Should Regional Policies be at the Center of Our Attention? Evaluating the Impact of the "Urban Center" Designation on Transit-Oriented Development in Denver.

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CHAPTER 1. CONTEXT

As the field of planning seeks to examine the relationships between the built and natural environments, populations are tending to pursue more dense urban development, moving away from the sprawling suburban development of the late 20th Century. As density in cities continues to increase, the question of how to properly develop and link these populations arises. A variety of stakeholders must be included in the planning process for ideas of this magnitude. The Denver Regional Council of Governments has taken on this role in the Denver and the surrounding region. With municipalities and elected leaders concerned about popularity and quality of life in their cities, planners must manage political and social concerns for space and monetary investments in order to facilitate growth and development (Aitken et al. 2003, Kwoka 2013).

As the importance of livability and interaction of transportation with land use has grown within the transportation field, transportation planning has grown into a more widely accepted field. The needs of public transport and pedestrians or cyclists received little or no attention to date, because most of the traditional transport planning practices that are familiar today were developed in a region where the car was king (Kwoka 2013). As the automobile culture of American planning continues to proliferate, it is important to denote the issues that arise in from this method. Congestion, sprawl, and public health concerns are ever present as the automobile continues to be the pervasive mode of transport in the United States (Kowka 2013). The rise of the automobile can be attributed to a number of factors including accessibility, capacity, flexibility, and privacy (Leinbach 2004). While technology has increased to make this resource more efficient,

it is finite and changes must be made to the transportation system as a whole to alleviate dependence upon it, which will simultaneously get rid of the issues mentioned above with it.

Congestion is an issue gathering importance under present day thinking. Common practice has used construction to relieve congestion, although multiple reports have shown that increased capacity only relieves congestion temporarily, and frequently results in increased congestion long term (Schrank, Eisele, & Lomax 2012). Congestion is a decrease of vehicle speed ultimately culminating in lower fuel efficiency, increased transportation time, and increased emissions detrimental to public health (Black 2010, Kwoka 2013).

Sprawling development is a style that harkens back to the port World War II era of the American Dream. It is characterized by low density, segregated patches of land use. Sprawl is another issue of the currently auto based planning culture, resulting in increased infrastructure investment and maintenance requirements when left unchecked. Due to their vast expanses, sprawling areas are inherently difficult to serve via public transit due to low population densities and too difficult to walk or bike for the same reason. The automobile dominated transportation system cannot sustain travel demands into the future. Planners and politicians must shift to alternative modes of transportation and land use changes that facilitate mobility within urban areas in an economically, environmentally and socially responsible fashion (Kwoka 2013).

Transit oriented development (TOD) is a method that can resolve this issue by placing populations in close proximity to a means to get them to their destination.

Denver is a budding metropolitan region at the base of the Rocky Mountains in Central Colorado. The region has experienced significant growth since the early 1990s. As such, the region rapidly expanded in a sprawling format. As the region has grown in population, it has looked to expand its transit offerings. In 1996, the Regional Transit District (RTD) opened the Central Light Rail line in the Downtown area. The Central line was followed by an expansion of the system to the Southwest Line in 2000 and the Southeast line in 2006. As part of a voter approved expansion project called FasTracks, RTD is expanding its current light rail lines, constructing three additional lines, commuter rail, and a bus rapid transit line. As seen in Figure 1, FasTracks project is currently the largest transportation project in the United States.

Figure 1 RTD FasTracks

The city of Denver is a particularly good example of the need for TOD. Denver is the largest city in and capital of Colorado; founded in 1858 as a mining town known as Denver City, the present day City and County of Denver occupy the roughly the same geographic space, covering 155 square miles, with a population of 649,495. Denver was built on a grid pattern with narrow blocks. As Denver grew from west to east, it expanded a streetcar system that reached its apex in 1893, when it was replaced by a bus system. Modern development moved from the urban areas of the Central Business District, to the inner ring suburbs south along I-25 and east along Colfax Avenue. Today, the Denver metro area is a sprawling, with little restraint on its commuting zone. Locally, Denver uses a number of different types of plans depending on the geography specified, ranging from citywide plans and initiatives, to small area plans, and general development plans. It is the RTD TOD Strategic Plan and DRCOG *Metro Vision* 2035 that link the City to the rest of its metro area.

Currently, the City of Denver is experiencing an increased rate of infill development following years of low density, auto-oriented development. Much of the infill and redevelopment in Denver is occurring on the northeast side of the city in areas such as Lowry, Stapleton, and the Denver International Airport. Infill development is expected throughout the City in the coming future, especially around new commuter rail stations along the I-70 corridor. As a landlocked city, Denver's focus is on infill development in largely underutilized areas. This will lead Denver to focus on the Northeast edges of its limits leading toward Denver International Airport along the East Corridor rail line.

The recent expansion of the RTD rail system has led Denver area governmental agencies to proactively implement growth management policies at the regional and local levels. Regional policy comes from the Denver Regional Council of Governments (DRCOG), while local policy from jurisdictions such as the City and County of Denver, and surrounding municipalities.

RTD is the Denver region transit provider, operating light rail, bus lines, shuttles, paratransit, and soon to open commuter rail lines throughout the metro area. As part of efforts to help the region grow efficiently and promote development near its infrastructure, RTD created the *Transit-Oriented Development Strategic Plan*. This plan focuses on guiding development on the land near station areas. According to this plan, TODs include all land within a half-mile buffer of a station location. All RTD light rail stations are designated TOD by the agency, and all current TOD sites can be seen in Figure 2 below. TODs can take many different forms depending on their neighborhood development type. This development style typically includes compact and dense development within a 10-minute walk, mixed uses, and pedestrian-oriented design.

> By focusing compact development around transit stations, TOD capitalizes on the value of public infrastructure investments and promotes sustainability. These development synergies promote increased transit ridership and an integrated station environment with more passenger amenities. In addition to increased ridership and more passenger amenities, TOD is also a successful tool for promoting local economic development, helping communities plan for sustainable growth, and increasing the overall quality of life in a region (RTD TOD Strategic Plan).

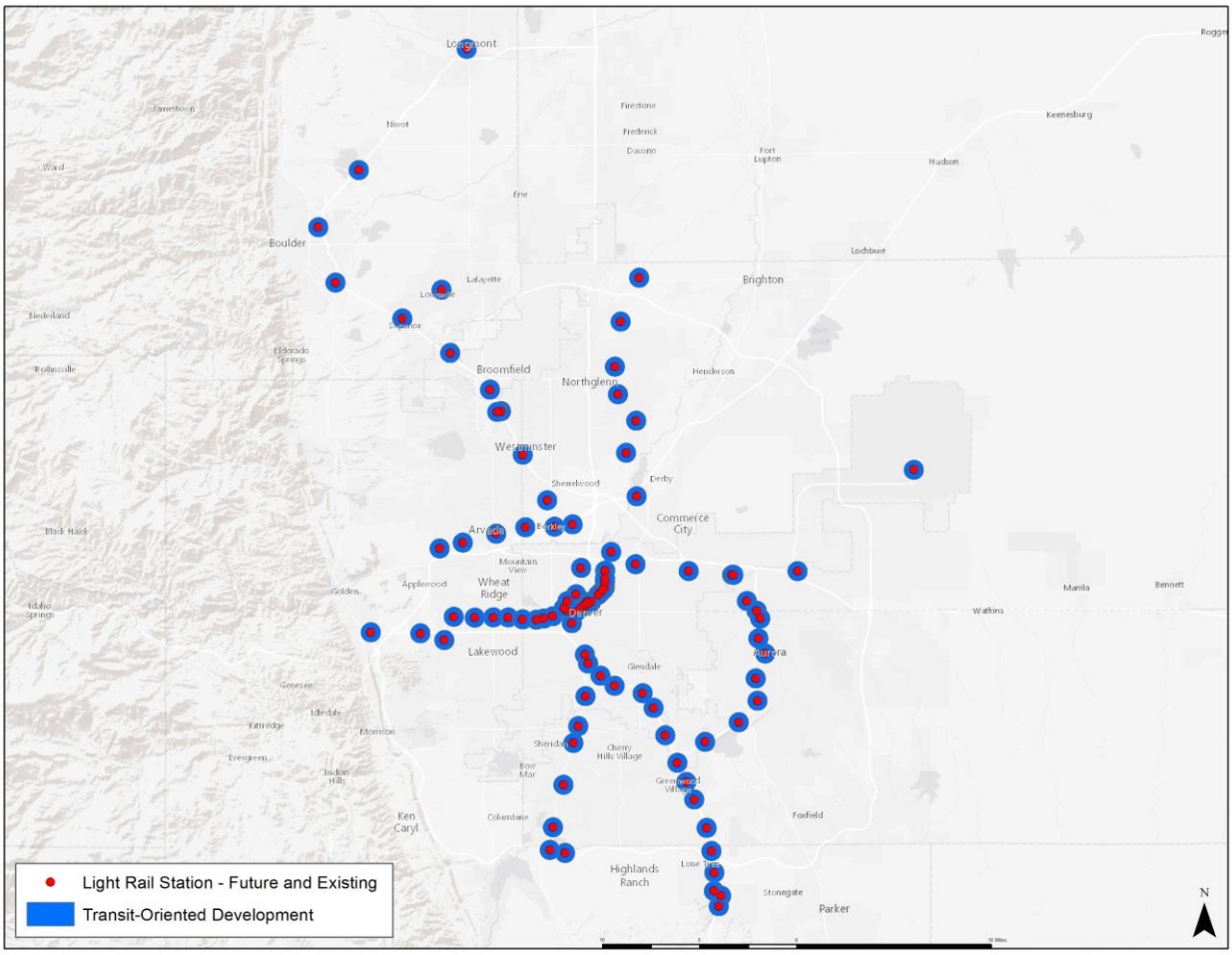

Figure 2 RTD Transit Oriented Developments

The Denver Regional Council of Governments (DRCOG) is a regional governmental organization comprised of nine counties in the Denver metropolitan area. These nine counties voluntarily participate in regional planning activities. As the regional planning body in Denver, DRCOG is responsible for creating efficient land use and development. DRCOG plans for growth with *Metro Vision 2035*, an outline for growth, transportation, and environmental policy in the Denver region. *Metro Vision* highlights a number of policies its member municipalities can take advantage of to ensure they grow in a sustainable manner. This report focuses on the “Urban Center” section of the plan, which calls for the development of nodal areas throughout the metro area with the goal

of attracting housing and job creation. A complete map of Urban Centers can be found below in Figure 3. These Urban Centers are intended to be hubs for mixed use, high density, and sustainable development seeking to be:

- Active, pedestrian-, bicycle-, and transit-friendly places;
- Allow people of all social and economic classes access to a range of opportunities without having to drive;
- Reduce per capita vehicle miles traveled, air pollution, greenhouse gas emissions and water consumption;
- And support existing neighborhoods.

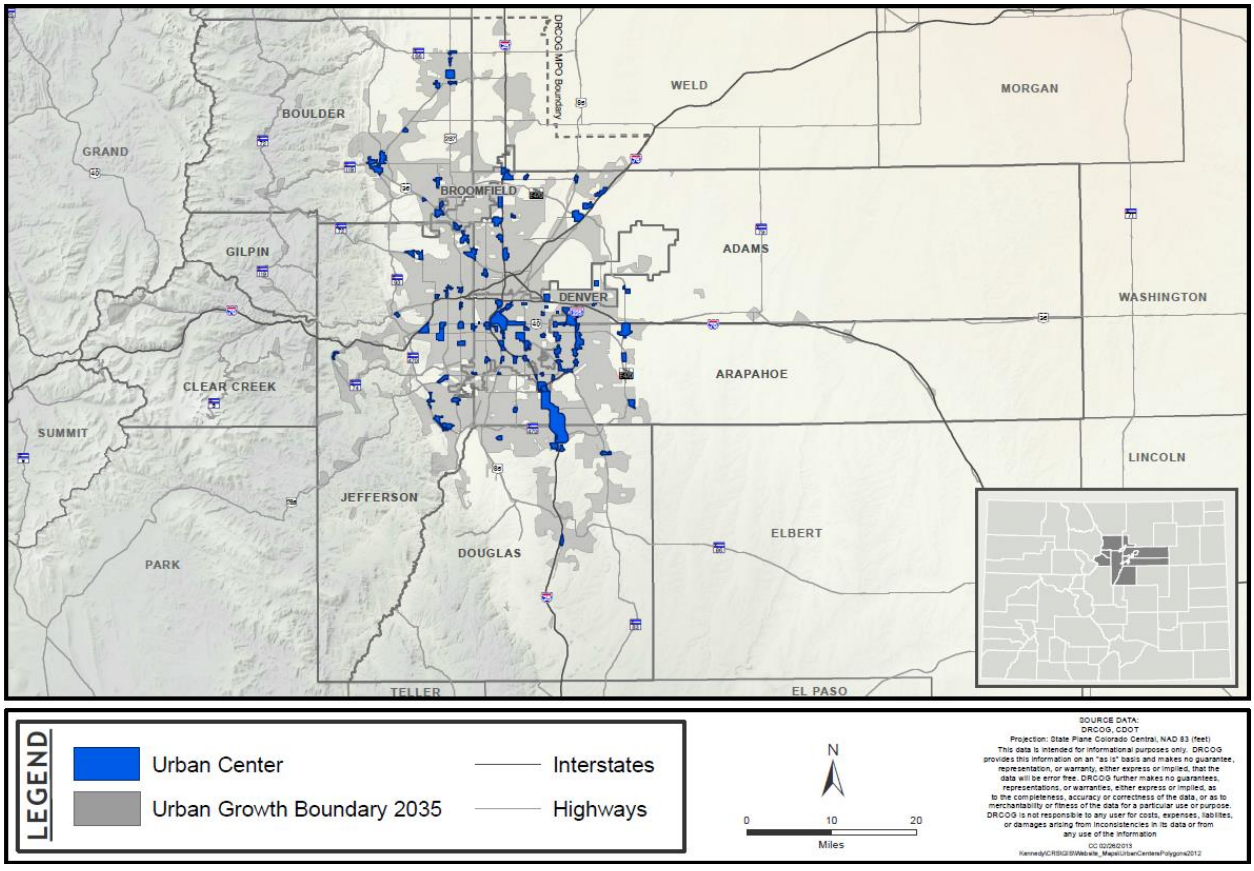

Figure 3 DRCOG Urban Centers

There are multiple similarities between transit-oriented development and Urban Centers, with their main difference being incentives used with each designation. RTD TODs are at station locations and are developed between RTD and private parties. Urban Centers on the other hand occur both at TODs and in other non-transit oriented

neighborhood commercial hubs. *Metro Vision 2035* incentivizes municipalities to develop in Urban Centers through use of Transportation Improvement Project (TIP) funds, enticing them to spur investment in Urban Center designated areas. Urban Centers are created through a voluntary process. Municipalities have the option to work with DRCOG to develop Urban Centers in areas that meet criteria set forth by DRCOG. Once this set of criteria is met, the area is designated and has the option to receive TIP funding for applicable projects. In Denver, RTD TODs and DRCOG Urban Centers are fundamentally similar ideas that frequently occupy the same space. It should be noted, that some TODs are Urban Centers and some Urban Centers are TOD, Urban Centers are not always TOD and TOD is not always concurrent with an Urban Center. As a result, Urban Centers are a financial incentive on the part of DRCOG that could be utilized in other ways if Urban Centers are shown to have no more positive effect than simply being a TOD.

The following sections of this report highlight key TOD research, primarily in the form of TOD development, regional implementation, and performance evaluation. Followed by the analysis framework, performance evaluation results, findings, and recommendations for DRCOG and RTD.

CHAPTER 2. LITERATURE

Literature in the field of regional plan implementation includes a mix of academic and professional papers and reports, covering topics ranging from TOD development, to regional implementation, and performance evaluation.

The Transit Cooperative Research Program published Report 102 on the experiences, challenges, and prospects of TOD in the United States. TOD is a development approach that requires thinking from a holistic approach (TCRP 2004). TOD should be evaluated post-occupancy through identification of barriers, impacts, and case studies of current TODs (Cervero 2004). Nelson, Niles, and Hibshoosh (2001) outline a template for creating transit-oriented development, including methodologies that can be evaluated after the station is opened. This is important when implementing TOD in an established community, as happened in the Denver area. This report is critical because of claims that transit oriented design must be accompanied by financing, developer incentives, stakeholder engagement, and careful land use and planning within the community itself to be successful (Goodwill 2002).

As the national resurgence in public transportation and the multimodal transportation system has increased, the concept of TOD has gained popularity as a way to grow sustainably. TOD is a development approach that allows for combination of high quality public transit to be used as an incentive for private parties (Belzer et al. 2010). TOD capitalizes on existing and proposed transit stations by creating walkable centers and neighborhoods that provide connections to regional employment and activity centers

without having to drive (Belzer et al. 2010). TOD is generally defined as moderate to high density mixed use development that includes professional and commercial uses, located within close proximity or using transit as its core (Lund 2006, Nelson et. al 2001). Vertical integration of uses is seen as key to transit-oriented development (Nelson et. al 2001). TOD is critical to the ever important link between transportation and land use. TOD is different from typical station area development because it places focus upon the urban design and pedestrian/bicycle friendliness of the station and surrounding area. The three Ds of TODs- density, design, and diversity are key components of successful TODs (Kwoka 2013). According to Cervero and Kockelman (1997), all of these elements must be present to achieve the full benefit of this development style in the community. In investigating the rise of TOD, Kwoka (2013) cited Ratner and Goetz (2013):

> The rise in the level of interest in transit oriented developments in the U.S. has been spurred by a] rapidly growing motor vehicle traffic congestion nationwide and increasing desire for multimodal alternatives; b] growing distaste for suburbia and strip development; c] growing desire for quality urban lifestyles with more walkable environments away from motor vehicle traffic; d] higher prices for gasoline and increased cost of motor vehicle ownership and use; and e] growing support for smart growth and urban sustainability changes in family structure to more single person households, young professionals, and empty nesters.

One of the newer areas of TOD and regional planning research is being spearheaded by the Center for Transit-Oriented Development (CTOD). CTOD has published two documents related to TOD planning at the regional scale, a 2012 report on TOD Planning at the Regional Scale and a 2010 report on TOD tools for MPOs. Each of these reports highlights the ability of regional planning bodies to have an impact on the creation of transit-oriented development. The Center for Transit Oriented Development

recognizes the need to plan at the regional level, rather than focusing solely on the individual station area (Anderson and Zimbabwe 2011). Coordinating TOD is difficult due to the incorporation of multiple stakeholders, as is the case in the Denver area with RTD, DRCOG, and respective municipalities. However, this coordination is required for successful TOD and to achieve stakeholder goals (Anderson and Zimbabwe 2011). TOD strengthens the regional economy through public investment, access for all people, and reduction of single occupancy vehicle use, all goals of entities in the Denver metro area (Anderson and Zimbabwe 2011). Regional planning bodies have the ability to support stakeholders within their jurisdiction support transit-oriented development and provide funding for transit supportive funding (Finkenbinder, Britt, and Blair 2010). CTOD mentions Denver and its use of TOD Typology to lay out the complexities that must be addressed for regional TOD to be manageable and recognizable (Finkenbinder, Britt, and Blair 2010).

Evaluating the success of an individual TOD is critical to knowing how to build a productive TOD. Many documents focus on ways to measure this success in both qualitative and quantitative manners. A NCHRP 2005 report focuses on developing a strategy to measure success of transit-oriented development, using methodologies that can be useful to evaluations in this report; it will be vital to developing indicators of success that can be transferred to a regional level. These indicators must evaluate the transportation and land use connection, including transportation, activity patterns, accessibility, and land use (Higgins 2014). Creating land use change in underdeveloped areas is commonly used as an indicator of investment around light rail (Higgins 2014).

This underdevelopment is a common factor in the Denver area and one of the leading reasons for increased TOD development in the region. Higgins (2014) identifies generalized indicators including improved accessibility, positive economic, population, and employment growth, urban design improvements, social change, and land availability, creating the foundation for performance evaluation. NCHRP (2005) identifies economic activity, environment and transportation activity, institutional changes, and community perception as general indicator categories for evaluation. Similarly, Nelson et al. identify the follow as factors determining success of TOD:

Number and siting of TODs	Housing type preference
Transit quality	Self-selection in residential choice
Transit technology	Number of parking spaces
Street pattern	Number of bicycle racks or lockers
Station-area parking	Household income
Employment and housing density	Housing growth
Commercial mix	Vacant land
Retail siting criteria	Land use
Regional market structure	Land investment
Consumer activity patterns	Transit provided
Travel behavior/trip chaining	Single occupancy vehicle
Zoning flexibility/land assembly	Pedestrian walkability

Additionally, analysis of TOD walkability has been credited with performance and success of this development style. Understanding the opportunities for pedestrian movement should be a key component in evaluating TOD performance (Schlossberg & Brown 2004). A number of studies have produced indicators effective for measuring walkability in a TOD including:

- Pedestrian catchment area size
- Density of dead ends (cul-de-sacs)
- Block length

In sum, regional approaches can lead to effective development on a regional scale. However, regional planning for Urban Centers and TOD is most successful when it is evaluated using proven methods and indicators that measure performance across a number of general categories, not relying on transit embarkations to tell the story.

CHAPTER 3. METHODS

Previous research noted in Chapter 2 highlighted a number of factors important in evaluating TOD effectively. A number of these have been incorporated into this report. The framework for this report involves three major steps. The first step is the selection of half mile TOD buffer areas that satisfy criteria making them suitable for analysis. This is followed by creation of a policy crosswalk identifying similarities between RTD's *TOD Strategic Plan* and the Urban Center section of the DRCOG *Metro Vision 2035* plan. The final prong of this framework is analysis of the selected TODs using US Census data and GIS to determine the success along several dimensions including demographics, land use, mobility, and walkability.

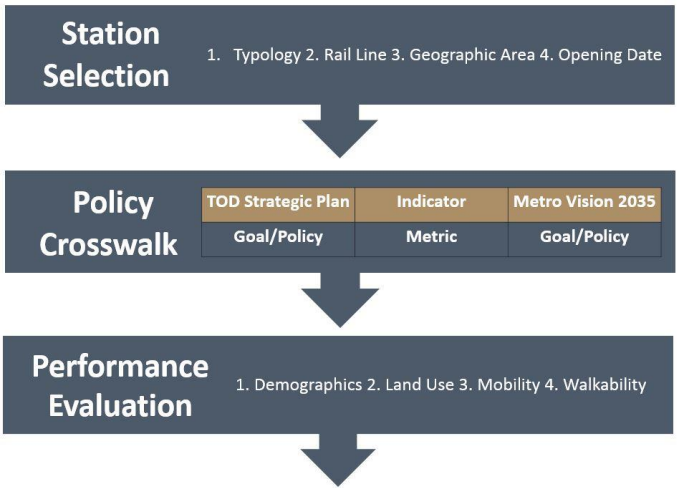

Figure 4 Policy Crosswalk

Station Selection

The first step in this framework is to select comparable station area TODs for analysis. The end goal of this step will be to identify four TODs that are not designated Urban Centers and four comparable TODs that are designated as Urban Centers. RTD Light Rail stations within the City of Denver are used for this analysis, as all stations are identified as TODs in the RTD TOD Strategic Plan and have a corresponding typology as identified by the City of Denver's Station Typology (Figure 5). This study is comprised of only stations that were opened in 2006 and before, allowing stations to

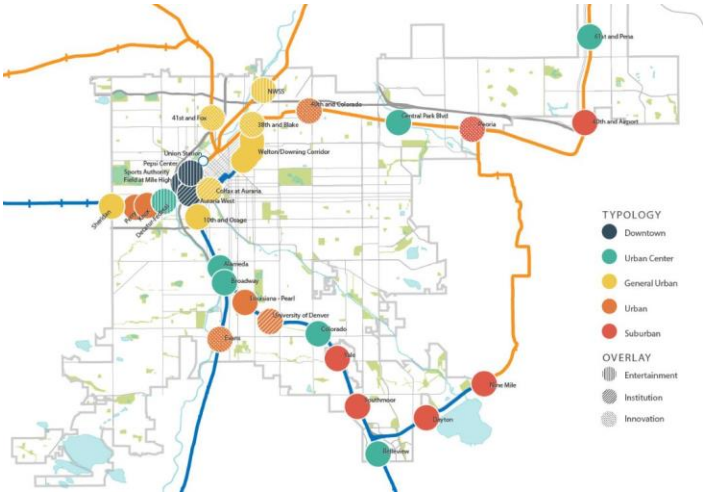

Figure 5 City of Denver TOD Typology

establish themselves within the community and assert influence over the surrounding area. For each station comparison, stations are compared with those opened in the same year, to ensure equal time for community influence. Additionally, selected stations are located along the same light rail route, and in similar neighborhood types. Stations will be paired for comparison using typologies outlined in the RTD TOD Strategic Plan, DRCOG Urban Center Typology, and City and County of Denver TOD Strategic Plan. While all Urban Centers selected in this study have the opportunity to apply for TIP funding, none of the locations chosen for this study have received funding to date. Using these plans, the following stations were identified for analysis (Table 1 and Figure 6).

Table 1 - Selected Stations

Station Name	Designation	Type	Line	Year Opened
20th & Welton	Urban Center	Downtown	D	1996
29th & Welton	TOD	Downtown	D	1996
University of Denver	Urban Center	Urban	E, F, H	2006
Louisiana-Pearl	TOD	Urban	E, F, H	2006
10th & Osage	Urban Center	General Urban	C, D, E, F, H	1996
Colfax at Auraria	TOD	General Urban	D, F, H	1996
Southmoor	Urban Center	Suburban	E, F, H	2006
Yale	TOD	Suburban	E, F, H	2006

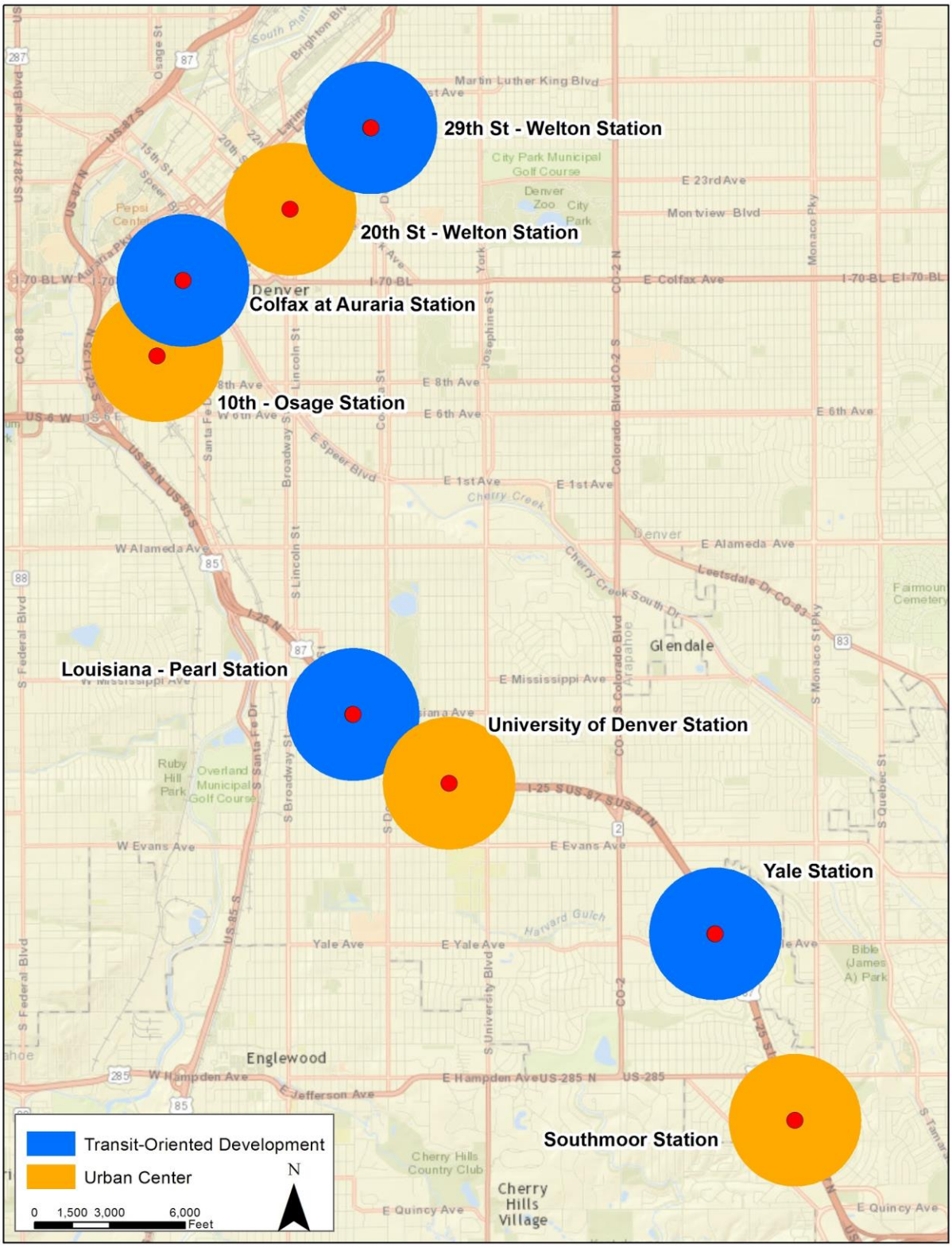

Figure 6 Selected Station Areas

Policy Crosswalk

A policy crosswalk is a tool used to compare similar but individual documents. This report crosswalks the RTD TOD Strategic Plan with the Urban Center section of the DRCOG *Metro Vision* 2035. These two elements contain similar characteristics as outlined in the context section above, but at times utilize different language. The policy crosswalk is intended to identify characteristics that these two documents share, enabling comparison of the TOD and Urban Center designations based upon these similarities by determining what each program is attempting to achieve. It will also allow identification of indicators that can be measured to determine success for each program. Outlined below are relevant policies from DRCOG *Metro Vision* 2035 and the RTD TOD Strategic Plan, followed by a matrix that crosswalks these policies and overlap between the two. An indicator that allows for the measurement of their performance either over time, spatially, or both characterize these overlapping policies.

RTD TOD Strategic Plan[1]

1. Goal 2: RTD will encourage livable communities and sustainable development that support the transit system.
    a. It is denser than existing development patterns in the surrounding area.
    b. It contains a mix of uses.
    c. It has a compact and attractive urban design.
    d. It promotes multimodal access so individuals need not rely on single occupant vehicles and allows easy pedestrian access to transit facilities.
    e. It supports a diversity of housing choices, including choices for low and moderate income individuals and families.

2. Goal 3: RTD supports multimodal access to the transit system by all users.
    a. Supporting a hierarchy of access to rapid transit which considers the following modes in order of priority: pedestrians, bus riders, bicyclists, vehicles (short-term parking), and vehicles (long-term parking).

[1] RTD (Regional Transit District). 2010. Strategic Plan for Transit Oriented Development. Revision 2. *Regional Transit District.*

b. Pedestrian connections to destinations within a 10-minute walk or ½ mile distance.
c. Regional bus transit and bicycle connections.
d. Vehicular access for the station catchment area.
e. Strategically managing the use and construction of RTD parking facilities to balance vehicular access and the opportunity for TOD to maximize ridership at stations and minimize the need for single-occupancy vehicle trips by transit riders outside of their trips to stations.
f. Optimizing RTD parking at stations by considering: proximity to Downtown Denver (less parking closer in), local feeder bus service (less parking with higher levels of service), and pedestrian connectivity (less parking with good pedestrian connections).

3. Goal 4: Protect and enhance RTD's transit assets and investments.
    a. Where appropriate, pursuing TOD as a means to increase the transit value of RTD owned land near stations.
    b. Where appropriate consider transitioning surface parking to structured parking, other transit-related facilities or TOD (including shared parking with consideration of RTD's Parking Management Program and governing state legislation on parking) and in doing so preserve the operational efficiency of the existing transit facility.

DRCOG *Metro Vision* 2035 – Urban Centers[2]

1. 50% of new jobs and new housing within Urban centers
2. be active, pedestrian-, bicycle-, and transit-friendly places that are more dense and mixed in use than surrounding areas
3. allow people of all ages, incomes and abilities to access a range of housing, employment, and service opportunities without sole reliance on having to drive
4. promote regional sustainability by reducing per capita vehicle miles traveled
5. Metro Vision encourages the development of urban centers at infill and redevelopment sites within the UGB/A throughout the metro area
6. Metro Vision prioritizes urban centers around existing or proposed transit stations or with high-frequency bus service.
7. Urban centers will have high levels of internal connectivity and will be well-connected to the region at large.
8. Urban centers will support housing suitable for a wide range of incomes and the full spectrum of life stages and physical abilities, providing good links to jobs,

[2] DRCOG (Denver Regional Council of Governments. 2011. Metro Vision 2035 Plan. *Denver Regional Council of Governments.*

services and other opportunities and reducing the combined cost of housing and transportation.

9. Modes such as walking, bicycling and transit will be equally competitive with driving within urban centers.

Table 2 integrates the key elements of RTD's Strategic Plan and DRCOG's *Metro Vision* plan identified above, synthesized through key indicators used to measure performance of the station area.

Table 2 - Policy Crosswalk

RTD TOD Strategic Plan		**DRCOG *Metro Vision* 2035**
DEMOGRAPHICS		
1a	**Population**	1, 2
1b	**Jobs**	1, 3
	Household income	3, 8
1e	**Housing Growth**	2, 3, 8
LAND USE		
1b	**Mix**	2
	Vacancy	2, 5
3a	**Value**	1, 3, 8
3a	**Year built**	5
MOBILITY		
2a, 2c, 2f	**Bus stops**	2, 3, 4, 5, 7, 9
2a, 2c	**Bus Routes**	2, 3, 4, 5, 7, 9
2a	**Percent who take public transit**	2, 3, 4
1d	**Average number of vehicles available per household**	2, 3, 4
1d	**Number Public**	2, 3, 4

	Transit/Walk/Bike	
1d, 2a, 2e, 2f, 3a	**Parking Spaces**	2, 3
2a, 2c	**Bicycle Parking**	2, 3, 9
WALKABILITY		
1d, 2a, 2b, 2f	**Walkshed Size**	2, 3, 7, 9
1d, 2a, 2b, 2f	**Walkshed Ratio**	2, 3, 7, 9
1d, 2a, 2b, 2f	**Cul-de-sacs**	2, 3, 7, 9
1d, 2a, 2b, 2f	**Cul-de-sac ratio**	2, 3, 7, 9
1d, 2a, 2b, 2f	**Street length**	2, 3, 7, 9
1d, 2a, 2b, 2f	**Average block length**	2, 3, 7, 9

Evaluation

The final element of analysis will use GIS to evaluate performance along indicators designated by the policy crosswalk. The success of these variables is ascertained by how well the metrics meet the goals of the relative plans temporally or spatially. Indicators outlined in the policy crosswalk were derived from a 2011 CTOD study measuring station area development, as well as a number of other studies outlining performance evaluation of TODs that can be found in Chapter 3 of this report. To ensure that comparable station areas had similar characteristics, many station areas were located close to each other. In some cases, the half-mile TOD buffer overlapped between stations. When this occurred, overlapping parcels were aggregated to each station area they intersect. Additionally, this report is focused on determining and analyzing outcomes from the outlined performance indicators, external market factors such as real estate market or economic variation are outside of the scope of this work.

For each TOD, indicators outlined in the policy crosswalk are evaluated. A brief explanation of each indicator derived from the policy crosswalk above is found below:

Demographics

- **Population** - Change in population of the station area from 2000-2010
- **Jobs** - Change in number of jobs of the station area from 2002-2009
- **Household Income** - Change in average household income from 2000-2010
- **Household Growth** - Change in number of households from 2000-2010
- **Housing Growth** - Change in number of housing units from 2000-2010

Land Use

- **Land Use Mix** - Number of parcels and acreage of each land use classification (2014)
- **Vacancy** - Number of vacant parcels within the station area (2014)
- **Value** - Total value of parcels within the station area (20141)
- **Year Built** - Average year of development for station area (2014)

Mobility

- **Bus Stops** - Number of bus stops within TOD (2014)
- **Bus Routes** - Number of bus routes that transect TOD (2014)
- **Public Transit Use** - Percent of residents that use public transit for commuting purposes (2010)
- **Vehicles Available** - Average number of vehicles available per household (2010)
- **Alternative Transportation Mode Share** - Percent of residents that use alternative transportation for commuting purposes (2010)
- **Parking Spaces** - Number of vehicle parking spaces available at station (2015)
- **Bicycle Parking** - Number of bicycle parking spaces available at station (2015)

Accessibility

- **Walkshed Size** - Acreage of half mile walkable area within TOD (2015)
- **Walkshed Ratio** - Ration of half mile walkshed acreage to half mile TOD (2015)
- **Cul-de-sacs** - Number of cul-de-sacs within TOD (2015)
- **Cul-de-sac Ratio** - Ratio of cul-de-sacs to acreage of half mile TOD (2015)
- **Street Length** - total length of streets within TOD (2015)
- **Average Block Length** - Average length of blocks within TOD (2015)

CHAPTER 4. RESULTS

The following section describes key findings from the research conducted on TOD station areas within the City and County of Denver using methods described in Chapter 3. These results were gathered based on indicators identified using a policy crosswalk formed from Denver Regional Council of Governments *Metro Vision* 2035 and the Regional Transit District Transit-Oriented Development Strategic Plan. Indicators were aggregated into the following overarching categories and presented using comparisons between Urban Center - TOD stations and TOD stations:

1. Demographics
2. Land Use
3. Accessibility
4. Walkability

20th & Welton Station and 29th and Welton Station

Station Name	Designation	Type	Line	Year Opened
20th & Welton	Urban Center	Downtown	D Line	1996
29th & Welton	TOD	Downtown	D Line	1996

Demographics

Table 3 - 20th & Welton & 29th & Welton Population

Station Name	Population 2000[3]	Population 2010[4]	% Change
20th & Welton	6,574	9,174	40%
29th & Welton	7,752	7,227	-7%

In 2000, the population of the 20th & Welton TOD area was 6,574, while it was 7,752 within the 29th & Welton TOD. In 2010 that number climbed to 9,174 at the 20th & Welton TOD and fell to 7,227 at the 29th & Welton station. This is an increase of 40% at 20th & Welton and a decrease of 7% at the 29th & Welton station.

Table 4 - 20th & Welton & 29th & Welton Employment

Station Name	Jobs 2002[5]	Jobs 2009[6]	% Change
20th & Welton	79,789	64,535	-19%
29th & Welton	1,733	1,285	-26%

In 2002, 20th & Welton station serviced 79,789 jobs, compared to 1,733 at 29th & Welton. This number fell to 64,535 at 20th & Welton in 2009 and climbed to 1,285 at 29th & Welton, resulting in a 19% decrease in jobs at the 20th & Welton station and 26% decrease at 29th & Welton.

[3] Census 2000 Summary File 1 p001001 aggregated from Census 2000 Blocks
[4] Census 2010 Summary File 1 p0010001 aggregated from Census 2010 Blocks
[5] 2002 LED Work Area Characteristic
[6] 2009 LED Work Area Characteristic

Table 5 - 20th & Welton & 29th & Welton Income

Station Name	Median Household Income 2000[7]	Median Household Income 2009[8]	% Change
20th & Welton	$ 19,277	$ 38,669	101%
29th & Welton	$ 24,972	$ 40,602	63%

Median household income in the 20th & Welton TOD doubled, from $19,277 in 2000 to $38,669 in 2009. Over the same period, the median household income of the 29th & Welton TOD increased from $24,972 to $40,602; an increase of 63%.

Table 6 - 20th & Welton & 29th & Welton Households

Station Name	Households 2000[9]	Households 2010[10]	% Change	Housing Units 2000[11]	Housing Units 2010[12]	% Change
20th & Welton	3,592	5,766	61%	4,140	6,686	61%
29th & Welton	2,771	3,140	13%	3,009	3,496	16%

The 20th & Welton TOD saw much greater housing growth than 29th & Welton between 2000 and 2010. The number of households in the 20th & Welton TOD increased 61% from 3,592 to 5,766, while the number of housing units increased 61% from 4,140 to 6,686. The number of households in the 29th & Welton TOD increased 13% from 2,771 to 3,140, while the number of housing units increased 16% from 3,009 to 3,496.

[7] Census 2000 Summary File 3 p053001 weighted average from Census 2000 Block Groups
[8] American Community Survey 2005-2009 5-Year Estimates b19013_001 aggregated from Census 2009 Block Groups
[9] Census 2000 Summary File 1 p015001 aggregated from Census 2000 Blocks
[10] Census 2010 Summary File 1 p0180001 aggregated from Census 2010 Blocks
[11] Census 2000 Summary File 1 h001001 aggregated from Census 2000 Blocks
[12] Census 2010 Summary File 1 h00010001 aggregated from Census 2010 Blocks

Table 7 - 20th & Welton & 29th & Welton Mode Share

Station Name	% who take public transit 2000[13]	% who take public transit 2009[14]	% Change	% who take public transit, bike, walk 2000[15]	% who take public transit, bike, walk 2009 (24)[16]	% Change
20th & Welton	17%	10%	-39%	48%	41%	-15%
29th & Welton	17%	11%	-31%	27%	25%	-6%

The 20th & Welton TOD saw 16.93% of its residents take public transit in 2000, compared to 10.31% in 2009. This is a decrease of 39%. The 29th & Welton TOD saw 16.55% of its residents take public transit in 2000, compared with 11.35% in 2009. This is a decrease of 31%. When looking at those that either took public transit, bicycle, or walked, 20th & Welton saw 47.94% of its residents use those modes in 2000 and 40.93% in 2009, a decrease of 15%. For the same modes, 29th & Welton saw a change from 26.6% in 2000 to 25.04% in 2009, for a decrease of 6%.

Table 8 - 20th & Welton & 29th & Welton Vehicles Available

Station Name	Average number of vehicles available per household 2000[17]	Average number of vehicles available per household 2009[18]
20th & Welton	0.66	0.9
29th & Welton	1.08	1.22

[13] Census 2000 Summary File 3 (p030005) / (p030001) aggregated from Census 2000 block groups
[14] American Community Survey 2005-2009 5-Year Estimates (b08301_010) / (b08301_001) aggregated from Census 2009 Block Groups
[15] Census 2000 Summary File 3 (p030005 + p030013 + p030014) / (p030002) aggregated from Census 2000 block groups
[16] American Community Survey 2005-2009 5-Year Estimates (b08301_010 + b08301_018 + b08301_019) / (b08301_001) aggregated from Census 2009 Block Groups
[17] Census 2000 Summary File 3 (h046001) / (h007001) aggregated from Census 2000 block groups
[18] American Community Survey 2005-2009 5-Year Estimates b25046_001 / b25044_001 aggregated from Census 2009 Block Groups

The average number of vehicles available per household in 2000 at 20th & Welton was 0.66, which increased 36% to 0.9 in 2009. At 29th & Welton, the average number of vehicles per household increased 13% from 1.08 to 1.22.

Table 9 - 20th & Welton & 29th & Welton Tenure

Station Name	Owner Occupied Housing Units 2000[19]	Owner Occupied Housing Units 2010[20]	% Change	Renter Occupied Housing Units 2000[21]	Renter Occupied Housing Units 2010[22]	% Change
20th & Welton	335	800	139%	3,258	4,966	52%
29th & Welton	1,060	1,260	19%	1,711	1,880	10%

20th & Welton housing units skew largely toward renters, with 3,258 rental units compared to 335 owned units in 2000. The number of rental units grew 52% through 2010 to 4,966 units, while the number of owned units grew even more, 139%, to 800 units in 2010. 29th & Welton housing units skew largely toward renters as well, although the trend lessened in 2010. 2000 showed 1,711 rental units compared to 1,060 owned units at 29th & Welton. The number of rental units grew 10% through 2010 to 1,880 units, while the number of owned units grew even more, 19%, to 1,260 units in 2010.

[19] Census 2000 Summary File 1 h004002 aggregated from Census 2000 Blocks
[20] Census 2010 Summary File 1 (h0040002 + h0040003) aggregated from Census 2010 Blocks
[21] Census 2000 Summary File 1 h004003 aggregated from Census 2000 Blocks
[22] Census 2010 Summary File 1 h0040004 aggregated from Census 2010 Blocks

Land Use

Table 10 - 20th & Welton & 29th & Welton Land Use - Source: City of Denver

	20th & Welton			29th & Welton		
Land Use	Parcels	Acres	% of Acres	Parcels	Acres	% of Acres
Commercial	797	394.75	15%	184	61.90	14%
Industrial	42	22.16	1%	35	14.03	3%
Institutional	39	22.58	1%	36	48.03	11%
Open Space	5	14.02	1%	1	8.52	2%
Residential	3283	2176.65	82%	2342	289.69	65%
Transportation	4	1.69	0%	4	1.465	0%
Vacant	73	19.13	1%	144	21.21	5%

The land use mix at 20th & Welton is largely indicative of the greater Denver metro area, with majority of parcels and land area comprised of residential uses, with 2,176.65 acres covering 82% of the total TOD area. Commercial parcels are the next largest land area, with 797 parcels covering 394.75 acres within the TOD. Together, commercial and residential parcels occupy 97% of the land area of the 20th & Welton TOD, with industrial, institutional, open space, transportation, and vacant covering the excess. There are 73 vacant parcels in this area covering 19.13 acres. Land uses at the 29th & Welton TOD follow a similar pattern to 20th & Welton, although the mix is slightly more variable. Residential uses comprise 65% of the total land area, followed by commercial at 14%, institutional at 11%, vacant at 5%, industrial at 3%, and open space at 2%. This mix is likely due to greater separation from the downtown core. There are 144 vacant parcels within the 29th & Welton TOD, totaling 21.21 acres.

Table 11 - 20th & Welton & 29th & Welton Parcel Value and Year Built- Source: City of Denver

TOD	Average Value	Average Year Built
20th & Welton	$ 2,232,379.31	1966
29th & Welton	$ 330,039.11	1916

The average value of parcels in the 20th & Welton TOD is $2,202,379.31. This value is an outlier when compared with other TOD locations in this study due to the location of this station in the downtown area. This compares with an average value of $330,039.11 for the 29th & Welton TOD. Similarly, there is a disparity in the average year of parcel development, with an average of 1966 at 20th & Welton and an average of 1916 at 29th & Welton.

Mobility

The 20th & Welton half mile TOD area is intersected by 37 RTD routes serving a total of 18 stops. The 29th & Welton half mile TOD area features eight RTD routes serving 25 stops. The number of parking spaces at the 20th & Welton and 29th & Welton stations are similarly absent, in terms of both vehicular and bicycle parking. 20th & Welton station offers 0 vehicle parking spaces, 0 bike racks, and 0 bike lockers. Similarly, the 29th & Welton station features 0 parking spaces for vehicles, 0 bike racks, and 0 bike lockers.

Walkability

Table 12 - 20th & Welton & 29th & Welton Walkability - Source: City of Denver GIS

Name	Walkshed (Acres)	TOD (Acres)	Walkshed to TOD Ratio	Number of Cul-de-sacs	Cul-de-sac Density (per Acre)	Street Length (Miles)	Average Block Length (Ft)
20th & Welton	346.87	502.57	0.69	1	0.002	30.16	238.72
29th & Welton	313.92	502.57	0.63	5	0.01	31.26	242.73

The 20th & Welton half mile TOD covers 502.57 acres as do all RTD TOD areas. Within this TOD area, the street network is a major factor in how far from the station itself people can access in half a mile of walking. The 20th & Welton half mile walkshed covers 346.87 acres, or 69% of the TOD boundary. A major impediment to street

connections is the cul-de-sac, of which the 20th & Welton TOD has one. Walkability is also affected by the block length of streets within the area. The average block length 238.72 feet. Within the 29th & Welton TOD area, the half mile walkshed covers 313.92 acres, or 63% of the TOD boundary. The 29th & Welton has five cul-de-sacs and an average block length of 242.73 feet within its boundary. Figures 7 and 8 depict the walksheds of these stations.

Summary of Trends

Overall, the 20th & Welton TOD area performs higher on more indicators than 29th & Welton. In many cases, this is due to the proximity of this station area to the downtown core in Denver. However, that does not indicate that it outperforms 29th & Welton in all cases. 20th & Welton outperformed 29th & Welton in most demographic indicators, particularly those involving housing, employment, and income. Due to its increased distance from downtown, 29th & Welton sees increased use of public transit. 29th & Welton has a greater land use mix than is present at 20th & Welton. Additionally, 20th & Welton has greater access to transit, because of its location near downtown, although neither station areas have vehicle or bicycle parking. As both station locations are adjacent to the downtown area, the walkability is among the highest for all studied station areas; showing that in this case, both stations have high walkability that is a factor of proximity to downtown rather than designation.

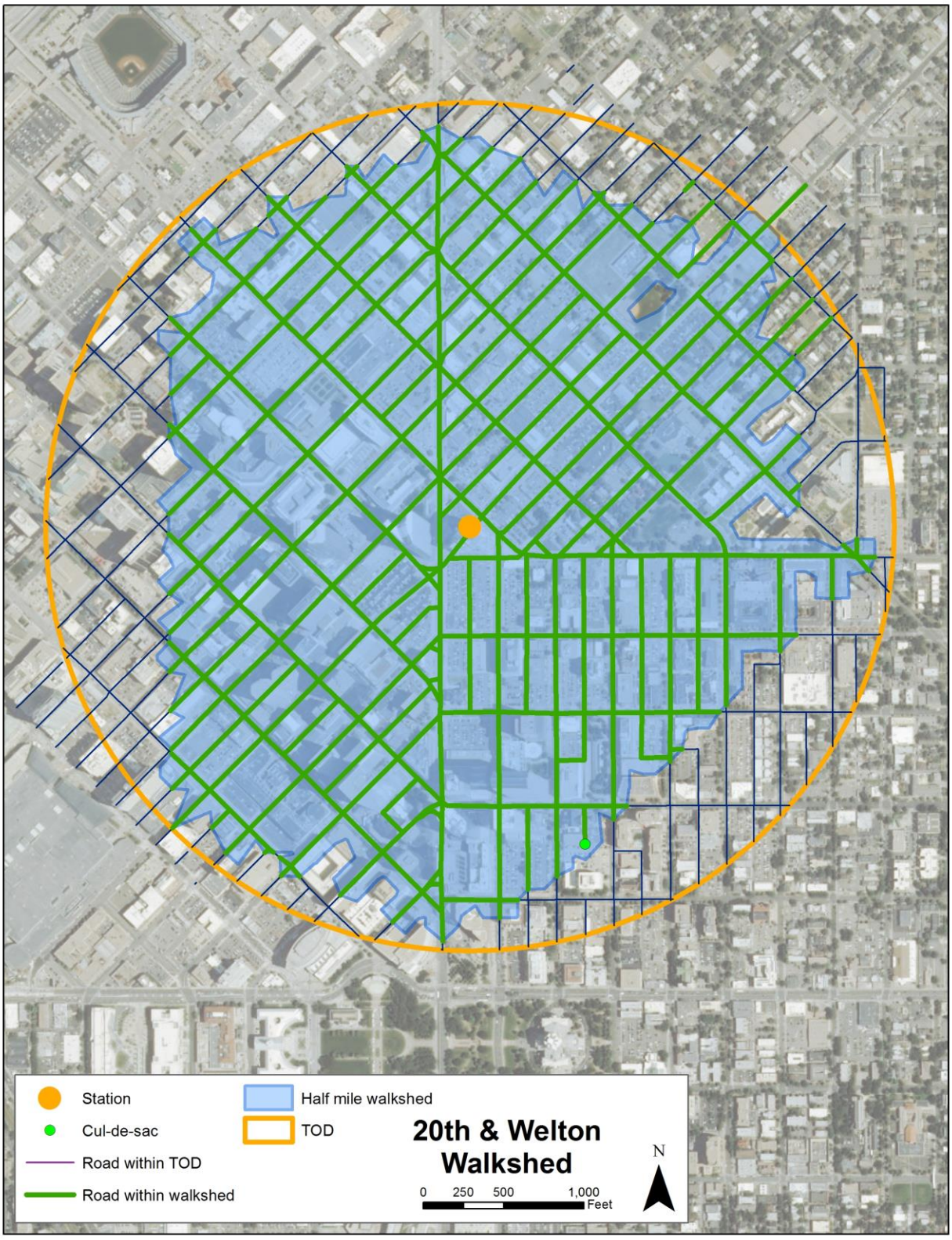

Figure 7 20th & Welton Walkshed

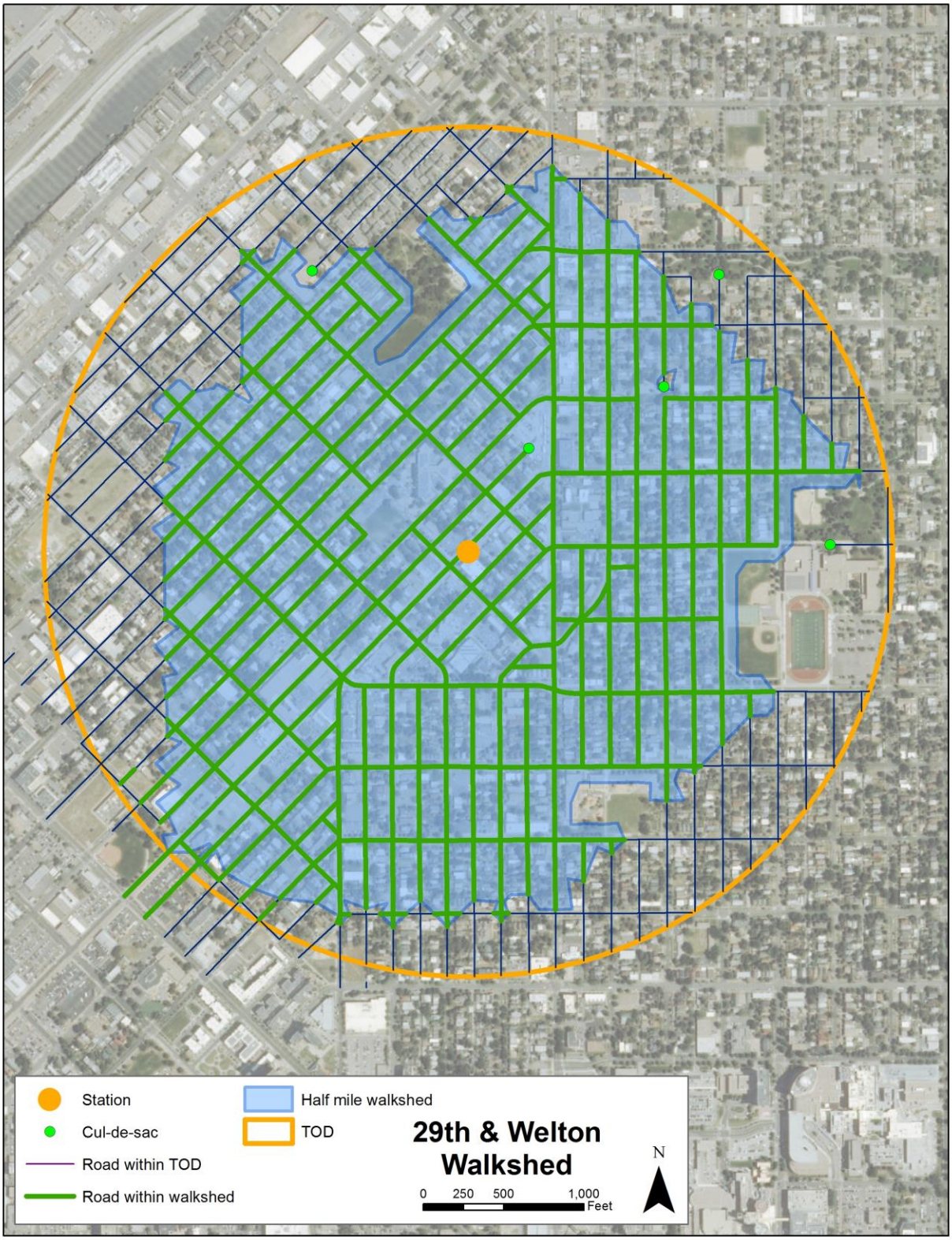

Figure 8 29th & Welton Walkshed

University of Denver Station and Louisiana-Pearl Station

Station Name	Designation	Type	Line	Year Opened
University of Denver	Urban Center	Urban	E Line, F Line, H Line	2006
Louisiana-Pearl	TOD	Urban	E Line, F Line, H Line	2006

Demographics

Table 13 - University of Denver & Louisiana-Pearl Population

Station Name	Population 2000[23]	Population 2010 [24]	% Change
University of Denver	4,397	4,571	4%
Louisiana-Pearl	4,359	4,448	2%

In 2000, the population of the University of Denver TOD area was 4,397, while it was 4,359 within the Louisiana-Pearl TOD. In 2010 that number climbed to 4,571 at the University of Denver TOD and 4,448 at the Louisiana-Pearl station. This is a 4% increase at the University of Denver and 2% at the Louisiana-Pearl station.

Table 14 - University of Denver & Louisiana-Pearl Employment

Station Name	Jobs 2002 [25]	Jobs 2009 [26]	% Change
University of Denver	4,205	4,724	12%
Louisiana-Pearl	1,478	2,078	41%

In 2002, University of Denver station serviced 4,205 jobs, compared to 1,478 at Louisiana-Pearl. This number rose to 4,724 at University of Denver station in 2009 and 2,078 at Louisiana-Pearl station, resulting in a 12% increase in jobs at the University of Denver station and 41% at the Louisiana-Pearl station.

[23] Census 2000 Summary File 1 p001001 aggregated from Census 2000 Blocks
[24] Census 2010 Summary File 1 p0010001 aggregated from Census 2010 Blocks
[25] 2002 LED Work Area Characteristic
[26] 2009 LED Work Area Characteristic

Table 15 - University of Denver & Louisiana-Pearl Income

Station Name	Median Household Income 2000[27]	Median Household Income 2009[28]	Income Change
University of Denver	$ 43,905	$ 54,881	25%
Louisiana-Pearl	$ 53,958	$ 71,479	32%

Median household income in the DU TOD increased from $43,902 in 2000 to $54,881 in 2009; an increase of 25%. Over the same period, the median household income of the Louisiana-Pearl TOD increased from $53,958 to $71,479; an increase of 32%.

Table 16 - University of Denver & Louisiana-Pearl Households

Station Name	Total Households 2000[29]	Total Households 2010[30]	% Change	Total Housing Units 2000[31]	Total Housing Units 2010[32]	% Change
University of Denver	1,850	1,823	-1%	1,996	1,956	-2%
Louisiana-Pearl	2,251	2,246	0%	2,336	2,392	2%

Both the University of Denver TOD and Louisiana-Pearl TOD were relatively stagnant in housing growth between 2000 and 2010. The number of households in the DU TOD decreased 1% from 1,850 to 1,823, while the number of housing units decreased 2% from 1,996 to 1,956. The number of households in the Louisiana-Pearl TOD decreased 0.2% from 2,251 to 2,246, while the number of housing units increased 2% from 2,336 to 2,392.

[27] Census 2000 Summary File 3 p053001 weighted average from Census 2000 Block Groups
[28] American Community Survey 2005-2009 5-Year Estimates b19013_001 aggregated from Census 2009 Block Groups
[29] Census 2000 Summary File 1 p015001 aggregated from Census 2000 Blocks
[30] Census 2010 Summary File 1 p0180001 aggregated from Census 2010 Blocks
[31] Census 2000 Summary File 1 h001001 aggregated from Census 2000 Blocks
[32] Census 2010 Summary File 1 h00010001 aggregated from Census 2010 Blocks

Table 17 - Mode Share

Station Name	% who take public transit 2000[33]	% who take public transit 2009[34]	% Change	% who take public transit, bike or walk 2000[35]	% who take public transit, bike or walk 2009[36]	% Change
University of Denver	6%	6%	0%	17%	21%	23%
Louisiana-Pearl	7%	5%	-31%	11%	10%	-7%

The University of Denver TOD saw 6% of its residents take public transit in 2000, compared to 6% in 2009; a change of 0%. The Louisiana-Pearl TOD saw a 31% drop in use as 7.1% of its residents took public transit in 2000, compared with 4.9% in 2009. When looking at those that either took public transit, bicycle, or walked, University of Denver saw 16.6% of its residents use those modes in 2000 and 20.5% in 2009, an increase of 23%. For the same modes, Louisiana-Pearl saw a change from 11.5% in 2000 to 10.7% in 2009, for a decrease of 7%.

Table 18 - University of Denver & Louisiana-Pearl Vehicles Available

Station Name	Average number of vehicles available per household 2000[37]	Average number of vehicles available per household 2009[38]
University of Denver	1.55	1.43
Louisiana-Pearl	1.56	1.65

[33] Census 2000 Summary File 3 (h044003 + h044004 + h044010 + h044011) / (h044001) aggregated from Census 2000 block groups
[34] American Community Survey 2005-2009 5-Year Estimates (b25044_003+b25044_004+b25044_010+b25044_011) / b25044_001 aggregated from Census 2009 Block Groups
[35] Census 2000 Summary File 3 (p030005) / (p030001) aggregated from Census 2000 block groups
[36] American Community Survey 2005-2009 5-Year Estimates (b08301_010) / (b08301_001) aggregated from Census 2009 Block Groups
[37] Census 2000 Summary File 3 (h046001) / (h007001) aggregated from Census 2000 block groups
[38] American Community Survey 2005-2009 5-Year Estimates b25046_001 / b25044_001 aggregated from Census 2009 Block Groups

The average number of vehicles available per household in 2000 at the University of Denver station was 1.55, which decreased 8% to 1.43 in 2009. At Louisiana-Pearl, the average number of vehicles per household increased 6% from 1.56 to 1.65.

Table 19 - University of Denver & Louisiana-Pearl Tenure

Station Name	Owner Occupied Housing Units 2000[39]	Owner Occupied Housing Units 2010[40]	% Change	Renter Occupied Housing Units 2000[41]	Renter Occupied Housing Units 2010[42]	% Change
University of Denver	844	786	-7%	1,005	1,037	3%
Louisiana-Pearl	1,425	1,393	-2%	826	853	3%

University of Denver housing units skew toward renters, with 1,005 rental units compared to 844 owned units in 2000. The number of rental units grew 3% through 2010 to 1,037 units, while the number of owned units declined 7%, to 786 units in 2010. Louisiana-Pearl housing units skew conversely toward owners. 2000 showed 826 rental units compared to 1,425 owned units at Louisiana-Pearl. The number of rental units grew 3% through 2010 to 853 units, while the number of owned units declined 2%, to 1,393 units in 2010.

[39] Census 2000 Summary File 1 h004002 aggregated from Census 2000 Blocks
[40] Census 2010 Summary File 1 (h0040002 + h0040003) aggregated from Census 2010 Blocks
[41] Census 2000 Summary File 1 h004003 aggregated from Census 2000 Blocks
[42] Census 2010 Summary File 1 h0040004 aggregated from Census 2010 Blocks

Land Use

Table 20 -University of Denver & Louisiana-Pearl Land Use - Source: City of Denver

	University of Denver			Louisiana-Pearl		
Land Use	Parcels	Acres	% of Acres	Parcels	Acres	% of Acres
Commercial	37	19.90	2%	124	28.32	6%
Industrial	0	0	0%	7	6.92	1%
Institutional	16	141.17	17%	12	86.73	19%
Open Space	1	15.99	2%	1	41.21	9%
Residential	1606	622.17	76%	2100	266.27	57%
Transportation	5	9.84	1%	4	9.49	2%
Vacant	33	7.80	1%	91	24.68	5%

The land use mix at University of Denver is similar the rest of the Denver metro area, as majority of parcels and land area are comprised of residential uses, with 622.17 acres covering 76% of the total TOD area. However, it differs because institutional land uses are the number two occupier of land area within the TOD, due to the presence of the university. Institutional uses cover 141.17 acres or 17% of the land area of the TOD. Commercial parcels are the next largest land area, with 37 parcels covering 19.89 acres. Together, residential, institutional, and commercial parcels occupy 96% of the land area of the University of Denver TOD, with industrial, open space, transportation, and vacant covering the excess. There are 33 vacant parcels in this area covering 7.80 acres. Land use at the Louisiana-Pearl TOD follows a similar pattern to University of Denver, although the mix is slightly more variable. Residential uses comprise 61% of the total land area, followed by institutional at 20%, open space at 9% commercial at 6%, vacant at 6%, and industrial at 2%. This mix is likely due to greater separation from the downtown core. There are 91 vacant parcels within the Louisiana-Pearl TOD, totaling 24.69 acres.

Table 21 - University of Denver & Louisiana-Pearl Parcel Value - Source: City of Denver

Station Name	Average Value	Average Year Built
University of Denver	$ 562,541.46	1946
Louisiana-Pearl	$ 407,904.87	1929

The average value of parcels in the University of Denver TOD is $562,541.46. This value is larger than most TODs used in this study due to the presence of the University of Denver, although the difference is less than that of the 20th & Welton TOD. This compares with an average value of $407,904.87 for the Louisiana-Pearl TOD. Similarly, there is a disparity in the average year of parcel development, with an average of 1946 at the University of Denver TOD and an average of 1929 at Louisiana-Pearl.

Mobility

The University of Denver half mile TOD area is bisected by seven RTD routes serving a total of 18 stops. The Louisiana-Pearl half mile TOD area features eight RTD routes serving 25 stops. The number of parking spaces at the University of Denver and Louisiana-Pearl stations differs greatly, both in terms of vehicular and bicycle parking. DU station offers 540 vehicle parking spaces, 10 bike racks (80-100 bikes), and 12 bike lockers. Conversely, the Louisiana-Pearl station features 0 parking spaces for vehicles, 0 bike racks, and 0 bike lockers.

Walkability

Table 22 -University of Denver & Louisiana-Pearl Walkability - Source: City of Denver GIS

Station Name	Walkshed (Acres)	TOD (Acres)	Walkshed to TOD Ratio	Number of Cul-de-sacs	Cul-de-sac Density (per Acre)	Street Length (Miles)	Average Block Length (Ft)
University of Denver	170.65	502.57	0.34	8	0.01	22.05	238.64
Louisiana-Pearl	324.37	502.57	0.65	5	0.01	28.78	215.54

Within the University of Denver TOD area, the half-mile walkshed covers 170.65 acres, or 34% of the TOD boundary. The University of Denver walkshed is smaller than the study average due to the presence of Interstate 25 and the lack of access to the north side of the TOD area. University of Denver features eight cul-de-sacs and an average block length of 238.64 feet. Within the Louisiana-Pearl TOD area, the half mile walkshed covers 324.37 acres, or 65% of the TOD boundary. The Louisiana-Pearl TOD has five cul-de-sacs and an average block length of 215.54 feet within its boundary. Figures 9 and 10 depict the walksheds of these stations.

Summary of Trends

Overall, the University of Denver and Louisiana-Pearl perform similarly on many indicators. University of Denver and Louisiana-Pearl have both seen growth in demographic measures that have goals under DRCOG and RTD. The housing market at these station areas was stagnant through the study period, as growth was minimal. Additionally, use of public transit varied among the two station areas. Due to the lower cost of parcels and greater availability of land, Louisiana-Pearl has a greater land use mix than is present at University of Denver. Louisiana-Pearl was measured as a much more walkable station area, and was among the highest of the studied station areas.

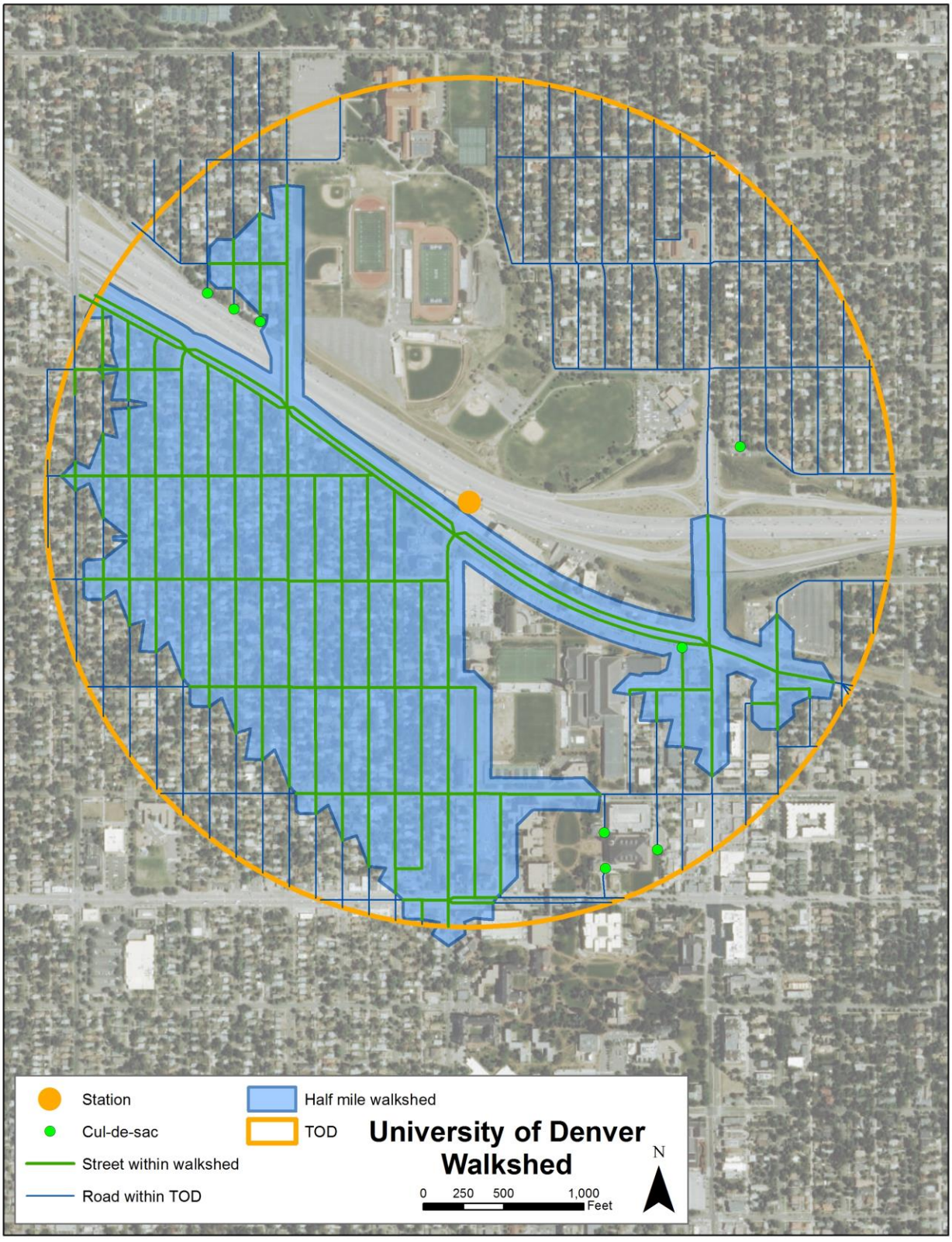

Figure 9 University of Denver Walkshed

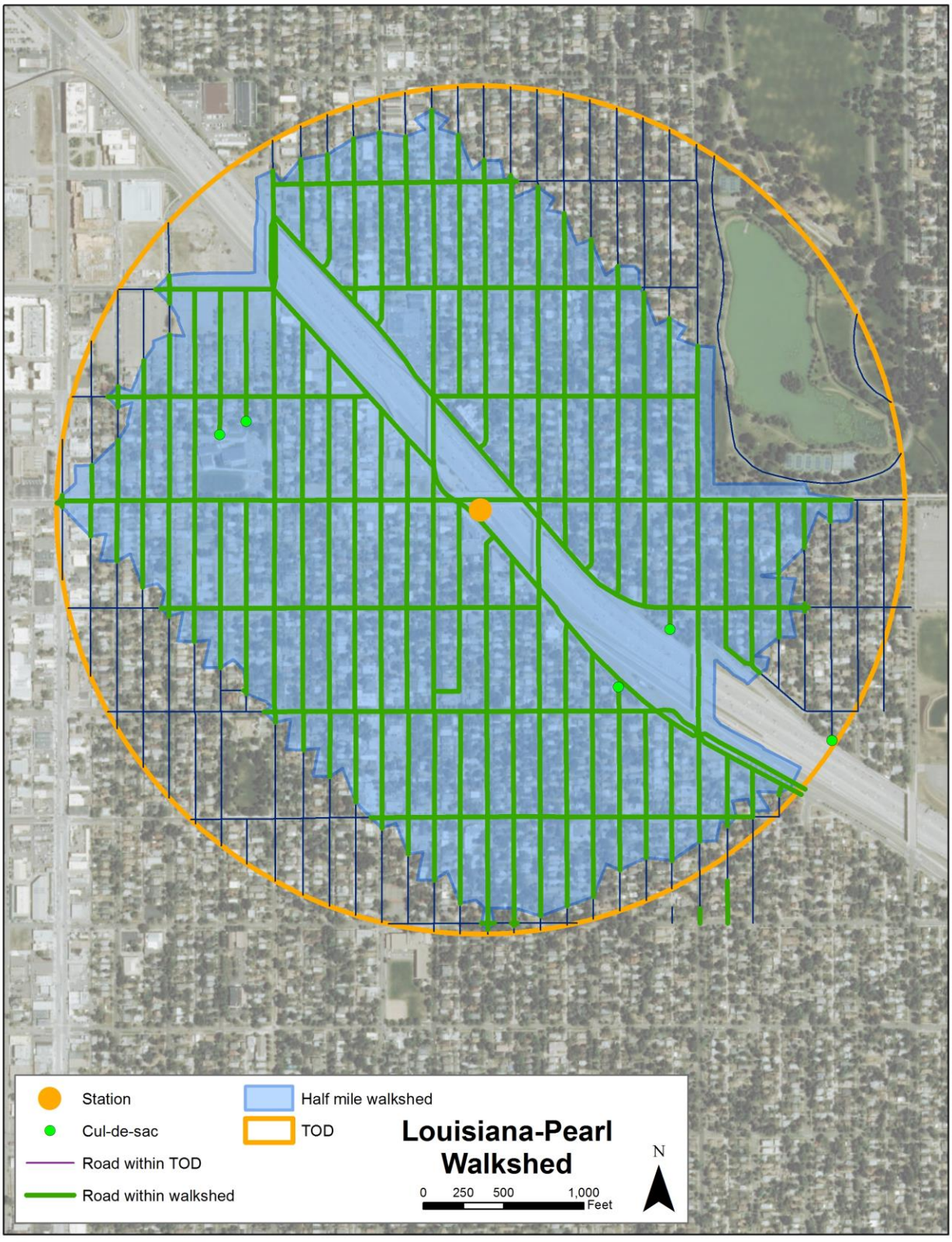

Figure 10 Louisiana-Pearl Walkshed

10th & Osage Station and Colfax at Auraria Station

Station Name	Designation	Type	Line	Year Opened
10th & Osage	Urban Center	General Urban	H Line, F Line, C Line, D Line, E Line	1996
Colfax at Auraria	TOD	General Urban	F Line, D Line, H Line	1996

Demographics

Table 23 - 10th & Osage & Colfax at Auraria Population

Station Name	Population 2000[43]	Population 2010[44]	% Change
10th & Osage	3,567	3,381	-5%
Colfax at Auraria	3,484	4,226	21%

In 2000, the population of the 10th & Osage TOD area was 3,567, while it was 3,484 within the Colfax at Auraria TOD. In 2010 that number fell to 3,381 at the 10th & Osage TOD and climbed to 4,226 at the Colfax at Auraria station. This is a decrease of 5% at 10th & Osage and an increase of 21% at the Colfax at Auraria station.

Table 24 - 10th & Osage & Colfax at Auraria Employment

Station Name	Jobs 2000[45]	Jobs 2010[46]	% Change
10th & Osage	6,307	4,754	-25%
Colfax at Auraria	10,869	8,944	-18%

In 2002, 10th & Osage station had 6,307 jobs, compared to 10,869 at Colfax at Auraria. This number dropped to 4,754 at 10th & Osage station in 2009 and 8,944 at Colfax at Auraria station, resulting in 25% and 18% decreases respectively.

[43] Census 2000 Summary File 1 p001001 aggregated from Census 2000 Blocks
[44] Census 2010 Summary File 1 p0010001 aggregated from Census 2010 Blocks
[45] 2002 LED Work Area Characteristic
[46] 2009 LED Work Area Characteristic

Table 25 - 10th & Osage & Colfax at Auraria Income

Station Name	Median Household Income 2000[47]	Median Household Income 2009[48]	% Change
10th & Osage	$ 22,554	$ 20,250	-10%
Colfax at Auraria	$ 31,101	$ 28,023	-10%

Median household income in the 10th & Osage TOD decreased from $22,554 in 2000 to $20,250 in 2009; a decrease of 10%. Over the same period, the median household income of the Colfax at Auraria TOD decreased from $31,101 to $28,023; a decrease of 10%.

Table 26 - 10th & Osage & Colfax at Auraria Households

Station Name	Households 2000[49]	Households 2010[50]	% Change	Housing Units 2000[51]	Housing Units 2010[52]	% Change
10th & Osage	1,248	1,288	3%	1,349	1,356	1%
Colfax at Auraria	1,811	2,133	18%	2,045	2,772	36%

The Colfax at Auraria TOD saw much greater housing growth than 10th & Osage between 2000 and 2010. The number of households in the 10th & Osage TOD increased 3% from 1,248 to 1,288, while the number of housing units increased 1% from 1,349 to 1,356. The number of households in the Colfax at Auraria TOD increased 18% from 1,811 to 2,133, while the number of housing units increased 36% from 2,045 to 2,772.

[47] Census 2000 Summary File 3 p053001 weighted average from Census 2000 Block Groups
[48] American Community Survey 2005-2009 5-Year Estimates b19013_001 aggregated from Census 2009 Block Groups
[49] Census 2000 Summary File 1 p015001 aggregated from Census 2000 Blocks
[50] Census 2010 Summary File 1 p0180001 aggregated from Census 2010 Blocks
[51] Census 2000 Summary File 1 h001001 aggregated from Census 2000 Blocks
[52] Census 2010 Summary File 1 h00010001 aggregated from Census 2010 Blocks

Table 27 - 10th & Osage & Colfax at Auraria Mode Share

Station Name	% who take public transit 2000[53]	% who take public transit 2009[54]	% Change	% who take public transit, bike or walk 2000[55]	% who take public transit, bike or walk 2009[56]	% Change
10th & Osage	21%	14%	-33%	36%	23%	-37%
Colfax at Auraria	16%	6%	-62%	40%	28%	-30%

The 10th & Osage TOD saw 21% of its residents take public transit in 2000, compared to 14% in 2009. This is a decrease of 33%. The Colfax at Auraria TOD saw 16% of its residents take public transit in 2000, compared with 6% in 2009. This is a decrease of 62%. When looking at those that either took public transit, bicycle, or walked, 10th & Osage saw 36% of its residents use those modes in 2000 and 23% in 2009, a decrease of 37%. For the same modes, Colfax at Auraria saw a change from 40% in 2000 to 28% in 2009, for a decrease of 30%.

Table 28 - 10th & Osage & Colfax at Auraria Vehicles Available

Station Name	Average number of vehicles available per household 2000[57]	Average number of vehicles available per household 2009[58]
10th & Osage	.99	.97
Colfax at Auraria	.95	.92

[53] Census 2000 Summary File 3 (h044003 + h044004 + h044010 + h044011) / (h044001) aggregated from Census 2000 block groups
[54] American Community Survey 2005-2009 5-Year Estimates (b08301_010) / (b08301_001) aggregated from Census 2009 Block Groups
[55] Census 2000 Summary File 3 (p030005 + p030013 + p030014) / (p030002) aggregated from Census 2000 block groups
[56] American Community Survey 2005-2009 5-Year Estimates (b08301_010 + b08301_018 + b08301_019) / (b08301_001) aggregated from Census 2009 Block Groups
[57] Census 2000 Summary File 3 (h046001) / (h007001) aggregated from Census 2000 block groups
[58] American Community Survey 2005-2009 5-Year Estimates b25046_001 / b25044_001 aggregated from Census 2009 Block Groups

The average number of vehicles available per household in 2000 at 10th & Osage was .99, which decreased 2% to .97 in 2009. At Colfax at Auraria, the average number of vehicles per household decreased 3% from .95 to .92.

Table 29 - 10th & Osage & Colfax at Auraria Tenure

Station Name	Owner Occupied Housing Units 2000[59]	Owner Occupied Housing Units 2010[60]	% Change	Renter Occupied Housing Units 2000[61]	Renter Occupied Housing Units 2010[62]	% Change
10th & Osage	314	363	16%	934	925	-1%
Colfax at Auraria	377	535	42%	1,435	1,597	11%

10th & Osage housing units skew largely toward renters, with 934 rental units compared to 314 owned units in 2000. The number of rental units declined 1% through 2010 to 925 units, while the number of owned units grew 16%, to 363 units in 2010. Colfax at Auraria housing units skew toward renters as well. 2000 showed 1,435 rental units compared to 377 owned units at Colfax at Auraria. The number of rental units grew 11% through 2010 to 1,597 units, while the number of owned units grew even more, 42%, to 535 units in 2010.

[59] Census 2000 Summary File 1 h004002 aggregated from Census 2000 Blocks
[60] Census 2010 Summary File 1 (h0040002 + h0040003) aggregated from Census 2010 Blocks
[61] Census 2000 Summary File 1 h004003 aggregated from Census 2000 Blocks
[62] Census 2010 Summary File 1 h0040004 aggregated from Census 2010 Blocks

Land Use

Table 30 - 10th & Osage & Colfax at Auraria Land Use - Source: City of Denver

	10th & Osage			Colfax at Auraria		
Land Use	Parcels	Acres	% of Acres	Parcels	Acres	% of Acres
Commercial	248	97.25	9%	275	545.94	16%
Industrial	146	154.85	14%	40	35.98	1%
Institutional	25	43.44	4%	42	275.24	8%
Open Space	0	0	0%	0	0	0%
Residential	754	696.56	63%	2352	2427.29	72%
Transportation	10	9.048	1%	30	16.01	0%
Vacant	102	110.39	10%	86	67.99	2%

The land use mix at 10th & Osage is more industrial than other areas of the Denver metro area, but majority of parcels and land area is comprised of residential uses, with 696.56 acres covering 63% of the total TOD area. Industrial uses comprise the next largest land area, with 146 parcels covering 154.85 acres within the TOD, followed by commercial with 248 parcels covering 97.25 acres or 9% of the land area. Together, residential, industrial, and commercial parcels occupy 86% of the land area of the 10th & Osage TOD, with commercial, institutional, transportation, and vacant covering the other. There are 10 vacant parcels in this area covering 110.39 acres, or 10% of the land area within the TOD. Land use at the Colfax at Auraria TOD follows a similar pattern to 20th & Welton, although the mix is slightly more variable. Residential uses comprise 72% of the total land area, followed by commercial at 16%, institutional at 8%, vacant at 2%, and industrial at 1%. This mix is likely due to greater separation from the downtown core and the nearby presence of multiple universities. There are 86 vacant parcels within the Colfax at Auraria TOD, totaling 67.99 acres.

Table 31 - 10th & Osage & Colfax at Auraria Parcel Value and Year Built - Source: City of Denver

Station Name	Average Value	Average Year Built
10th & Osage	$ 418,106.96	1928
Colfax at Auraria	$ 952,867.47	1971

The average value of parcels in the 10th & Osage TOD is $418,106.96. This compares with an average value of $952,867.47 for the Colfax at Auraria TOD, which is heavily influenced by the presence of multiple universities, similar to the University of Denver TOD. Here there is also disparity in the average year of parcel development, with an average of 1928 at 10th & Osage and an average of 1971 at Colfax at Auraria.

Mobility

The 10th & Osage half mile TOD area features 11 RTD routes serving a total of 23 stops. The Colfax at Auraria half mile TOD area features 12 RTD routes serving 34 stops. The number of parking spaces at the 10th & Osage and Colfax at Auraria stations are similarly absent, in terms of both vehicular and bicycle parking. 10th & Osage station offers 0 vehicle parking spaces, 0 bike racks, and 0 bike lockers. Similarly, the Colfax at Auraria station features 0 parking spaces for vehicles, 0 bike racks, and 0 bike lockers.

Walkability

Table 32 - 10th & Osage & Colfax at Auraria Walkability - Source: City of Denver GIS

Station Name	Walkshed (Acres)	TOD (Acres)	Walkshed to TOD Ratio	Number of Cul-de-sacs	Cul-de-sac Density (per Acre)	Street Length (Miles)	Average Block Length (Ft)
10th & Osage	156.07	502.57	0.31	16	0.03	18.50	213.24
Colfax at Auraria	220.08	502.57	0.44	17	0.03	20.31	182.98

Within the 10th & Osage TOD area, the half mile walkshed covers 156.07 acres, or 31% of the TOD boundary. 10th & Osage features 16 cul-de-sacs and an average block length of 213.24 feet. Within the Colfax at Auraria TOD area, the half mile walkshed

covers 220.08 acres, or 44% of the TOD boundary. The Colfax at Auraria TOD has 17 cul-de-sacs and an average block length of 182.98 feet within its boundary. Figures 11 and 12 depict the walksheds of these stations.

Summary of Trends

Overall, the Colfax at Auraria TOD area performs higher on more indicators than 10th & Osage. In many cases, this is due to the proximity of this station area to the downtown core in Denver. However, that does not indicate that Colfax at Auraria outperforms 10th & Osage in all cases. Colfax at Auraria outperformed 10th & Osage in most demographic indicators, particularly those involving housing, employment, and income. Use of public transit was down in both station areas, significantly at both. Due to the lower cost of parcels and greater availability of land, 10th & Osage has a greater land use mix. Colfax at Auraria has greater access to transit, because of its location near downtown, although neither station areas have vehicle or bicycle parking. Colfax at Auraria has greater walkability, as 10th & Osage is impeded by railroad tracks on its western border.

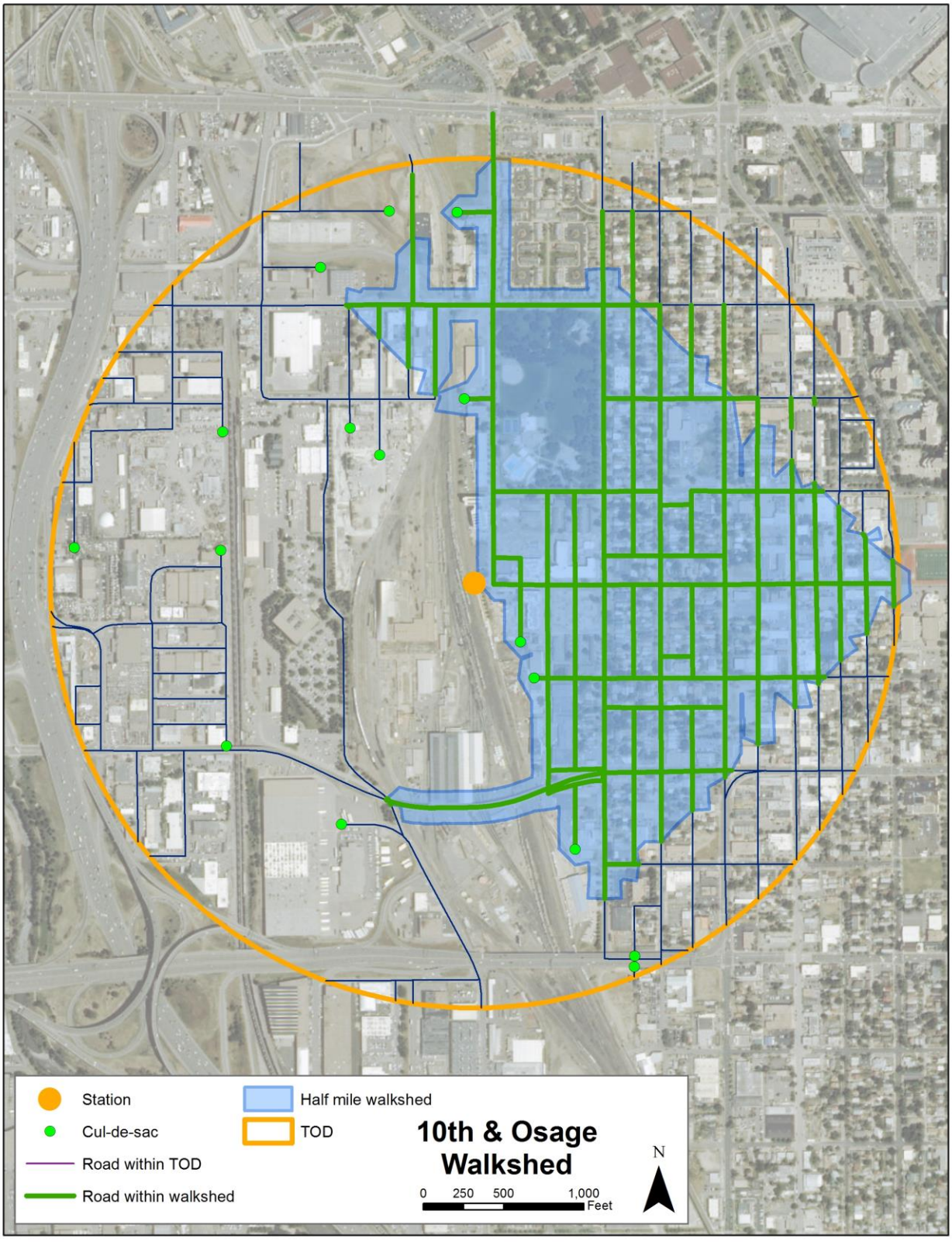

Figure 11 10th & Osage Walkshed

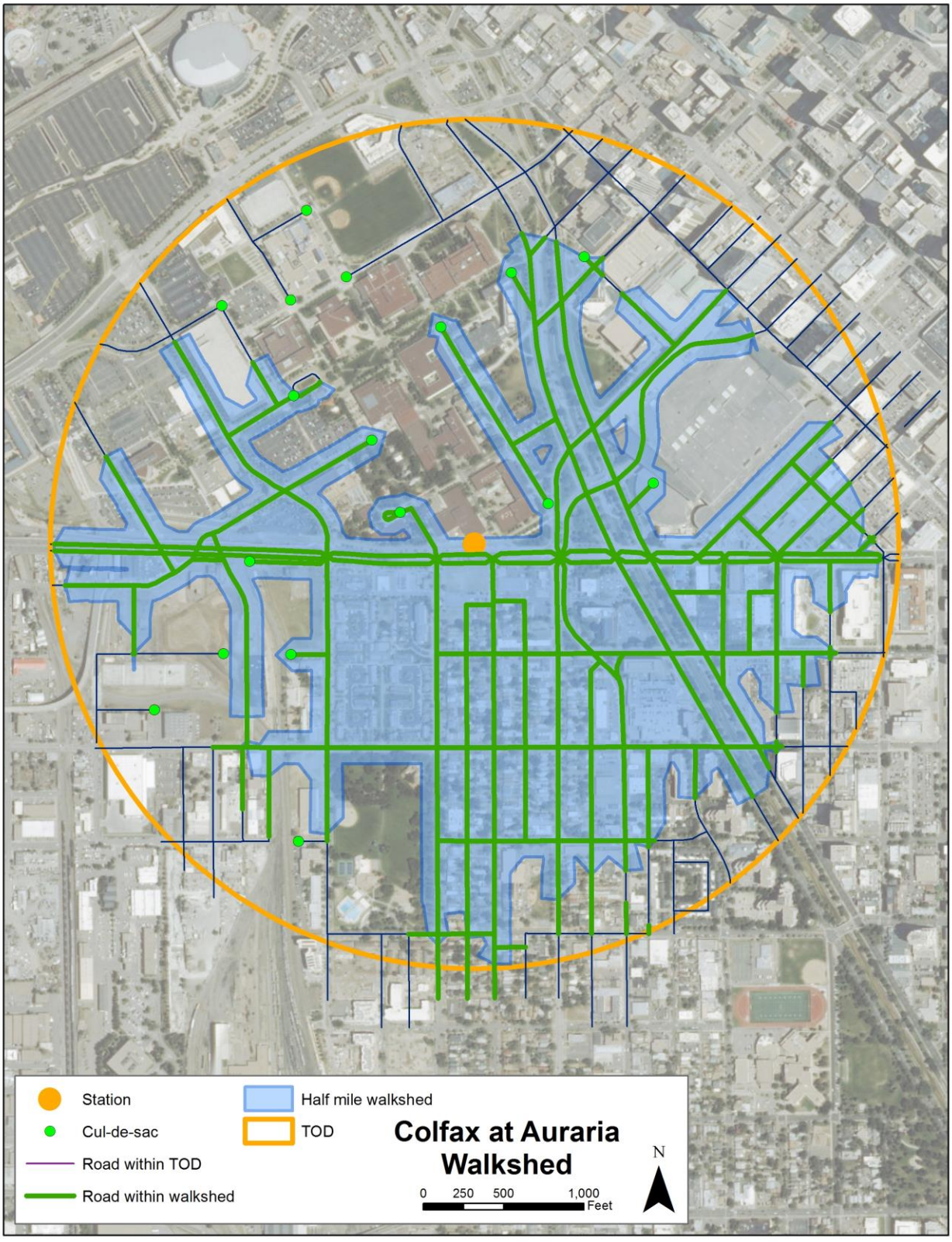

Figure 12 Colfax at Auraria Walkshed

Southmoor Station and Yale Station

Station Name	Designation	Type	Line	Year Opened
Southmoor	Urban Center	Suburban	F Line, E Line, H Line	2006
Yale	TOD	Suburban	F Line, E Line, H Line	2006

Demographics

Table 33 - Southmoor and Yale Population

Station Name	Population 2000[63]	Population 2010[64]	% Change
Southmoor	2,743	3,082	12%
Yale	3,618	3,473	-4%

In 2000, the population of the Southmoor TOD area was 2,743, while it was 3,618 within the Yale Avenue TOD. In 2010 that number climbed to 3,082 at the Southmoor TOD and fell to 3,473 at Yale Avenue station. This is an increase of 12% at Southmoor and a decrease of 4% at the Yale station.

Table 34 - Southmoor and Yale Employment

Station Name	Jobs 2000[65]	Jobs 2010[66]	% Change
Southmoor	1,057	2,104	99%
Yale	934	942	1%

In 2002, Southmoor station area had 1,057 jobs, compared to 934 at Yale. This number rose to 2,104 at Southmoor station in 2009 and 942 at Yale station, resulting in a 99% increase in jobs at the Southmoor station TOD and 1% at the Yale Avenue station TOD.

[63] Census 2000 Summary File 1 p001001 aggregated from Census 2000 Blocks
[64] Census 2010 Summary File 1 p0010001 aggregated from Census 2010 Blocks
[65] 2002 LED Work Area Characteristic
[66] 2009 LED Work Area Characteristic

Table 35 - Southmoor and Yale Income

Station Name	Median Household Income 2000[67]	Median Household Income 2009[68]	% Change
Southmoor	$ 68,279	$ 81,312	19%
Yale	$ 55,196	$ 59,425	8%

Median household income in the Southmoor TOD increased from $68,279 in 2000 to $81,312 in 2009; an increase of 19%. Over the same period, the median household income of the Yale Avenue TOD increased from $55,196 to $59,425; an increase of 8%.

Table 36 - Southmoor and Yale Households

Station Name	Households 2000[69]	Households 2010[70]	% Change	Housing Units 2000[71]	Housing Units 2010[72]	% Change
Southmoor	1,294	1,433	11%	1,338	1,517	13%
Yale	1,624	1,588	-2%	1,653	1,676	1%

The Southmoor TOD saw much greater housing growth than Yale Avenue between 2000 and 2010. The number of households in the Southmoor TOD increased 11% from 1,294 to 1,433, while the number of housing units increased 13% from 1,338 to 1,517. The number of households in the Yale Avenue TOD decreased 2% from 1,624 to 1,588, while the number of housing units increased 1% from 1,653 to 1,676.

[67] Census 2000 Summary File 3 p053001 weighted average from Census 2000 Block Groups
[68] American Community Survey 2005-2009 5-Year Estimates b19013_001 aggregated from Census 2009 Block Groups
[69] Census 2000 Summary File 1 p015001 aggregated from Census 2000 Blocks
[70] Census 2010 Summary File 1 p0180001 aggregated from Census 2010 Blocks
[71] Census 2000 Summary File 1 h001001 aggregated from Census 2000 Blocks
[72] Census 2010 Summary File 1 h00010001 aggregated from Census 2010 Blocks

Table 37 - Southmoor and Yale Mode Share

Station Name	% who take public transit 2000[73]	% who take public transit 2009[74]	% Change	% who take public transit, bike, walk 2000[75]	% who take public transit, bike, walk 2009[76]	% Change
Southmoor	3%	3%	0%	5%	8%	76%
Yale	3%	10%	265%	3%	12%	257%

The Southmoor TOD saw 3% of its residents take public transit in 2000, compared to 3% in 2009, for a change of 0%. The Yale TOD saw 2.6% of its residents take public transit in 2000, compared with 9.5% in 2009. This is an increase of 265%. When looking at those that either took public transit, bicycle, or walked, Southmoor saw 4.6% of its residents use those modes in 2000 and 8.1% in 2009, an increase of 76%. For the same modes, Yale saw a change from 3.25% in 2000 to 11.6% in 2009, for an increase of 257%.

Table 38 - Southmoor and Yale Vehicles Available

Station Name	Average number of vehicles available per household 2000[77]	Average number of vehicles available per household 2009[78]
Southmoor	1.87	1.7
Yale	1.68	1.47

The average number of vehicles available per household in 2000 at Southmoor was 1.87, which decreased 9% to 1.7 in 2009. At Yale, the average number of vehicles per household decreased 13% from 1.68 to 1.47.

[73] Census 2000 Summary File 3 (p030005) / (p030001) aggregated from Census 2000 block groups
[74] American Community Survey 2005-2009 5-Year Estimates (b08301_010) / (b08301_001) aggregated from Census 2009 Block Groups
[75] Census 2000 Summary File 3 (p030005 + p030013 + p030014) / (p030002) aggregated from Census 2000 block groups
[76] American Community Survey 2005-2009 5-Year Estimates (b08301_010 + b08301_018 + b08301_019) / (b08301_001) aggregated from Census 2009 Block Groups
[77] Census 2000 Summary File 3 (h046001) / (h007001) aggregated from Census 2000 block groups
[78] American Community Survey 2005-2009 5-Year Estimates b25046_001 / b25044_001 aggregated from Census 2009 Block Groups

Table 39 - Southmoor and Yale Tenure

Station Name	Owner Occupied Housing Units 2000[79]	Owner Occupied Housing Units 2010[80]	% Change	Renter Occupied Housing Units 2000[81]	Renter Occupied Housing Units 2010[82]	% Change
Southmoor	1,143	951	-17%	151	482	219%
Yale	1,223	1,105	-10%	401	483	20%

Southmoor housing units skew toward owners, with 151 rental units compared to 1,143 owned units in 2000. The number of rental units grew 219% through 2010 to 482 units, while the number of owned units declined 17%, to 951 units in 2010. Yale station housing units skew toward owners as well. 2000 showed 401 rental units compared to 1,223 owned units at Yale. The number of rental units grew 20% through 2010 to 483 units, while the number of owned units declined 10%, to 1,105 units in 2010. Southmoor and Yale stations show the largest change from owner to renter of all stations evaluated, particularly the large growth in rental units. This change can be attributed to a large apartment complex that recently opened within the Southmoor TOD area.

[79] Census 2000 Summary File 1 h004002 aggregated from Census 2000 Blocks
[80] Census 2010 Summary File 1 (h0040002 + h0040003) aggregated from Census 2010 Blocks
[81] Census 2000 Summary File 1 h004003 aggregated from Census 2000 Blocks
[82] Census 2010 Summary File 1 h0040004 aggregated from Census 2010 Blocks

Land Use

Table 40 - Southmoor and Yale Land Use - Source: City of Denver

	Southmoor			Yale		
Land Use	Parcels	Acres	% of Acres	Parcels	Acres	% of Acres
Commercial	28	46.65	1%	48	52.51	9%
Industrial	1	34.55	1%	0	0	0%
Institutional	8	53.71	1%	22	38.97	7%
Open Space	1	17.32	0%	2	14.30	2%
Residential	1406	5202.01	97%	1554	477.13	81%
Transportation	1	9.68	0%	3	1.39	0%
Vacant	37	4.37	0%	28	3.29	1%

The land use mix at Southmoor is largely similar to other exurban areas of the greater Denver metro area, with majority of parcels and land area comprised of residential uses, with 1,406 parcels covering 5,202.00 acres or 97% of the total TOD area. Commercial parcels are the next largest land area, with 28 parcels covering 46.65 acres within the TOD. Together, commercial and residential parcels occupy 98% of the land area of the Southmoor TOD, with industrial, institutional, open space, transportation, and vacant covering the excess. There are 37 vacant parcels in this area totaling 4.37 acres of land. Land use at the Yale TOD follows a similar pattern to Southmoor, although the mix is slightly less drastic. Residential uses comprise 81% of the total land area, followed by commercial at 9%, institutional at 7%, open space at 2%, and vacant at 1%. There are 28 vacant parcels within the Yale TOD, totaling 3.29 acres.

Table - 41 Southmoor and Yale Parcel Value and Year Built - Source - City of Denver

Station Name	Average Value	Average Year Built
Southmoor	$ 374,608.11	1968
Yale	$ 291,267.93	1957

The average value of parcels in the Southmoor TOD is $374,608.11. This value is comparable with Yale station due to similar land use mixes, with an average value of

$291,267.93. Similarly, there is the average year of parcel development is similar, with an average of 1968 at Southmoor and an average of 1957 at Yale. The difference in average development year is likely exemplary of suburban type development outward from the city center.

Mobility

The Southmoor half mile TOD area includes eight RTD routes serving a total of 28 stops. The Yale Avenue half mile TOD area features five RTD routes serving 16 stops. The number of parking spaces at the Southmoor and Yale stations differs greatly, both in terms of vehicular and bicycle parking. Southmoor station offers 788 vehicle parking spaces, 16 bike racks (128-160 bikes), and 22 bike lockers. The Yale station features 129 parking spaces for vehicles, 8 bike racks (64-80 bikes), and 10 bike lockers.

Walkability

Table 42 - Southmoor and Yale Walkability - Source: City of Denver GIS

Station Name	Walkshed (Acres)	TOD (Acres)	Walkshed to TOD Ratio	Number of Cul-de-sacs	Cul-de-sac Density (per Acre)	Street Length (Miles)	Average Block Length (Ft)
Southmoor	72.68	502.57	0.14	7	0.01	13.72	81.40
Yale	133.14	502.57	0.27	43	0.086	22.65	82.66

Within the Southmoor TOD area, the half mile walkshed covers 72.68 acres, or 14% of the TOD boundary. This area is much smaller than the average walkshed size for this study due to the presence of Interstate 25 on the eastern side of the station and the lack of access across. Southmoor features seven cul-de-sacs and an average block length of 81.40 feet. Within the Yale TOD area, the half mile walkshed covers 133.14 acres, or 27% of the TOD boundary. The Yale TOD has 43 cul-de-sacs and an average block

length of 82.66 feet within its boundary. Figures 13 and 14 depict the walksheds of these stations.

Summary of Trends

Overall, the Southmoor TOD area performs higher on more indicators than Yale. However, that does not indicate that Southmoor outperforms Yale in all cases. Southmoor outperformed Yale in most demographic indicators, particularly those involving housing, employment, and income. However, Yale outperforms Southmoor in measures of transit use and vehicle ownership. Due to the lower cost of parcels and greater availability of land, Yale has a greater land use mix than is present at Southmoor. Southmoor has greater access to transit, in addition to greater amounts of vehicle and bicycle parking. These stations have to lowest walkability of all stations, due to the presence of Interstate 25 on the edge of each station.

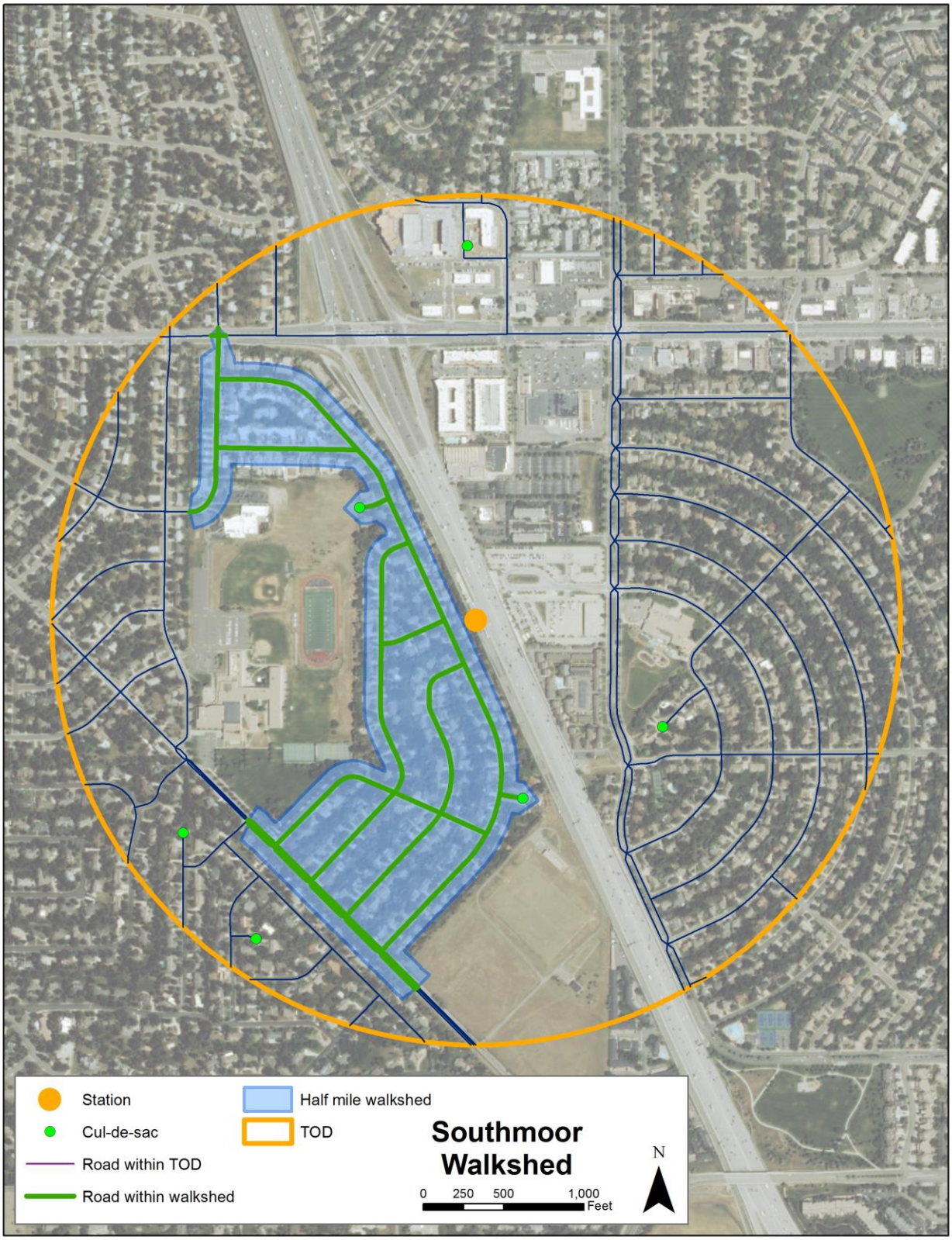

Figure 13 Southmoor Walkshed

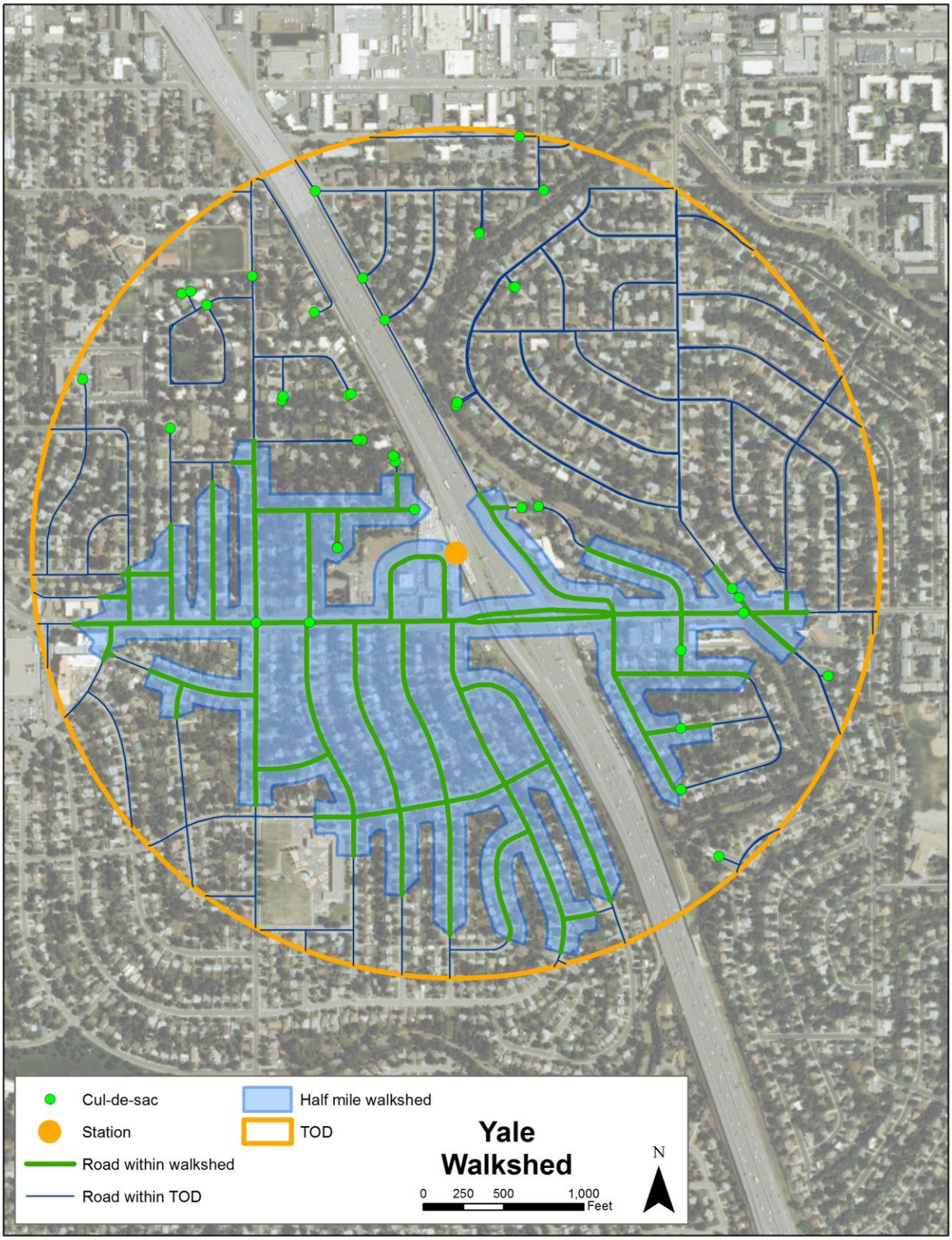

Figure 14 Yale Walkshed

CHAPTER 5. FINDINGS

Findings

The following section highlights trends from Chapter 4 across all station areas evaluated in this study. Urban Center and TOD designation comparisons are made in this section by evaluating the performance of all station areas under each designation, as well as determining if the designation had an impact upon specific indicators. The following tables describe trends for each general category, with green indicating improvement, yellow indicating neutral, and red indicating a decrease.

Demographics

Table 43 - Demographics Trends

Designation	Population	Jobs	Housing	Tenure	Alternative Mode Use
Urban Center					
TOD					

Generally, population growth at Urban Centers and TOD areas in this study are increasing in a manner that implies it is related to Urban Center typology. Three of four Urban Centers increased in population over the dates within this study, while only two of four TOD areas increased and at a lesser rate. In every comparison except 10th & Osage and Colfax at Auraria, Urban Centers saw greater population increases and therefore density increases than their TOD counterpart. Since this increase trend is displayed in three of four comparisons, it is likely related to policies enacted by *Metro Vision*.

The same conclusion cannot be drawn from employment trends within the study area. Growth in jobs in the study area varied widely across both designation types and

therefore is likely determined by forces not studied by this report. Both downtown stations (20th & Welton and 29th & Welton) saw decreases in employment numbers from 2002 to 2009. Station areas adjacent to downtown saw similar trends and rates of decline. 10th & Osage and Colfax at Auraria declined in jobs at rates almost identical to those of the downtown stations. After moving away from downtown, the trend reverses, with both University of Denver and Louisiana-Pearl showing increases in jobs, culminating with a 99% increase in jobs at Southmoor station. The increase in jobs at Southmoor station is likely due to spillover from the Denver Tech Center. This conclusion shows that job growth is not determined by designation of the station areas in this study; it is impacted more heavily by distance from the downtown core. This is a significant finding for Urban Centers, as it is a DRCOG goal to achieve 50% of job growth in the region within that designation.

Housing growth within the area showed no discernable pattern in relation to Urban Center or TOD designation. Varying growth rates suggest that external market forces are likely impacting growth rates more than distance from the downtown core and designation type. While downtown stations saw significant housing growth, adjacent stations saw very minimal change for either designation. Moving away from downtown, this trend continued at University of Denver and Louisiana-Pearl. Southmoor saw significant housing growth, primarily in the form of rental apartments. Change in tenure was a trend that varied across station area pairings. The four stations closest to downtown saw increases in both owner and rental units from 2000-2010. Designation did not seem to have an impact on the growth for either indicator. Moving away from

downtown, the trend changing to a decrease in owner occupied housing and an increase in renter occupied housing. This trend occurred at all four stations outside of the downtown area, increasing as distance from the core increased. Both Southmoor and Yale saw significant decreases in owner occupied housing, with Southmoor seeing a 219% increase in rental occupied housing due to construction of new rental housing stock. Tenure change was prevalent in both designations and is likely more of cultural shift than determined by DRCOG or RTD policy. When comparing housing growth, tenure, parcel value, and household income across all stations, it appears as though the cost of housing is rising with household income in all station areas.

A surprising trend showed up in analysis of transit and alternative mode usage within the study area. Transit, bicycle, and walking use decline as a percent of total usage in the four stations closest to downtown Denver. While these stations still have higher rates of use when compared with outlying stations, their decrease is also greater. In fact, the four stations farthest from downtown showed the most increase in alternative mode share. This trend occurred with distance, rather than along Urban Center/ TOD lines. Both Southmoor and Yale showed drastic increases in alternative mode share, with Yale increasing 257%. Vehicle ownership showed a similarly patterned trend, with average number of vehicles increasing from the downtown stations outward. Vehicle ownership is similar for all areas, regardless of designation, showing that a designation likely has no impact on vehicle ownership. This is likely caused by the relatively little infrastructure and accessibility of alternative modes in these areas.

Land Use

Table 44 - Land Use Trends

Designation	Land Use	Year Built	Parcel Value
Urban Center			
TOD			

For every station pairing except, 10th & Osage and Colfax at Auraria, the Urban Center development has a greater percentage of residential development. Additionally, at Urban Center stations, there is less diversity in mix of uses with larger disparities between residential and other uses. The reason for this trend is not apparent within DRCOG Urban Center designation criteria, as there is no explicit land use criteria that would suggest a reason for this trend. However, vacancy rates are higher at TODs that are not also Urban Centers, particularly those closer to downtown Denver.

Results show that neither Urban Centers nor TOD areas have spurred new development to reach their goals in areas adjacent to stations. While development directly at the station is shown to be high, development farther into the half mile buffer is happening at a slower rate. No station area shows an average year built of more recent than 1971 at Colfax at Auraria. Other station areas have far less new development, including 29th and Welton with an average year built of 1916 due to its many residential parcels. When looking at the value pf parcels at these designations, it appears that neither type is significant in spurring values. Parcel value decrease moving away from the downtown core, in a reliable fashion, that is not indicative of TOD or Urban Centers causing the change.

Mobility

Table 45 - Mobility Trends

Designation	Transit	Parking	Bicycle Parking
Urban Center			
TOD			

In regards to mobility both within and connecting to the regional large, neither Urban Centers nor TOD areas show a significant difference between the two. There is a decrease is transit presence, both in number of routes and stops, servicing areas as the location increases in distance from the downtown core. This does not seem to show a correlation with either typology. Additionally, the number of parking spaces was significantly lower than expected. Parking spaces are absent from five of eight stations evaluated, although those that do have parking, have larger amounts. Bicycle parking follows the same pattern as vehicle parking, as five of eight stations do not have bicycle parking, but those that do have abundance. This number should increase under pressure from DRCOG in order to make station areas more accessible by all modes.

Accessibility

Table 46 - Accessibility Trends

Designation	Walkshed Ratio
Urban Center	
TOD	

While the standard rate for a defined area to be considered walkable is 50% to a buffered area to be actually walkable within that buffer, only three of eight station areas studied meet that criteria (Schlossberg & Brown 2004). Only 20th & Welton, 29th & Welton, and Louisiana-Pearl have walkshed ratios greater than 50%, at 69%, 63%, and 65% respectively. Urban Centers are more walkable, as they had a higher walkshed ratio than TOD. Typically, block length can be used as an indicator of walkability, with

shorter blocks equating to more walkable environments. In this case, that claim cannot be made, as the least walkable areas (Southmoor and Yale) also have the shortest average block length. Overall, indicators differed between Urban Centers and TOD areas, showing no relationship between the designations and walkability. However, both agencies should make increased efforts to increase walkability within their focus areas.

As a result, this report uncovered that demographic indicators are largely unaffected by the Urban Center or TOD designation. With the exception of alternative mode share which is affected by proximity, external market forces, rather than designation type primarily affect demographic indicators. Land use mix bucks this trend, as the results show a higher mix at TODs than Urban Centers. Additionally, neither designation type performed better in regards to mobility or accessibility.

Recommendations

DRCOG *Metro Vision* 2035 and RTD TOD Strategic Plan need to increase interaction. By using concurrent policies, these documents have greater potential for effectiveness due to their similar foundations and goals. Each document should connect on a regional and local level scale to reduce redundancies and increase potential strengths. As such, Metro Vision should include references to the RTD TOD Strategic Plan in a general sense, as well as referencing the plan when referring to individual station areas. An example of the interconnectedness would be the addition of a transportation or transit oriented section within Metro Vision to address issues with transportation and the connection to land use in the current document. Additionally, the RTD TOD Strategic Plan should reference Metro Vision at both the regional scale and in individual station area plans.

DRCOG *Metro Vision* should alter its Urban Center typology and functional overlays to include the addition of a TOD overlay. DRCOG should coordinate with RTD to enhance the policies and goals of station areas designated under each plan. This designation would allow for coordination between the two plans at regional and local scales, as well as allowing station areas that fall under both to be recognized as areas that have different goals from Urban Centers that are not transit oriented. Additionally, this recommendation could be adopted by RTD to develop an Urban Center typology for its TODs typology.

RTD TOD Strategic Plan needs to take a greater approach to livability. Livability indicators such as housing growth, income, and population at RTD TOD station areas scored significantly lower than other indicators in this study comparatively; as a result RTD should strengthen its policies to increase development potential within them. Specifically, RTD should increase the effectiveness of Goal 2: RTD will encourage livable communities and sustainable development that support the transit system. By adopting policies related to TOD occupants, it increases the potential for developers of all kinds to see potential in these areas, while also increasing the quality of life for occupants.

Increased mobility is needed within both designations. While both RTD and DRCOG mention mobility within their station areas and Urban Centers, neither type is displaying significant connectivity within its self or with the surrounding communities. Both agencies should seek to make greater efforts to connect by using more bicycle infrastructure, specifically parking, as well as make concerted efforts to provide feeder transit service to surround communities.

Development of explicit station area measures should be a priority for each agency. While DRCOG has developed population and employment growth goals for the entire metro area in regards to Urban Centers, both DRCOG and RTD should set specific goals. By setting goals, DRCOG will keep in line with its policy that each Urban Center is a unique area, and should be treated accordingly. This is likely to also increase buy-in from local communities and developers. Explicit station area goals will make it easier for RTD to complete Quality of Life surveys, as well as enticing developers through goals relevant to their impact and investment.

Further Research

The following topics were uncovered by the researcher over the course of completing this report:

- The light rail system in Denver is in a time of expansive growth. Analysis of station areas from their conception will provide additional insight into how each designation influences greenfield development.

- Limiting the number of comparisons would allow the researcher to look more in depth into how each station area is affected, including surveying and more localized indicators.

- Completing a policy crosswalk with additional geographic levels, particularly local areas, including cities outside of the City of Denver would provide additional indicators for performance evaluation.

Conclusion

This report used a three-step framework to evaluate the performance of Urban Centers and TOD in the city of Denver. This framework included a process of station selection, the formulation of a policy crosswalk comparing the DRCOG *Metro Vision 2035* and RTD TOD Strategic Plan, and performance evaluation using spatial and temporal methods to determine if TODs that are also Urban Centers perform better than TODs that are not Urban Centers. Analysis and findings show that TODs that are not Urban Centers do not perform better than TODs that are not Urban Centers. It did however, find that both plans are integral to the success of transit oriented development in Denver as each plan has strengths in indicators. These to plans should seek to increase their

concurrency through policies and goals in order to be most effective and see the highest rate of performance across all indicators measured.

REFERENCES

Anderson, A., Zimbabwe, S. 2011. Planning for TOD at the Regional Scale. *Center for Transit-Oriented Development*.

Aitken, S., F. Stutz, R. Prosser, and R. Chandler. 1993. Neighborhood Integrity and Resident's Familiarity: Using a GIS to Investigate Peace Identity. *Tijdschrift Voor Economische en Sociale Geografie* 34:1-12.

Belzer, D., Srivastava, S., et al. 2011. Transit and Regional Economic Development. *Center for Transit-Oriented Development*.

Black, W. 2010. *Sustainable Transportation: Problems and Solutions*. New York: The Guilford Press.

Cervero, R, Kockelman, K. 1997. Travel demand and the 3d's: density, diversity, and design. Transportation Research Part D: Transport and Environment, 2(3):199-219.

Cervero, R. 2004. Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects. *Transportation Research Board.*

City of Denver. 2014. Transit Oriented Denver: Transit Oriented Development Strategic Plan. *City and County of Denver.*

DRCOG (Denver Regional Council of Governments). 2010. Who is TOD in Metro Denver, Colorado? Benchmarking the Evolution of TOD in Metro Denver. Retrieved 2015.

DRCOG (Denver Regional Council of Governments. 2011. Metro Vision 2035 Plan. *Denver Regional Council of Governments.*

DRCOG (Denver Regional Council of Governments. 2012 *Urban Centers Map*. http://gis.drcog.org/datacatalog/sites/default/files/TH_UrbanCentersPolygons2012.jpg

Finkenbinder, A., Britt, K., and Blair, C., C. 2010. Transit-Oriented Development Tools for Metropolitan Planning Organizations. *Center for Transit-Oriented Development.*

Goodwill, J., & Hendricks, S. 2002. Building Transit Oriented Development in Established Communities. *National Center for Transit Research.*

Higgins, C., Ferguson, M., & Kanaroglou, P. 2014. Light tail and land use change: rail transit's role in reshaping and revitalizing cities. *Journal of Public Transportation*, *17*(2), 93-112.

Kwoka, G. J. 2013. *The impact of transit oriented development on the travel behaviors of workers in Denver, Colorado* (Master's thesis).

Leinbach, T. 2004. City Interactions: The Dynamics of Passenger and Freight Flows. In *The Geography of Urban Transportation,* ed S. Hanson and G. Giuliano, 30-59. New York: The Guilford Press.

Lund, H. 2006. Reasons for Living in a Transit-Oriented Development, and Associated Transit Use. *Journal of the American Planning Association* 72 (3): 357-366.

Nelson, D., Niles, J., and Hibshoosh, A. (2001). A New Planning Template for Transit-Oriented Development. San Jose, CA: *Mineta Transportation Institute.*

Ratner, K., and Andrew Goetz. 2013. The reshaping of land use and urban form in Denver through transit oriented development. *Cities*. 30: 31-46.

Renne, J., Wells, L., & Jan, S. (2005). *Transit-oriented development: Developing a strategy to measure success* (294). Washington, DC: National Cooperative Highway Research Program.

RTD (Regional Transit District). 2010. FasTracks TOD Lessons Learned Report. *Regional Transit District.*

RTD (Regional Transit District). 2010. Strategic Plan for Transit Oriented Development. Revision 2. *Regional Transit District.*

RTD (Regional Transportation District). 2014. *RTD FasTracks Progress Map* http://www.rtd-fastracks.com/images/uploads/main/FasTracks_Progress_Map_9314.jpg

Schlossberg, M., & Brown, N. 2004. Comparing Transit-Oriented Development Sites by Walkability Indicators. *Journal of the Transportation Research Board 1187*: 34-42.

Schrank, D., Eisele, B., & Lomax, T. 2012. *TTI's 2012 urban mobility report*. College Station, TX: Texas A&M Transportation Institute.