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Highland Redevelopment Master Plan

Feasibility Study of achieving LEED ND Certification

APPROVED BY

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Highland Redevelopment Master Plan

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By

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Report

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Highland Redevelopment Master Plan

Feasibility Study of achieving LEED ND Certification

By

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The University of Texas at Austin, 2014

SUPERVISOR: Terry Kahn

This report studies the specific case of the Highland Redevelopment Master Plan as if would pursue a LEED ND certification. It highlights the major issues observed to fulfill compliance of LEED ND minimum requirements as it is proposed, as well as the importance of achieving this certification as a means to define a performance level of the development.

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Chapter 1: Introduction

Report Overview

While many American metropolitan regions continue with their outward and peripheral growth, signs of environmental and financial trouble are commonly recognized within these regions. With "Big-box" centers (large retailers) declining their business success in suburban areas and many jurisdictions looking to alter their zoning codes to encourage more compact development, there has been an increase of opportunities to create walkable, urban places in areas where large retailers used to operate successfully.

As IMAGINE AUSTIN[1] goals are encouraging the creation of a compact and connected city, this report describes an analysis that showcases the level of connectivity and compact development proposed for the Highland Mall Redevelopment.

Both, Imagine Austin and The Capital Area Metropolitan Planning Organization (CAMPO) 2035 Regional Growth Concept designate the area where Highland Mall lays as a Regional Center. This designation, among the goals of Imagine Austin, encourages this redevelopment to perform successfully not only in terms of job generation and housing balance, but also in terms of connectivity and compact development, as well as broader goals of smart growth and environmental sustainability.

According to the Imagine Austin Plan:

[1] Comprehensive Plan for Austin, TX. See http://austintexas.gov/imagineaustin

"Regional Centers are the most urban places in the region. These centers are, and will become, the retail, cultural, and entertainment destinations for Central Texas. These are the places where the greatest density of people and jobs, and the tallest buildings in the region will be located. Housing in regional centers will mostly consist of low to high-rise apartments, mixed use buildings, rowhouses, and townhouses. However, other housing types may be included depending on the location and character of the center and can include single family neighborhoods."[2]

Highland Mall was the first mall in the city of Austin, TX. This superstructure of about 1 million square feet of conditioned space is located on an 80-acre site along Airport Boulevard, just north of Hwy 290 East[3]. While the market, demographics and other factors in the city changed over time, this mall experienced a reduced amount of visits and commercial activity decrease, creating the opportunity for a local College (Austin Community College) to acquire the property and develop a proposal of retrofitting buildings and land development in the underutilized surface parking areas. The current land development proposal, aims to include a core of educational and administrative uses that will support ACC's goals, as well as residential, vertical mixed-use components, and commercial office buildings.

This report looks at the specific early decisions that are being taken by the involved stakeholders in this process, and analyzes their performance while placing the proposed redevelopment among a specific rating system requirements and thresholds.

[2] Imagine Austin, Appendix C. Glossary
[3] See Chapter 04 – Map 1: Location & Current Site Map

LEED ND - A Performance Evaluation Tool

While Central Texas is characterized by cities with orientation to automobile use, Austin's current comprehensive plan aims to take as models places that are denser and less automobile oriented. Thresholds for defining the level of Connectivity and Compact Development are needed when a Comprehensive Plan is not specific with expected performance metrics and indicators.

The rating system used as a base for the measurement of levels of connectivity, shown in this analysis, comes as an alternative standard of measurement to(the Central Texas Sustainability Indicators Project[4]. LEED ND[5] (LEED for Neighborhood Development) is used as a performance evaluation tool to evaluate levels of Connectivity and Compact Development.),

Unlike any other rating systems created by the USGBC, LEED ND, it is a rating system that has been developed in a partnership between The NRDC (Natural Resources Defense Council), The CNU (Congress for New Urbanism), and The USGBC (United States Green Building Council). This unique tool has been consistently supporting developments to reach their sustainable goals, utilizing smart growth principles, green building strategies, and environmentally friendly concepts.

LEED for Neighborhood Development (LEED ND) can be used as an urban design tool in appropriate locations to encourage developments that improve the quality of these areas and address important characteristics of green building and smart growth, transforming environments into walkable communities that are vibrant and where people can live, work and play.

Chapter 2 in this report outlines the LEED ND rating system and the intended focus of its 3 categories of performance evaluation: Smart Location and Linkages (SLL), Neighborhood Pattern

[4] See *www.centex-indicators.org*
[5] LEED ND – Green Neighborhood Development. Rating system by the USGBC (http://www.usgbc.org/neighborhoods)

and Design (NPD), and Green Infrastructure and Building (GIB). That chapter also showcases a general overview of the rating system and its appropriate use for large-scale projects.

Research Questions and Goals

What level of Connectivity and Compact Development proposed is achieved by this Redevelopment Proposal?

This report aims to measure levels of Connectivity and Compact Development through the production of a series of maps as the visual representation of the goals achieved by this redevelopment proposal, using the LEED ND rating tool (and its referenced standards) as a base of measurements.

While this report focuses on the performance and compliance of requirements within the mentioned standard, it also aims to outline strategies that are used in conjunction with the rating system itself when redeveloping areas with similar characteristics as the one in study. These strategies are commonly listed as general ideas that are addressed by some or many of the credits in the LEED ND rating system.

It is also recognized through this report that the strategies taken as a basis of design (when looking at compact and connected communities), could drag potential benefits related to the improvement of social, economic and environmental factors.

Would the Developer in Partnership with ACC (Austin Community College) be able to pursue a LEED ND certification if there are not big financial expenditures associated to the investment and its effort?

While this report assesses some indicators of Connectivity and Compact Development, some quantifiable recommendations are made to the Developer and Planning Team. These recommendations will serve as an argument in the decision making process of the Development Partnership. It is important for every stakeholder in this Partnership that an educated decision is made if they are planning to pursue a LEED for Neighborhood Development (ND) certification.

As an institutional commitment, ACC has a policy of achieving LEED certification for all their buildings. This commitment could push the envelope to a next level of consideration and attitude towards sustainability practices that consider community impact instead of just a site and its building factors.

Methodology

The existence of a plan for retrofitting a site in evident decrease of activity is evidence of a recognized opportunity in a specific market and location. Stakeholders will take these opportunities of transformation to create places that could be more difficult and challenging to create in established urban fabrics. The methods employed while achieving these transformations are becoming clearer in terms of how suburban fabrics are transformed with the use of Design Guidelines. LEED ND is a tool that will not only help achieving development goals, but is as well a platform of support and credibility for local governments and communities.

Although LEED ND is not a zoning code, the strategies laid out in the form of prerequisites and credits in this rating system will help urban designers assure sustainable goals at the same time as creating places that are vibrant and walkable. LEED ND has been designed and developed to apply the principles of smart growth and ensure a good balance between tactics applied in the developments.

This report looks at design decisions of the Highland Mall Redevelopment (HMR) proposed Master Plan and measures its performance through a series of established frameworks and thresholds. This analysis is a 3-step process that involves:

1. Definition and Classification of the site area as an Infill Site.

2. LEED ND Prerequisites Review in the categories:

   - Smart Location and Linkages (SLL)
   - Neighborhood Pattern and Design (NPD)

3. Graphic Representation of findings for steps 1 & 2.

While some challenges are still present when sites like this try to be retrofitted, a set of recommendations[6] are also portrayed to the Planning Team and Developer, so that early decisions benefit future development. Some of the existing challenges are strictly related to existing suburban codes and standards, as well as market demands that currently support high parking ratios. Opportunities for local governments are there to look into better relationships for connectivity and transit service.

Since this is a large-scale development, other challenges are related to the creation of real places with pride and character, avoiding "faux urbanism". Creating and considering the balance of costs and benefits of phasing developments are also challenges for long-range, large-scale developments; but opportunities should be clearly outlined to understand the trade-offs of these retrofits.

As a general overview of this analysis, Chapter 3 of this report outlines the opportunities that could be observed early in a planning process for this type of development. These strategies outlined there

[6] See Chapter 5: Conclusions and Recommendations

are a summary of basic steps for planners to maximize future development benefits in terms of social, economic and environmental factors.

Chapter 2: Theoretical Background

Chapter Overview

The Highland Neighborhood used to be a peripheral suburb of the City of Austin, predominantly dominated by single-family settings and a few large sites that conglomerated commercial activities and/ or educational functions. With market trends and suburban areas growing in the periphery, a consequent decline of commercial activity in the Highland Mall became evident through time, originating a unique opportunity for a large-scale retrofit.

While opportunities to retrofit large-scale sites like this are not very common if these sites are in close proximity to urban settings, challenges could be as similar, difficult and challenging as retrofits in suburban areas. For cases like Highland Redevelopment (HR) are few and could take years to complete the entire community development, some theoretical background of strategies applied to early decisions are needed to understand an appropriate and successful approach when planning this specific type of large-scale retrofits.

It is extremely important to understand the background of the setting where the retrofit is being applied in terms of its history, market trends, current economic performance, demographics and environmental indicators that outline its current performance as a Regional Center.

While this chapter starts with an analysis of the area in study and its immediate surroundings, in order to build up knowledge of the community at large, its character and

performance; the understanding of theoretical principles and utilized methods of this analysis is also outlined in this chapter.

This Chapter consists of three sections that explain (1) the background, history, and performance of the area in study, (2) general definitions and principles of Smart Growth and New Urbanism, and (3) the general overview of the LEED ND rating system as an integrative tool for planning and urban design.

I. Background, History and Performance of the Area

Highland Mall and Surroundings – A Common Vision

As part of the Neighborhood Planning efforts within the City of Austin, the area compromised in this study and its surrounding neighborhoods are included in several adopted plans, as well as several current planning processes. As briefly mentioned before in Chapter 1, the area in study is considered by these plans as an important Activity Center within the city of Austin.

The adopted neighborhood plans included in this area aim to preserve their visions, priorities, and aspirations that are geared towards common goals. These goals are mainly focused on the improvement of walkability, the encouragement and promotion of mix of uses, as well as the intent to increase diversity of housing options.

The adopted neighborhood plans that encompass this Activity Center are:

- The Saint Johns / Coronado Hills Neighborhood Plan (2012),
- The North Lamar / Georgian Acres Neighborhood Plan (2010),

- The University Hills/Windsor Park Combined Neighborhood Plan (2007),
- The Crestview/Wooten Combined Neighborhood Plan (2004),
- The Brentwood/Highland Combined Neighborhood Plan (2004), and
- The North Loop Neighborhood Plan (2002).

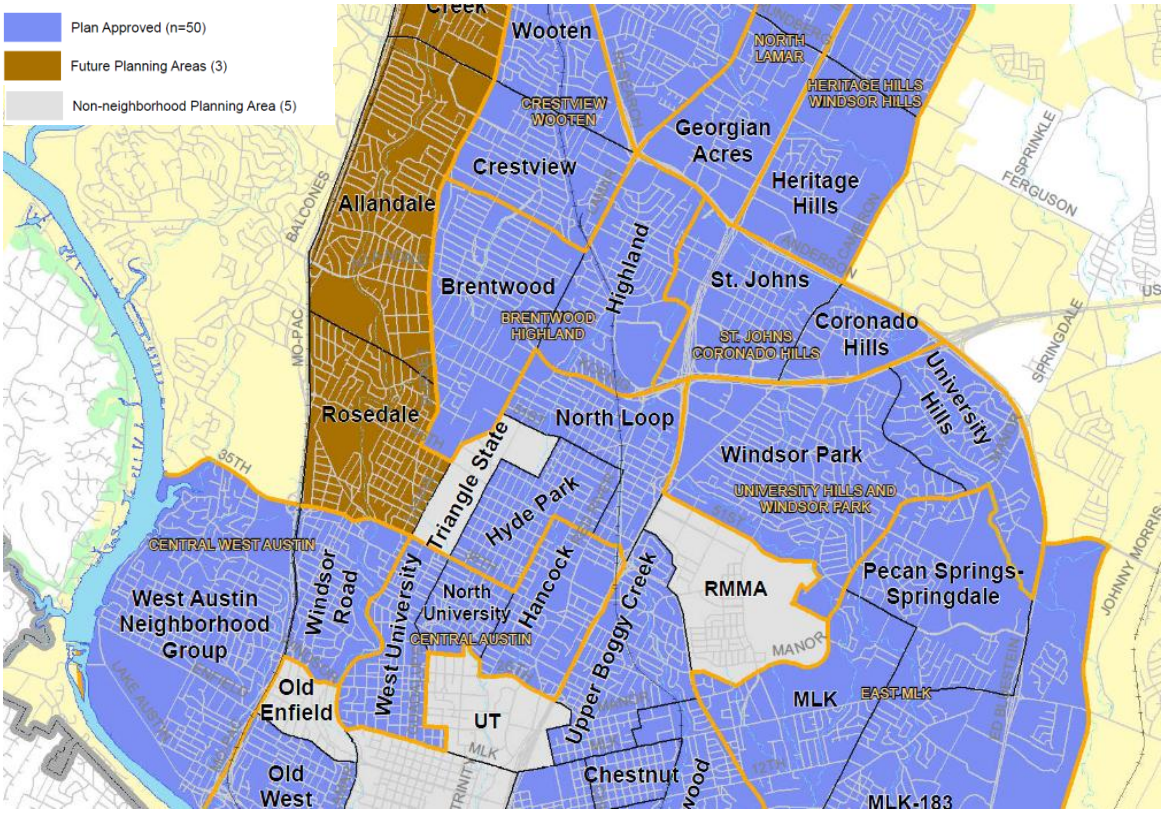


Fig 1 *| City of Austin Neighborhood Planning Areas. Highland Neighborhood and surroundings. Status as of July 2013*

Source: City of Austin, Planning and Review Department

Among these adopted plans, other similar efforts in the surroundings have produced very similar outcomes from their visions and goals. The Brentwood/Highland Combined Neighborhood Plan; and The St. John's- Coronado Hills Combined Neighborhood Plan also encourage vividly

similar goals and priorities. All these plans have the intention to guide development and take advantage of the benefits of compact developments and connected, walkable, and vibrant urban areas.

In parallel to these planning processes in progress, the Airport Boulevard Form-Based Code Initiative[1] emphasizes the conceptual idea of The Imagine Austin Plan: to develop a compact and connected city. The Airport Boulevard Mobility Corridor Study[2] is an analysis that examines the entire length of Airport Boulevard, including the Highland Activity Center, and specifically the Highland Mall site. The goal of this study was to identify short, medium, and long-term transportation improvements that address safety and accessibility for drivers, cyclists, pedestrians, and transit users while improving the quality of life for those who live and work in the corridor.

Fig 2 *| Airport Boulevard Corridor*
Source: Airport Boulevard Mobility Corridor Study

[1] See http://airportboulevard.com/
[2] See http://airportboulevard.com/?q=airport-boulevard-mobility-corridor-study

The Capital Area Metropolitan Planning Organization (CAMPO), in 2010 looked into Central Texas at a larger scale, analyzing the city of Austin and its surroundings to identify Centers and conceptually categorized them according to their size and influence. The Highland Area was recognized as one of these conceptual Centers[3].

With more zoning codes and city plans encouraging and converging in similar visions, priorities and ambitions; a unified goal of developing a connected and compact city is clearly ruling the intention of future developments in the city of Austin. A series of interconnected centers of different sizes, where densities are higher will build up to the City character and its surroundings.

[3] See Fig 3.

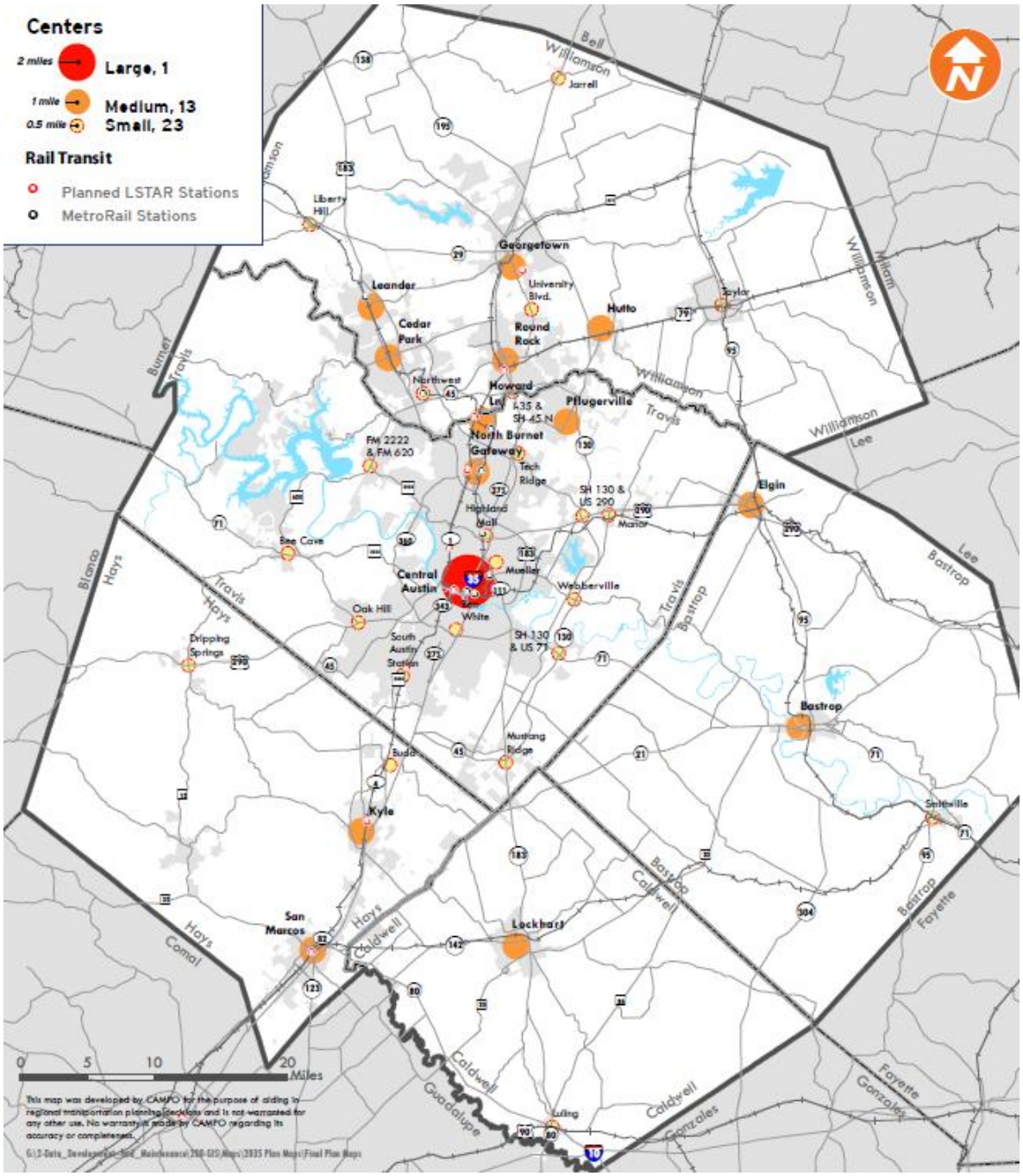


Fig 3 *| CAMPO Conceptual Centers. 2010*

Source: CAMPO

Jobs and Population of the Highland Activity Center

The Highland Activity Center and its classification according to the CAMPO Conceptual Centers as a "Small Center" is consistent with the proportional numbers of this centers' representation in terms of quantities for jobs and residents.

According to CAMPO, by 2007 this Activity Center had 6,000 jobs, which represented 0.9% of the jobs in the region (area outlined in the map of figure 3). The Activity center had as well 3,000 residents, which accounted for 0.2% of the population in the region. These numbers clearly showcase the proportion and influence that this center represents in the region.

Although this Activity Center is classified as a "Small Center, with a radius of influence of around ½ mile; other similar-size centers in this category have not yet met their projected target: to reach between 2,000 and 10,000 residents and jobs; a standard that this center already meets.

CAMPO aims for every conceptual center to meet certain future criteria and characteristics that are consistent with[4]:

- Approach of a healthy mix of employment and housing,
- More intensive development compared to its surrounding areas,
- Have a strong pedestrian orientation,
- Have a strong connection to their surroundings through a mix of transportation options.

While this proportional analysis [5] of jobs and residents includes the Census Tracts showcased in Figure 4 –which does not compromise the symbolic ½-mile sphere of influence of CAMPO's

[4] CAMPO Regional Growth Concept; pages 3-4
[5] See "Highland Activity Center – Performance for Detailed Performance Indicators Analysis

conceptual centers—, this selection is consistent to the Market Assessment that The Airport Boulevard Mobility Corridor Study applies.

Fig 4 *| Census Tracts encompassing the Highland Activity Center*
Source: Gateway Planning Group, TXP, Inc.

The Census Tracts used for this analysis included:

- Census Tract 15.03, Block groups 1, 2, 3, and 4;
- Census Tract 21.05, Block Group 3; and
- Census Tract 3.04, Block Groups 1 and 2.

History and Character of the Highland Activity Center

Before the Highland Activity Center was recognized as a commercial center with a larger retailer box development, this area experienced a wide variety of different uses. The Highland Mall opened its doors in 1971 as the city's first suburban shopping mall; but before that, this area shifted its character while transitioning from an Industrial Suburban character to the declining Commercial center that is today.

Between the years 1907 and 1942, when this area was not included within the boundary of the City of Austin, a Home for Black Orphans was situated very close to the current mall site: St. John's Industrial Home.

Before 1940, this area was minimally developed and it was characterized by widely open empty spaces; with the exception of a small Airport that operated between 1938 and 1940 at 111 E. Koenig Ln.[6]. It didn't take too long for this airport to cut operation; it closed shortly after the Mueller Airport, which launched operations in 1930, became bigger and busier.

The area started to develop soon after World War II, due to military activity which derived in many soldiers being sent to college to The University of Texas.[7] It was annexed into the City in 1951 and the Reilly Elementary School opened its doors in 1954.[8]

By1999, because of its proximity to residential areas and its frequency of planes operations, the Mueller Airport was considered undesirable and originated its closure. Soon after this airport

[6] http://www.austinexplorer.com/Locations/ShowLocation.aspx?LocationID=1994
[7] http://www.northfieldna.org/northfield.html
[8] Brentwood/Highland Combined Neighborhood Plan; page. 20.

close, property values increased. Since then, property values have been climbing and redevelopment potential has been increasing.[9]

Until the evident decline of the shopping mall, the opportunity for retrofit the underperforming area of the mall was not as vibrant and clear as Austin Community College sought in its vision for expansion. Over the course of 2010 and 2011, the property of the Highland Mall was gradually purchased by ACC.

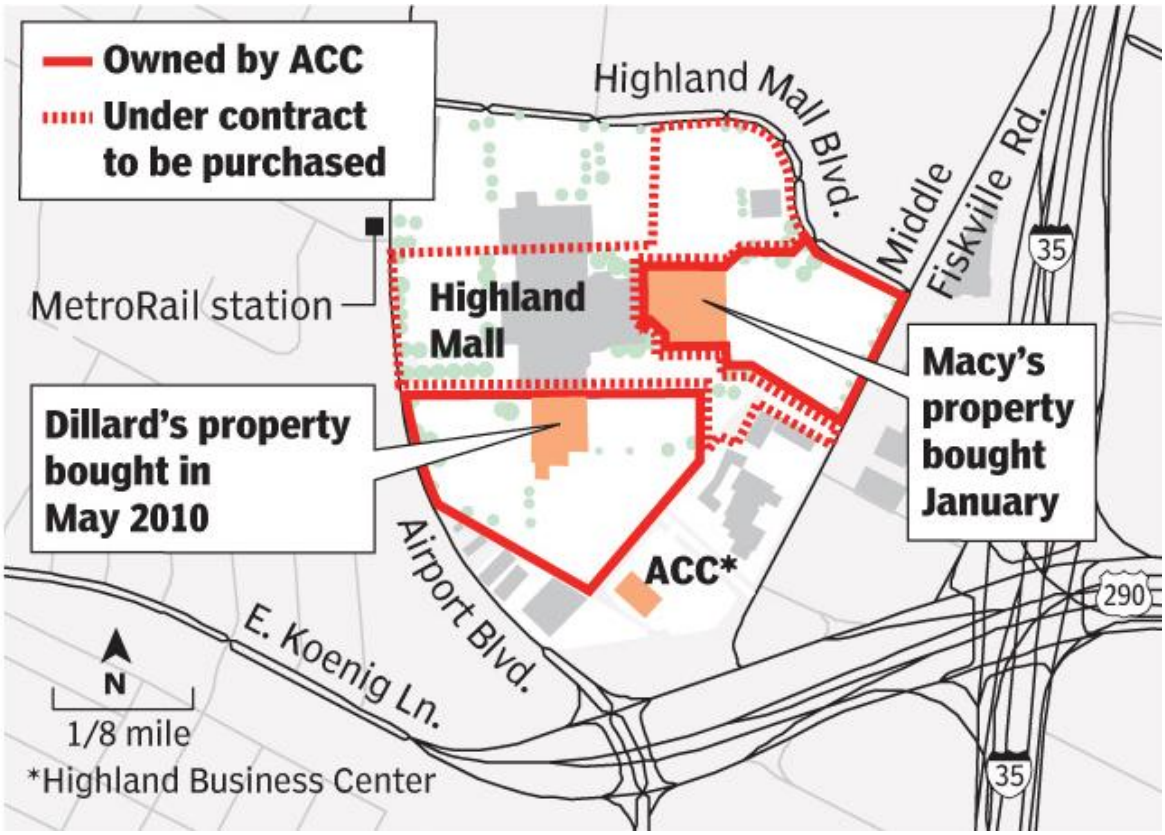


Fig 5 *| Gradual acquisition of the Highland Mall property by ACC. Status by May 2010*
Source: American Statesman

[9] Airport Boulevard Market Analysis; page 21.

This purchase is considered today as one of the factors with most potential to transform this Activity Center. The intention of ACC is to provide educational facilities (and supportive uses) to serve a large amount of students in the existing superstructure left by the Mall.

ACC's large-scale, long-term vision is to also sale gradually the large amount of surface parking areas surrounding the superstructure; which will allow redevelopment around an educational core which will be reusing the existing building structure.[10]

As of late 2013, ACC's bond program advisory committee recommended ACC Highland as the top priority in a list of 11 project needs for the college. This decision comes supported by the board of trustees for ACC, which mention that this development is an important project for the community as a key transformer of the Airport Boulevard Form-Based Code Initiative[11].

ACC Highland is currently included in the vision of revitalizing the 2.5-mile long Airport Boulevard Corridor. The City of Austin has in place a 30-year collective vision for the transformation of this corridor that is being derived from community meetings and workshops. This collective vision aims to create pedestrian-friendly environments with access to multiple types of transportation options, while revitalizing the areas with potential development and preserving the areas with existing character.

The Airport Boulevard Corridor has been aging and transforming, and the Highland Activity Center has always been one of the anchors of this corridor. While the development along the corridor has included major changes such as the Mueller Development just east of I-35, these

[10] American Statesman. Haurwitz, Ralph K.M. August 2011.
[11] Community Impact. Volume 5, Issue 10, September 2013.

changes are building up a new character that focuses on economic development, sustainability and housing affordability.

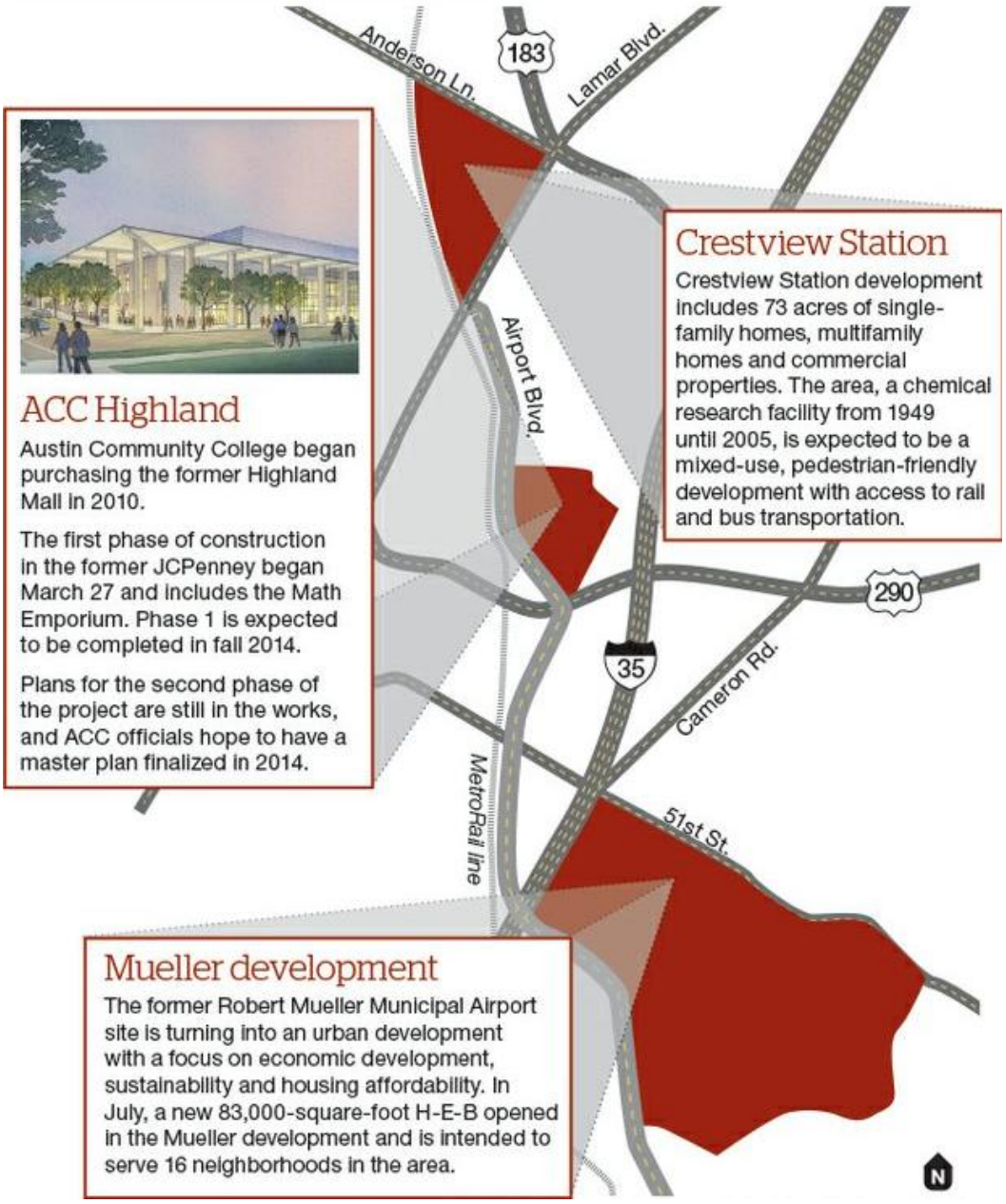


Fig 6 *| Austin Boulevard Corridor at the Highland Activity Center*

Sources: Community Impact. Sept 2013. Austin Community College, Stratus Properties, Inc, Catellus.

Performance Analysis of the Highland Activity Center

As Imagine Austin proposes the creation of a community that is compact and connected, and promotes as well the preservation of residential neighborhoods that "appeal to the ethnic, gender and age diversity of Austin and to all socioeconomic levels"[12], a constructive way to build and be consistent with the city's character has been clearly defined.

In parallel of the definition of an area's character, it is extremely important to understand its performance which will shape the insights of its character. An analysis of demographics, land use, infrastructure, housing, environmental resources, economic development, safety levels, community engagement, neighborhood completeness, and other factors; are useful indicators which help identifying lifestyle indicators and the area's performance.

The analysis shown in the next few pages describe the performance factors mentioned above as a preliminary introduction to the Highland Activity Center's character.

When looking into performance indicators, a good start is to observe the demographic trends. These indicators help predicting needs for services and infrastructure, as well as defining investment climates for specific areas.

According to the US Census Bureau, the population count observed using the census tracts described as the limit of the scope of this analysis[13], confirm that while Austin has experienced a steady growth; the Activity Center area grew until the year 2000, and then declined in terms of population between 2000 and 2010. The chart below shows the different ratios of growth in a parallel comparison between the city as a whole and this Activity Center.

[12] Imagine Austin (Comprehensive Plan); page 76
[13] See section "Jobs an Population of the Highland Activity Center" above

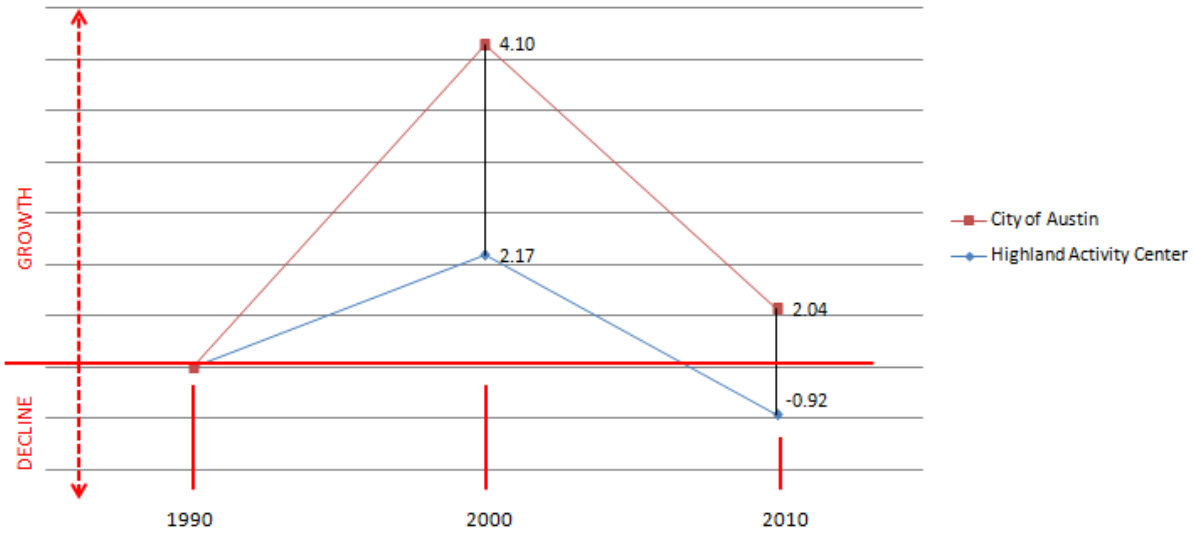


Chart 1 *| Growth Rates for City of Austin and Highland Activity Center*

Sources: Airport Boulevard Market Assessment (2012), US Census Bureau.

While City of Austin kept maintaining a positive growth rate (growing from 465,622 in 1990 to 790,390 residents in 2010), the population in the Highland Activity Center declined from 8,383 to 7,613 residents from the years 2000 to 2010.

In terms of future settlement of residents, the CAMPO 2035 Regional Concept Plan proposes sub area populations attached to traffic corridors. This plan forecasts growth using a modeling tool that assumes the development and distribution of land uses.

According to CAMPO projections, using the Traffic Analysis Zones (TAZ)[14] consistent with the Highland Activity Center area (TAZ 278, 279, 290, 291, 321 and 320)[15], we could deduct a stable growth between 2010 and 2035 (see Chart 2 above). Between 2010 and 2035 4,109 new residents will be added to this Activity Center area, projecting a total of 11,722 residents by 2035.

[14] See figure 7
[15] CAMPO 2035 Regional Growth Concept

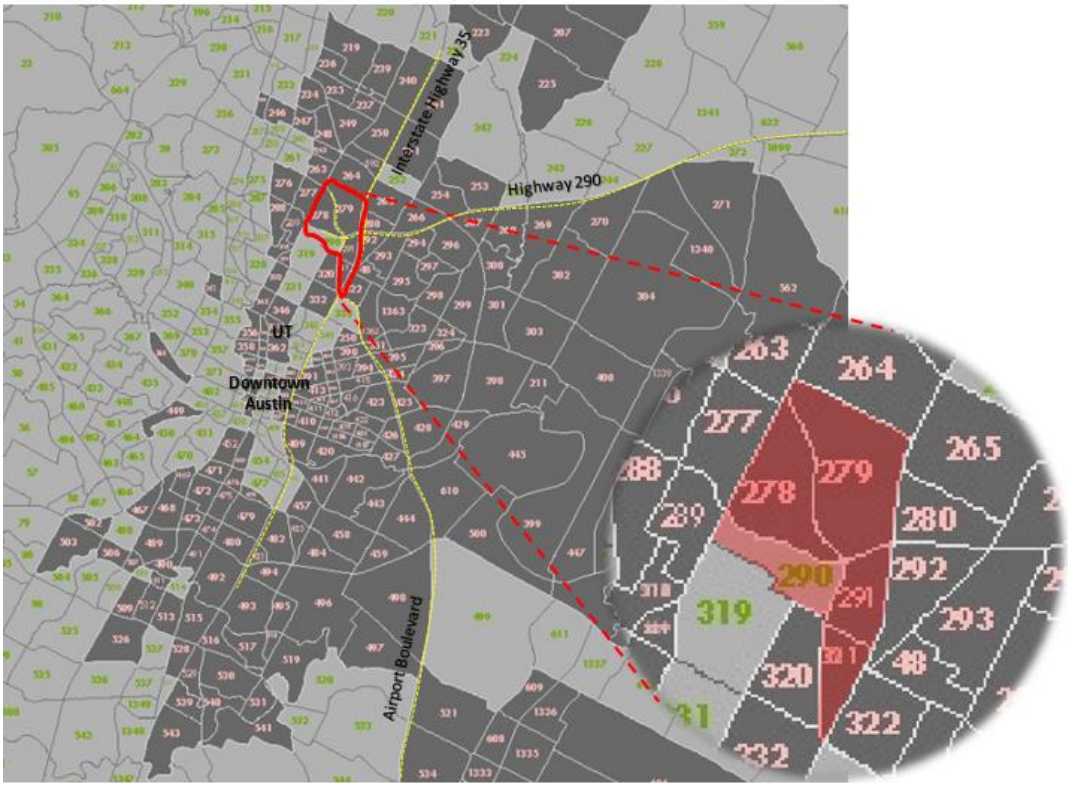


Figure 7 *| Traffic Analysis Zones (TAZ's) consistent with The Highland Activity Center.*

Source: CAMPO 2035 Regional Growth Concept Plan.

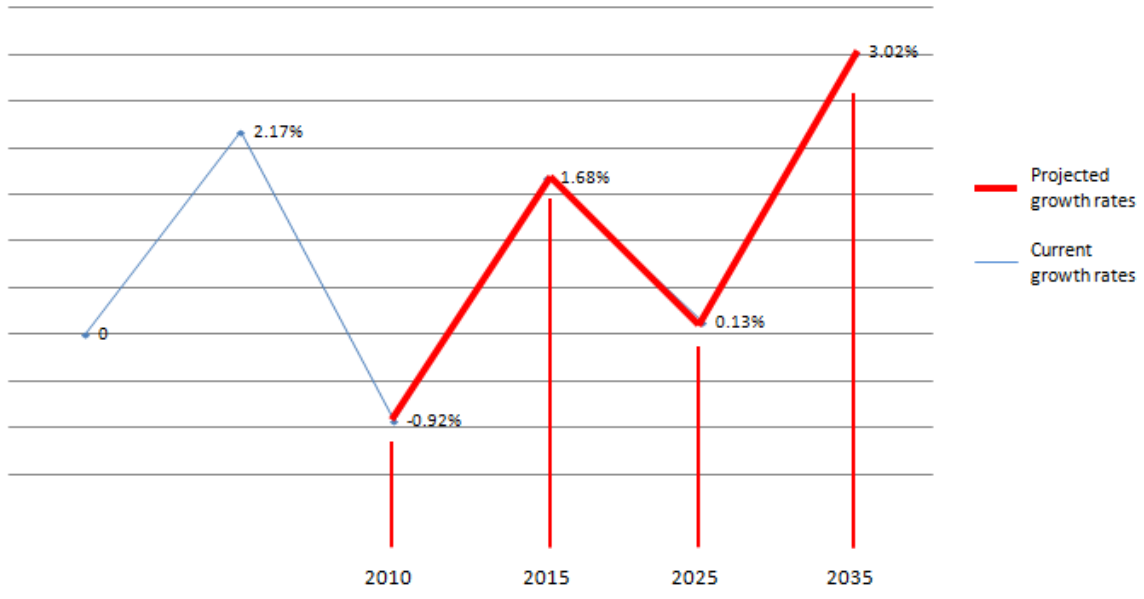


Chart 2 *| Projection of growth rates for the Highland Activity Center*

Sources: CAMPO 2035 Regional Growth Concept Plan, US Census Bureau.

CAMPO projects the scenario described above under its "Centers Concept". According to CAMPO's definition of this concept:

> *"The Centers Concept assumed that the region establishes policies and incentives to accommodate new growth into multiple high density, mixed use centers around the region. This concept assumed that some of the projects currently in the investment pipeline do not move forward over the next 25 years. Under the Centers Concept, the funding available is invested to expand the region's public transit system (including buses and rail), to implement a network of high capacity roadway lanes, and to build new arterials serving the mixed use centers".*[16]

Other social and Demographic facts of this area also help with the overall vision of the area's character. The highest level of education for residents in this Area is an indicator that allows measuring the level of skill sets available for the job market. This interconnection between residents and their level of education allows quantifying approximations of housing and job balance.

Educational attainment for residents over 25 years old is distributed in the area of study as Chart 3 below shows. According to the US Census Bureau, by 2010 the population of this Area with 25 years or older was a total of 4,983 residents. 1,416 residents within the area hold a bachelor's degree and 1,073 some college degree.

[16] Alternative Scenarios by CAMPO 2035. Regional Toll Analysis, page 38.

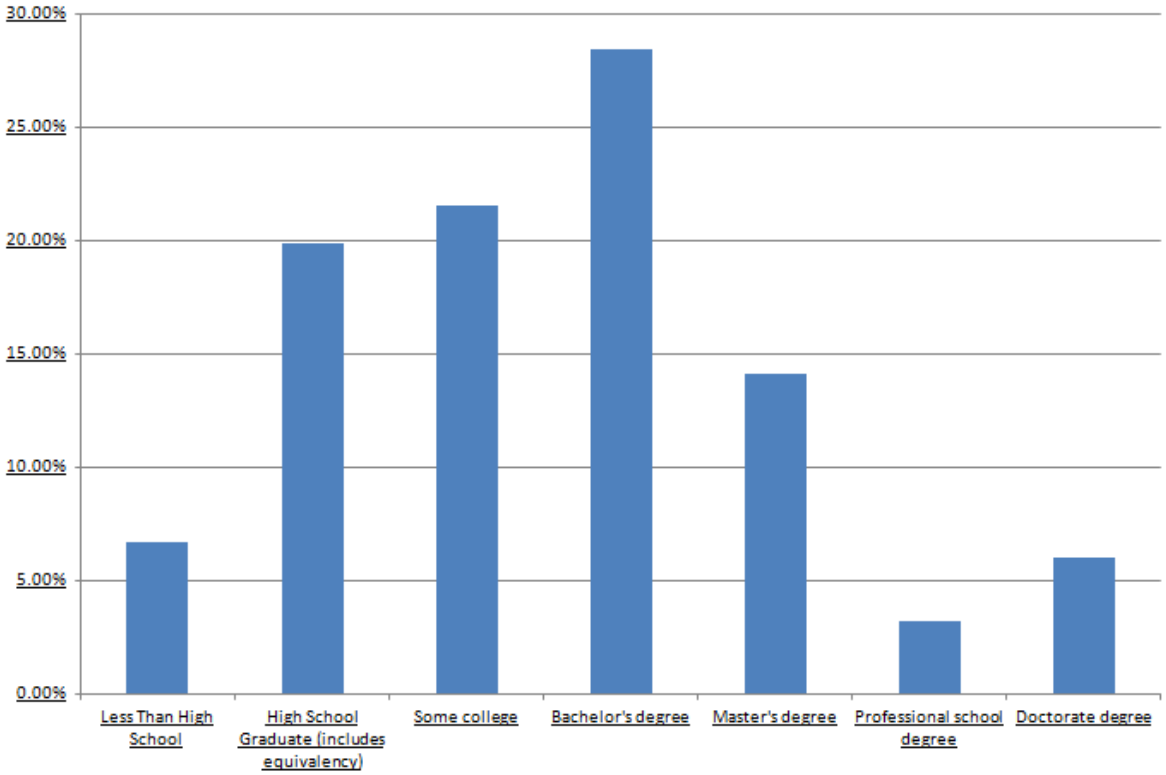


Chart 3 *| Educational Attainment for The Highland Activity Center*
Sources: US Census Bureau (American Community Survey).

On a parallel study of the demographics and social characteristics, residential trends also allow with the overall understanding of this area's character. Housing tenure is also another indicator that helps with approximations of expenses and/or debt those residents could be involved in. According to the US Census Bureau, around 65% of

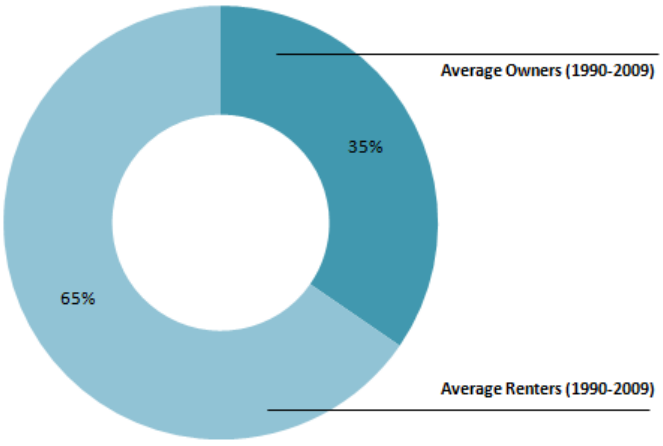


Chart 4 *| Housing Tenure*
Source: US Census Bureau.

residents in this area are renters rather than owners. The proximity of this area to the University of Texas is a factor that may be affecting directly the proportion of this indicator.

As much as demographics help defining the character of the area, another factor that provides vital information of an area's character is its physical characteristics. By looking at land uses of the area and their changes overtime, trends could be predicted and changes can be extrapolated from the data in accordance to the neighborhood plans to produce future land use preferences. It is recognized that this type of analysis could give planners, and urban designers, hints about ambitions of the residents and market trends.

In physical land distribution terms, The Highland Activity Center is surrounded by diverse type of land uses, some of these parcels are owned by the local government and or other local jurisdictions, showcasing the variety of ownership that is not only for private housing, but as well for public and recreation activities.

Population densities are a very useful to describe the area's character in terms of the evaluation of compact development and housing-jobs balance. Locally or federally owned land can give an idea of the impact and influence that governmental decisions could have in the area, shaping as well a different character in the neighborhood. Quick studies of proportions of the area owner by governmental jurisdictions, as well as proportional ratios of residential uses over retail, are useful indicators which help describing the physical character of the Highland Activity Center.

Chart 5 below shows the distribution of ownership of parcels owned by governmental jurisdictions (city, county, CapMetro, state) in the Highland Activity Center (1,293.51 Acres of total land). As a parallel comparison of this proportion, the same type of ownership percentage is larger

for the whole city. While governmental property represents an 11.4% of the total land area within a ½-mile radius (Highland Activity Center – HAC), Citywide proportions bump this percentage up to 26.1%.

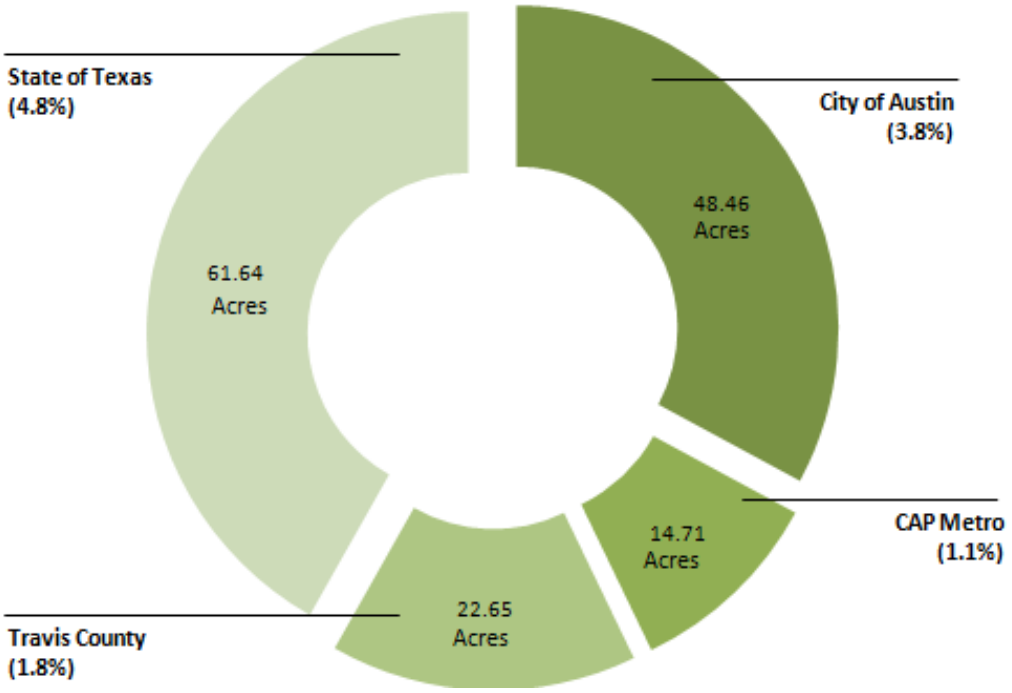


Chart 5 *| Distribution of Government-owned land in the Highland Activity Center (HAC)*
Source: City of Austin GIS.

The larger parcels in the HAC with governmental ownership that make up the majority of the 11.4% (147.46 Acres) are parcels owned by several AISD campuses and the Texas Department of Public Safety (North Central Campus).

When evaluating population densities, not only residents are taken into account, but also employees within the ½-mile radius that the HAC represents. According to the US Census bureau,

by 2010, the number of employees within the Census Tracts represented by the HAC were 18,761, the number of dwelling units (DU) were 3,933, and the number of people per DU were in average 1.94. These 3 numbers allows to deduct the average density of the area: 20.4 people per acre.

Residential areas in the HAC represent only 20% of the total land area within the HAC. Chart 6 illustrates the distribution of land uses within the area in study. The 419.4 Acres of Residential parcels over the 289.8 Acres of Commercial Parcels represent a 1.5:1 ratio of predominating residential area over commercial.

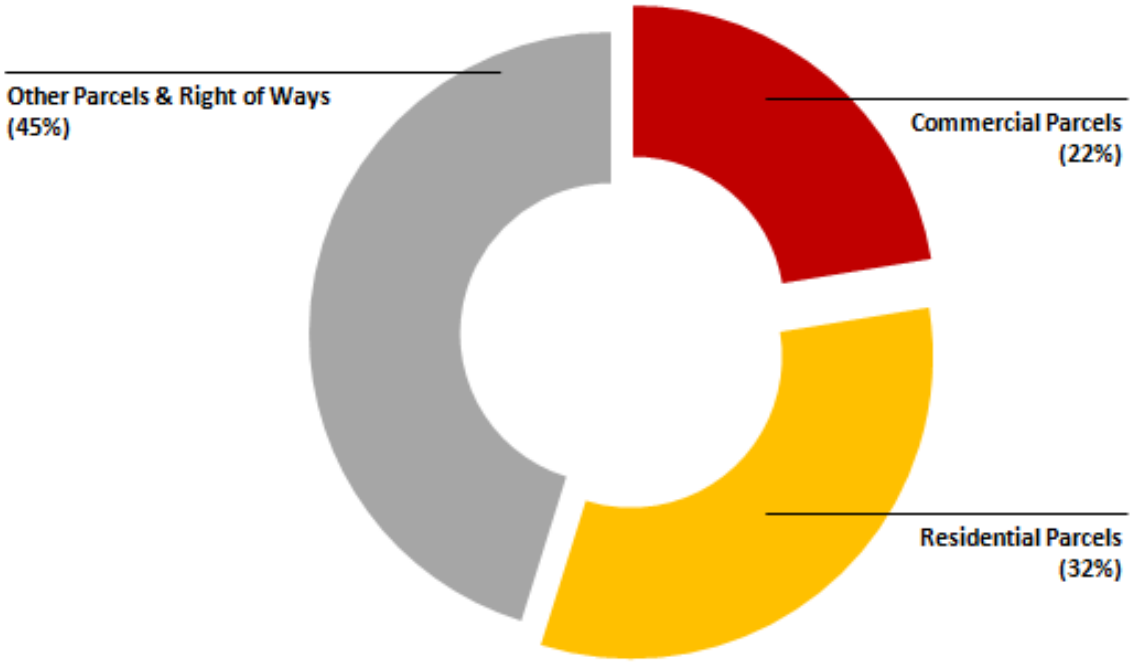


Chart 6 *| Distribution of Land Uses in the Highland Activity Center (HAC)*
Source: City of Austin GIS.

As residential demand within the city of Austin Urban core is increasing consistently, this area is also embracing the possibility of more residential development. The Highland Redevelopment (HR) will bring a substantial amount of residents and other activities to this center, making it more active and vibrant. As the values expressed in neighborhood plans and the overall vision of Imagine Austin, the importance of inclusion of housing diversity, affordability and increasing density, will encourage more compact and dense development.

CAMPO 2035 proposes an increase between 2,000 and 10,000 jobs. Affordability and access to these created jobs and other amenities are factors that future developments (as the HR) need to take into account to deliver a consistent vision: the increase of residential density that provides diversity of housing types and incomes.

Smart Growth indicators look at housing from the point of view of shares between dwelling types, its stock age, as well as its proximity to transit. The charts below show the distribution of the residential areas within the HAC in terms of the evaluation of these 3 indicators.

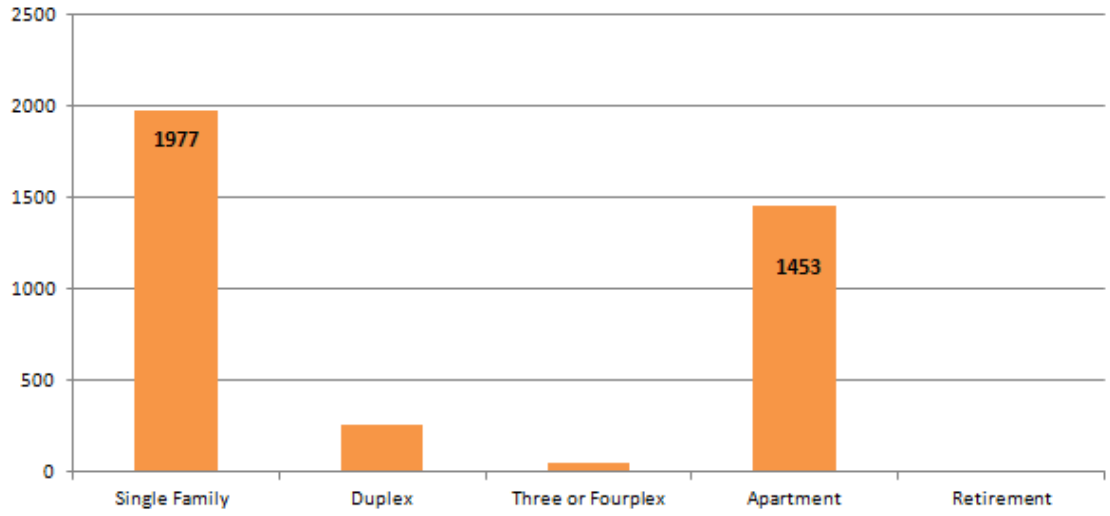


***Chart 7** | Distribution of Housing Types in the Highland Activity Center (HAC)*
Source: City of Austin GIS.

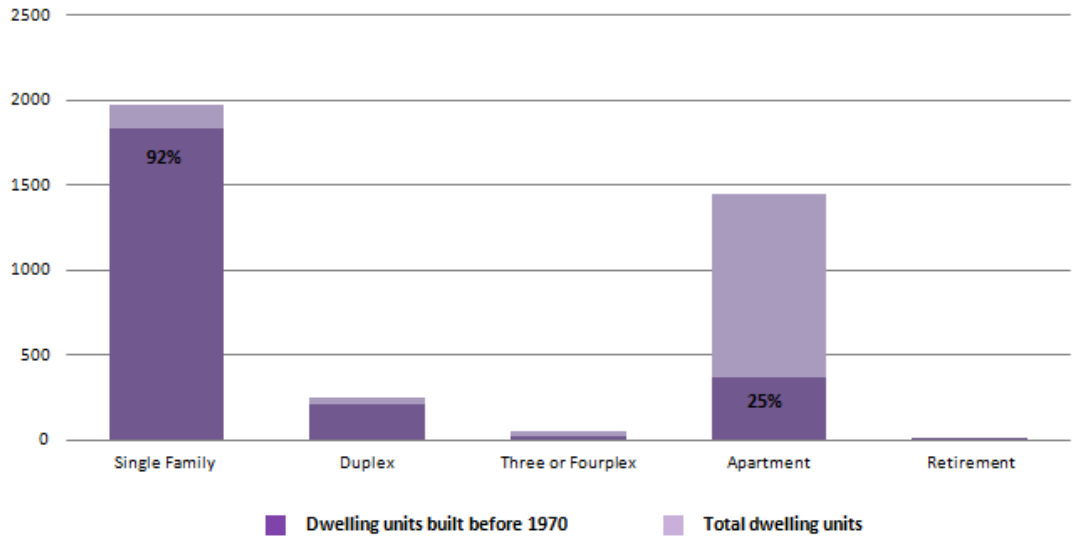


Chart 8 *| Distribution of Housing by age and type in the Highland Activity Center (HAC)*
Source: City of Austin GI, Airport Boulevard Market Analysis.

Chart 9 *| Count of Dwelling units with access to transit stops within the (HAC)*
Source: City of Austin GIS.

As some of the descriptions of Land Use distribution, housing, population densities, and demographic statistics discussed above are essential to describe the character of the HAC area, the

analysis of the existing infrastructure is also a factor that may influence future decisions for growth and development. While transportation networks, water and sewer lines, power lines, etc., are the most common categories of infrastructure, these are directly linked to their service capacity and control of systems that link to development (ex. Flood control systems).

Projected addition of jobs and residents in the HAC (5,000 jobs and 5,000 residents)[17] are very useful when planning completion or addition of infrastructure networks, to critically meet future demands.

Infrastructure networks are usually aligned to street grids, in order to efficiently distribute services to an area. It is arguable that a denser grid would distribute more efficiently (in terms of costs) these networks, but it is definitely more beneficial to the performance of a walkable community to increase these grids densities. Chapter 4 of this Report evaluates in a closer look to the Highland Redevelopment (HR), the connectivity, street networks densities, and Right of Ways (ROWs) intersections.

Transit services are a critical part of a development area in terms of infrastructure coverage. The more mobility alternatives for residents and employees in the area, the better connected and integrated is the neighborhood.

As the CAMPO Regional Growth Concept builds up scenarios based on Transit Served Areas, it is consistent to this assumption that most of the growth and development will be likely structured to provide future linkages to existing transportation networks. The HAC area is part of a very important corridor within the city, and it is also intersected by the "Red Line" that connects the

[17] CAMPO 2035, Imagine Austin Comprehensive Plan

City of Austin with other areas north of the HAC. Transit Oriented Development will be very likely a predominant type of development within the area.

Table 1 below showcases the frequency of services for the public transit networks operating within the HAC. While many transit options are provided within the area, proportionally more service is provided in the rest of the Capital Metro Service Area. The HAC area has considerably high number of stops given the amount of local routes (multiple stops), rather than express routes (selected stops).

Route Name	Route Type	Length (ft.)	# Stops/weekday
(1L) North Lamar	Local	4691	80
(7) Duval	Local	17900	48
(101) North Lamar/South Congress	Limited	4691	47
(37) Colony Park/Windsor	Local	8440	47
(10) South 1st	Local	29663	43
(300) Govalle	Crosstown	10130	36
(320) St. Johns	Crosstown	23228	32
(684) RR/Red River/Cameron Rd	UT Shuttle	13991	18
CapMetro Red Line MetroRail	Rail	13017	16
(990) Northeast Express	Express	13553	6
TOTAL	**n/a**	**126287**	**357**
CapMetro Service Area	440656 ac.	6227039	2754

Table 1 *| Transit Service Frequencies by Route & Route Length of coverage within HAC.*
Source: City of Austin GIS, CAPMetro.

The HAC seems to be very well transit served, which precedes a very good base for TOD (Transit Oriented Development). It is a very important sustainability indicator of the area's character that could lead to improvement of access and connections through the city with alternative means other than the automobile.

Other important indicators of character relate to issues like safety, public engagement in decision-making processes, and school performance to mention a few.

Of the five schools present within the HAC area, 3 are public. According to the 2011 Accountability Rating (Texas Education Agency), there are 2 ratings for these schools: "acceptable" (Ridgetop Elementary, Webb Middle School, AISD[18]), and "recognized, commended on mathematics" (Reilly Elementary School).

In terms of crime, according to the APD (Austin Police Department), only in 2012 the HAC represented about 4% of total vehicle burglaries (2,452 occurrences city wide), and about 5% of total aggravated assaults (2,009 occurrences city wide).

While measuring public engagement, the HAC area approximation of election participation showed that voter turnout in municipal elections was very low. According to 2010 Census, the HAC averages participation around 9% (average of municipal elections for 2008, 2009 and 2011), while citywide participation averaged around 23.5%.

[18] Austin Independent School District.

II. Best Practices in Urbanism

Integrative approach

Observing practices of land policies that have historically shaped cities and suburbs in the United States, failure to provide better frameworks in terms of growth management is evident. In order for any movement, framework or set of techniques that addresses a diverse constituency – with focus on best practices for land policies and efforts to manage development patterns, while protecting natural resources and advocating for green infrastructure and buildings– to gain significant political support in many regions, an integrative approach shall be brought to affect land policies.

Within these efforts for organizing best practices of urban planning and design, a few movements, tools, guidelines and frameworks are recognized within planners and urban designers. Smart Growth and New Urbanism theories are starting to address the integration of various disciplines; although, a broader approach for integration with more disciplines is addressed by LEED ND in its early phases of evolution.

Smart Growth

Growth management practices have been historically evolving, and Smart Growth became a set of these growth management techniques assembled together as part of this evolutionary process that have allowed planners and urban designers develop more sustainable, vibrant and active communities.

Smart Growth is not only an agglomeration of techniques, but a movement that has brought into the debate integration and interaction between many fields. Smart Growth has provided an overarching view where transportation groups, engineers, planners, urban designers, architects, local businesses, federal agencies, environmentalists, advocates for affordable housing, neighborhood activists, among others, could combine efforts to affect land policies.

In the early and mid nineties, Smart Growth emerged as a new paradigm for growth management techniques. In a very short time, these techniques gained support from many respected and recognizable entities / agencies around the United States. Among these efforts (some of them combined), we find calls for best practices within the American Planning Association (APA), the US Department of Housing and Urban Development (HUD), the Natural Resources Defense Council, the US Environmental Protection Agency (EPA), the US Green Building Council, among others.

According to the NRDC (Natural Resources Defense Council), sprawling patterns of land development are consuming undeveloped land areas at an alarming rate of 365 acres an hour, transforming the natural landscapes into networks of strip malls, and suburbs with poor connectivity. This has forced communities to become automobile dependent which contributes to greenhouse gas emissions and global warming.

Utilizing Smart Growth techniques, communities are choosing to develop differently from the trend described above, creating a more pleasing mix of homes, stores and other activities that give their residents an alternative to the car.

According to Smart Growth America, a national organization dedicated to researching, advocating for and leading coalitions to bring smart growth practices to more communities nationwide, Smart Growth is a better way to build and maintain towns and cities. It means building smart urban, suburban and rural communities with housing and transportation choices near jobs, shops and schools.

Smart Growth is an approach to the built environment that supports local economies and protects the environment[19]. Smart growth is about returning to the principles that once made America's big cities and small towns great places to live[20].

It is important to note that Smart Growth is not about preventing growth, but rather about considering where and how growth can occur, creating choices about where people live and how they get around, and about thoughtfully replacing historically poor planned development with growth that supports vibrant communities. Smart Growth strongly supports the revitalization of existing communities, particularly center cities and older suburbs, with the goal of preserving open space and natural resources.

Table 2 below clarifies misconceptions about the best practices that Smart Growth supports and showcases a parallel between what this movement is about. Smart Growth developments around the US are recognized to be mostly compact, transit and pedestrian oriented, with a greater mix of housing types and affordability levels, and are predominantly mixed use.

[19] Smart Growth America - http://www.smartgrowthamerica.org/what-is-smart-growth
[20] NRDC – Picturing Smart Growth - http://www.nrdc.org/smartGrowth/visions/

Smart Growth is...	Smart Growth is not...
more transportation choices and less traffic	against cars and roads
vibrant cities, suburbs and towns	anti-suburban
wider variety of housing choices	against growth
well-planned growth that improves the quality of life	about telling people where or how to live

Table 2 *| Clarification of Smart Growth supportive goals.*
Source: Smart Growth America, USGBC.

New Urbanism

On a parallel note, a supportive movement to these practices and strategies for growth management emerged around the same timeline: New Urbanism. This movement appeared as a response to the large-scale approach of growth management and in an effort to refine the built environment with the provision of a framework of principles with a little more focus on smaller-scale development.

Aside the strong support and similarity of goals between New Urbanism and Smart Growth, New Urbanism is organized as a movement rather than a collection of best practices from the evolution of growth management. Although New Urbanism it is very arguable to be a movement

with a framework that would solve all problems faced by land developers, policy makers, and every stakeholder involved in the transformation of the built environment; the intent of this report is to showcase the theoretical background that these 2 frameworks offer.

According to its website (www.newurbanism.org), this movement is the most important planning movement of the last century with international manifestation. This movement is geared towards the improvement of quality of life and living standards by creating better places to live.

> *"New Urbanism is the revival of our lost art of place-making, and is essentially a re-ordering of the built environment into the form of complete cities, towns, villages, and neighborhoods - the way communities have been built for centuries around the world. New Urbanism involves fixing and infilling cities, as well as the creation of compact new towns and villages."*[21]

Principles of New Urbanism

As a movement organized around the improvement of life standards and quality of life, New Urbanism aligns 10 principles to build its framework of best practices. Whiles some of these principles are very specific, others are arguably broad in concept which could allow for misinterpretations and could lead to the creation of "faux urbanism" if not applied following its central core goals.

In my opinion, this set of principles are not completely linked in a strong fabric to provide an integrative approach to urbanism, and it allows for weak usage of these strategies –when not combined appropriately-- to pursue the overarching view of improving quality of life.

[21] New Urbanism – www.newurbanism.org

According to this movement's website, the creation of livable and sustainable communities is the result of applying the principles of New Urbanism. These principles, outlined below, could be applied to projects at diverse ranges of scales (from single buildings to entire communities).

1. Walkability
2. Connectivity
3. Mixed-Use & Diversity
4. Mixed Housing
5. Quality Architecture & Urban Design
6. Traditional Neighborhood Structure
7. Increased Density
8. Smart Transportation
9. Sustainability
10. Quality of Life

Walkability refers to the strategies that could transform, at the human scale, the pedestrian environment to provide friendly networks that intend to promote alternative transportation means other than motorized. This principle could be described with a few indicators:

- Walkable environments are commonly characterized by streets (with few exceptions) that connect diverse activities within a walking distance of 10 minutes.
- Walkable streets are design so they are pedestrian friendly (buildings close to street; porches, windows & doors; tree-lined streets; on street parking; hidden parking lots; garages in rear lane; narrow, slow speed streets).

Connectivity refers to the interconnection of street networks that will allow helping disperse traffic and promote walking activities. This principle promotes the idea of creating hierarchy of streets, boulevards and alleys.

Mixed-Use & Diversity refers to the set of different places and activities that are within the walkable distances mentioned above, and within the network described in the connectivity principle. A mix of uses that could include commercial shops, offices, residential apartments and homes; not only mixing them within the neighborhood, but also within blocks and at the building scale. This principle also refers to the diverse set of ages, income levels, cultures and races.

Mixed Housing refers to the provision of alternative types and prices of residential units allowed within the proximities of the neighborhood and including the characteristics described above.

Quality Architecture & Urban Design refers to the emphasis on aesthetics that relate to human comfort, and the creation of a sense of place; with correlation of civic uses in special locations within the community. Promoting architecture and places with a conscious human scale that nourish the human spirit.

Traditional Neighborhood Structure refers to the formal distribution of urban design elements that conceptualize and reinforce their settings. Formally, urban design allows the incorporation of concepts such as “center” and “edge” as elements where public realm and public habitats are interconnected as a conglomerate of public spaces. The formality of this principle also

introduces the idea of Transect Planning[22], which promotes highest densities at town centers; progressively diminishing this density towards the edge and rural areas.

> *"The transect is an analytical system that conceptualizes mutually reinforcing elements, creating a series of specific natural habitats and/or urban lifestyle settings. The Transect integrates environmental methodology for habitat assessment with zoning methodology for community design. The professional boundary between the natural and man-made disappears, enabling environmentalists to assess the design of the human habitat and the urbanists to support the viability of nature. The urban-to-rural transect hierarchy has appropriate building and street types for each area along the continuum."*[23]

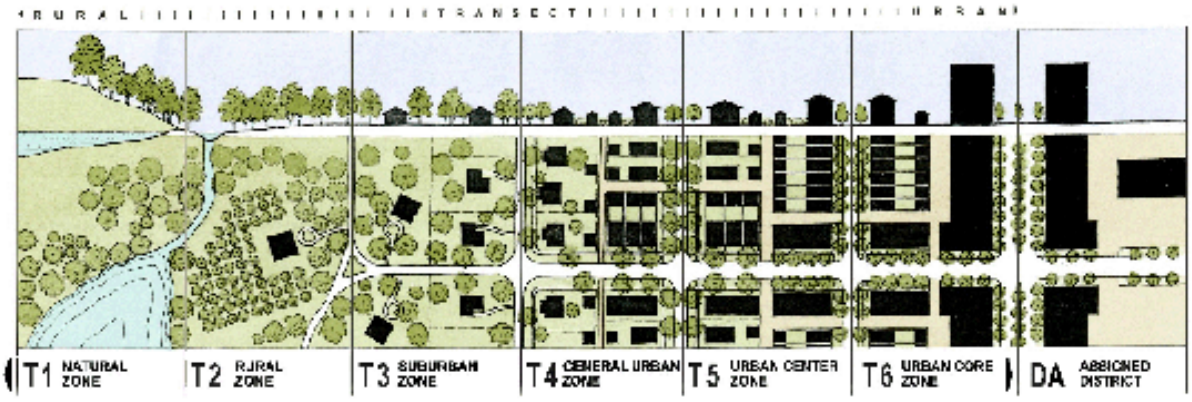


***Figure 8** | Transect diagram from rural to urban.*
Source: New Urbanism website.

Increased Density refers to the allocation of quantity of buildings, residential units, shops, and services closer together to promote walking activities, and with the intention of utilize resources more efficiently, creating environments that are enjoyable to live for the proximity convenience.

[22] See figure 8
[23] Transect definition – www.newurbanism.org

Diverse scales for densities are contemplated within this principle to be applied in small towns as well as large cities.

Smart Transportation refers again to the connectivity and walkable networks principles, with the inclusion of an interaction at larger scales within centers and or other cities / towns. Coverage and multimodal alternatives are key premises under this principle.

Sustainability refers to the minimal impact on environmental networks and resources, utilizing eco-friendly technologies, encouraging energy efficiencies and local production.

Quality of life refers as to how the complete and appropriate combination of the principles described above will ensure a high live standard quality with the creation of places that enrich, uplift and inspire the human spirit.

While these principles seem simple to apply, land development practices have historically allowed sprawl to happen, leaving obstacles to overcome from the point of view of policies and zoning requirements. The strong domination of single use and low-density in suburban areas are still aspects to shift in a long-term period, and these are areas where retrofits may help improving the overall performance of American suburbs.

III. LEED for Neighborhood Development

Generalities and Evolution of LEED

While the energy crisis was generating conservationist movements in terms of energy consumption and fuel efficiency in the early 1990s, engineering technologies and design frameworks were touching base in the construction and building industry. By the mid 1990s, the concept of green building was sought as a framework of strategies that could be adopted within the design and construction practices of buildings.

As of 2013 (20 years after the creation of the USGBC[24]), LEED has become one of the most important rating systems to evaluate performance of the built environment from the construction and building industries perspective. LEED stands for Leadership in Energy and Environmental Design, and is a set of rating systems[25] that have demonstrated to be driving the green building industry around the world. LEED has transformed the way buildings and communities are designed, constructed, maintained and operated across the globe with the interaction of a tool that is comprehensible and flexible, evolving through time in accordance with a process that is consensus-based.

LEED rating systems have evolved to launch a diverse set of strategies that addressed specific areas and scales of the built environment, touching from issues concerning commercial and residential buildings, to commercial interiors, healthcare environments, educational environments; and Neighborhood Development as well. LEED can be applied to most of all project types at any

[24] United States Green Building Council – www.usgbc.org
[25] See figure 9

point of their building cycle. As shown in Figure 8 below, LEED rating systems are designed to cover most of the timeline of a project life, and to show diversity of its application.

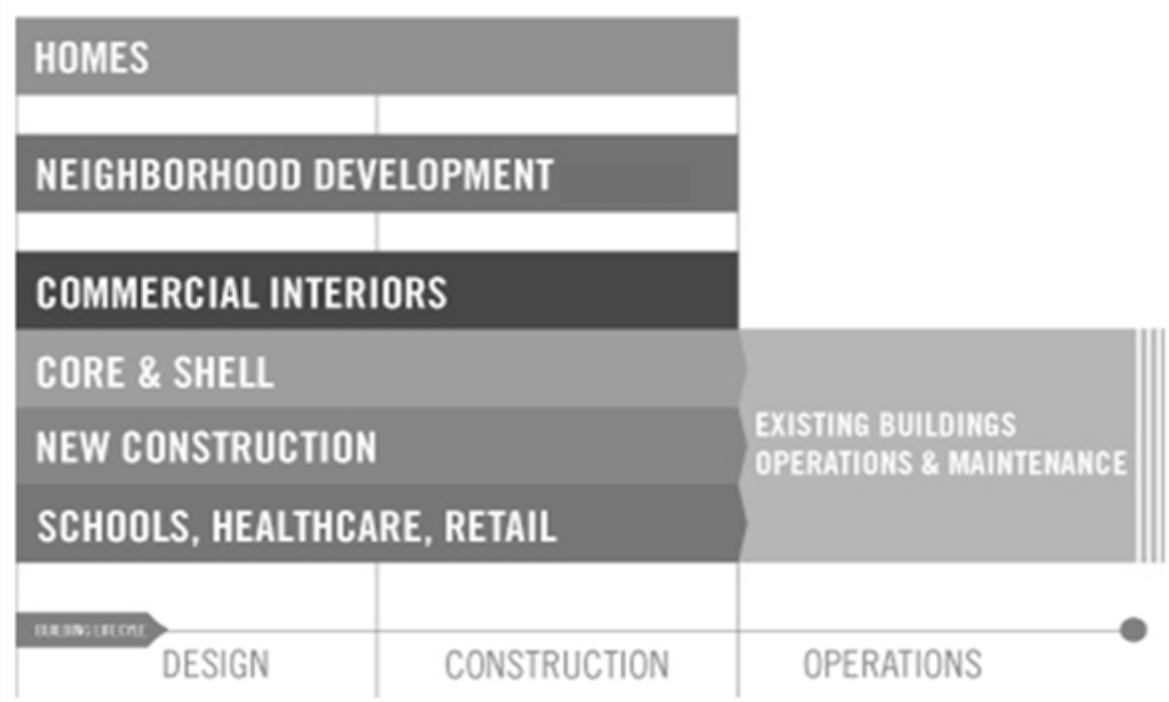


Figure 9 *| LEED Rating Systems and their relation to the timeline of a project.*
Source: USGBC.

International Recognition & Application of LEED

LEED projects are not only within the United States, but also around the world. In 2009, probably as a result of the big recession, more than 50% of square meters of LEED registered and

certified buildings were located outside the US[26]. The infographics below show the current (as of April 2013[27]) state for LEED projects in the world.

***Figure 10** | LEED projects registered and Certified in top regions by GSM (gross square meters)*
Source: USGBC, GBCI, IndiaGBC and Canada GBC.

[26] WorldGBC data. 2009
[27] USGBC Articles – Infographic: LEED in the world. Published May, 3. 2013.

LEED ND , early phases (2008-2013)

By September 2013, there were 333 LEED ND (Neighborhood Development) projects. According to the USGBC, this rating system (the last one to be implemented among the other rating systems in operation) took a little more time to develop and test, given the scale and specific characteristics of the project types (neighborhood development).

Chart 10 below shows the distribution of LEED ND projects (registered and certified) around the world. Given its original conception and application of pilot projects, more than ¾ of the total projects are within the US and Canada, but of the 24% of projects outside the US, 15 have achieved a certification level.

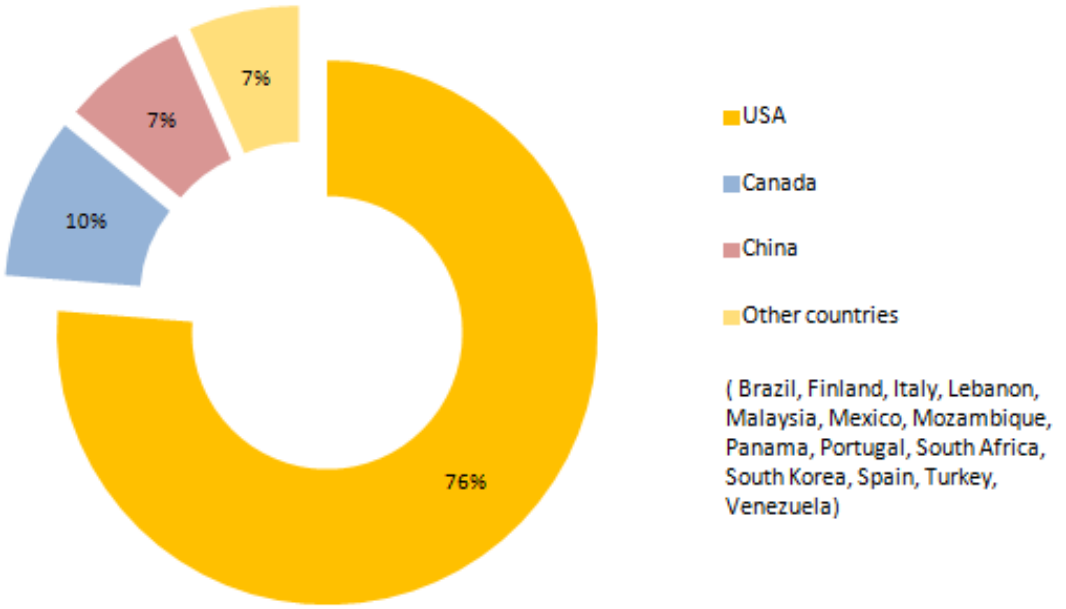


Chart 10 *| LEED ND projects around the world.*
Source: USGBC.

LEED ND and future integration to urban practices in the US

Of the total 254 LEED ND projects (certified and registered) within the United States, 134 participated of the pilot version of this rating system (LEED ND v 1.0 pilot), and 120 are currently registered and/or certified under the latest version (LEED ND v 2009). The pilot version included projects certified as early as 2008[28], while the 2009 version has projects certified as early as 2010.

Of the 97 projects within the US that have achieved a level of certification, only 2 are in Texas and are under the v 1.0 pilot version of LEED ND: Mueller Development (Austin, Silver level); and Alliance Town Center (Fortworth, Certified level). There are currently no projects in Texas pursuing a LEED ND certification.

Such a slow percentage of participation (2%) of LEED for Neighborhood Development projects within Texas could speak to as a small interest about this rating system or not enough knowledge about the rating system. The amount of participation found in Texas is result of a few reasons that would need further exploration and research to increase the number of LEED ND projects in the state of Texas. A few of these resons are outlined below as an initial approximation to areas that could be directly addressed if future improvements are desired in terms of increasing LEED ND participation, and Sustainable planning strategies within Texas:

- Create / Implement incentives for using the rating systems.
- Increase knowledge about the rating system.
- Quantify and share associated additional investments for a LEED ND project
- Leverage support from policies

[28] USGBC – Project database

- Improve integration of requirements at different jurisdictional levels.

While LEED ND is still a rating system under development and evolution, with only 5 years of pilot testing and application, it is clearly recognized that some developments around the world are interested in using this framework as a design tool. In some places, the use of this rating system is promoting the transformation of current policies and requirements in development codes to improve the strategies and techniques that current growth management trends are driving.

As it happened with other rating systems, the evolution and flexibility of LEED ND could experience growth in participation of many projects within the US and the state of Texas. Although the growth trend of projects at a building level has been steady as accounted by the other LEED rating systems, LEED ND could be expected to grow at a slower rate given the specific characteristics of scale and time schedules that Neighborhood Developments require.

As of September 2013, advocates from the CNU, USGBC and NRDC have been strongly supporting and encouraging practices consistent with the set of guidelines and tools described within the LEED rating system that they developed together. This promotion of best practices have been pushed at policy levels –depending on the state and local jurisdictions—as an effort that will help improving urban and regional planning practices. A few of the key improvements in policies and practices in general are directly related to creating favorable environments for the utilization of this tool, including awareness and education about benefits and trade-offs.

While an increase of incentives for developers could help to the growth of LEED ND projects, these incentives need to be, at the same time, fully communicated and compliant with local regulations. A few examples for incentives to developers from local jurisdictions could include (1)

development bonuses, (2) reimbursements or discounts for some impact fees or other related fees, (3) expedite processes during permit and review phases, and/or (4) introduction of public-private partnerships.

Although, incentives could be created from a local perspective (from local jurisdictions), a major barrier to overcome is the lack of knowledge of these tools at the policy level as well as the developer and designer levels. In the USA, there are 340 LEED professionals holding an ND (Neighborhood Development) specialty. This number represents about 77.4% of all LEED AP ND professionals in the world (439). Of these 340 professionals within the US, only 14 (4.1%) are in Texas[29]. This small amount of representation of LEED AP ND professionals within Texas[30], is partly cause and result of the small amount of projects in the state.

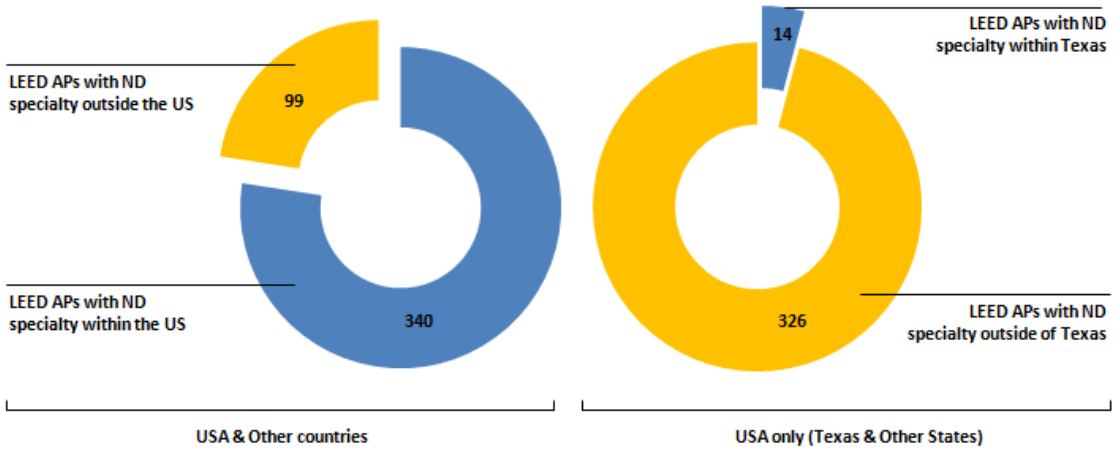


Chart 11| *LEED APs with ND specialty.*
Source: GBCI – Professional Directory

[29] GBCI (Green Building Certification Institute) – Professional Directory
[30] See chart 11

Critically pushing the interest and involvement of professionals with these set of practices, could lead to improvements in policies and projects that address LEED ND and its integrative tools more often. The State of California is leading towards this progressive approach, with a count of 19 LEED ND projects.

When additional financial investment is associated to a new development, a risk evaluation by the developer is a quick way to find the feasibility of pursuing that additional cost. The financial aspect of a development is usually one of the key stones that are harder to move when budgets are set in development projections. With the associated risk to any additional investment, the probability of pursuing the "extra" item falls deeply low and it is usually not conceived. One way to counter balance this risk behavior of additional investments is to provide incentives that are directly appointed to balance the risk and provide direct financial support to the specific "extra" item.

While LEED in general is considered an "extra" item in any type of development, the criteria for financial investment and risk management related to the pursue of a LEED certification, is completely applicable. An example of direct incentive to support the strategies and guidelines of LEED ND is provided in Chapter 5 of this report, through a creative proposition of financial support for a specific case study. It is important to note that these types of counter balance strategies could be extremely case specific depending on the location and regulations of the LEED ND project.

On another note, not only developers and investment parties should acquire the knowledge of this rating system and its benefits when applying them, but policy makers are also considered important stakeholders. If policies are developed in a way that do not impede for guidelines and frameworks like LEED ND to incorporate its strategies and performance measures, but also actively

promote the development of projects that use these strategies; a community could assure a more sustainable planning approach.

The most challenging part of this effort is to slowly transform land development codes and growth management practices. With a few more knowledge of these best practices at the private and public levels, communities could transform the way American cities and suburbs have been developed in the past 6-7 decades.

Chapter 3: LEED ND as an Integrative tool for Highland Redevelopment (HR)

Chapter Overview

Highland Redevelopment (HR) lays within a very important asset of the City of Austin. Its pressure for success and performance will be closely evaluated through the years; therefore, this development shall carefully observe opportunities for major positive impact early in its design process. The particular characteristics of ownership of this site, give to HR a very peculiar set of Development paths that need to be clearly recognized.

This chapter outlines a set of large-scale opportunities when using LEED ND as a framework in the design process. While requirements of the rating system support lots of opportunities and synergies, there are viable arguments for the compliance of these when applied to this specific project.

This chapter reports some of the credits and pre-requisites within LEED ND that can be considered as front-end strategies that allow for the creation of communities with a strong commitment to three aspects: being compact, complete and connected neighborhoods.

I. Scope of Analysis

LEED ND is a rating system that groups its credits and prerequisites in 3 categories: Smart Location and Linkages, Neighborhood Pattern and Design, and Green Infrastructure and Buildings.

As this 3 categories work together to support the creation of environmentally-friendly neighborhoods that contain green infrastructure and buildings, as well as connected, compact and complete neighborhoods; the requirements of the rating system support a lot of opportunities for synergies between credits that help complying with the intents and requirements of the rating system when applied to real projects.

Neighborhood Pattern and Design (NPD) is one of the categories where the involvement of design in terms of architecture, landscape architecture, engineered infrastructure and urban design, is key for the creation of compact, vibrant, diverse, and interconnected communities. This category within the LEED ND rating system is the one with most points; therefore has been looked closely in this chapter.

While LEED ND –within its 3 categories-- provides a list of strategies that can make real-life projects perform better in terms of environmentally friendly, energy efficient, equitable, compact, complete, and connected neighborhoods; the items listed in the following pages are just a selection of few strategies that can be used at a large scale.

The major opportunities outlined in this chapter are explained in the following pages, and were selected because potential has been sought to provide direct and indirect benefits that will

optimize other specific performance metrics in the projects, like other credits within the LEED ND rating system.

II. Major opportunities with LEED ND credits

LEED ND could be used as a tool to guide designers and planning teams to achieve goals and ambitions of communities in the process of creating a neighborhood. This tool is not only thought to create environmentally friendly projects, but vibrant, compact, complete and connected places.

The following list of 7 credits was chosen after an overall research of the positive synergies that these can produce with other credits within the rating system. Although these credits were presented in different order than the rating system, this selection and order was decided to highlight ways designers can make "big moves" and overlap synergies with other credits from other categories in the rating system itself.

Compact Development

NPD credit 2 measures density and proposes strategies that are anti-sprawl oriented, such as the non-consumption of land and decrease of automobile usage. This credit has the intent to promote walkability to create healthier places.

Density is measured throughout the whole rating system in two ways:

- For non-residential components: FAR (Floor to area ratio)

- For residential components: DU/acre (Dwelling units per acre)

This credit points out that sprawl-like development won't definitely achieve the minimum density requirements to comply with the pre-requisite with the same name. A real typical single-family subdivision with cul-de-sacs in the suburbs is definitely an example of real-life projects this type of rating system is trying to walk away from.

Thresholds to achieve points in this credit are shown in the table below:

Residential density (DU/acre)	Nonresidential density (FAR)	Points
> 10 and ≤ 13	> 0.75 and ≤ 1.0	1
> 13 and ≤ 18	> 1.0 and ≤ 1.25	2
> 18 and ≤ 25	> 1.25 and ≤ 1.75	3
> 25 and ≤ 38	> 1.75 and ≤ 2.25	4
> 38 and ≤ 63	> 2.25 and ≤ 3.0	5
> 63	> 3.0	6
DU = dwelling unit; FAR = floor-area ratio.		

***Table 3** | Points for density per acre of buildable land.*
Source: LEED ND 2009 – Reference guide

Mixed-Use Neighborhood Centers

NPD credit 3 aims to foster diverse land uses, and consistently encourage walking biking and transit use as well as the NPD credit 2 did. The intent of this credit is to include a diverse number of uses (four and up) to create a neighborhood that is as compact and vibrant.

This credit measures compliance by locating a minimum of 50% of dwelling units within ¼ mile of these diverse uses. Mixed used developments are then encouraged to cluster in neighborhood centers or nodes that contain activity and character that supports the creation of vibrant communities.

As a minimum diversity of 4 uses is required to comply with the requirements of this credit, larger projects would be able to achieve this in a very straightforward manner. For projects larger than 40acres, the requirements are to cluster uses in various nodes or centers, as well as providing access by public transit to large retail components (ex. Malls).

The thresholds to achieve points for this credit are shown in the table below:

Diverse uses	Percentage occupancy of total square footage	Points
4–6	20%	1
7–10	30%	2
11–18	40%	3
≥ 19	50%	4

Table 4 *| Points for diverse uses within ¼-mile walk distance, by time of occupancy*
Source: LEED ND 2009 – Reference guide

Mixed-Income & Diverse Communities

NPD credit 4 aims to create more socially equitable and engaging communities with a range of people from diverse economic levels that interact to create a sense of place as well as vibrant neighborhoods.

This credit measures 2 things: diversity of housing types and house affordability. In order to achieve a great amount of housing diversity, The Simpson Diversity Index measures the level of housing mix; while house affordability is measured as percentages of units that are placed for rental or for sale with prices in proportion of local AMI (Area median income).

Housing diversity (up to 3 points): When the simpson diversity Index scores values above 0.5 (0 meaning low diversity – 1 meaning extremely diverse) points are awarded with the following thresholds.

Simpson Diversity Index score	Points
> 0.5 to < 0.6	1
≥ 0.6 to < 0.7	2
≥ 0.7	3

***Table 5** | Points for housing diversity*
Source: LEED ND 2009 – Reference guide

Housing affordability (up to 3 points, and additional bonus points): The larger the percentage of units that are priced up to the percentages shown in the tables below for rental or for-sale dwelling units, the higher the score within this credit.

Rental dwelling units				For-sale dwelling units			
Priced up to 60% AMI		Priced up to 80% AMI		Priced up to 100% AMI		Priced up to 120% AMI	
Percentage of total rental units	Points	Percentage of total rental units	Points	Percentage of total for-sale units	Points	Percentage of total for-sale units	Points
5	1	10	1	5	1	8	1
10	2	15	2	10	2	12	2
15	3	25	3	15	3	--	--
AMI = area median income.							

***Table 6** | Points for affordable housing*
Source: LEED ND 2009 – Reference guide

This credit awards bonus for projects that achieve 2 points under diversity and 2 points under affordability.

Street network

NPD credit 6 encourages large-scale connectivity to ensure walkable and bikeable environments, as well as neighborhoods that are connected to the community at large. The intent is to encourage the connectivity through the project and its surroundings

This credit measures external and internal connectivity with thresholds as minimum requirements for density of intersections per square miles and block sizes.

The external connectivity (outside of the project) is measured along the project boundary where the credit requires at least 1 thru-street at every 400' interval, as well as meeting existing external streets for future connection.

The internal connectivity could award up to 2 points if complying with the thresholds outlined below for intersections per square mile. This calculation is made within the project boundary and/or within ¼ mile if the project ares is very small.

Street intersections per square mile	Points
> 300 and ≤ 400	1
> 400	2

Table 7 *| Points for connectivity*
Source: LEED ND 2009 – Reference guide

Some eligibility requirements are important to highlight when making a calculation for this credit (and the related pre-requisite). Non-motorized intersections can be counted as much as 20% of the total number of intersections. All intersections need to be open to the public the 24 hours a day, so gated intersections are not considered eligible.

Transportation Demand Management (TDM)

NPD credit 8 encourages connectivity via use of public transportation and proposes strong synergies with reduced parking strategies. The intent of this credit is to reduce the amount of automobile use, energy consumption and pollution associated to this; as well as to encourage multi-modal transit environments.

This credit's approach can be satisfied via 5 different options which provides alternatives to real projects depending on their location, stakeholders, motivators and decision-makers:

Opt 1: TDM Program: ensuring a program is designed and operational to reduce the peak-period motor vehicles trips by at least 20% compared to a baseline. This program could be comprehensive to include any strategy as the options 2-5. This program has to be funded for a minimum of three years after the build-out of the project.

Opt 2: Transit passes: Subsidizing 1-yr transit passes for at least 3 years. This passes could be cheaper or half price, and have to be publicized for availability.

Opt 3: Developer-Sponsored Transit: Providing year-round private transit services such as vans, shuttles, buses, etc. that connect the project to at least one central transit facility or major centers / nodes in the project

Opt 4: Vehicle Sharing: Locating the project such that 50% of DU and non-residential building entrances are within a ¼ mile of a Vehicle that is part of a vehicle sharing program, or a vehicle sharing facility.

Opt 5: Unbunding of parking: Providing economic incentives to share parking or sell / rent parking spaces that are residential or non-residential separating these from the residential units or square footage of non-residential facilities.

Neighborhood Schools

NPD credit 15 encourages walkability not only for shopping or commercial amenities / places, but also for educational facilities. The intent of the credit is to promote community interaction and engagement, integrating schools into their neighborhoods.

A social component is introduced in this credit given the historical importance of schools within communities because of their civic function. Having schools that are connected and at a walking distance of compact and vibrant neighborhoods, could enhance and optimize the interaction of the people living in these neighborhoods.

Studies and statistics show that schools located on sprawl-like suburbs or neighborhoods have a very small ratio of students walking to these facilities, due to lack of connectivity and travel distances.

The measurement for compliance of this credit is that if the project contains a residential component bigger than 30% of total gross area in square feet, at least 50% of DU should be located within ½ mile of elementary or middle schools, or a maximum of 1 mile from a high school.

Community Outreach and Involvement

NPD credit 12 aims to encourage designs that are responsive to goals and ambitions of the community, through involvement of people who live and/or work in the neighborhood itself and the surroundings.

The compliance method for this credit requires that workshops, such as design charettes and other community meetings, are documented with input from the community since very early in the planning and design process. It is also required to have advertisement of the open meetings. These meetings should be geared towards defining the core goals of the project as well as continuously capturing input to modify conceptual design. This credit requires de documentation of modifications of the design as result to this community feedback, as well as continuous communication with the community during the design and construction processes.

It is good planning and design practice to make and re-shape designs with educated decisions from the community. Capturing insights from the community is a very challenging process for architects, landscape architects, engineers and urban designers. A good planning team will recognize the need of participation of multidisciplinary stakeholders to direct the goals of the community in the right direction.

Chapter 4: Feasibility Analysis

Chapter Overview

While overall strategies were recognized in Chapter 3 as potential measures to benefit Highland Redevelopment, this chapter looks closely to the specific requirements within LEED ND and the specific application of these in the case study.

A set of data and methods were outlined in this section of the research, in order to answer the questions raised for this report: ***What level of Connectivity and Compact Development proposed is achieved by this Redevelopment Proposal?;*** and: ***Would the Developer in Partnership with ACC (Austin Community College) be able to pursue a LEED ND certification if there are not big financial expenditures associated to the investment and its effort?***

A set of illustrative plans were also developed to visually explain the research points, definitions and performance metrics outlined below. This chapter showcases a visual representation of the goals achieved by the Highland Redevelopment proposal in terms of Compact Development and Connectivity, which can be later compared to other areas.

I. Problem Statement

While the market, demographics and other factors in the city changed, the Highland Mall reduced the amount of visits and commercial activity, creating the opportunity for a local College (Austin Community College) to acquire the property and develop a proposal of retrofitting

buildings and land development in the underutilized surface parking areas. The current land development proposal, aims to include a core of educational and administrative uses that will support ACC's goals, as well as residential, vertical mixed-use components, and commercial office buildings.

As IMAGINE AUSTIN goals are encouraging the creation of a compact and connected city, this analysis aims to use indicators that showcase the level of connectivity and compact development proposed for this mall redevelopment.

While Central Texas is characterized by cities with orientation to automobile use, Austin's current comprehensive plan aims to take advantage of cities that are denser and less automobile oriented. Thresholds for defining the level of Connectivity and Compact Development are needed when a Comprehensive Plan is not specific.

II. Infill Site Definition

In order to consider this Development Proposal as a plan that minimizes adverse effects when measured in terms of urban connectivity, the selection of the site within the city could make a substantial difference. An Infill Site selection could help minimize VMTs (vehicle miles travelled), therefore reducing the amount of greenhouse gases associated to this development. An Infill site selection will help preventing development of Greenfield areas, and will contribute on reducing automobile travel, as well as reducing the need of creation of impermeable surfaces. An Infill site will have existing infrastructure in place surrounding it, reducing the need of constructing more.

An Infill site, as defined within the LEED ND Rating System (LEED for Neighborhood Development) could be considered a site that meets one of these 4 conditions:

- When at least 75% of the site's boundary borders parcels that individually are at least 50% previously developed (The site has been altered by paving, construction, an/or land use that would have typically required permitting) and that in aggregate are at least 75% previously developed.
- The site, in combinations with bordering parcels, forms an aggregate parcel whose boundary is 75% bounded by parcels that individually are at least 50% previously developed and that in aggregate are at least 75% previously developed.
- At least 75% of the land area, exclusive of rights-of-way, within a ½-mile distance from the project boundary is previously developed.
- The lands within a ½-mile distance from the project boundary have a preproject connectivity of at least 140 intersections per square mile.

For this case study, two maps were developed to identify the third and fourth definitions. This area, as explained in the map, complies with the third definition, but not with the fourth. The first two definitions were not studied since data was insufficient to analyze the amount of previously developed percentage.

The maps at the end of this chapter outline the compliance with the third definition and the connectivity of the surroundings that do not comply with the threshold defined in the fourth definition.

III. Adjacent Site Definition

In order to consider this Development Proposal as a plan that minimizes adverse effects of sprawl-like developments, this development would have optional compliance paths that support the Infill Site definition. As a proof of flexibility for the applicability of this rating system, the Adjacent Site Definition is an option for compliance.

According to the LEED ND rating system and Adjacent Site is a site that has at least 25% of its boundary bordering parcels that are each 75% previously developed[1].

IV. Data Summary, Map creation and Methodology

In order to perform this analysis, a diverse set of data was needed. This analysis was viable using GIS (Geographic Information System) software's capabilities and analysis tools. The datasets collected were downloaded mainly from the City of Austin (COA) website in May 2013, and was extremely necessary to perform this analysis.

Although the process of data set selection was a very straight-forward process, data simplification and redefinition to the scale and proportions of the specific project case, was an additional process necessary as well to perform this analysis. It was also necessary to digitize the Highland Redevelopment proposal as it stand on April 2013.

[1] Previously Developed: According to the LEED ND definition is a site that has been altered by paving, construction, and/or land use that would have typically required permitting. A street or right-of-way does not constitute previously developed land; instead, it is the status of the property on the other side of the street or right-of-way that matters.

Data Summary

The most important datasets needed for this analysis are outlined and described below:

- **COA Streets:** Shapefile and data collected from the City of Austin GIS website that includes poly-lines informing the street networks in the city.
- **Proposed streets:** Shapefile created from proposed master plan of new development of the Highland Mall Area. This shapefile includes poly-lines digitized within the ArcGIS platform representing motorized and non-motorized rights of way.
- **Proposed Building footprints:** Shapefile created from proposed master plan of new development of the Highland Mall Area. This shapefile includes polygons digitized within the ArcGIS platform, and data information of these such as area and land use.
- **COA Land use:** Shapefile and data collected from the City of Austin GIS website that includes polygons informing the land use in the city.
- **COA Relevant features:** Shapefiles and data collected from the City of Austin GIS website that includes polygons and poly-lines with information of features such as parks, topography, creeks, floodplains and water bodies.

Map creation

A total of 9 maps where created to illustrate definitions and to demonstrate compliance with LEED ND requirements. This maps are the following:

- **Location and current State:** The site location as in relation with the intersection area of two important corridors in Austin. This map shows the area as its current state based on aerial photographs retrieved with ArcGIS in May 2013.
- **Vicinity Map:** Contains the area in study as placed by data collected from the City of Austin GIS (2013), this includes transportation networks, main features (parks, creeks), and building profiles.
- **Site Base Map:** Showcases the project area and immediate surroundings with categorization of existing land uses from database collected from the City of Austin and CAPMetro (2013). It also shows relevant features such as public transit stops, railroads, creeks, and tree canopies. It shows as well the project proposal for the site in terms of building profiles.
- **Project Base Map:** Contains a more detailed illustration of the project proposal, including architectural definition between buildings and parking structures, as well as proposed trees and street network within the site.
- **Infill Site Definition Maps:** These 2 maps showcase the site's compliance and non-compliance with the definitions of an Infill Site as outlined by LEED[2].
- **Project Connectivity Map:** Showcases the visual representation of intersections for the proposed project and its translation to a connectivity performance with thresholds based on minimum LEED requirements.
- **Right-of-Way Boundary Intersections Map:** Showcases the analysis for right-of-way intersections and their proximity/frequency as a factor to determined compact and connected neighborhoods within thresholds defined in LEED.

[2] See Section II-Infill Site definition

- **¼-Mile Boundary Connectivity:** Showcases the alternative analysis for compliance in terms of connectivity within the project's in immediate surroundings.

Methodology

The process that allow for the creation of the maps listed above, as part of this analysis, required a specific methodology that is described below in these specific steps:

- **Data collection:** All data and shapefiles used for this analysis were collected through the City of Austin GIS website platform. After collection, this data was cropped within 3 miles of the geometric center of the project in study to minimize file size and operations performance.
- **Data digitization:** All these shapefiles were created using a proposed master plan developed by McCann-Adams Studio. Information such as building footprints and street networks (motorized and non-motorized rights of way) as proposed were digitized to perform analysis operations within the proposed project and surroundings
- **Intersection Density Analysis:** Network analysis were performed within the project boundary and outside the project boundary within ¼-mile and ½ mile radii, in order to measure the level of connectivity according to LEED ND definitions.
- **Developed land:** Some parcels are defined as "developed land" within a specific radius outside the project boundary. This was done through the analysis of land use information.

V. Review of feasibility

By putting this proposal in its current context, we are able to run a feasibility study with focus on the viability of achieving LEED ND certification for the Highland Redevelopment project. This analysis focuses on decisions that are being taken by the planners and developers early in the planning and design process.

The analysis detailed below, outlines a few strategies that if considered could facilitate the achievement of a LEED ND level. This analysis looks at the minimum requirements that are needed to pursue a level of LEED ND certification, and looks closely at the performance of this project under the system's SLL (Smart Location and Linkages) and NPD (Neighborhood Pattern & Design) categories.

SLL review

The goals for LEED ND under its SLL category are geared towards picking the right sites and develop on the right portions of the site. The SLL category requires compliance with 5 thresholds as an absolute minimum for a project that wants to achieve a LEED ND certification. This break down is recognized as Pre-requisites that will have to comply with several minimum requirements and performance thresholds in order to achieve a minimum performance required by LEED.

Prerequisite 1 under the SLL category of pre-requisites and credits is titled "SLL p1 – Smart Location". This prerequisite requires (a) the selection of a site that is currently served by existing water and wastewater infrastructure, or (b) the location of the project within a legally adopted, publicly owned, planned water and wastewater service area, providing new water and

wastewater infrastructure for the project. Either (a) or (b) must be satisfied as well as operating under one of the compliance paths or options defined below.

- **Option 1: Locate the project on an Infill Site**[3]**.** This option seeks to minimize the negative effects of developing projects within already developed areas. As defined in Section II of this chapter an Infill Site has specific performance metrics. As it is visually presented and confirmed with Maps 5 & 6 at the end of this chapter, this project is located on an Infill Site.
- **Option 2: Locate the project in an Adjacent Site with Connectivity.** This option relates to the intent of the Adjacent Site definition[4], which requires a minimum percentage of previously developed sites; but additionally requires a minimum connectivity of 90 intersections per square mile within a ½ mile from the project boundary; plus an additional requirement of ROW boundary intersections interval no bigger than 800 feet, and 600 feet on average.
- **Option 3: Locate the site on a Transit Corridor or Route with Adequate Transit Service.** Where the 50% of dwelling units (required residential component for this option) are within walking distance of existing or planned transit service(s). Maximum distances to walk to a bus or street car stops is ¼ mile, while to bus rapid transit stops, light or heavy rail stations, and/or ferry terminals is ½ mile. Required weekday trips minimum for bus or streetcars are 60, and 40 per weekend; while per bus rapid transit, light or heavy rail, and/or ferries are 24per weekday and 6 per weekend.

[3] See Section II – Infill Site definition.
[4] See Section III – Adjacent Site definition.

- **Option 4: Locate the site within an area with Nearby Neighborhood Assets.** A minimum residential component representing 30% of total project's square footage (without considering parking) is required for this option. Additionally, the project has to be located such as a ¼ mile from its boundary connects with at least five diverse uses; or within ½ mile from its geographic center to seven diverse uses. Some restrictions and limitations are defined within the LEED ND reference guide in order to define the number of "diverse" uses within the community.

SLL credit 1: Preferred locations, allows for project to earn between 1-10 points, while encouraging developments to be located within existing cities, suburbs and towns; reducing the adverse effects associated to sprawl. Under this credit, option 1 allows up to 5 points depending on what location type the project is plan for development. As Table 8 and 9 below show, projects are encouraged to be located on infill sites or sites with high connectivity. This credit focuses on reduce development pressure beyond the limits of existing development, while preserving natural and financial resources required for construction and maintenance of new infrastructure.

If a project is developed on an Infill site (option 1 under SLL p1), the most potential for maximum points can be earn under SLL c1; additionally, if the project is located on an area with high connectivity (as shown with table 9), a maximum of 10 points can be achieve by the project.

Location Type	Points
Previously developed site that is not an adjacent or infill site	1
Adjacent site that is also a previously developed site	2
Infill site that is not a previously developed site	3
Infill site that is also a previously developed site	5

Table 8 *| Points for Location Type under SLL c1*
Source: LEED ND 2009 – Reference guide

Intersections per square mile	Points
≥ 200 and < 250	1
≥ 250 and < 300	2
≥ 300 and < 350	3
≥ 350 and < 400	4
≥ 400	5

Table 9 *| Points for Connectivity within ½ mile of the project under SLL c1*
Source: LEED ND 2009 – Reference guide

The HR proposal complies with requirements (a) and Option 1 of the SLL prerequisite 1. A quick analysis of maximum score potential within Options 1 through 4, places Option 1 as the strategy with more potential to achieve more point within the rating system . The HR proposal could earn 5 points under option 1 in SLLc1 as it is proposed; but, unfortunately, this proposal is located on an area with low connectivity, impeding the collection of more points under SLL c1. As shown in Map 6, the connectivity within ½ mile of the project boundary is about 113.75 intersections per square mile. This proposal could achieve 5 points under SLLc1 option 1, as a maximum.

While SLLp1 observes where the project should be built, prerequisites 2 through 5 focuses on where the project should limit its impact. This includes the analysis of impact of: SLLp2: Imperiled Species and Ecological Communities; SLLp3: Wetlands and Water Body Conservation; SLLp4: Agricultural Land Conservation; and SLLp5: Floodplain Avoidance.

The HR proposal will comply with all prerequisites 1 through 5 of the SLL review, since this project is located on an Infill Site (as defined by LEED) and is not in direct relation to any of the others aspects studied under prerequisites 2 through 5.

NPD Review

The goals for LEED ND under its NPD category are geared towards developing neighborhoods that are compact, complete and connected. The NPD category requires compliance with 3 thresholds as an absolute minimum for a project that wants to achieve a LEED ND certification. Similarly to the SLL review, these 3 thresholds are recognized as Pre-requisites that will have to comply with several minimum requirements and performance thresholds in order to achieve a minimum performance required by LEED.

Since LEED ND encourages the creation of neighborhoods that are connected; under its NPD category, providing streets that are friendly for walking and bicycling is a priority. This is evaluated in the rating system under NPD p1: Walkable Streets; where the promotion of walking activities and environments are in relation with the strategies for safety, aesthetics and comfort of the streets. Walkable streets need to take care of concerns about pedestrian injuries at the same time that encourage daily physical activities, transportation efficiency, and overall reduction of VMTs in a community.

NPDp1 evaluates streets in four aspects for compliance with LEED: (1) Principal functional entries should face public spaces or sidewalks rather than parking lots. LEED ND requires a minimum of 50% compliance within total entries in the proposed project; (2) Spatial enclosure, requiring a minimum proportion between building heights and street widths. LEED ND requires a 1:3 proportional ratio as a minimum (1 of building height, per 3 of street width); (3) Continuous sidewalks, meaning that the pedestrian-friendly and safe network is provided in continuity for the whole project; and (4) Limited garage entries, which defines a maximum of 20% of building facades to be dedicated to the automobile.

NPDp2 encourages the conservation of land while building with higher densities, at the same time that promotes livability, walkability, and transportation efficiency. Building compact neighborhoods also supports the reduction of VMTs and leverage transit investments. The thresholds required by LEED under NPDp2 can be reached under 2 options: (1) For projects in transit corridors: a residential density of 12 dwelling units per acre, and non-residential densities of 0.8 FAR[5]; and (2) For all other projects: a residential density of 7 dwelling units per acre, and non-residential densities of 0.5 FAR.

NPDp3 encourages the creation of communities that are very well connected and walkable, measuring the level of connectivity (intersections per square mile), and promoting transportation efficiency. The thresholds defined under NPDp2 can be achieved under 2 options as well: (1) For projects without internal streets: a minimum street connectivity of 140 intersections per square mile; and (2) For projects without internal streets: an outside minimum connectivity of 90 intersections per square mile measured within a ¼ mile from the project boundary.

Although NPDp1 requires a closer look of final street designs, the design guidelines produced by the urban designers provide minimum compliance measures that could be compatible with LEED ND for a better approach of score performance.

NPDp2 measures the level of compact development of the proposed project, and will be as well another factor to look closely when designing the density proposed for the project. Based on the proposal of the HR proposed as of 2013, the level of density and compact development will comply with the minimum requirements (prerequisites) of the NPD category, but will have to be

[5] Floor to area ratio: Calculated dividing the usable square footage of the building(s) by the land area where the building(s) sit(s).

carefully studied to optimize its performance under the thresholds defined in NPDc2. Table 10 below shows the point availability in relation to different ranges of development densities.

Residential density (DU/acre)	Nonresidential density (FAR)	Points
> 10 and ≤ 13	> 0.75 and ≤ 1.0	1
> 13 and ≤ 18	> 1.0 and ≤ 1.25	2
> 18 and ≤ 25	> 1.25 and ≤ 1.75	3
> 25 and ≤ 38	> 1.75 and ≤ 2.25	4
> 38 and ≤ 63	> 2.25 and ≤ 3.0	5
> 63	> 3.0	6
DU = dwelling unit; FAR = floor-area ratio.		

Table 10 *| Points for Development Density under NPD c2*
Source: LEED ND 2009 – Reference guide

The HR proposal complies with NPD prerequisites 1 and 2; and partially complies with NPDp3. As shown in Maps 7, 8 and 9; the analysis of NPDp3 is very close to meet the minimum requirements. Although the immediate surroundings of the project (see map 9) provide evidence of a very low-performing area in terms of connectivity, the project proposal complies with the minimum threshold of connectivity within the site (140 intersections per square mile), showcasing a performance of 246.67 intersections per square mile (see map 7). Map 8 shows non-compliance with a portion of the requirements under NPDp3, which also call for a maximum frequency of Right-of-way (ROW) boundary intersections (no larger than 800' and 600' in total average). While all ROW boundary intersections fall under 500', there is a section on the east side of the project that does not comply with this requirement because is a section of 992 feet in length.

Since the HR project is in a very early stage, there is still a possibility of reshaping the problematic area to make it comply with NPDp3.

VI. Maps

The following maps were developed to illustrate the feasibility analysis and review of prerequisites explained above in this chapter:

Map 1: Location and Current State

Map 2: Vicinity Map

Map 3: Site Base Map

Map 4: Project Base Map

Map 5: Infill Site Definition

Map 6: Infill Site Definition

Map 7: Project Connectivity

Map 8: Right-of-Way Boundary Intersections

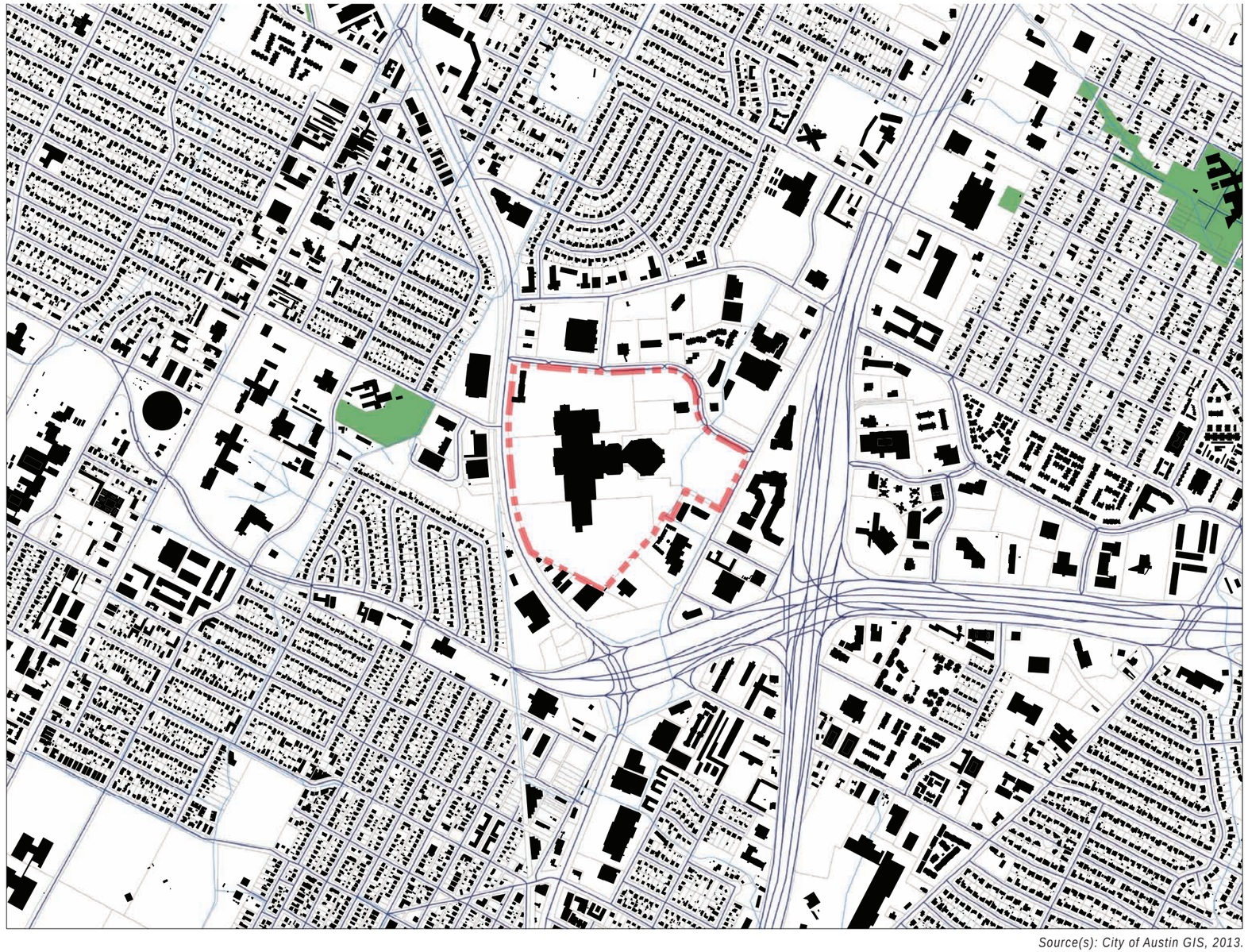
Map 9: ¼ Mile Boundary Connectivity

Source(s): Google Earth, 2013.

CASE STUDY BOUNDARY
(PREVIOUSLY DEVELOPED SITE)

N

0 0.25 0.5 MILES



BUILDING FOOTPRINTS

CASE STUDY BOUNDARY

N

0 0.25 0.5 MILES

Source(s): City of Austin GIS, 2013.

PROPOSED BUILDING FOOTPRINTS

EXISTING LAND USE

- SINGLE FAMILY
- MULTI FAMILY
- COMMERCIAL
- OFFICE
- INDUSTRIAL
- CIVIC
- TRANSPORTATION
- OPEN SPACE
- UNDEVELOPED

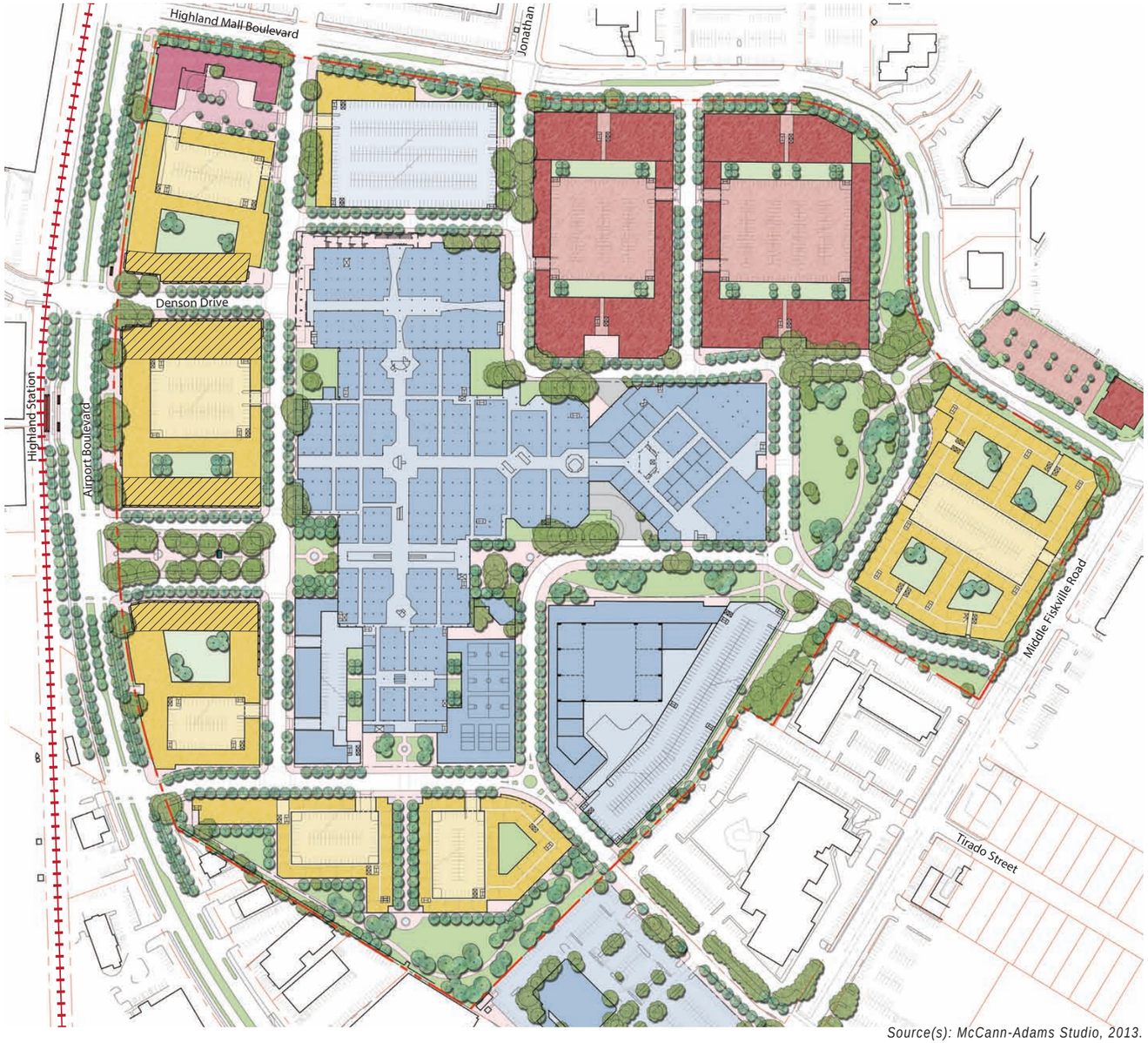
RELEVANT FEATURES

- PUBLIC TRANSIT STOPS
- RAILROADS
- CREEKS
- CANOPY COVER
- CASE STUDY BOUNDARY

N

0 500 1,000 FEET

Source(s): City of Austin GIS, CAPMetro, 2013.



Source(s): McCann-Adams Studio, 2013.

Source(s): City of Austin GIS, 2013.

LEED ND - INFILL SITE DEFINITION

Compact Development and Connectivity are indicators that LEED ND (Neighborhood Development) addresses within their pre-requisites and credits.

This rating system defines an Infill Site as a site that meets any of the following conditions:

1. When at least 75% of the site's boundary borders parcels that individually are at least 50% previously developed and that in aggregate are at least 75% previously developed.

2. The site, in combinations with bordering parcels, forms an aggregate parcel whose boundary is 75% bounded by parcels that individually are at least 50% previously developed and that in aggregate are at least 75% previously developed.

3. At least 75% of the land area, exclusive of rights-of-way, within a ½-mile distance from the project boundary is previously developed.

4. The lands within a ½-mile distance from the project boundary have a preproject connectivity of at least 140 intersections per square mile.

This map shows compliance with definition #3 above.

1/2-MILE RADIUS FROM PROJECT BOUNDARY

PROJECT SITE (PREVIOUSLY DEVELOPED)

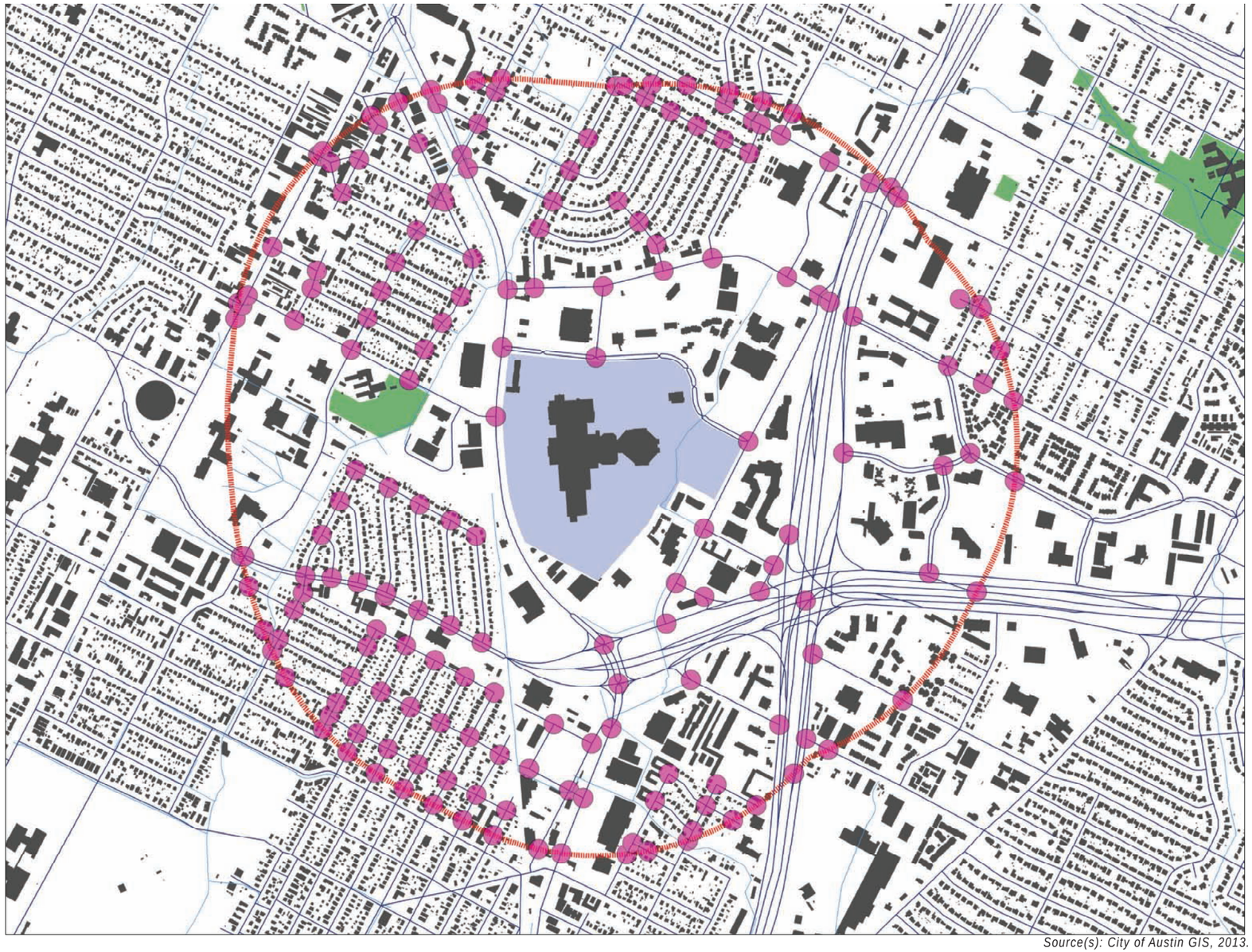
PREVIOUSLY DEVELOPED LAND WITHIN 1/2 MILE RADIUS **(853.36 Acres = 98.79%)**

UNDEVELOPED LAND WITHIN 1/2 MILE RADIUS (10.48 Acres = 1.21%)

PARKS

N

0 0.25 0.5 MILES



Source(s): City of Austin GIS, 2013.

LEED ND - INFILL SITE DEFINITION

Compact Development and Connectivity are indicators that LEED ND (Neighborhood Development) addresses within their pre-requisites and credits.

This rating system defines an Infill Site as a site that meets any of the following conditions:

1. When at least 75% of the site's boundary borders parcels that individually are at least 50% previously developed and that in aggregate are at least 75% previously developed.

2. The site, in combinations with bordering parcels, forms an aggregate parcel whose boundary is 75% bounded by parcels that individually are at least 50% previously developed and that in aggregate are at least 75% previously developed.

3. At least 75% of the land area, exclusive of rights-of-way, within a ½-mile distance from the project boundary is previously developed.

4. The lands within a ½-mile distance from the project boundary have a preproject connectivity of at least 140 intersections per square mile.

This map shows non-compliance with definition #4 above.

1/2-MILE RADIUS FROM PROJECT BOUNDARY (1.6 sq miles)

ELIGIBLE INTERSECTIONS (TOTAL = 182)

Calculation: 182 intersecions / 1.6 sq. miles = 113.75

N

0 0.25 0.5 MILES

Source(s): Master Plan designed by McAnn Adams Studio, April 2013.

LEED ND - CONNECTIVITY REQUIREMENT

Compact Development and Connectivity are indicators that LEED ND (Neighborhood Development) addresses within their pre-requisites and credits.

This rating system requires at least a minimum project connectivity of 140 intersections per square mile. Non-motorized intersections can be counted in this calculation but no more than 20% of the total number of intersections.

ELIGIBLE STREET INTERSECTIONS (TOTAL = 22)

ELIGIBLE NON-MOTORIZED INTERSECTIONS (TOTAL = 16)

CASE STUDY BOUNDARY (0.12 sq. miles)

Calculation:

Total intersections = 38
Total eligible intersections = 22 + (38 x 0.2) = 29.6

Intersection density = 29.6 / 0.12 sq miles = **246.67**

N

0 500 1,000 FEET

LEED ND - ROW BOUNDARY INTERSECTIONS

Compact Development and Connectivity are indicators that LEED ND (Neighborhood Development) addresses within their pre-requisites and credits.

This rating system requires right-of-way (ROW) boundary intersections to be separated no more than 800’.

ELIGIBLE STREET INTERSECTIONS (TOTAL = 22)

ELIGIBLE NON-MOTORIZED INTERSECTIONS (TOTAL = 16)

CASE STUDY BOUNDARY (0.12 sq. miles)

NON-COMPLIANT BOUNDARY SECTION (GREATER THAN 800’)

NON-ELIGIBLE BOUNDARY

COMPLIANT BOUNDARY (LESS THAN 800’)

This map shows non-compliance with LEED ND, NPDp3 (Connected and Open Community - Prerequisite - Option 1) requirements.

N

0 500 1,000 FEET

Source(s): City of Austin GIS, 2013.

LEED ND - INTERSECTION DENSITY

Compact Development and Connectivity are indicators that LEED ND (Neighborhood Development) addresses within their pre-requisites and credits.

This rating system requires a minimum connectivity rating of 90 intersections per square mile (using only the net area) within a 1/4 mile radius from the project boundary.

ELIGIBLE STREET INTERSECTIONS (TOTAL = 35)

CASE STUDY BOUNDARY (0.12 sq. miles)

1/4 MILE RADIUS FROM PROJECT BOUNDARY (0.66 sq. miles)

Calculation:

Net area = 0.66 - 0.12 = 0.54 sq. miles

Intersection density = 35/ 0.54 = **64.8**

This map shows non-compliance with LEED ND, NPDp3 (Connected and Open Community - Prerequisite - Option 2) requirements.

N

0 750 1,500 FEET

Chapter 5: Conclusions and Recommendations

Conclusions and Recommendations

With a unique chance to create a vibrant neighborhood and activity center within the City of Austin, Highland Redevelopment (HR) is a great opportunity for 3 potential partners: City of Austin, Austin Community College (ACC), and Red Leaf Properties (Developer). These 3 actors are planning to work together in a Public-Private Partnership.

As a special district denomination, ACC's operations are strongly limited to educational facilities and supportive functions. With the proposed master plan of the fully developed former Highland Mall, which includes facilities for other uses than just education, acquisition of surrounding parcels will be required to develop the components that include residential, commercial, office and other land uses.

As it is currently proposed, this master plan complies with local regulations and proposes a set of design guidelines for future development. Another unique opportunity is presented here to encourage a development with performance metrics that are above the minimum required by law. As LEED ND projects in the world and within the US are gaining traction, and Central Texas experiencing pressure for development, the showcase of another LEED ND project in Texas could put the region and the City in the spotlight while showcasing best practices in land development and growth management.

The use of LEED ND as a framework for designers and urban planners to design and optimize the performance of a neighborhood –with compatible goals with the IMAGINE AUSTIN

plan geared to build compact and connected places--, could be supported by the HR proposal to become a development with application of exemplary strategies. If a LEED ND certification is achieved, the shareholders of the partnership, as well as the community stakeholders will benefit from external factors that may include the following recognitions:

- Austin as a city committed and engaged with innovative developments and growth management practices;
- ACC as a college committed with sustainability beyond their sphere of action, and
- Red Leaf Properties as a developer committed to put in real terms the best practices of land development.

With the City of Austin in current process of re-writing its LDC (Land Development Code), another unique opportunity for planners and professionals involved in the Land Development Process is present to provide best practices and frameworks that could re-shape future developments in cities, suburbs and towns. While professionals in the world are strongly encouraged to participate in multidisciplinary processes when developing projects like the HR, LEED Accredited Professionals (LEED APs) with a ND (Neighborhood Development) specialty could ensure a participation of a diverse set of stakeholders. If more LEED APs with ND specialty are involved in this type of projects, we could see an increase of performance for these developments; unfortunately, even with Texas holding the third place with more LEED APs within the US, LEED APs with a ND specialty are few in the world.

A LEED ND certification goal for this development would bring to Austin another center of activities that, as planned by CAMPO, aims to showcase dense, vertical mix uses and an important employment center.

While IMAGINE AUSTIN (IA) does not provide a specific set of performance metrics and thresholds to measure the level of compact development and connectivity wanted in the city, CAMPO looks a little closer into the performance goals of Activity centers. As IA seeks to create a compact and connected city, a couple of modifications to the HR proposal will need to be made in order to reach the thresholds defined by LEED ND.

The area surrounding this project clearly shows that it was not originally plan as a walkable-friendly environment and its performance is low in terms of connectivity.

Although the surrounding of the area performs low in terms of connectivity, the HR proposal could improve the overall performance of the area. This project could be improved with a small amount of changes in order to optimize its performance and be able to pursue a LEED ND certification.

As reviewed by this report, the HR proposal complies with most of the prerequisites within LEED ND, with a partial exception under NPDp3. A GIB (Green Infrastructure and Buildings) Review was not necessary given the existing commitment of ACC to certify every building under LEED Silver as a minimum. As a minimum, a LEED-certified building is a required prerequisite for LEED ND under the GIB category. ACC's commitment to achieve LEED certification for all their buildings will give this project compliance with that pre-requisite. The HR proposal will also comply with the other pre-requisites under the GIB category of LEED ND, meaning that the project will achieve a minimum performance for water and energy uses, and will apply construction pollution and prevention control practices.

In general terms, a few observations and recommendations are listed below to facilitate the possibility of achieving LEED ND for this project:

- It is important to note that it would be beneficial for ACC that their minimum requirement of having all their buildings LEED Silver is met and, assuming the Mall renovation will achieve LEED certification, that this happens before registration of the LEED ND project. In the case a LEED ND certification is pursued, the LEED building needs to be part of the LEED ND project; therefore, LEED ND registration needs to happen before the LEED building is certified. For this specific project case, the Mall renovation will fall under the LEED for New Construction and Major Renovations rating system, and if LEED ND is to be be pursued, the LEED building would need to be certified after the LEED ND registration is effective, in order to comply with LEED ND GIB prerequisites. If the Mall Renovation (LEED building) is certified before the LEED ND registration, another building will have to pursue LEED certification in order to comply with the LEED ND GIB requirements.
- As urban design guidelines are being developed by a team of planners and designers, it would be beneficial for the overall performance of the project to conceive and fully understand LEED ND goals and requirements to include compatibility language within these guidelines and ensure a great potential to achieve LEED ND. With events being developed by organizations with missions related to sharing best practices in land development and growth management, the involvement of most of the stakeholders of this HR project, would leverage momentum in the creation and application of best practices with LEED ND as a tool to facilitate this.
- Chapter 3 of this report gives an overview of potential strategies that could optimize the performance of a LEED ND project early in its process, applying large-scale / long-term strategies. It would be beneficial for this HR development that stakeholders are involved in the

specifics of the credits outlined in chapter 3, since it has been recognized that those would be the ones with major positive potential in the neighborhood development performance.

While analyzing the proposal design itself, a few areas of improvement were found. The following recommendations are made so these improvements enhance the project's performance and ensure compliance with the minimum LEED ND requirements:

- North-East parcel proposed to be fully for office use could be reconfigured without compromising FAR and leasable yield of area, so that blocks are more connected. A sample of reconfiguration is attached to the appendix of this report. That proposal will increase the level of connectivity, making possible the achievement of additional points.
- Eastern parcel proposed as multifamily could also be reconfigured without compromising dwelling units / acre (DU/acre) in order to reduce block size. A non-motorized connection is eligible to intersect this parcel as it is a walk-friendly feature. The addition of a motorized connection may unfavorably affect yield of dwelling units, and may not be compliant with local TxDoT[1] requirements; therefore, it is recommended to include only a pedestrian connection that would be considered eligible.
- While levels of density are still variable and in study, they should be carefully assessed and observed in parallel with Table 10 (under Chapter 4), which provides thresholds and points according to the amount of dwelling units per acre and FAR levels.

The following pages below showcase proposed changes to a few parcels of this development and yield studies that are being shared with the developer for further analysis and study of mixed-use

[1] Texas Department of Transportation

treatments and alternatives, and further development of proformas. This proposal is presented as follows:

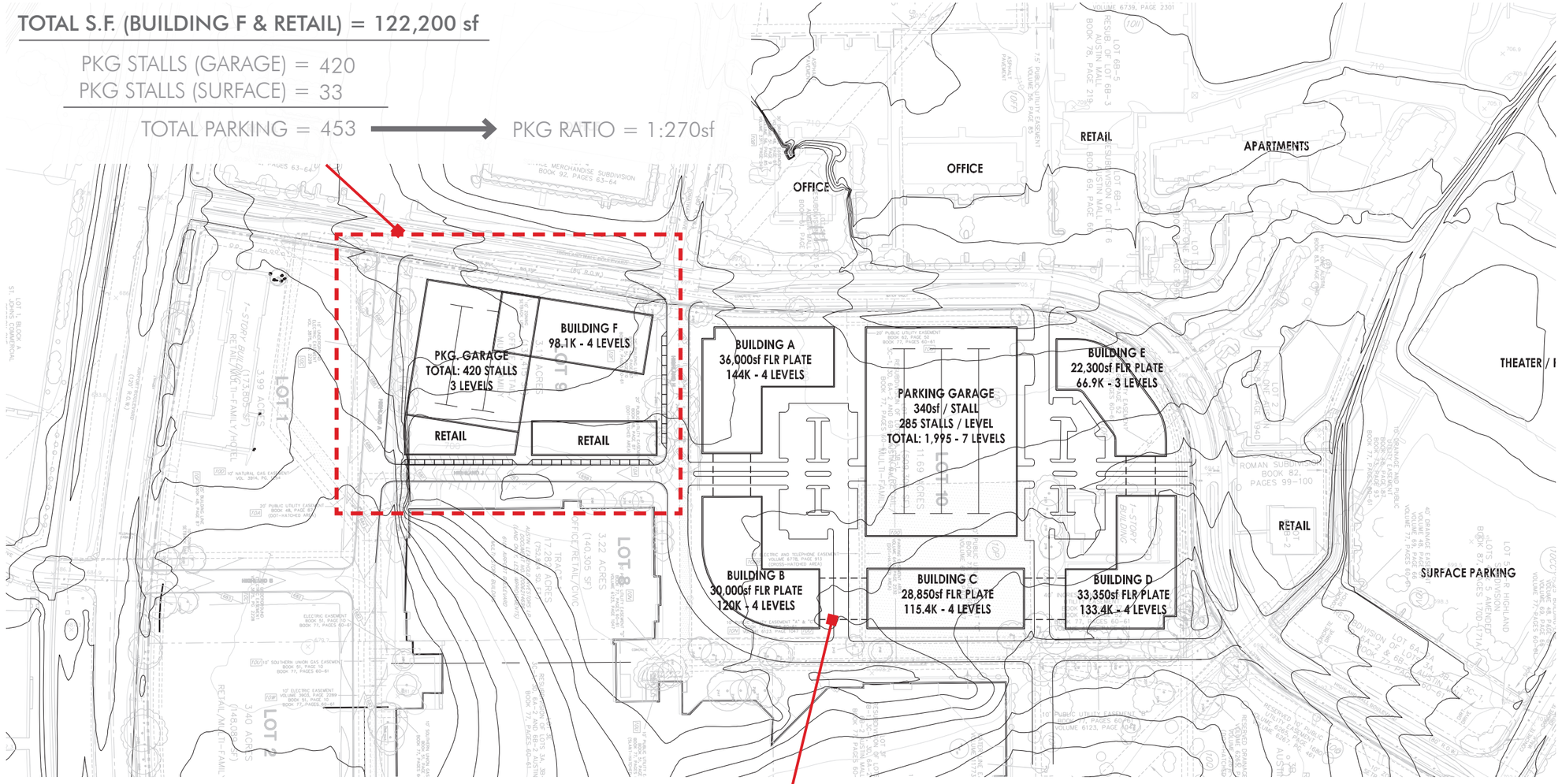
- Exhibit 1: STG Design Inc – Office Parcel Proposal Map.
- Exhibit 2: Office and Retail Plaza aerial view.
- Exhibit 3: Office and Retail Plaza pedestrian views.

The provisions of these general and specific recommendations in this report display the supportive nature of the professional developing this document. This report is intended to be shared with current planners and developers as a base for future improvement of the areas highlighted as "non-compliant" with LEED ND. As this project is not too far to meet the basic pre-requisites of the LEED ND rating system, this study may help direct a decision of certifying the Neighborhood Development under the USGBC rating system (LEED ND), as well as define a level of performance for a compact and connected neighborhood within the city of Austin.

TOTAL S.F. (BUILDING F & RETAIL) = 122,200 sf

PKG STALLS (GARAGE) = 420
PKG STALLS (SURFACE) = 33

TOTAL PARKING = 453 → PKG RATIO = 1:270sf



TOTAL S.F. (BUILDINGS A-E) = 579,700 sf

PKG STALLS (GARAGE) = 1,995
PKG STALLS (SURFACE) = 150

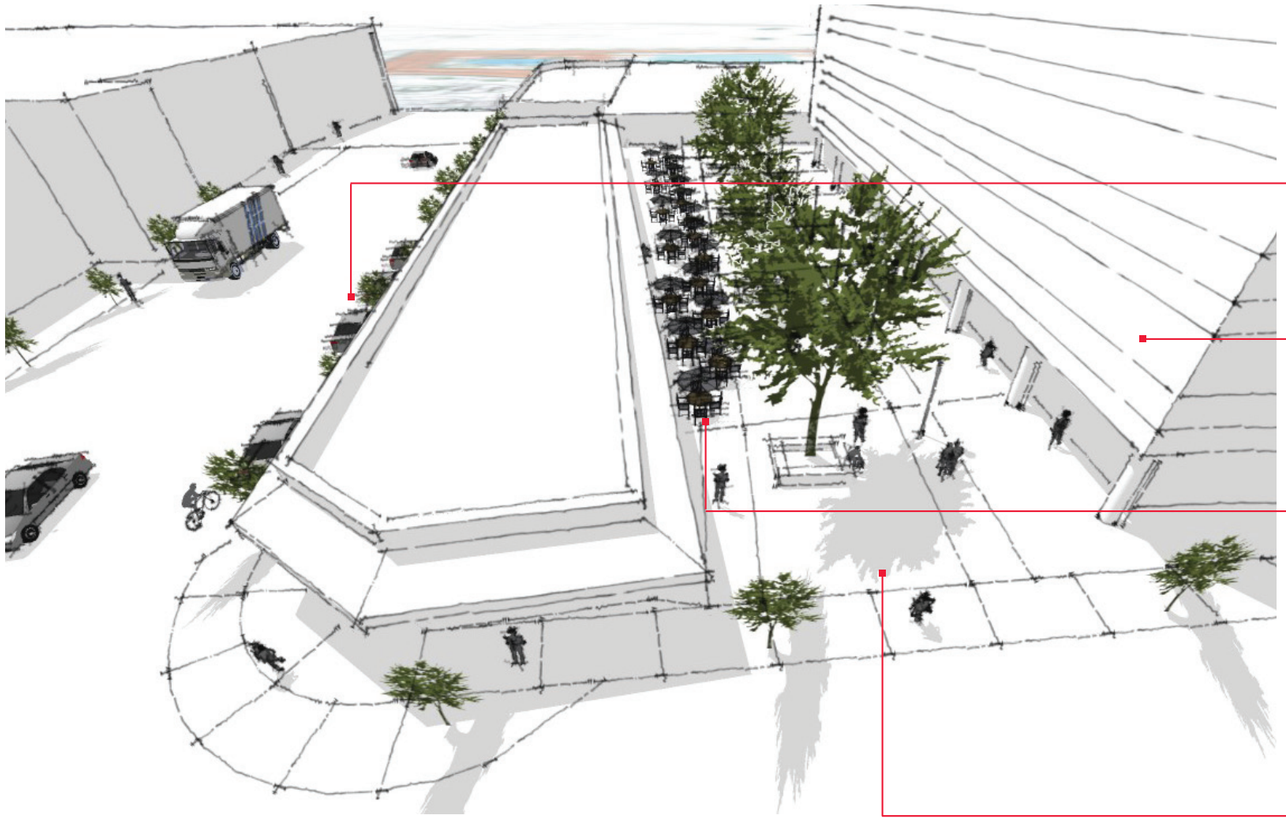
TOTAL PARKING = 2,145 → PKG RATIO = 1:270sf

POTENTIAL OVER-STREET CONNECTION(S) IF NEEDED BY BIG TENANT(S)

Source(s): STG Design, 2013.

N

0 100 500 FEET

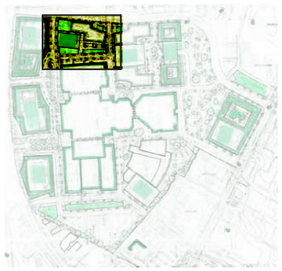


ON-STREET PARKING

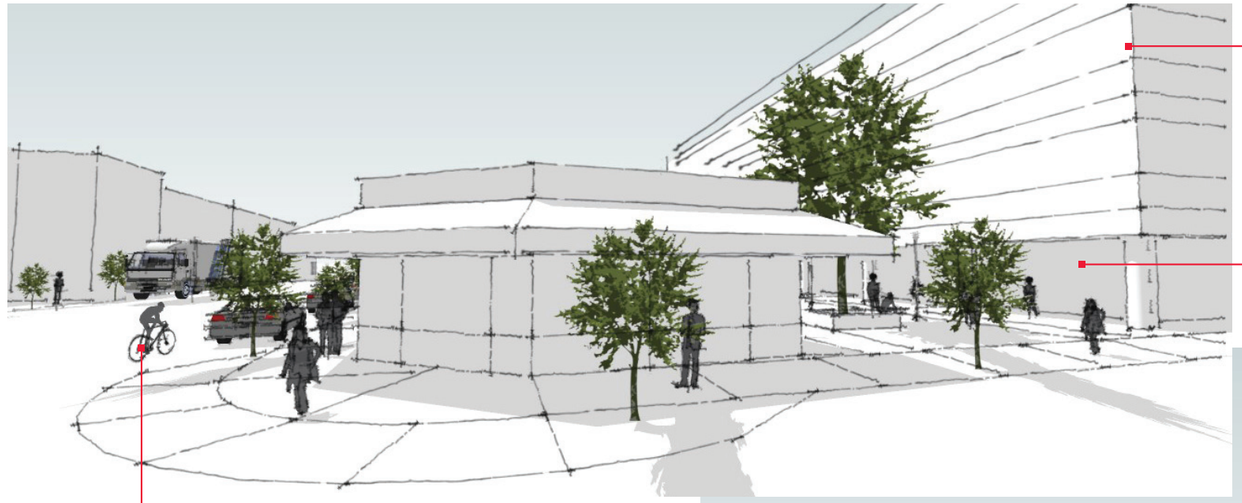
OFFICE ABOVE RETAIL

OUTDOOR SEATING

OPEN PLAZA:
RETAIL OPPORTUNITY
ON BOTH SIDES



Source(s): STG Design, 2013.



OFFICE ABOVE RETAIL

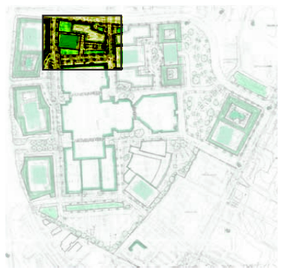
PEDESTRIAN LIGHTING

RETAIL

MULTIMODAL STREET: ON-SITE PARKING CYCLING

RETAIL

OUTDOOR SEATING



Source(s): STG Design, 2013.

Works cited

Airport Boulevard Market Assessment. February 2012.

Brentwood/Highland Combined Neighborhood Plan.

Revised Draft CAMPO 2035 Regional Growth Concept: A Guide for Integrating Land Use and Transportation in Central Texas. May 16, 2007.

Comprehensive Housing Market Study. City of Austin. 2009. BBC Research and Consulting.

Criterion Planners. Smart Growth Index: A Sketch Tool for Community Planning. 2002.

Imagine Austin Comprehensive Plan.

North Loop Neighborhood Plan.

Northfield Neighborhood Association website. http://www.northfieldna.org

"Partnership for Sustainable Communities." Partnership for Sustainable Communities. HUD, 2009. Web. 06 Apr. 2012. <http://www.sustainablecommunities.gov/aboutUs.html>.

Draft St. John's Coronado Hills Neighborhood Plan.

Travis County North Campus Master Plan. 2010.

TXP, Inc., and Gateway Planning Group, Inc. Upper Airport Blvd. Market Assessment Report. Rep. Austin, TX. Print.

University Hills/Windsor Park Combined Neighborhood Plan.

Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen, Growing Cooler: The Evidence on Urban Development and Climate Change (Washington, D.C.: Urban Land Institute, 2008).

"Greenhouse Gases, Climate Change, and Energy" (Energy Information Administration, May 2008).

Charter of the Congress for the New Urbanism, www.cnu.org/charter, 2013.

H. Dittmar and G. Ohland, eds., The New Transit Town: Best Practices in Transit-Oriented Development (Washington, D.C.: Island Press, 2004)

Jane Jacobs, The Death and Life of Great American Cities (New York: Random House, 1961)

A Local Government Guide to LEED for Neighborhood Development. March 2011

United States Green Building Council, www.usgbc.org, 2013.

ACC Disctrict Map, 2013

CAMPO Map 2: Centers Concept. CAMPO Region, May 2010.

U.S. Geological Survey (2000). 2000 data.

McGraw Hill Construction (2010). Green Outlook 2011: Green Trends Driving Growth.

Foundations of LEED. USGBC, July 2009.

USGBC – Green Neighborhood Development. LEED ND Reference Guide. 2009