Housing, Prosperity
Employment	7	Prosperity
Personal	12	Mobility, Cultural, Sustainability, Health, Subjective Well-being
Open-ended	4	NA
Total	52 Questions	All identified indicators covered

Data Collection Protocol

A total of 859 “survey packets” were sent out to the four different case study neighborhoods on March 17, 2010. These “survey packets” consisted of the survey instrument itself (See Appendix B), a pre-stamped self-addressed return envelope, a personal letter to the respondent (See Appendix A), and the generic letter of consent

formed by Cal Poly's human subjects committee (See Appendix C). The letters to the respondent (personal and generic) briefly explained the purpose of the study, expected survey length time, verified the survey was voluntary, explained that any items on the questionnaire could be omitted, and verified that the survey was completely anonymous. All surveys returned between March 17, 2010 and April 28, 2010 were processed within the results section.

Chapter 4

Selected Case Studies

A total of four case studies were examined – two LEED-ND certifiable neighborhoods and two suburban neighborhoods. One of each neighborhood type was examined within the City of Pasadena, California and the City of Orange, California.

CITY OF ORANGE CASE STUDIES

Due to the fact that Depot Walk was the only fully constructed LEED-ND certified neighborhood (stage two) within California at the commencement of this study, it was chosen as a case study site. Because Depot Walk is located within the City of Orange, a suburban neighborhood with similar housing prices that was also located within the City of Orange was selected. The locations of these two case studies are depicted in Figure 8.

Figure 8: Location of case study neighborhoods within Orange, California. Google Maps (2010), modified by author 3 June 2010.

LEED-ND CERTIFIED CASE STUDY: DEPOT WALK

Depot Walk is both a LEED-ND (stage two) and LEED for Homes (silver) certified neighborhood. This neighborhood opened in September 2007, and consists of 30 brownstone “loft-style” townhomes and two live-work units, all of which range from 1,277 square feet to 2,010 square feet. Each residential and live/work unit boasts a two-car garage, private decks, and contemporary design. Furthermore, the neighborhood received the 2008 Builder’s Choice Award for the country’s best green/sustainable community. In total, the project attained 41 of the 106 possible LEED-ND “credits” (See Appendix D).

Location

Depot Walk was constructed on a previously developed infill site that is located approximately two blocks from Old Town Orange and one block from the Metrolink

Station. This location provides residents with an opportunity to walk to work, school, and/or a variety of different services. None of the development occurred on slopes greater than 15 percent in order to minimize erosion and protect habitat.

Linkage

Depot Walk is located less than 1.5 miles from Interstate 5, U.S. Route 55, and U.S. Route 22. Vehicular transportation problems do occur on these routes (with an emphasis on Interstate 5) due to the inadequate capacity of the existing freeway system to serve peak period travel demands. This, in turn, has led to severe congestion and low travel speeds during peak travel times (i.e., 7-9am and 4-6pm on weekdays) (City of Orange, 2010).

The eastern property line of Depot Walk is approximately 150 feet from the City of Orange's Metrolink/Amtrak Station and the Orange County Transportation Authority (OCTA) Transit Center. In addition to these transit facilities, there are two bus stops located within ¼ mile of the site, and 17 bus transit stops located within ½ mile of the site.

Although the site is located close to an array of different public transportation options, it should be noted that there is a significant lack of bicycle facilities located near the Depot Walk site. There are no existing bikeways located ½ mile from the project site; however, proposed class three (on-street) bicycle routes are proposed to surround the site in the future. See Figure 9. A total of 14 credits (out of a 30 credits possible) were attained within the Smart Location and Linkage category.

Figure 9: Location of Depot Walk with relation to transportation opportunities. City of Orange (2010) modified by author 3 June 2010.

Neighborhood Pattern and Design

Depot Walk consists of 32 units on approximately 1.82 acres; thus, the project's density is 17.6 dwelling units per acre of buildable land. Vehicular parking for these units is provided by means of private garages and lots that are located at the rear of the buildings, leaving the building frontages and streetscapes free of surface parking lots. This design has been said to increase the pedestrian orientation to the project.

Depot Walk's location adjacent to Old Towne Orange provides residents with an opportunity to walk to a variety of different services including shops, galleries,

restaurants, drugstores, and bars (See Figure 10). Utilizing Google Earth Pro, an approximate number of services located within ½ mile of the project site were identified (See Figure 11). Examples of these services can be found in Table 8. A total of eight credits (out of a possible 39 credits) were attained within the Neighborhood Pattern and Design category.

Figure 10 (top): Services near Depot Walk. Olsen (2010), further modified by author on 3 June 2010.

Figure 11: Services within ½ mile radius of Depot Walk. Olson Homes (2010), further modified by author on 3 June 2010.

Table 8: Depot Walk Services		
Service	Number	Examples
Grocery / Convenience Store	7	Hoov's Liquor; Eagle Health Supplies
Restaurant	19	Cast n' Cleaver Restaurant; Taco Adobe
Movie Rental	1	AM/PM Video
Automobile Repair / Gasoline	4	Mitchell's Auto Service; Chapman Car Care
Bank	4	Wells Fargo; Citizen's Business Bank
Church	7	Plaza Bible Church; Orange Fuente de Salvacion
Bar / Lounge	5	District Lounge; Paul's Cocktails
Park	4	Plaza Square Park; Santa Fe Depot Park
Café / Coffee Shop	4	Tokyo Café; Diedrich Coffee
School	8	Wilkinson College of Letters; Chapman University: Law
Total	63	

Green Infrastructure and Buildings

As mentioned above, every building within the Depot Walk project is LEED for Homes Silver Certified. These buildings have attained Green Infrastructure and Buildings credits for energy efficiency, stormwater management, solar orientation, energy generation, construction waste management, comprehensive waste management, light pollution reduction, and minimum site disturbance through site design & construction. Fifteen total credits (out of 31 possible credits) were attained within this LEED-ND category.

ORANGE SUBURBAN CASE STUDY

The Orange suburban case study consists of 102 single-family residential homes that are adjacent to El Modeno Open Space in the City of Orange (see Figure 12). In total, the project attained 3 of the 106 possible LEED-ND “credits” (See Appendix E).

Figure 12: Suburban case study site in Orange, California. Bing Maps (2010), further modified by author on 3 June 2010.

Location

The Orange suburb neighborhood does not meet the smart location prerequisite due to the fact the neighborhood is not located on a previously developed infill site *and* none of the residences are located within ¼ mile of a bus stop. The neighborhood lacks overall walkability because there are also no services (except recreational amenities) within ¼ mile of any of the neighborhood households. There are, however, two schools (i.e., Santiago Middle School and Turville School of Photography) within ½ mile of the

neighborhood. Portions of the developed area also occur on slopes greater than 15 percent, which could increase the likelihood of erosion.

Linkage

The Orange suburb is located less than five miles from Interstate 5, U.S. Route 241, U.S. Route 55, and U.S. Route 261. The portions of these routes near the suburban neighborhood have the same vehicular transportation problems mentioned above in the Depot Walk description – there is inadequate capacity of the existing freeway system to serve peak period travel demands, which has led to severe congestion and low travel speeds during peak travel times (i.e., 7-9am and 4-6pm on weekdays) (City of Orange, 2010). It should also be mentioned that the outlined neighborhood is composed of eight cul-de-sacs, which can reduce ease of mobility and access.

There are no bus, bus rapid transit, or light rail stops located within ¼ mile of any of the residences within the suburban neighborhood. Within ½ mile southeast of the site, however, there are three bus stops located on East Chapman Avenue.

Although the Orange suburban neighborhood is located adjacent to an existing Class I bicycle path and multiple recreational trails, there is not a complete bicycle network that leads to multiple services. See Figure 13. One credit (out of 31 possible credits) was attained within the “Location and Linkage” LEED-ND category.

Figure 13: Location of suburban case study with relation to transportation opportunities. City of Orange (2010) modified by author 3 June 2010.

Neighborhood Pattern and Design

The Orange suburban case study site consists of 102 single-family residential units on approximately 19.25 acres; thus, the neighborhood's density is 5.3 dwelling units per acre. This density would not meet the requisite 7 dwelling units per acre density outlined in Neighborhood Pattern and Design Prerequisite 2: Compact Development. As mentioned above, each of these residences is located on one of eight cul-de-sacs. Vehicular parking for the units is provided by means of private garages/driveways and on-street parking in the front of each residence. Recreational trails are also located in green areas between some of the residential units.

The suburban neighborhood does provide adequate recreational opportunities through ample hiking & biking trails/paths and public soccer/baseball fields; however, it is clear that a vehicle is needed to reach services such as grocery stores, restaurants, and

bars/lounges. As with Depot Walk, Google Earth Pro was used to identify an approximate number of services located within ½ mile of the project site. Examples of these services can be found in Table 9. A total of two credits (out of a possible 39 credits) were attained within the Neighborhood Pattern and Design category.

Table 9: Orange Suburban Services		
Service	Number	Examples
Grocery / Convenience Store	0	--
Restaurant	0	--
Movie Rental	0	--
Automobile Repair / Gasoline	0	--
Bank	0	--
Church	0	--
Bar / Lounge	0	--
Park	1	El Modeno Open Space
Café / Coffee Shop	0	--
School	2	Santiago Middle School; Turville School of Photography
Total	3	

Green Infrastructure and Buildings

None of the homes within this neighborhood are LEED for Homes certified. There was no information found regarding green building / infrastructure of these residences; thus, it was assumed that these points would not be applicable. One credit (out of 31 possible credits) was attained within this LEED-ND category.

PASADENA CASE STUDIES

Although not currently LEED-ND certified, Paseo Colorado in Pasadena, California was identified as an existing, fully constructed neighborhood that would attain a high number of LEED-ND credits. As such, this neighborhood was chosen as a case study, as was a suburban neighborhood located in Pasadena that exhibited a similar housing cost to Paseo Colorado.

PASEO COLORADO

Location

Paseo Colorado was constructed on a previously developed infill site that is located in the downtown area of the City. As with Depot Walk, the location of this neighborhood provides residents with an opportunity to walk to work, school, and/or a variety of different services. Furthermore, none of the development occurred on slopes greater than 15 percent in order to minimize erosion.

Linkage

Paseo Colorado is located less than ½ mile from Interstate 210, U.S. Route 134, and U.S. Route 110. Moderate vehicular congestion frequently occurs during weekday peak periods on all three of these roadways. In addition, congestion on East Colorado Boulevard and North Fair Oaks Avenue is common at peak and non-peak periods. It should be noted, however, that the City of Pasadena's guiding principle (outlined within its 2004 Mobility Element of the General Plan) seeks to establish "a community where people can circulate without cars" (City of Pasadena, 2004, p. 1).

The western property line of Paseo Colorado is less than ½ mile from two light rail stops (Del Mar Station and Memorial Park Station). Specifically, this light rail, the Metro Gold Line, spans 13.7 miles from Union Station in Downtown Los Angeles to Sierra Madre Villa in East Pasadena (City of Pasadena, 2010). In addition to these transit facilities, there are 26 bus transit stops located within ¼ mile of the site's centroid, and 83 bus transit stops located within ½ mile of the site's centroid.

In addition to the neighborhood's location near an array of different public transportation options, there are also a limited number of bicycle facilities available to the

Paseo Colorado residents. Both enhanced bicycle routes and standard bicycle routes are located ½ mile from the project site, which could be used to reach a variety of different services and workplaces. See Figure 14. A total of 21 credits (out of a 30 credits possible) were attained within the Smart Location and Linkage category.

Figure 14: Location of Paseo Colorado with relation to transportation opportunities. City of Pasadena (2004) modified by author 3 June 2010.

Neighborhood Pattern and Design

Paseo Colorado consists of 393 residential units within the privately managed “Terraces Apartment Homes” and 557,323 square feet of retail space on approximately 10.9 acres. The project’s residential density is, therefore, 36 dwelling units per acre and has a Floor Area Ratio for retail space of 1.17. Vehicular parking for the residential units is provided by means of private subterranean parking, while two parking structures are utilized for retail visitors. Specifically, the Marengo Avenue parking structure is two levels (the second level has a connecting pedestrian bridge) and is located on the western edge of the site, while the two-level Los Robles Avenue parking structure (also with a connecting pedestrian bridge) is located on the southern edge of the site. Separating the cars from the people in this manner has been said to increase the pedestrian orientation to the project.

Paseo Colorado’s location provides residents with an opportunity to walk to a variety of different services including shops, a movie theatre, restaurants, pharmacies, gyms, and bars/lounges (see Figure 15). Utilizing Google Earth Pro and the Paseo Colorado retail website, approximately 167 different services were identified within ½ mile of the project site centroid. Examples of these services can be found in Table 10. A total of 23 credits (out of a possible 39 credits) were attained within the Neighborhood Pattern and Design category.

Figure 15: Paseo Colorado site map. Developers Diversified Realty (2010).

Table 10: Paseo Colorado Services within ½ Mile of Neighborhood Centroid		
Service	Number	Examples
Grocery / Convenience Store	4	Gelson's; AM/PM
Restaurant	64	Rubio's Fresh Mexican Grill; Yard House
Retail Store	52	Cole Hann; Forever 21; Macy's
Movie Cinema	1	ArcLight Cinemas
Automobile Repair / Gasoline	3	Mobil; Pasadena Shell
Bank	10	Bank of America; Bank of the West
Church	12	Friendship Baptist Church; St. Andrew's Church
Bar / Lounge	4	Geniza Cigar Lounge; Sheraton Hotel Bar
Fitness	3	Dahn Yoga; Equinox Fitness Center
Park	2	Central Park; Pasadena Memorial Park
Café / Coffee Shop	10	Starbucks; Leaforever Tea House
School	2	University of Phoenix Learning Center; Piedmont University
Total	167	

Green Infrastructure and Buildings

None of the buildings within this neighborhood are LEED certified. There was no information found regarding green building / infrastructure of these residences; thus, it was assumed that these points would not be applicable. One credit (out of 31 possible credits) was attained within this LEED-ND category.

PASADENA SUBURBAN CASE STUDY

Location

The Pasadena suburb neighborhood does not meet the LEED-ND smart location prerequisite due to the fact the neighborhood is not located on a previously developed infill site *and* none of the residences are located within ¼ mile of a bus stop. The neighborhood lacks overall walkability because there are also no services within ¼ mile of the neighborhood's centroid. There is, however, a grocery store, pharmacy, and a few restaurants within ½ mile of the neighborhood's centroid. Portions of the developed area also occur on slopes greater than 15 percent, which could increase the likelihood of erosion.

Linkage

The Pasadena suburb is located less than five miles from Interstate 210, U.S. Route 110, U.S. Route 2, and U.S. Route 134. Moderate vehicular congestion frequently occurs during weekday peak periods on all four of these roadways.

There are no bus, bus rapid transit, or light rail stops located within ¼ mile of any of the residences within the suburban neighborhood. Within ½ mile southeast of the site, however, there are 17 total bus stops located on Colorado Boulevard, North Avenue 64, and North Figueroa Street. San Rafael Elementary School is also located within ½ mile of

at least 50 percent of the residential units. There are not identified bicycle paths, lanes, or routes adjacent to any of the neighborhood’s residences (See Figure 16). One credit (out of 31 possible credits) was attained within the “Location and Linkage” LEED-ND category.

Figure 16: Location of Pasadena suburban case study with relation to transportation opportunities. City of Pasadena (2004) modified by author 3 June 2010.

Neighborhood Pattern and Design

The Pasadena suburban case study site consists of 332 single-family residential units on approximately 66 acres; thus, the neighborhood's density is approximately 5 dwelling units per acre. This density would not meet the requisite 7 dwelling units per acre density outlined in Neighborhood Pattern and Design Prerequisite 2: Compact Development. Each of these residences is located on a curvilinear street. As with the Orange suburban case study, vehicular parking for the units is provided by means of private garages/driveways and on-street parking in the front of each residence.

The large majority of the homes within the Pasadena suburban neighborhood require a vehicle to easily access to services such as grocery stores, restaurants, and bars/lounges. This is not only due to distance, but also because of the vehicle-oriented streets. As with the Orange suburban neighborhood, Google Earth Pro was used to identify an approximate number of services located within ½ mile of the project site. Examples of these services can be found in Table 11. No LEED-ND credits (out of a possible 39 credits) were attained within the Neighborhood Pattern and Design category.

Table 11: Pasadena Suburban Site - Services within ½ Mile of Neighborhood Centroid		
Service	Number	Examples
Grocery / Convenience Store	1	Vons
Restaurant	4	McDonalds; Stoney Point Bar and Grill
Movie Rental	0	--
Automobile Repair / Gasoline	1	Chevron
Bank	1	Chase
Church	2	Central Filipino Sda Church; Shambhala Meditation Center
Bar / Lounge	0	--
Park	2	Lanark Shelby Park; San Rafael Park
Pharmacy	1	CVS
Café / Coffee Shop	0	--
School	1	San Rafael Elementary School

Total	13	
-------	----	--

Green Infrastructure and Buildings

None of the buildings within this neighborhood are LEED certified. There was no information found regarding green building / infrastructure of these residences; thus, it was assumed that these points would not be applicable. No LEED-ND credits (out of 31 possible credits) were attained within this category.

Chapter 5

Findings

In order to determine if there is, in fact, a relationship between LEED-ND and quality of life, appropriate objective and subjective indicators were examined. The objective indicators are included to show the case study neighborhoods reality, while the subjective indicators are used to explain the residents' perception of the reality.

SAMPLE DESCRIPTION

In order to effectively analyze the primary and secondary data gathered, it is important to understand aspects of the residents' life that could be considered confounding variables. These factors include residents' age, income, home ownership, number of people living within their household, and education level. Due to the fact that all of these variables could not be controlled, it will be important to qualitatively analyze the statistical results of the study in order to avoid erroneous "false positive" conclusions for specific indicators.

LEED-ND CASE STUDIES

In total, 53 residents from LEED-ND and LEED-ND certifiable neighborhoods responded to the mailed survey. Approximately 87 percent of these respondents either lived by themselves (49 percent), or with one other person (38 percent). The average age

within the neighborhoods is 40.1 years, and approximately 89 percent of all respondents have attained a bachelor's degree or higher. The large majority of residents within these neighborhoods rented their residences opposed to owning (i.e., 87 percent and 11 percent, respectively). Average income per household was approximated as \$138,461 from specified range data. This approximation is conservative, being that 34 percent of respondents indicated that they earned over \$150,000; thus, average income could increase significantly depending upon how far over \$150,000 the respondent earned.

SUBURBAN CASE STUDIES

In total, 117 residents from suburban neighborhoods responded to the mailed survey. Approximately 64 percent of these respondents either lived by themselves (21 percent), or with one other person (43 percent). Approximately 16 percent of respondents indicated that three people lived within their household, while seven percent indicated that four people, four percent indicated that five people, and one percent indicated that six or more people living within their household. The average age within the neighborhoods is 54 years, and approximately 89 percent of all respondents have attained a bachelors degree or higher. The large majority of residents within these neighborhoods owned their residence opposed to renting (i.e., 93 percent and 5 percent, respectively). Average income per household was approximated as \$148,635 from specified range data. This approximation is also conservative, being that 29 percent of respondents indicated that they earned over \$150,000; thus, average income could increase significantly depending upon how far over \$150,000 the respondent makes.

OBJECTIVE DIMENSION

Because this analysis is carried out on a neighborhood scale (not a city, county, state, or national scale) the majority of objective indicators identified within the literature review used to examine quality of life would not be appropriate. For example, a commonly used objective indicator of health is number of instances of tuberculosis, which would not be appropriate at a small scale such as a neighborhood. Therefore, a large proportion of this study's analysis of quality of life will fall to the subjective component.

Objective indicators that would be appropriate to examine at the neighborhood scale include mobility, services, culture, and security (See Table 12). The objective indicators measuring sense of community, housing, health, prosperity, sustainability, and subjective wellbeing were not examined for the various reasons outlined within the methodology section of this study.

Table 12: Objective Indicator Measurement		
Domain	Indicator	Measurement
Mobility	Access to public transportation	Number of bus and rail stops within ½ mile from neighborhood centroid
	Access to bicycle networks and facilities	Presence of bicycle routes, lanes, and paths within ½ mile from neighborhood centroid
Services	Number of services within ½ mile	Approximate number of services within ½ mile from neighborhood centroid.
Security	Crime Rates	Incidents of theft, burglary, vandalism, disturbing the peace / public intoxication, forgery, drunk driving, and battery over a three month period.

MOBILITY

Mobility within both neighborhoods was measured objectively by examining the number of bus stops, rail stops, and total bicycle network mileage within ½ mile of each neighborhood centroid. Cumulatively, LEED-ND certified/certifiable neighborhoods

exhibited approximately 100 bus stops, 4 rail stops, and 2.98 miles of designated bicycle routes/lanes, while suburban neighborhoods exhibited approximately 20 bus stops, 0 rail stops, and .95 miles of bicycle path (See Table 13). From an objective standpoint it is clear that LEED-ND neighborhoods have far greater accessibility to transit by bus, rail, and cycling due to the significantly higher number of stops/mileage. It should be noted that vehicular mobility was measured within the subjective component of the analysis by determining the number of residents who owned or had easy access to a car.

Table 13: Objective Mobility Indicators					
	Bus Stops	Rail Stops	Bicycle Network (Mileage)		
			Route	Lane	Path
LEED-ND	100	4	1.29	1.69	0
Suburban	20	0	0	0	.95
<i>Google Earth, 2010</i>					

SERVICES

Similar to the objective measurement of mobility, the objective measurement of accessibility to services was determined by examining the total number of services within ½ mile of the neighborhood centroid. Cumulatively (City of Orange and Pasadena), the LEED-ND certified/certifiable neighborhoods totaled approximately 220 individual services, while suburban neighborhoods totaled approximately 16 individual services. Because LEED-ND certified/certifiable neighborhoods exhibit almost 14 times more individual services within ½ mile radius than suburban neighborhoods, objective evaluation would conclude that residents within these LEED-ND neighborhoods have greater access to services overall (see Table 14).

Table 14: Objective Services Indicators	
<i>LEED-ND</i>	<i>Suburban</i>
220	16
<i>Google Earth, 2010</i>	

SECURITY

Overall security within the case study neighborhoods was measured objectively by obtaining crime rates over a three-month period (between March 1, 2010 and May 31, 2010). Specifically, the number of incidents of crime within a ½ mile radius of the neighborhood centroid was determined. This neighborhood-specific information was obtained for both Pasadena case study sites; however, only citywide crime data were found for the City of Orange sites.

Overall, 66 separate incidents occurred within the specified time period ½ mile from the LEED-ND certified/certifiable neighborhood centroid, while only 12 incidents occurred within the suburban neighborhood over the same time period (See Table 15) (Omega Group, 2010). It should be noted that approximately 35 percent of the incidents reported within the LEED-ND certified/certifiable neighborhood were vehicular burglary, which is understandable being that there are two large parking structures located directly adjacent to the site. This data shows that concentrations of services and people also may concentrate the incidents of crime that may occur.

Table 15: Paseo Colorado Crime Incidents (March 1, 2010 to May 31, 2010)		
Incident	LEED-ND	Suburb
Grand Theft	3	2
Residential Burglary	2	3
Commercial Burglary	6	1
Unspecified Burglary	3	0
Vandalism	3	2
Vehicle Burglary	23	1
Disturbing the Peace / Public Intoxication	4	1
Forgery	2	0
Drunk Driving	8	0
Petty Theft	1	2
Battery	5	0
Total Incidents	66	12
<i>Omega Group, 2010</i>		

SUBJECTIVE DIMENSION

The subjective dimension of the neighborhood quality of life analysis was determined using a 52-question survey that was sent to all residents within the specified area of each case study site. This survey included indicator questions that addressed all quality of life domains – sense of community, prosperity, health, housing, mobility, access to services, culture, sustainability, and subjective wellbeing. A total of 393 surveys were sent to the Pasadena LEED-ND certified/certifiable neighborhood. Of these 393 surveys, 36 surveys were “returned to sender” (due to vacancy) and 46 were completed and mailed back for analysis. Exactly 32 surveys were sent to the City of Orange LEED-ND certified/certifiable neighborhood, with one survey that was “returned to sender” due to a vacancy. A total of seven surveys were completed and returned (See Table 16).

Furthermore, a total of 332 surveys were sent to the Pasadena suburban neighborhood. Of these 332 surveys, 6 surveys were “returned to sender” (due to vacancy) and 92 were completed and mailed back for analysis. While 102 surveys were

sent to the City of Orange suburban case study site, of which, two were “returned to sender” and 25 were returned for analysis (See Table 16).

Table 16: Subjective Analysis Survey Response Rates						
	LEED-ND			Suburban		
	Number Sent Out*	Number Received	Response Rate	Number Sent Out*	Number Received	Response Rate
City of Orange	31	7	23%	100	25	25%
Pasadena	357	46	13%	326	92	28%
Total	389	53	13.6%	426	117	27.5%
<i>*Excluding surveys “returned to sender” due to vacancies.</i>						

Following statistical analysis using the chi-square test of association, those indicators showing an association with neighborhood type (LEED-ND vs. suburban) will be further analyzed qualitatively by examining each respective contingency table. Specifically, the agreement or importance of any indicator with a calculated probability that exceeded a 95 percent chance of association was examined.

It was important to examine both agreement and importance contingency tables in order to understand the “haves” and “wants” of the residents surveyed. For example, a resident may state that they do not have bicycle paths near their home, but also indicate that they do not think having bicycle paths near their home is important. Thus, this resident’s quality of life would not be negatively impacted by not having this specified indicator that he/she does not want.

The following subjective analysis first examines both the City of Orange and Pasadena case study sites cumulatively. The analysis is then followed by an individual

site analysis of indicators that were found to have an association (either agreement or importance) and were not discussed within the cumulative analysis.

CUMULATIVE ANALYSIS

Sense of Community:

A total of four different indicators were examined to analyze the quality of life sense of community domain. The chi-square test of association determined that suburban residents felt that having their voice heard when they want changes within their community was more important than LEED-ND residents *and* suburban residents have lived within their house/apartment significantly longer than LEED-ND residents. Because the case study suburban residents have significantly higher ownership rates than the case study LEED-ND residents *and* the LEED-ND neighborhoods are much newer constructions than the suburban neighborhood, it was determined that these confounding variables elicited a determination that there is not a relationship between sense of community and neighborhood form. A more detailed analysis of each indicator is provided below.

I feel my voice is heard when I want changes within my community (Importance - .045)(Suburb)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with the importance to a resident that his/her voice is heard when he/she wants changes within the community. Specifically, 74 percent of suburban respondents felt that this indicator was important or very important, while only 51 percent of LEED-ND respondents felt similarly (See Figure 17). There was not an association, however, when agreement with this statement was examined. Thus, the majority of respondents within each neighborhood expressed neutral agreement with the statement “I

feel my voice is heard when I want changes within my community” (i.e., 72 percent in LEED-ND and 63 percent in suburban neighborhoods) (See Figure 18).

Due to the fact that suburban respondents felt that this indicator was significantly more important than LEED-ND respondents, and there was not a significant difference in overall agreement with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents. It is understandable that suburban respondents felt that this indicator is more important than LEED-ND respondents because the majority of suburban respondents (93 percent) own their home, while the majority of LEED-ND respondents (78 percent) rent their apartment/townhome. Thus, any change to the suburban neighborhood could directly effect the economic value of these respondents’ homes, which would not be the case for the majority of LEED-ND respondents. Therefore, the confounding variable of home ownership elicited a false positive response for this indicator and there is not a clear a determination that there is a relationship between this indicator and neighborhood form.

Figure 17: Sense of community indicator 1 (agreement).

Figure 18: Sense of community indicator 1 (importance).

How long have you lived in your house / apartment?

There is an extreme difference between the lengths of time suburban respondents reported living within their neighborhood as compared to LEED-ND respondents. Approximately 78 percent of suburban respondents indicated that they have been living within their neighborhood for six or more years, while only four percent of LEED-ND respondents indicated that they had been living within their respective neighborhood for the same amount of time (See Figure 19). It should be acknowledged that stage three LEED-ND certified neighborhoods are master planned, brand new neighborhoods. The “newness” of these neighborhoods may negatively impact residents’ overall sense of community because residents may not be as familiar with their neighbors or surroundings.

Figure 19: Sense of community indicator 2.

Prosperity:

Six of the nine indicators that were used to examine the quality of life prosperity domain were found to be associated with neighborhood form (LEED-ND vs. suburban) using the chi-square test of association. These included the importance to the resident that they have a stable and secure job, that they work in a safe environment, their satisfaction with the number hours they work each week, and satisfaction with the income and benefits provided by their employer. Additionally, resident agreement with satisfaction with the economic value of their home, improvement efforts within their neighborhood, and income/ benefits provided by their employer also was found to be associated with neighborhood form.

Upon further qualitative analysis it was determined that confounding variables elicited false positive responses for each of these indicators, thus there is not a clear a determination that there is a relationship between prosperity and neighborhood form. In addition, the resident's working environment and job would not likely be associated to

the neighborhood type they reside within because their place of employment is likely not located within their neighborhood. Thus, only the indicators regarding the residents' economic value of their home and neighborhood improvements will be further analyzed below.

I am satisfied with the economic value of my home (.000)(Suburb)

The chi-square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated to respondent satisfaction with the economic value of their home. Specifically, 72 percent of suburban respondents agreed or strongly agreed that they were satisfied, while only 46 percent of suburban respondents felt similarly (See Figure 20). Furthermore, 50 percent of LEED-ND respondents stated that they had a neutral opinion of the indicator statement, while only 15 percent of suburban respondents felt similarly.

There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that their satisfaction with improvement efforts in the neighborhood was important or very important (i.e., 77 percent in LEED-ND and 90 percent in suburban neighborhoods) (See Figure 21). Due to the fact that the majority of residents within the LEED-ND neighborhoods do not own their homes and the majority of residents living within the suburban neighborhoods do own their homes it is understandable that suburban residents feel that satisfaction with the economic value of their home is more important than LEED-ND residents. Thus, the confounding variable of home ownership elicited a false positive response for this indicator and there is not a clear a determination that there is a relationship between satisfaction with the economic value of one's home and neighborhood form.

Figure 20: Prosperity indicator 1 (agreement).

Figure 21: Prosperity indicator 1 (importance).

I am satisfied with the improvement efforts in my neighborhood (.003)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated to respondent satisfaction with the improvement efforts in his/her neighborhood. Specifically, 24 percent of LEED-ND respondents strongly agreed that

they were satisfied, while only 6 percent of suburban respondents felt similarly (See Figure 22). Furthermore, only two percent of LEED-ND respondents stated that they disagreed or strongly disagreed with the indicator statement, while 15 percent of suburban respondents disagreed or strongly disagreed.

There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that their satisfaction with improvement efforts in the neighborhood was important (i.e., 62 percent in LEED-ND and 76 percent in suburban neighborhoods) (See Figure 23). Due to the fact that LEED-ND respondents were more satisfied with the improvement efforts in their neighborhood, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents.

It should be noted, however, that both of the LEED-ND case study neighborhoods completed construction within the last ten years, whereas the largest suburban case study site (Pasadena) has been established for decades. Thus, it is understandable that residents of these “newer” neighborhoods are more satisfied with improvement efforts because they have been exposed to the latest technology, design, etc. as a result of living within a new construction. Therefore, the confounding variable of neighborhood age elicited a false positive response for this indicator and there is not a clear determination that there is a relationship between satisfaction with improvement efforts with the neighborhood and neighborhood form.

Figure 22: Prosperity indicator 2 (agreement).

Figure 23: Prosperity indicator 2 (importance).

Mobility:

Four of the six indicators that were used to examine the quality of life mobility domain were found to be associated with neighborhood form (LEED-ND vs. suburban) using the chi-square test of association. These included owning/having easy access to a car, having many transportation options near their neighborhood, having a lot of vehicular traffic adjacent to their neighborhood, and being satisfied with the quality of

public transportation in their neighborhood. Overall, these indicators show that residents of LEED-ND certified/certifiable neighborhoods are significantly more satisfied with their mobility than suburban residents; thus, neighborhood type is related to this quality of life domain. Each individual mobility indicator that showed association using the chi-square test is discussed in detail below.

I own or have easy access to a car (Agreement - .017)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with residents' agreement that he/she owns or has easy access to a car. 100 percent of respondents from LEED-ND neighborhoods stated that they agreed or strongly agreed with the statement (85 percent strongly agreed), while 93 percent of suburban respondents stated that they agreed or strongly agreed with the statement (59 percent strongly agreed). It is notable that the remaining seven percent of suburban respondents strongly disagreed with the indicator statement (see Figure 24 and 25).

Overall, the residents of LEED-ND neighborhoods were younger than the suburban residents. This age discrepancy might explain why 7 percent of the suburban residents do not own or have easy access to a car – their age might inhibit their ability to safely operate a vehicle. Although LEED-ND residents have many alternative modes of transportation within or adjacent to their neighborhood, there was not a significant difference in how important owning or having easy access to a car was to residents of LEED-ND or suburban neighborhoods. Thus, the confounding variable of resident age elicited a false positive response for this indicator and there is not a clear a determination that there is a relationship between owning or having easy access to a vehicle and neighborhood form.

Figure 24: Mobility indicator 1 (agreement).

Figure 25: Mobility indicator 1 (importance).

There are many transportation options near my neighborhood (.000)(LEED-ND)

The Chi-Square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated with whether or not there are many transportation options within

the neighborhood. Approximately 87 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed with the statement that there are many transportation options near their neighborhood, while only 33 percent of suburban residents agreed or strongly agreed (see Figure 26).

There was not an association between neighborhood type and how important many transportation options within their neighborhood were overall. Therefore, the “wants” (depicted by stated importance) of LEED-ND residents are more satisfied than residents living in suburban neighborhoods (see Figure 27). This statement ties into the smart location and linkage area of LEED-ND certification; thus, it is understandable that LEED-ND neighborhoods would have more transportation options.

Figure 26: Mobility indicator 2 (agreement).

Figure 27: Mobility indicator 2 (importance).

There is a lot of vehicular traffic in and adjacent to my neighborhood (.000)

The Chi-Square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with amount of vehicular traffic in and adjacent to the neighborhood. Approximately 84 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed with the statement that is a lot of vehicular traffic in and adjacent to their neighborhood, while only 59 percent of suburban residents agreed or strongly agreed (see Figure 28).

The Chi-Square test of association also shows that neighborhood type (LEED-ND vs. suburban) is associated with the importance to residents that there is not a lot of vehicular traffic in and adjacent to the neighborhood. Approximately 80 percent of residents within suburban neighborhoods stated that it is important or very important that there is not a lot of vehicular traffic in and adjacent to their neighborhood, while only 54 percent of LEED-ND residents felt that this was important or very important (see Figure 29). Although there is more vehicular traffic within LEED-ND neighborhoods as

compared to suburban neighborhoods, residents of LEED-ND neighborhoods feel that not having vehicular traffic is not as important as suburban residents. This might be due to the fact that there are more alternative transportation options to the car in LEED-ND neighborhoods. Thus, one could conclude the higher volumes of vehicular traffic within the LEED-ND neighborhoods do not negatively impact residents' quality of life.

Figure 28: Mobility indicator 3 (agreement).

Figure 29: Mobility indicator 3 (importance).

I am satisfied with the quality of public transportation within my neighborhood (.000)(LEED-ND)

The Chi-Square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated with satisfaction with the quality of public transportation within the neighborhood. Approximately 58 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed that they are satisfied with the quality of public transportation within their neighborhood, while only 28 percent of suburban residents agreed or strongly agreed (see Figure 30). There was not an association between neighborhood type and how important resident satisfaction with quality of public transportation within each neighborhood (see Figure 31). Therefore, the “wants” (depicted by stated importance) of LEED-ND residents are more fulfilled than residents living in suburban neighborhoods.

Figure 30: Mobility indicator 4 (agreement).

Figure 31: Mobility indicator 4 (importance).

Services:

Four of the five indicators that were used to examine the quality of life access to services domain were found to be associated with neighborhood form (LEED-ND vs. suburban) using the chi-square test of association. These included having many shops/services within ½ mile radius of the neighborhood, satisfaction with the number of

shops/services within ½ mile radius of the neighborhood, satisfaction with the number of *different* services within ½ mile of the neighborhood, and satisfaction with the number of recreational opportunities within ½ mile of the neighborhood. Overall, these indicators show that residents of LEED-ND certified/certifiable neighborhoods are significantly more satisfied with their access to services than suburban residents; however, suburban residents thought that having these services within ½ mile of their neighborhood was significantly less important than LEED-ND residents. The majority of suburban residents did acknowledge that these four indicators were “important,” thus, neighborhood type is slightly related to this quality of life domain. Each individual services indicator that showed association using the chi-square test is discussed in detail below.

***There are many shops/services within ½ mile radius of my neighborhood (.000)
(LEED-ND)***

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with the number of shops/services within ½ mile radius of the neighborhood. Approximately 98 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed that there are many shops/services within ½ mile radius of their neighborhood, while only 50 percent of suburban residents agreed or strongly agreed (see Figure 32).

The chi-square test of association shows that neighborhood type (LEED-ND vs. Suburban) is also associated with the importance to residents that there are many shops/services within ½ mile radius of their neighborhood. Approximately 96 percent of residents within LEED-ND neighborhoods stated that it is important or very important that there are many shops and services within ½ mile radius of their neighborhood, while

only 76 percent of LEED-ND residents felt that this was important or very important (see Figure 33).

Although it is clear that having services nearby is more important to LEED-ND residents than suburban residents, it is notable that the majority of suburban residents (76 percent) still felt that having many shops/services within ½ mile radius of their neighborhood was important or very important. Only 50 percent of these suburban residents agreed that they did have many shops/services within ½ mile radius of their neighborhood. Therefore, residents’ “wants” are more sufficiently met within LEED-ND neighborhoods where 96 percent of residents felt that the statement was important and 98 percent of residents agreed with the statement.

Figure 32: Services indicator 1 (agreement).

Figure 33: Services indicator 1 (importance).

I am satisfied with the number of services located 1/2 mile from my neighborhood (.000)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with the resident satisfaction with the number of services located within 1/2 mile radius of the neighborhood. Approximately 92 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed that they were satisfied with the number of services within 1/2 mile radius of their neighborhood, while only 53 percent of suburban residents agreed or strongly agreed (see Figure 34).

The chi-square test of association also shows that neighborhood type (LEED-ND vs. suburban) is associated with the importance to residents that they are satisfied with the number of services within 1/2 mile radius of their neighborhood. Approximately 96 percent of residents within LEED-ND neighborhoods stated that it is important or very important that they are satisfied with the number of services within 1/2 mile radius of their neighborhood, while only 73 percent of LEED-ND residents felt that this was important or very important (see Figure 35).

Although it is clear that satisfaction with the number of services nearby is more important to LEED-ND residents than suburban residents, it is notable that the majority of suburban residents (73 percent) still felt that their satisfaction with the number of services within ½ mile radius of their neighborhood was important or very important. Only 53 percent of these suburban residents agreed that they were satisfied or very satisfied with the number of services located within ½ mile radius of their neighborhood. Therefore, residents’ “wants” are more sufficiently met within LEED-ND neighborhoods, where 96 percent of residents felt that the statement was important and 92 percent of residents agreed with the statement.

Figure 34: Services indicator 2 (agreement).

Figure 35: Services indicator 3 (importance).

I am satisfied with the different types of services located within 1/2 mile of my neighborhood (.000)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated with the resident satisfaction with the different types of services located within 1/2 mile radius of the neighborhood. Approximately 92 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed that they were satisfied with the different types of services within 1/2 mile radius of their neighborhood, while only 43 percent of suburban residents agreed or strongly agreed (see Figure 36).

The chi-square test of association also shows that neighborhood type (LEED-ND vs. Suburban) is associated with the importance to residents that they are satisfied with the different types of services within 1/2 mile radius of their neighborhood. Approximately 98 percent of residents within LEED-ND neighborhoods stated that it is important or very important that they are satisfied with the different types of services within 1/2 mile radius

of their neighborhood, while only 73 percent of LEED-ND residents felt that this was important or very important (see Figure 37).

Although it is clear that satisfaction with the number of services nearby is more important to LEED-ND residents than suburban residents, it is notable that the majority of suburban residents (73 percent) still felt that their satisfaction with the different types of services within ½ mile radius of their neighborhood was important or very important. Only 43 percent of these suburban residents agreed that they were satisfied or very satisfied with the different types of services located within ½ mile radius of their neighborhood. Therefore, residents’ “wants” are more sufficiently met within LEED-ND neighborhoods, where 98 percent of residents felt that the statement was important and 92 percent of residents agreed with the statement.

Figure 36: Services indicator 4 (agreement).

Figure 37: Services indicator 4 (importance).

I am satisfied with the number of recreational possibilities located within ½ mile of my household (Importance and Agreement.028)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated with resident satisfaction with the number of recreational opportunities located within ½ mile radius of their household. Approximately 68 percent of residents within LEED-ND neighborhoods stated that they agreed or strongly agreed that they were satisfied with the different types of services within ½ mile radius of their neighborhood, while only 48 percent of suburban residents agreed or strongly agreed (see Figure 38).

The chi-square test of association also shows that neighborhood type (LEED-ND vs. suburban) is associated with the importance to residents that they are satisfied with the number of recreational possibilities located within ½ mile radius of their neighborhood. Although the majority of LEED-ND and suburban residents felt the indicator statement was important or very important (79 percent and 78 percent respectively), the degree of importance reported varied considerably. 42 percent of

LEED-ND respondents felt that the indicator statement was very important, while only 22 percent of suburban respondents felt similarly (see Figure 39). Due to the fact that LEED-ND respondents felt that this indicator was significantly more important and agreed with the statement significantly more than suburban respondents, one could conclude the differing “wants” of LEED-ND suburban and LEED-ND are satisfactorily fulfilled in each respective neighborhood.

Figure 38: Services indicator 5 (agreement).

Figure 39: Services indicator 5 (importance).

Security:

All three of the indicators that were used to examine the quality of life security domain were found to be associated with neighborhood form using the chi-square test of association. These included feeling completely safe within the neighborhood, feeling safe at home during the day, and feeling safe on the neighborhood block during the day. Overall, these indicators show that residents of LEED-ND certified/certifiable neighborhoods are significantly more satisfied with security than suburban residents; thus, neighborhood type is related to this quality of life domain. Each individual security indicator that showed association using the chi-square test is discussed in detail below.

My family and I feel completely safe within the neighborhood we live within (.000)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated to respondent agreement that they and their families feel completely safe within their neighborhood. Specifically, 53 percent of LEED-ND respondents strongly agreed that they were satisfied, while only 18 percent of suburban

respondents felt similarly (See Figure 40). Furthermore, only six percent of LEED-ND respondents stated that they disagreed or strongly disagreed with the indicator statement, while 11 percent of suburban respondents disagreed or strongly disagreed.

Figure 40: Security indicator 1 (agreement).

There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that feeling completely safe within their neighborhood was important or very important (i.e., 98 percent in LEED-ND and 96 percent in suburban neighborhoods) (See Figure 41). Due to the fact that LEED-ND respondents expressed a higher degree of agreement that they feel completely safe within their neighborhood, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents. The perception of safety and security described by the LEED-ND residents, and lack thereof described by the suburban residents, is likely related to the fact that the LEED-ND neighborhoods identify with the three main qualities a safe city street

should have (as stated by Jane Jacobs), while the suburban streets do not. Specifically Jane Jacobs states,

A city street equipped to handle strangers, and to make a safety asset, in itself, out of the presence of strangers, as the streets of successful city neighborhoods always do, must have three main qualities:

First, there must be a clear demarcation between what is public space and what is private space. Public and private spaces cannot ooze into each other as they do typically in suburban settings or in projects. Second, there must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. The buildings on a street equipped to handle strangers and to insure the safety of both residents and strangers, must be oriented to the street. They cannot turn their backs or blank sides on it and leave it blind. And third, the sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalks in sufficient numbers. Nobody enjoys sitting on a stoop or looking out a window at an empty street. Almost nobody does such a thing. Large numbers of people entertain themselves, off and on, by watching street activity. (Jacobs, 1961, p. 116)

The contrast between neighborhood streets in the LEED-ND certifiable neighborhood, Paseo Colorado, and the suburban neighborhood in Pasadena is depicted below in Figures 42 and 43.

Figure 41: Security indicator 1 (importance).

Figure 42: Paseo Colorado neighborhood has a multitude of pedestrians throughout the day. Retrieved 3 June 2010 from http://farm4.static.flickr.com/3129/2668161936_601ea68949.jpg

Figure 43: The Intersection of Redwood Drive and Elmwood Drive at the Pasadena suburban case study site does not have a large amount of pedestrian activity. Bing Maps (2010), and further modified by the author on 3 June 2010.

I feel safe in my neighborhood at home during the day (.000)

The chi-square test of association shows that neighborhood type is associated to respondent agreement that they feel safe in their neighborhood at home during the day. Specifically, 78 percent of LEED-ND respondents strongly agreed that they felt safe at home during the day, while only 40 percent of suburban respondents felt similarly (See Figure 44). There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that feeling safe in their neighborhood during the day was important or very important (i.e., 100 percent in LEED-ND and 97 percent in suburban neighborhoods) (See Figure 45). Due to the fact that LEED-ND respondents expressed a higher degree of agreement that they feel safe within their neighborhood at home during the day, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents.

Figure 44: Security indicator 2 (agreement).

Figure 45: Security indicator 2 (importance).

I feel safe on my neighborhood block during the day (.001)

The chi-square test of association shows that neighborhood type (LEED-ND vs. Suburban) is associated to respondent agreement that they feel safe on their neighborhood block during the day. Specifically, 72 percent of LEED-ND respondents strongly agreed that they felt safe on their neighborhood block during the day, while only 40 percent of suburban respondents felt similarly (See Figure 46). There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that feeling safe on their neighborhood block during the day was important or very important (i.e., 100 percent in LEED-ND and 97 percent in suburban neighborhoods) (See Figure 47). Due to the fact that LEED-ND respondents expressed a higher degree of agreement that they feel safe on their neighborhood block during the day, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents.

Figure 46: Security indicator 3 (agreement).

Figure 47: Security indicator 3 (importance).

Sustainability:

Four of the six indicators that were used to examine the quality of life sustainability domain were found to be associated with neighborhood form using the chi-square test of association. These included actively trying to reduce the amount of air

pollution the resident emits, actively trying to use energy produced by renewable resources, actively trying to reduce the amount of waste he/she produces, and actively trying the recycle. These indicators did not show a clear distinction between neighborhood form and sustainability being that two of the indicators were thrown out due to confounding variables, and one of each of the remaining indicators showed higher agreement in the LEED-ND neighborhoods and the suburban neighborhoods. Thus, one could not conclude that subjective sustainability and neighborhood form have a clear relationship. Each individual sustainability indicator that showed association using the chi-square test is discussed in detail below for further reference.

I actively try to reduce the amount of air pollution I emit (.011)(LEED-ND)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with residents' agreement that he/she actively tries to reduce the amount of air pollution he/she emits. Approximately 70 percent of respondents from LEED-ND neighborhoods stated that they agreed or strongly agreed with the statement (30 percent strongly agreed), while 66 percent of employed suburban respondents stated that they agreed or strongly agreed with the statement (13 percent strongly agreed) (see Figure 48). There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that actively trying to reduce the amount of air pollution they emitted was important or very important (i.e., 83 percent in LEED-ND and 86 percent in suburban neighborhoods) (see Figure 49). Due to the fact that LEED-ND respondents expressed a higher degree of agreement that they actively try to reduce the amount of air pollution they emit, and there was not a significant difference in overall importance with the

statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents.

Figure 48: Sustainability indicator 1 (agreement).

Figure 49: Sustainability indicator 1 (importance).

I actively try to use energy that is produced from renewable resources (.002)(XX)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with residents' agreement that he/she actively tries to use energy that is produced from renewable resources. Approximately 14 percent of respondents from LEED-ND neighborhoods and 9 percent of suburban respondents stated that they strongly agreed with the statement, while 16 percent of LEED-ND respondents and seven percent of suburban respondents stated that they strongly disagreed with the statement (see Figure 50). It is notable that there was not a significant difference in response between the neighborhoods when "agree" and "strongly agree," and "disagree" and "strongly disagree" were grouped together. When grouped, each category (disagree, neutral, and agree) received roughly one-third of each neighborhood's responses.

Furthermore, there was not an association when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that actively trying to use energy that is produced from renewable resources was important or very important (i.e., 78 percent in LEED-ND and 80 percent in suburban neighborhoods) (see Figure 51). Due to the fact that LEED-ND respondents expressed both a higher degree of agreement and disagreement with the indicator statement, and there was not a significant difference in overall importance with the statement, one could not necessarily conclude the "wants" of LEED-ND respondents are any more satisfactorily fulfilled than those of the suburban residents.

Figure 50: Sustainability indicator 2 (agreement).

Figure 51; Sustainability indicator 2 (importance).

I actively try to reduce the amount of waste I produce (.002)(Suburb)

The chi-square test of association shows that neighborhood type (LEED-ND vs. suburban) is associated with residents' agreement that he/she actively tries to reduce the amount of waste he/she produces. Approximately 90 percent of respondents from

suburban neighborhoods stated that they agreed or strongly agreed with the statement (25 percent strongly agreed), while 68 percent of LEED-ND respondents stated that they agreed or strongly agreed with the statement (19 percent strongly agreed) (see Figure 52).

There was not an association when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that actively trying to reduce the amount of air pollution they emitted was important or very important (i.e., 84 percent in LEED-ND and 94 percent in suburban neighborhoods) (see Figure 53). Due to the fact that suburban respondents expressed a higher degree of agreement that they actively try to reduce the amount of waste they produce, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of suburban respondents are more satisfactorily fulfilled than those of the LEED-ND residents.

Figure 52: Sustainability indicator 3 (agreement).

Figure 53: Sustainability indicator 3 (importance).

I actively try to recycle (.000)

The chi-square test of association shows that neighborhood type is associated with residents' agreement that he/she actively tries to reduce the amount of waste he/she produces. Approximately 97 percent of respondents from suburban neighborhoods stated that they agreed or strongly agreed with the statement (31 percent strongly agreed), while 75 percent of LEED-ND respondents stated that they agreed or strongly agreed with the statement (31 percent strongly agreed) (see Figure 54).

There was not an association when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that actively trying to reduce the amount of air pollution they emitted was important or very important (i.e., 92 percent in LEED-ND and 97 percent in suburban neighborhoods) (see Figure 55). It should be noted, however, that many of the Pasadena LEED-ND residents noted that all of their trash is picked up and processed by a private waste collection company at a material recovery facility that removes recyclable material from the general waste.

Thus, there is not a need for these residents to actively try to recycle, which may explain why there were much lower agreement ratings in the LEED-ND certified/certifiable neighborhoods. Therefore, the confounding variable of neighborhood waste disposal services elicited a false positive response for this indicator and there is not a clear a determination that there is a relationship between actively trying to recycle and neighborhood form.

Figure 54: Sustainability indicator 4 (agreement).

Figure 55: Sustainability indicator 4 (importance).

Subjective Wellbeing:

One of the two subjective wellbeing indicators was found to be associated with neighborhood form. Specifically, residents in LEED-ND certified/certifiable neighborhoods were found to be significantly more satisfied with their life than suburban residents. This indicator is discussed in more detail below.

I am satisfied with my life (.026)(LEED-ND)

The chi-square test of association shows that neighborhood type is associated with residents' satisfaction with life. Although the percentage of respondents who either agreed or strongly agreed with the statement did not significantly vary between the neighborhoods (81 percent in LEED-ND and 82 percent in suburban), the degree to which the respondents agreed did vary. Approximately 49 percent of respondents from LEED-ND neighborhoods stated that they strongly agreed with the statement, while only 26 percent of suburban respondents stated that they strongly agreed with the statement (see Figure 56).

There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that satisfaction with their life was important or very important (i.e., 96 percent in LEED-ND and 96 percent in suburban neighborhoods) (see Figure 57). Due to the fact that LEED-ND respondents expressed a higher degree of agreement that they are satisfied with their life, and there was not a significant difference in overall importance with the statement, one could conclude the “wants” of LEED-ND respondents are more satisfactorily fulfilled than those of the suburban residents. The significantly higher degree of satisfaction with life found in LEED-ND respondents may be attributable to their higher degrees of satisfaction with mobility, services, and security indicators.

Figure 56: Subjective wellbeing indicator 1 (agreement).

Figure 57: Subjective wellbeing indicator 1 (importance).

PASADENA CASE STUDY ANALYSIS

Due to the fact that the Pasadena case studies made up approximately 81 percent of the total combined sample size, the resulting chi-squared tests of association came up with very similar results. A total of seven indicators (under the prosperity, health, sustainability, and services domains) differed from the above combined analysis. These indicators will be analyzed below:

Prosperity:

All three of the remaining indicators that were not discussed in the cumulative analysis were found to be associated with neighborhood form using the chi-square test of association for solely the Pasadena case study sites. These included the resident's agreement that he/she has a stable and secure job, that he/she is satisfied with the number of hours he/she works each week, and importance to the resident that they have an balanced working and non-working life.

Upon further qualitative analysis it was determined that the confounding variable of age elicited false positive responses for each of these indicators, thus there is not a clear a determination that there is a relationship between prosperity and neighborhood form. In addition, the resident's working environment and job would not likely be associated to the neighborhood type they reside within because their place of employment is likely not located within their neighborhood. Thus, further description of these indicators is not needed.

Health:

One of the three health indicators (i.e., "I am satisfied with my personal health") was found to be associated with neighborhood form when the Pasadena case study sites were analyzed separately with the chi-square test of association. Due to the fact that the suburban residents are significantly older than LEED-ND residents, the confounding variable of age elicited a false positive response for this indicator and there is not a clear a determination that there is a relationship between satisfaction with health and neighborhood form.

Services:

The importance of one of the five service indicators (i.e., "there are medical amenities that are available to my neighborhood") was found to be associated with neighborhood form when the Pasadena case study sites were analyzed separately with the chi-square test of association. As with the abovementioned health indicators, the fact that the suburban residents are significantly older than LEED-ND residents would likely make this indicator more important to those residents. Thus, the confounding variable of age elicited a false positive response for this indicator and there is not a clear a

determination that there is a relationship between importance of available medical amenities and neighborhood form.

Sustainability:

One of the sustainability indicators that did not show association within the cumulative analysis was found to be associated with neighborhood form when the Pasadena case study sites were solely analyzed. This indicator is discussed further below.

I actively try to reduce the amount of fresh water I use (.041)

The chi-square test of association shows that neighborhood type is associated with residents' agreement that they actively try to reduce the amount of fresh water they use. Approximately 86 percent of respondents from the suburban neighborhood stated that they agreed or strongly agreed with the statement, while only 70 percent of LEED-ND respondents stated that they agreed or strongly agreed with the statement. In addition, approximately 20 percent of respondents from LEED-ND neighborhoods stated that they disagreed or strongly disagreed with the statement, while only 4 percent of suburban respondents disagreed or strongly disagreed (see Figure 58).

There was not an association, however, when the importance of this indicator statement was examined. Thus, the majority of respondents within each neighborhood felt that reducing the amount of fresh water they use was important or very important (i.e., 84 percent in LEED-ND and 94 percent in suburban neighborhoods) (See Figure 59). Due to the fact that suburban respondents expressed a higher degree of agreement with the indicator statement, and there was not a significant difference in overall importance with the statement, one could conclude the "wants" of suburban respondents are more satisfactorily fulfilled than those of the LEED-ND residents.

Figure 58: Sustainability indicator 5 (agreement).

Figure 59: Sustainability indicator 5 (importance).

CITY OF ORANGE CASE STUDY ANALYSIS

Due to the incredibly small sample size of the City of Orange's LEED-ND case study (i.e., 7 total respondents), the chi-squared test of association only determined an

association between neighborhood type and a given indicator in three instances. The only indicator that was not discussed previously is described below:

I am satisfied with the improvement efforts in my neighborhood (.040)

The chi-square test of association shows that the City of Orange neighborhood type is associated with how important satisfaction with improvement efforts in their neighborhood is to residents. Approximately 96 percent of suburban respondents felt the statement was important or very important (28 percent felt it was very important), while 86 percent of LEED-ND respondents felt the statement was important or very important (29 percent felt it was very important).

The chi-squared test of association did not show that Orange neighborhood type (LEED-ND vs. suburban) was associated with resident satisfaction with the improvement efforts in their neighborhood. Due to the fact that suburban respondents expressed a higher degree of importance with the indicator statement, and there was not a significant variation in respondent agreement one could conclude the “wants” in the LEED-ND neighborhood are slightly more fulfilled than the suburban neighborhood.

Figure 60: Prosperity indicator 3 (agreement).

Figure 61: Prosperity indicator 3 (importance).

Chapter 6

Conclusions

LEED-ND CONTRIBUTIONS TO QUALITY OF LIFE

The subjective findings from this analysis have shown that the LEED-ND rating system has contributed to residents' quality of life in four distinct areas (i.e., domains) – mobility, services, security, and subjective wellbeing as compared to suburban neighborhoods. The majority of indicators within these domains showed that resident agreement was associated with neighborhood type, while importance of the indicator to the resident did not vary significantly. This shows that the “wants” of the residents within the LEED-ND neighborhood are more satisfactorily fulfilled than the residents living within the suburban neighborhoods.

One exception to this general finding was the proximity to services domain. Residents within the suburban case study sites were less satisfied with the number and variety of services than the LEED-ND residents; however, they also felt that having these services near their neighborhood was less important than LEED-ND residents. The contingency tables showing resident importance was examined further, which showed that the majority of suburban residents did, in fact, think that proximity to a variety of

services was important. Thus, although suburban residents felt that this indicator was less important than their LEED-ND counterparts, one could still conclude that LEED-ND residents “wants” are slightly more fulfilled than suburban residents (see Table 17).

The objective data confirms both the mobility and services domains, in that the LEED-ND neighborhoods cumulatively have 13.75 times more services, five times more bus stops, three times more bicycle network miles, and rail stops within ½ mile of their neighborhood centroid as compared to suburban neighborhoods. The objective data for the security domain, however, contrasted the subjective security data. The Pasadena LEED-ND neighborhood had 5.5 times more recorded instances of crime within a three-month period (½ mile for the neighborhood centroid) than the suburban neighborhood during the same time period. The higher density of services, shops, vehicular parking, visitors, etc. to the LEED-ND sites likely increases the rate of crime – there are more cars, stores, and people to burglarize; more bars (that correlate with drunk in public and drunk driving instances); and more visitors that do not have a sense of ownership within the community and are more likely to vandalize property. The greater density in LEED-ND neighborhoods also increases the number of “eyes on the street,” thus, although there are more instances of crime, there are more people around to prevent or report a crime, which is likely the reason LEED-ND residents have a greater perception of security than the suburban neighborhood.

Table 17: Quality of Life Indicators That Relate to LEED-ND Neighborhood Form		
Indicator	Chi-Squared Determination	Interpretation
Mobility		
There are many transportation options near my neighborhood	A: $\chi^2(4, N=167)= 61.1, p= .00$	LEED-ND residents overwhelming agreed that there were many transportation options near their neighborhood – one of which was good quality public transportation. Although LEED-ND residents agree that there is more vehicular traffic adjacent to their neighborhood, they also feel that it significantly less important to have a small amount of traffic, possibly due to the good quality public transportation.
There is a lot of vehicular traffic in and adjacent to my neighborhood	A: $\chi^2(4, N=167)= 25.1, p= .00$ I: $\chi^2(4, N=167)= 13.3, p= .00$	
I am satisfied with the quality of public transportation within my neighborhood	A: $\chi^2(4, N=167)= 61.1, p= .00$	
Services		
There are many shops/services within ½ mile of my neighborhood	A: $\chi^2(4, N=167)= 87.3, p= .00$ I: $\chi^2(4, N=167)= 36.6, p= .00$	LEED-ND residents were significantly more satisfied with the overall number and variety of services within ½ mile of their neighborhood as compared to suburban residents; however, they felt that having these services near their neighborhood was significantly less important than suburban residents. Upon qualitative examination of the services contingency tables it was found that the majority of suburban residents still felt that having services nearby was either important or very important (around 70 percent); thus, it was determined that LEED-ND residents “wants” are more satisfactorily fulfilled.
I am satisfied with the number of shops/services within ½ mile of my neighborhood	A: $\chi^2(4, N=167)= 60.9, p= .00$ I: $\chi^2(4, N=167)= 36.1, p= .00$	
I am satisfied with the different types of shops/services within ½ mile of my neighborhood	A: $\chi^2(4, N=167)= 64.9, p= .00$ I: $\chi^2(4, N=167)= 35.5, p= .00$	
I am satisfied with the number of recreational opportunities within ½ mile of my neighborhood	A: $\chi^2(4, N=167)= 11.0, p= .03$ I: $\chi^2(4, N=167)= 11.5, p= .02$	
Security		
My family and I feel completely safe in the neighborhood we live within	A: $\chi^2(4, N=167)= 22.7, p= .00$	LEED-ND residents had significantly higher rates of agreement with all three of the security indicator questions, while importance of security was the same. Thus, LEED-ND residents felt more safe within their respective neighborhood.
I feel safe in my neighborhood at home during the day	A: $\chi^2(4, N=167)= 22.0, p= .00$	
I feel safe on my neighborhood block during the day	A: $\chi^2(4, N=167)= 17.8, p= .00$	
Subjective Wellbeing		
I am satisfied with my life	A: $\chi^2(4, N=167)= 11.0, p= .03$	LEED-ND residents were

		found to be more satisfied with their lives, which could be caused by greater satisfaction with mobility, services, and security.
<i>Agreement: Chi-square (degrees of freedom, sample size)=xx, probability=xx</i> <i>Importance: Chi-square (degrees of freedom, sample size)=xx, probability=xx</i>		

QUALITY OF LIFE DOMAINS NOT ADDRESSED BY LEED-ND

The subjective findings from this analysis show that the LEED-ND rating system has not contributed to the sense of community, housing, health, prosperity, culture, and sustainability domains. This contrasts findings from the LEED-ND and Healthy Neighborhoods “Expert Panel Review,” which found that LEED-ND certified neighborhoods increase social connection and sense of community *and* various aspects of resident health (USGBC, 2010i). More extensive analysis (that was not within this study’s scope) should be conducted to further confirm that LEED-ND does not, in fact, contribute to any of these domains. For example, objective indicators for neighborhood-specific sustainability could be analyzed to supplement subjective data, sense of community-specific surveys could be mailed to appropriate residents, and more extensive health analysis could be conducted.

RECOMMENDATIONS AND ACTION ITEMS

This study has many implications for planning practitioners, the future of the LEED-ND program, and future research. These implications are discussed below.

PLANNING PRACTITIONERS

It is becoming incredibly common for jurisdictions within the United States to establish LEED-based public policy incentives (e.g., density bonuses, grants, expedited processing, fee waivers) for rating systems that were created when LEED first

commenced. It is likely that the LEED-ND rating system will also begin to become a part of new policy, as examples across the country are already occurring. For instance, Governor Blagojevich of the State of Illinois signed “The Green Neighborhood Grant Act” on August 21, 2007, which made this state the first to create incentives for LEED for Neighborhood Development. This Act (Public Act 95-0325) directs the Department of Commerce and Economic Opportunity to fund up to 1.5 percent of total development costs for up to three (3) LEED-ND certified neighborhoods per year, funds permitting (U.S. Green Building Council, 2010j).

Due to the fact that this study has found there are four quality of life domains that were, in fact, associated with neighborhood form (LEED-ND vs. suburban) planning practitioners could claim, to a certain extent, that improving quality of life would be one of the benefits of enacting LEED-ND based public policy. However, the term “Quality of Life” could be misleading, being that it is wrapped up with so many other indicators and this study only found 4 of the 10 indicators were related to LEED-ND. In addition, it is clear that the LEED-ND assessment is based upon New Urbanism and Smart Growth, but there are other neighborhood forms that might be just as sustainable while also improving quality of life; just because it would not be certified LEED-ND does not mean it is necessarily a “worse” neighborhood form. Practitioners should be cognizant of the benefits of LEED-ND, while also keeping an open mind to other neighborhood forms that are sustainable, improve quality of life, and are appropriate for the region.

THE FUTURE OF THE LEED-ND PROGRAM

Although this study found that the USGCB was, to a certain extent, correct in saying that LEED-ND certified neighborhoods would improve resident quality of life, it

is still clear that the rating system could be improved upon. This analysis shows that certain groups of people do strongly prefer a neighborhood form that varies from the “smart growth” form encouraged by the LEED-ND rating system. The rating system should acknowledge this preference, and develop criteria for new and existing lower density neighborhoods, as to not force all people into one type of neighborhood form that they may not prefer.

In addition, the LEED-ND rating system is geared toward master planned neighborhoods that will be newly constructed. An additional rating system should be developed that addresses retrofitting the thousands of existing neighborhoods, which would likely have an even greater impact than the existing rating system due to the large number of existing neighborhoods opposed to the small number of master planned neighborhoods that are new constructions.

FUTURE RESEARCH

Future research should be directed at improving the current 2009 LEED-ND rating system, developing a LEED for existing neighborhoods rating system, and more accurately measuring quality of life within these neighborhoods over time (e.g., increasing sample sizes, reducing confounding variables, etc.). Continuously improving the LEED rating systems is necessary as new information, technology, and best practices develop. Monitoring, and improving methods of monitoring, the quality of life within these LEED certified neighborhoods will be an important component of understanding and insuring the type of neighborhood development the USGBC (and various jurisdictions whom promote the LEED-ND rating system) encourages is providing residents with the best quality of life possible.

REFERENCES:

Aurbach, L. (2009). An Introduction to LEED-ND for CNU Members. Congress of New Urbanism DC Chapter. Retrieved from

http://www.cnudc.org/Images/LEEDND_Intro.pdf on 1 November 2009.

Beatley, T. (1995). Planning and Sustainability: The Elements of a New (Improved?) Paradigm. *Journal of Planning Literature*, 9(4), 383-395.

Borthwick-Duffy, S.A. (1992). Quality of Life and Quality of Care in Mental Retardation. In L. Rowitz (Ed.), *Mental Retardation in the Year 2000* (pp. 52-66). Berlin: Springer-Verlag.

Calthorpe, P. (1993). *The Next American Metropolis*. New York: Princeton Architectural Press.

Center for Disease Control (2009). LEED-ND and Healthy Neighborhoods: An Expert Panel Review. National Center for Environmental Health Division of Emergency and Environmental Health Services (2009). Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=5895> on 29 October 2009.

Christoph, B. & Noll, H. (2003). Subjective Well-Being in the Europeans Union During the 90s. *Social Indicators Research*, 64(3), 521-546.

City of Orange (2010). Orange General Plan: Circulation Element. Retrieved from http://www.edaw.com/orange/PDFs/PRDGP/OrangeGP_3_CirculationMobility.pdf on 22 May 2010.

City of Pasadena (2004). City of Pasadena General Plan: Mobility Element. Retrieved from http://ww2.cityofpasadena.net/trans/tpd/gpme2004/pdf/2004_MOBILITY_ELEMENT.pdf on 22 May 2010.

City of Pasadena (2010). Metro Gold Line. Retrieved from <http://ww2.cityofpasadena.net/trans/transit/goldline/> on 22 May 2010.

Criterion Planners (2007). LEED for Neighborhood Development – Characteristics of Pilot Projects.

Cvitkovich, Y. & Wister, A. (2001). The Importance of Transportation and Prioritization of Environmental Needs to Sustain Well-Being Among Older Adults. *Environment and Behavior*, 33(6), 809-829.

Cummins, R. (1992). Assessing Quality of Life. In R.I. Brown (Ed) *Quality of Life for People with Disabilities: Models, Research, and Practice* (pp. 116-143).

Developers Diversified Reality (2010). Paseo Colorado. Retrieved from <http://www.paseocoloradopasadena.com/> on 3 June 2010.

Diener, E., Oishi, S., and Lucas, R.E. (2003). Personality, Culture, and Subjective Well-Being: Emotional and Cognitive Evaluations of Life. *Annual Review Psychology*, 54, 403-25.

Doi, K., Kii, M., and Nakanishi, H. (2008). An Integrated Evaluation Method of Accessibility, Quality of Life, and Social Interaction. *Environment and Planning B: Planning and Design*, 35, 1098-1116.

Edgerton, R. B. (1990). Quality of life from a longitudinal research perspective. In R.L. Schalock (Ed.), *Quality of life: Perspectives and issues* (pp. 149-160). Washington DC: American Association on Mental Retardation.

Epley, D.R. & Menon, M. (2007). A Method of Assembling Cross-sectional Indicators into a Community Quality of Life. *Social Indicators Research*, 88, 281-296.

Felce, D. & Perry, J. (1995). Quality of Life: Its Definition and Measurement. *Research in Developmental Disabilities*, 16(1), 51-74.

Ferrans, C.E. & Frisch, M. (2005). Measuring QOL: Is Weighting with Importance Justified? *Quality of Life Research*, 14(9), 2012.

Garde, A. (2009). Sustainable by Design? Insights From U.S. LEED-ND Pilot Projects *Journal of the American Planning Association*, 75(4), 424-440.

Grasso, M. & Canova, L. (2008). An Assessment of the Quality of Life in the European Union Based on the Social Indicators Approach. *Social Indicators Research*, 87, 1-25.

Haas, B. (1999). Clarification and Integration of Similar Quality of Life Concepts. *Journal of Nursing Scholarship*, 31(3), 215-220.

Hancock, T., et al. (1999). Indicators that count? Measuring population health at the community level. Ottawa: Health Canada.

Hebbert, M. (2003). New Urbanism – the Movement in Context. *Built Environment*, 29(3), 193-208.

Hormann, M. (2009). Ghosts of Malls Past: The Plaza Pasadena. Retrieved 5 May 2010 from <http://hometown-pasadena.com/history/ghosts-of-malls-past-the-plaza-pasadena/>.

Howley, P., Scott, M., and Redmond, D. (2009). Sustainability versus Liveability: an Investigation of Neighborhood Satisfaction. *Journal of Environment Planning and Management*, 52(6), 847-864.

Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York: Vintage Books.

Massam, B. (2002). Quality of Life: Public Planning and Private Living. *Progress in Planning*, 58, 141-227.

Mccrea, R., Stimson, R., and Western, J. (2005). Testing A Moderated Model of Satisfaction with Urban Living Using Data For Brisbane-South East Queensland, Australia. *Social Indicators Research*, 72, 121-152.

Mollenkopf, H. et al. (2004). Quality of Life in Urban and Rural Areas of Five European Countries: Similarities and Differences. *Hallym International Journal of Aging*, 6(1), 1-36.

Myers, D. (1988). Building Knowledge about Quality of Life for Urban Planning. *American Planning Association Journal*, Summer, 347-358.

National Resources Defense Council (2009a). LEED for Neighborhood Development. Retrieved from <http://www.nrdc.org/cities/smartGrowth/leed.asp> on 1 November 2009.

Neuman, M. (2005). The Compact City Fallacy. *Journal of Planning Education and Research*, 25 (11).

Olson Homes (2010). Depot Walk. Retrieved from <http://olsonhomes.com/find/community/overview.aspx?codeTitle=depotwalk> on 2 November 2010.

Omega Group (2010). Crimemapping. Retrieved 2 June 2010 from <http://www.crimemapping.com/about.aspx>.

Retzlaff, R.C. (2008). Green Building Assessment Systems: A Framework and Comparison for Planners. *Journal of the American Planning Association*, 74(4), 505-519.

Retzlaff, R.C. (2009). The Use of LEED in Planning and Development Regulation: An Exploratory Analysis. *Journal of Planning Education and Research*, 29; 67-77.

Santana Row (2010). Vision and History. Retrieved from <http://www.santanarow.com/more/> on 5 May 2010.

Sartorius, N. (1987). Cross-cultural comparisons of data about quality of life: A sample of Issues. In N.K. Aaronson & J. Beckmann (Eds.), *The Quality of Life of Cancer Patients* (19-24). New York: Raven Press.

Sirgy, M. & Cornwell, T. (2002). How Neighborhood Features Affect Quality of Life. *Social Indicators Research*, 59 (1), 79-114.

Urban Land Institute (2002). Urban Land Development: Case Studies – Paseo Colorado. Retrieved from <http://casestudies.uli.org/CSFrameset.aspx?i=C032009> on 3 November 2009.

Urban Land Institute (2004). Urban Land Development: Case Studies – Santana Row. Retrieved from <http://casestudies.uli.org/CSFrameset.aspx?i=C034024> on 3 November 2009.

Urban Land Institute (2008). Urban Land Development: Case Studies – City Heights Urban Village. Retrieved from <http://casestudies.uli.org/Profile.aspx?j=8294&p=3&c=17> on 3 November 2009.

U.S. Green Building Council (2010a). What is LEED? Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222> on 3 June 2010.

U.S. Green Building Council (2010b). LEED for Neighborhood Development. Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148> on 3 June 2010.

U.S. Green Building Council (2010c). LEED 2009 for Neighborhood Development Rating System. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=6146> on 4 May 2010.

U.S. Green Building Council (2010d). LEED for New Construction and Major Renovation. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=5546> on 3 May 2010.

U.S. Green Building Council (2010e). LEED for Neighborhood Development Registered Pilot Projects and Plans List - updated 3/1/10. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=2960> on 3 June 2010.

U.S. Green Building Council (2010f). LEED for Neighborhood Development Backgrounder. Retrieved from <http://www.usgbc.org/Docs/LEEDdocs/LEED-ND%20Backgrounder.pdf> on 1 April 2010.

U.S. Green Building Council (2010g). USGBC About Us. Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124> on 2 April 2010.

U.S. Green Building Council (2010h). FAQ: LEED for Neighborhood Development. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=3357> on 1 June 2010.

U.S. Green Building Council (2010i). LEED-ND and Healthy Neighborhoods: An Expert Panel Review. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=5895> on 5 June 2010.

U.S. Green Building Council (2010j). LEED Public Policies. Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852> on 5 June 2010.

Veenhoven, R. (1996). Happy Life-Expectancy: A Comprehensive Measure of Quality-of-Life In Nations. *Social Indicators Research*, 39(1), 1-58.

Veenhoven, R. (2005). Apparent Quality-of-Life in Nations: How Long and Happy People Live. *Social Indicators Research*, 71, 61-86.

Veenhoven, R. (2009). Wellbeing in Nations and Wellbeing of Nations: Is there a Conflict between Individual and Society. *Social Indicators Research*, 91, 5-21.

APPENDIX A: INSTRUMENT OPENING LETTER

Hello Neighbor!

You have an opportunity to participate in research
about your neighborhood!

My name is Stephanie Timm and I am a second year graduate student at Cal Poly- San Luis Obispo in the Master of City and Regional Planning program. I am conducting research for my Master's Thesis in select southern California neighborhoods. The purpose of the study is to examine the various attributes of these different neighborhoods.

As a resident of one of the case study neighborhoods, you have been selected to participate in this research study by completing the enclosed questionnaire. ***Your responses are greatly valued and are necessary for me to carry out my research objectives.***

This questionnaire should take no longer than 10 minutes of your time. This is an anonymous survey to protect your privacy, so please do not write your name or address on any of the response materials. You may choose to skip any questions you do not want to answer. Please return the completed questionnaire in the pre-stamped, addressed envelope by Friday, April 2, 2010.

Thank you for taking the time to read this letter, completing the questionnaire, and participating in this research project about your neighborhood!

Return Information:

Please return questionnaire no later than
Friday, April 2, 2010 to:

California Polytechnic State University
City and Regional Planning Department
Attention: Stephanie Timm
1 Grand Avenue
San Luis Obispo, CA 93407

Sincerely,

APPENDIX B: INSTRUMENT

	Your agreement with the statement					How important the statement is for you				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not important at all	Unimportant	Doesn't matter	Important	Very important
I regularly participate in recreational activities (e.g., art tours, hiking, biking, farmers markets, concerts, etc.)										
I actively try to reduce the amount of air pollution I emit (from vehicle use, electricity use, etc.)										
I actively try to use energy that is produced from renewable resources (e.g., solar, wind, geothermal, etc.)										
I actively try to reduce the amount of fresh water I use.										
I actively try to reduce the amount of waste I produce.										
I actively try to buy local products / produce.										
I actively try to recycle.										
I do not feel stressed/anxious often.										
I am satisfied with my personal health.										
I am satisfied with my life.										
I have high self-esteem.										
Open-ended Questions:										
What would you like to preserve in your neighborhood?										
What would you like to add to your neighborhood?										
What would you like to remove from your neighborhood?										
What would you like to keep out of your neighborhood?										

Neighborhood Survey

The following survey is collecting information for a graduate student research project that is taking place at Cal Poly- San Luis Obispo. The objective of the project is to examine the attributes of different neighborhoods. Please answer the following questions based on your experiences within your current neighborhood.

Demographic Information (Circle One)

How many people currently live or are staying in this household?	1	2	3	4	5	6 or more
What is your age?	18 – 29 years	30 – 39 years	40 – 49 years	50 – 59 years	60 – 69 years	Over 70
What is the highest level of education attained within your household?	No high school diploma	Some college no degree	Associates degree	Bachelor's degree	Master's degree	Doctoral degree
Is your house / apartment:	Owned by you or someone in the household with a mortgage or loan?		Owned by you or someone in the household free and clear (without a mortgage or loan?)		Rented?	Occupied without payment of rent?
How long have you lived in your house / apartment?	Less than 1 year	1 year to 5 years	6 years to 10 years	11 years to 15 years	16 years to 20 years	21 years or more
In what range does your household income fall?	Less than \$29,999	\$30,000 - \$59,999	\$60,000 - \$89,999	\$90,000 - \$119,999	\$120,000 - \$149,999	Over \$150,000

Please rate the following statements based on your agreement with them and how important each sentence is to you. To the right of each statement, two scales are provided for your respective ratings.

	Your agreement with the statement					How important the statement is for you				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not important at all	Unimportant	Doesn't matter	Important	Very important
Environment										
There are many transportation options near my neighborhood.										
There is a lot of vehicular traffic in and adjacent to my neighborhood.										
I regularly use the bicycle paths/lanes/trails near my neighborhood.										
I use the public transportation systems near my neighborhood often.										
I am satisfied with the quality of public transportation in my neighborhood.										
There are medical amenities that are easily accessible to my neighborhood.										
There are many shops / services available within ½ mile radius of my neighborhood.										
I am satisfied with the number of services located within ½ mile of my neighborhood.										
I am satisfied with the different types of services located within ½ mile of my neighborhood.										
I am satisfied with the number of recreational possibilities (e.g., parks, farmers markets, art tours, trails, etc.) within ½ mile from my household.										
My family and I feel completely safe within the neighborhood we live within.										
I feel safe in my neighborhood at home during the day.										
I feel safe in on my neighborhood block during the day.										
Community										
I am interested in what goes on within my community.										
I feel like I belong within my community.										

	Your agreement with the statement					How important the statement is for you				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not important at all	Unimportant	Doesn't matter	Important	Very important
I agree with the values and beliefs held by the majority of people within my community.										
I feel my voice is heard when I want changes in this community.										
I am satisfied with the socio-economic status of my neighborhood.										
I am satisfied with improvement efforts in my neighborhood.										
Housing										
I am satisfied with the housing conditions I currently reside within.										
I am satisfied with the living area within my personal household.										
The housing within my neighborhood is affordable.										
I am satisfied with the economic value of my home.										
Employment										
I am satisfied with the availability of job opportunities near my neighborhood.										
I am currently employed.										
The job I have is stable and secure.										
I work in a safe environment.										
I have a good balance of work and non-working life.										
I am satisfied with the number of hours I work each week.										
I am satisfied with the income and benefits offered by my employer.										
Personal										
I own or have easy access to a car.										

APPENDIX C: INSTRUMENT HUMAN SUBJECTS LETTER

INFORMED CONSENT TO PARTICIPATE IN NEIGHBORHOOD SURVEY

A research project on neighborhood attributes is being conducted by Stephanie Timm in the Department of City and Regional Planning at Cal Poly, San Luis Obispo. The purpose of the study is to examine the various attributes of different neighborhoods in southern California. This research will aid in the increased understanding of neighborhood planning.

You are being asked to take part in this study by completing the attached/enclosed questionnaire(s). Your participation will take approximately ten minutes. Please be aware that you are not required to participate in this research and you may discontinue your participation at any time without penalty. You may also omit any items on the questionnaire(s) you prefer not to answer. Your responses will be provided anonymously to protect your privacy.

If you have questions regarding this study or would like to be informed of the results when the study is completed, please feel free to contact Stephanie Timm at 805-756-1592. If you have questions or concerns regarding the manner in which the study is conducted, you may contact Dr. Steve Davis, Chair of the Cal Poly Human Subjects Committee, at 756-2754, sdavis@calpoly.edu, or Dr. Susan Opava, Dean of Research and Graduate Programs, at 756-1508, sopava@calpoly.edu.

If you agree to voluntarily participate in this research project as described, please indicate your agreement by completing and returning the attached questionnaire. Please retain this consent cover form for your reference, and thank you for your participation in this research.

APPENDIX D: DEPOT WALK LEED-ND CHECKLIST

	LEED For Neighborhood Development	Points
Smart Location & Linkage	Preferred Location (previously developed infill site)	7
	Reduced Auto Dependence (1/4 mile max. to bus stop)	2
	Steep Slope Protection	1
	Housing and Jobs Proximity	3
	School Proximity	1
Neighborhood Pattern & Design	Compact Development	1
	Diversity of Uses (1/2 mile max. to neighborhood services)	4
	Reduced Parking Footprint	2
	Community Outreach and Involvement	1
Green Construction & Technology	LEED Certified Green Buildings	3
	Energy Efficiency	3
	Min. Site Disturbance Through Site Design & Construction	2
	Stormwater Management	2
	Solar Orientation	1
	Energy Generation	1
	Construction Waste Management	1
	Comprehensive Waste Management (Recycling)	1
	Light Pollution Reduction	1
Innovation & Design Process	LEED Accredited Professional	1
	Innovation In Design	3
Total	Minimum 40 Points for Certified	41

APPENDIX E: ORANGE SUBURB LEED-ND CHECKLIST

LEED for Neighborhood Development Pilot Draft Project Checklist

Project Name: Orange Suburb

Project City: Orange Project State: CA

***Note:** Registration for the LEED for Neighborhood Development Pilot Program is closed; registration for the fully launched program is planned to open in late 2009, pending USGBC member ballot approval.

Yes	?	No		
3		79	Project Totals (Pre-Certification Estimates)	
			106 Points	
			Certified: 40-49 points	Silver: 50-59 points
			Gold: 60-79 points	Platinum: 80-106 points

Yes	?	No		
1		29	Smart Location & Linkage	
			30 Points	
Yes			Prereq 1	Smart Location
Yes			Prereq 2	Proximity to Water and Wastewater Infrastructure
Yes			Prereq 3	Imperiled Species and Ecological Communities
Yes			Prereq 4	Wetland and Water Body Conservation
Yes			Prereq 5	Farmland Conservation
Yes			Prereq 6	Floodplain Avoidance
		2	Credit 1	Brownfield Redevelopment
		1	Credit 2	High Priority Brownfields Redevelopment
		10	Credit 3	Preferred Location
		8	Credit 4	Reduced Automobile Dependence
		1	Credit 5	Bicycle Network
		3	Credit 6	Housing and Jobs Proximity
1			Credit 7	School Proximity
		1	Credit 8	Steep Slope Protection
		1	Credit 9	Site Design for Habitat or Wetlands Conservation
		1	Credit 10	Restoration of Habitat or Wetlands
		1	Credit 11	Conservation Management of Habitat or Wetlands

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No			
		18	Neighborhood Pattern & Design		39 Points
Yes			Prereq 1	Open Community	Required
Yes			Prereq 2	Compact Development	Required
		7	Credit 1	Compact Development	7
		4	Credit 2	Diversity of Uses	4
		3	Credit 3	Diversity of Housing Types	3
		2	Credit 4	Affordable Rental Housing	2
		2	Credit 5	Affordable For-Sale Housing	2
		2	Credit 6	Reduced Parking Footprint	2
		8	Credit 7	Walkable Streets	8
		2	Credit 8	Street Network	2
		1	Credit 9	Transit Facilities	1
		2	Credit 10	Transportation Demand Management	2
		1	Credit 11	Access to Surrounding Vicinity	1
1			Credit 12	Access to Public Spaces	1
1			Credit 13	Access to Active Public Spaces	1
		1	Credit 14	Universal Accessibility	1
		0	Credit 15	Community Outreach and Involvement	1
		1	Credit 16	Local Food Production	1

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No		
1		27	Green Construction & Technology	31 Points

Yes			Prereq 1	Construction Activity Pollution Prevention	Required
		3	Credit 1	LEED Certified Green Buildings	3
		3	Credit 2	Energy Efficiency in Buildings	3
		0	Credit 3	Reduced Water Use	3
		2	Credit 4	Building Reuse and Adaptive Reuse	2
		1	Credit 5	Reuse of Historic Buildings	1
		1	Credit 6	Minimize Site Disturbance through Site Design	1
		1	Credit 7	Minimize Site Disturbance during Construction	1
		1	Credit 8	Contaminant Reduction in Brownfields Remediation	1
		5	Credit 9	Stormwater Management	5
		1	Credit 10	Heat Island Reduction	1
		1	Credit 11	Solar Orientation	1
		1	Credit 12	On-Site Energy Generation	1
		1	Credit 13	On-Site Renewable Energy Sources	1
		1	Credit 14	District Heating & Cooling	1
		1	Credit 15	Infrastructure Energy Efficiency	1
		1	Credit 16	Wastewater Management	1
		1	Credit 17	Recycled Content for Infrastructure	1
		1	Credit 18	Construction Waste Management	1
		1	Credit 19	Comprehensive Waste Management	1
1			Credit 20	Light Pollution Reduction	1

Yes	?	No		
1		5	Innovation & Design Process	5 Points

		1	Credit 1.1	Innovation in Design: Provide Specific Title	1
		1	Credit 1.2	Innovation in Design: Provide Specific Title	1
		1	Credit 1.3	Innovation in Design: Provide Specific Title	1
		1	Credit 1.4	Innovation in Design: Provide Specific Title	1
		1	Credit 1.5	Innovation in Design: Provide Specific Title	1
1		0	Credit 2	LEED® Accredited Professional	1

APPENDIX F: PASEO COLORADO LEED-ND CHECKLIST

LEED for Neighborhood Development Pilot Draft Project Checklist

Project Name: Paseo Colorado

Project City: Pasadena Project State: CA

***Note:** Registration for the LEED for Neighborhood Development Pilot Program is closed; registration for the fully launched program is planned to open in late 2009, pending USGBC member ballot approval.

Yes	?	No		
46		0	Project Totals (Pre-Certification Estimates)	
			106 Points	
			Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80-106 points	

Yes	?	No		
21		0	Smart Location & Linkage	
			30 Points	
Yes			Prereq 1	Smart Location
Yes			Prereq 2	Proximity to Water and Wastewater Infrastructure
Yes			Prereq 3	Imperiled Species and Ecological Communities
Yes			Prereq 4	Wetland and Water Body Conservation
Yes			Prereq 5	Farmland Conservation
Yes			Prereq 6	Floodplain Avoidance
		0	Credit 1	Brownfield Redevelopment
		0	Credit 2	High Priority Brownfields Redevelopment
8			Credit 3	Preferred Location
7			Credit 4	Reduced Automobile Dependence
1			Credit 5	Bicycle Network
3			Credit 6	Housing and Jobs Proximity
1			Credit 7	School Proximity
1			Credit 8	Steep Slope Protection
		0	Credit 9	Site Design for Habitat or Wetlands Conservation
		0	Credit 10	Restoration of Habitat or Wetlands
		0	Credit 11	Conservation Management of Habitat or Wetlands

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No			
23		0	Neighborhood Pattern & Design		39 Points
Yes			Prereq 1	Open Community	Required
Yes			Prereq 2	Compact Development	Required
3			Credit 1	Compact Development	7
4			Credit 2	Diversity of Uses	4
		0	Credit 3	Diversity of Housing Types	3
		0	Credit 4	Affordable Rental Housing	2
		0	Credit 5	Affordable For-Sale Housing	2
2		0	Credit 6	Reduced Parking Footprint	2
7			Credit 7	Walkable Streets	8
		0	Credit 8	Street Network	2
1			Credit 9	Transit Facilities	1
1	1		Credit 10	Transportation Demand Management	2
1			Credit 11	Access to Surrounding Vicinity	1
1			Credit 12	Access to Public Spaces	1
1		0	Credit 13	Access to Active Public Spaces	1
1	1		Credit 14	Universal Accessibility	1
1			Credit 15	Community Outreach and Involvement	1
		0	Credit 16	Local Food Production	1

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No		
1		0	Green Construction & Technology	31 Points

Yes	?	No			
		0	Prereq 1	Construction Activity Pollution Prevention	Required
			Credit 1	LEED Certified Green Buildings	3
			Credit 2	Energy Efficiency in Buildings	3
			Credit 3	Reduced Water Use	3
1			Credit 4	Building Reuse and Adaptive Reuse	2
			Credit 5	Reuse of Historic Buildings	1
			Credit 6	Minimize Site Disturbance through Site Design	1
			Credit 7	Minimize Site Disturbance during Construction	1
			Credit 8	Contaminant Reduction in Brownfields Remediation	1
			Credit 9	Stormwater Management	5
			Credit 10	Heat Island Reduction	1
			Credit 11	Solar Orientation	1
			Credit 12	On-Site Energy Generation	1
			Credit 13	On-Site Renewable Energy Sources	1
			Credit 14	District Heating & Cooling	1
			Credit 15	Infrastructure Energy Efficiency	1
			Credit 16	Wastewater Management	1
			Credit 17	Recycled Content for Infrastructure	1
			Credit 18	Construction Waste Management	1
			Credit 19	Comprehensive Waste Management	1
			Credit 20	Light Pollution Reduction	1

Yes	?	No		
1			Innovation & Design Process	5 Points

			Credit 1.1	Innovation in Design: Provide Specific Title	1
			Credit 1.2	Innovation in Design: Provide Specific Title	1
			Credit 1.3	Innovation in Design: Provide Specific Title	1
			Credit 1.4	Innovation in Design: Provide Specific Title	1
			Credit 1.5	Innovation in Design: Provide Specific Title	1
1			Credit 2	LEED® Accredited Professional	1

APPENDIX G: PASADENA SUBURB LEED-ND CHECKLIST

LEED for Neighborhood Development Pilot Draft Project Checklist

Project Name: Pasadena Suburb

Project City: Pasadena Project State: CA

***Note:** Registration for the LEED for Neighborhood Development Pilot Program is closed; registration for the fully launched program is planned to open in late 2009, pending USGBC member ballot approval.

Yes	?	No		
2		78	Project Totals (Pre-Certification Estimates)	
			106 Points	
			Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80-106 points	

Yes	?	No		
1		29	Smart Location & Linkage	
			30 Points	
Yes			Prereq 1	Smart Location Required
Yes			Prereq 2	Proximity to Water and Wastewater Infrastructure Required
Yes			Prereq 3	Imperiled Species and Ecological Communities Required
Yes			Prereq 4	Wetland and Water Body Conservation Required
Yes			Prereq 5	Farmland Conservation Required
Yes			Prereq 6	Floodplain Avoidance Required
		2	Credit 1	Brownfield Redevelopment 2
		1	Credit 2	High Priority Brownfields Redevelopment 1
0		10	Credit 3	Preferred Location 10
0		8	Credit 4	Reduced Automobile Dependence 8
0		1	Credit 5	Bicycle Network 1
0		3	Credit 6	Housing and Jobs Proximity 3
0		1	Credit 7	School Proximity 1
1		0	Credit 8	Steep Slope Protection 1
		1	Credit 9	Site Design for Habitat or Wetlands Conservation 1
		1	Credit 10	Restoration of Habitat or Wetlands 1
		1	Credit 11	Conservation Management of Habitat or Wetlands 1

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No	Neighborhood Pattern & Design		39 Points
0		18			
Yes			Prereq 1	Open Community	Required
Yes			Prereq 2	Compact Development	Required
0		7	Credit 1	Compact Development	7
0		4	Credit 2	Diversity of Uses	4
0		3	Credit 3	Diversity of Housing Types	3
0		2	Credit 4	Affordable Rental Housing	2
0		2	Credit 5	Affordable For-Sale Housing	2
0		2	Credit 6	Reduced Parking Footprint	2
0		8	Credit 7	Walkable Streets	8
0		2	Credit 8	Street Network	2
0		1	Credit 9	Transit Facilities	1
0	1	2	Credit 10	Transportation Demand Management	2
0		1	Credit 11	Access to Surrounding Vicinity	1
0		1	Credit 12	Access to Public Spaces	1
0		1	Credit 13	Access to Active Public Spaces	1
0	1	1	Credit 14	Universal Accessibility	1
0		1	Credit 15	Community Outreach and Involvement	1
0		1	Credit 16	Local Food Production	1

LEED for Neighborhood Development Pilot Draft Project Checklist

Yes	?	No		
0		31	Green Construction & Technology	31 Points

Yes			Prereq 1	Construction Activity Pollution Prevention	Required
		3	Credit 1	LEED Certified Green Buildings	3
		3	Credit 2	Energy Efficiency in Buildings	3
		3	Credit 3	Reduced Water Use	3
0		2	Credit 4	Building Reuse and Adaptive Reuse	2
		1	Credit 5	Reuse of Historic Buildings	1
		1	Credit 6	Minimize Site Disturbance through Site Design	1
		1	Credit 7	Minimize Site Disturbance during Construction	1
		1	Credit 8	Contaminant Reduction in Brownfields Remediation	1
		5	Credit 9	Stormwater Management	5
		1	Credit 10	Heat Island Reduction	1
		1	Credit 11	Solar Orientation	1
		1	Credit 12	On-Site Energy Generation	1
		1	Credit 13	On-Site Renewable Energy Sources	1
		1	Credit 14	District Heating & Cooling	1
		1	Credit 15	Infrastructure Energy Efficiency	1
		1	Credit 16	Wastewater Management	1
		1	Credit 17	Recycled Content for Infrastructure	1
		1	Credit 18	Construction Waste Management	1
		1	Credit 19	Comprehensive Waste Management	1
		1	Credit 20	Light Pollution Reduction	1

Yes	?	No		
1			Innovation & Design Process	5 Points

			Credit 1.1	Innovation in Design: Provide Specific Title	1
			Credit 1.2	Innovation in Design: Provide Specific Title	1
			Credit 1.3	Innovation in Design: Provide Specific Title	1
			Credit 1.4	Innovation in Design: Provide Specific Title	1
			Credit 1.5	Innovation in Design: Provide Specific Title	1
1			Credit 2	LEED® Accredited Professional	1