BUILDING INCLUSIVE NEIGHBORHOODS: ASSESSING THE SOCIO-SPATIAL IMPLICATIONS OF TRANSIT-ORIENTED DEVELOPMENT IN ST. LOUIS, MISSOURI

BY

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DISSERTATION

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Abstract

This dissertation research emphasizes achieving greater urban inclusion through transit-oriented development (TOD). In exploring St. Louis, Missouri's Delmar Loop TOD site, I specifically focus on the impact public transportation activities have on residents in neighborhoods surrounding light rail transit stations. I seek to understand if these developments indeed improve living conditions and urban inclusion for residents in areas around the station. TODs can be desirable spaces for residents, planners, and developers as they potentially enhance economic development, improve regional connectivity, increase transit ridership, among many other benefits and goals. However, this desirability of TODs may lead to the people with the most need for public transportation and improved neighborhood conditions being further marginalized.

I argue that TOD activities can indeed assist in establishing non-inclusive spaces. By TOD activities, I refer to TOD plans, plan-making, plan implementation, and developments related to TOD plans. The following research questions guide this research: 1) *Does gentrification and TOD related neighborhood change occur in light rail transit station neighborhoods?* 2) *What principles guide TOD activities? 3) What are the (overall and inclusive) TOD activities planners should undertake?* 4) *What overall and inclusive TOD activities occur?* 5) *How can planners better assist in establishing inclusive TOD neighborhoods?*

I answer these questions through a mixed method analysis, employing both quantitative and qualitative analyses. First, I use spatial regression analyses to explore the relationship between gentrification-related residential change and LRT stations. The results from the analyses point toward St. Louis, Missouri and the Delmar Loop TOD site specifically as a place to further

examine gentrification and inclusivity. Second, I undertake a case study of the Delmar Loop utilizing interviews, observations, and document analysis to identify and analyze whether and how planners engage in inclusive TOD activities.

I ultimately found that: 1) planners did not assist in establishing the Delmar Loop TOD site as an inclusive neighborhood and; 2) it is not a homogenous neighborhood where all TOD residents and spaces benefit from transit and neighborhood developments. Delmar Loop TOD activities ignored a portion of the TOD site largely occupied by minorities that most needed neighborhood improvements and increased transit access. Overall, the results of this dissertation describe the ways that planners consciously and inadvertently undertake activities that socially, spatially, and economically affect urban spaces largely occupied by minorities and the poor. Demonstrating how such planning activities unfold will show the specific, everyday ways in which blacks, minorities in general, and the poor are marginalized – contributing to the production and reproduction of U.S. urban segregation.

The study of the Delmar Loop TOD site is instructive to TOD planners in general as it shows how not maintaining active leadership focusing on inclusion may possibly result in non-inclusive neighborhoods. It is also instructive to planners as it identifies how not identifying existing contextual issues may result in the marginalization of black (and minorities in general) and poor TOD residents. Both of which specifically aim to ensure that the people who need urban inclusion the most are served through projects improving transit access.

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Chapter 1: Introduction

For the last 30 years, leading scholars and national and Federal agencies have promoted the importance of Transit Oriented Developments (TODs), identified as cohesively planned mixed-use neighborhood-scale developments with a specific focus on pedestrian and public transit usage within a quarter- to half-mile radius of a transit stop. This is because TODs are expected to improve a multitude of urban and regional conditions, including economic opportunities (Corbett & Zykofsy, 1996), environmental sustainability (combating climate change) (Chatman, 2013), regional and transit access (Lund, 2006), social equity (Atkinson-Palombo & Kuby, 2011), and land use (Calthorpe, 1993) – all of which, taken together, provide livable neighborhoods (Bernick & Cervero, 1997). As a result, planners have turned to TODs as a more sustainable and overall beneficial form of development. This dissertation research shows that TOD activities may paradoxically lead to a contrarian outcome – assisting to establish non-inclusive spaces.

TODs' assistance in establishing non-inclusive spaces may be largely due to TODs' expected benefits. TODs may have unintended consequences and unfortunately only produce livable neighborhoods and benefits for a select few. These unintended consequences include increased (housing and commercial) property values due to TODs' expected benefits – which may lead to gentrification (Hess & Almeida, 2007). Gentrification is a process of neighborhood change characterized by neighborhood upgrading (i.e.; infrastructure and property improvements), along with residential displacement (Brown-Saracino, 2009; Glass, 1964). Thus, gentrification and its subsequent displacement may possibly lead to the residents with the most need for the transit and improved neighborhood developments to ultimately not have access to them.

This dissertation research addresses the contradiction that although TODs have great potential and promise, and that increased transit access should lead to increased employment opportunities and therefore social benefits for the people most in need (i.e.; namely minorities and the poor), TODs may nevertheless fall short of their initial promises and produce urban spaces that only benefit a select few. Scholars, for example, point to the negative impacts that TODs have such as increased rents and housing prices that may exclude certain populations from having access to these transit areas and subsequently regional amenities and employment opportunities in places such as Boston and Phoenix, respectively (Atkinson-Palombo & Kuby, 2011; Feinstein & Allen, 2011). This could be due to a lack of coordinated efforts to understand and plan for the social, in conjunction with the economic, impacts of TODs. This is a problem because, as new developments spring forth, higher land and housing prices may force existing residents to relocate. Similarly, new commercial or employment developments may not match existing residents' interests or skills. Additionally, more affluent, existing residents may not welcome new transit stops and related developments and, subsequently, leave these TOD areas. Hence, more inclusive TOD research is still needed to understand whether and how TODs can truly fulfill their potential.

I operationalize inclusion as all regional residents having access to a particular space, having access to the means to shape the space, and all social groups and the spaces they occupy having equitable treatment in the distribution of public goods. In the particular case of TODs, the public good is light rail transit, with the space to be shaped and which is occupied is the space within a half-mile radius of a light rail stations.

I argue that TOD activities assist in establishing non-inclusive spaces. By TOD activities, I refer to TOD plans, plan-making, plan implementation, and developments related to TOD

plans. The following research questions guide this research: 1) *Does gentrification and TOD related neighborhood change occur in light rail transit station neighborhoods?* 2) *What principles guide TOD activities? 3) What are the (overall and inclusive) TOD activities planners should undertake?* 4) *What overall and inclusive TOD activities occur?* 5) *How can planners better assist in establishing inclusive TOD neighborhoods?* I answer these questions through a mixed method analysis, employing both quantitative and qualitative analyses.

I use spatial regression analyses to answer question 1 and identify how and where the presence of a light rail station is related to detrimental neighborhood change such as gentrification and a decrease in TOD related effects (i.e.; public transit use and population density). Indeed, it is critical to also identify whether regions are adversely affected by light rail stations. A failure to understand: a) the type of neighborhood change that occurs and, more importantly b) where detrimental neighborhood change occurs, is likely to severely limit planners' abilities to fully diagnose and assist areas in need.

The results from question 1 provide a necessary but not sufficient component to understanding transit's role in neighborhood residential change. The results of question 1, therefore led me to select St. Louis, Missouri and its Delmar Loop TOD site as a case study site to explore how the specific planning activities may have possibly influenced the detrimental neighborhood change (i.e.; gentrification) that occurred there. I thus conduct an in-depth, qualitatively based case study using content analysis, interviews, and observations to answer questions 2, 3, and 4.

Using content analyses, I extrapolate the guiding principles from St. Louis and Delmar Loop planning documents that inform TOD activities at the site. I then use interviews and observations to identify the TOD activities related to these guiding principles and discuss

whether and how the actual activities relate to inclusivity. While identifying guidelines for inclusive TOD is important, identifying whether and how actual TOD activities are inclusive is important to better ensure that all TOD residents can equitably access the prospective TOD benefit.

By arguing that TOD activities assist in establishing non-inclusive neighborhoods is not to denounce TODs as a viable planning practice and outcome. Rather, my underlying goal is to improve planners' and researchers' approaches to neighborhood scale developments and identify how planning processes may unintentionally contribute to non-inclusive neighborhoods. Overall, without clearly identifying the type(s) of detrimental change that has occurred and how it has occurred, TODs will contribute to social exclusion patterns where the people with the most need for TOD benefits do not have access to them. Demonstrating and analyzing how TOD activities assist in establishing non-inclusive spaces in the case of the Delmar Loop is therefore important as it: 1) provides a greater understanding where planning has been negligent in inclusive neighborhood development with TODs; and 2) identifies the places where planning can better assist in TOD activities to overcome their potentially harmful impact.

TOD Activities

I refer to TOD activities as the actions planners engage in or undertake to establish TODs. I examine the existing literature (Chapter 2) to identify the TOD activities planners should undertake to establish TODs. Largely, I refer to plan making, plan implementation(s), and development(s) related to the plans as TOD activities In Chapter 2, I also identify how the TOD activities should be inclusive as indicated throughout the existing literature. I categorize such general TOD actions as relating to either Procedural or Substantive Guiding Principles. In

Chapter 4, I establish the Guiding Principles to relate to and categorize the TOD activities based on existing planning documents (i.e.; TOD plans and guidelines). In Chapters 5 and 6, I identify and analyze the TOD activities undertaken (and not undertaken) by planners and planning at the Delmar Loop TOD site.

Before fully describing the TOD activities in Chapters 5 and 6, I list the TOD activities, guiding principles, and expected inclusive activities below in **Table 1.1**. I identify planners as being the main actors needing to engage in these inclusive activities at the Delmar Loop TOD site due to researchers and planning agencies considering TODs as *planning* tools (Belzer, Autler, & Strategic Economics, 2002, p. 8; City of Austin, n.d.). As will be discussed in Chapter 2, I identify these TOD activities through the existing literature.

Table 1.1: TOD Activities

General	Guiding Principles	Activities (Related to Guiding Principles)	Expected Inclusive Activities (From Existing Literature)
TOD Plan Making	Visioning and Leadership	TOD Plan making	Pre-planning to account for the most disadvantaged residents receiving TOD benefits Planning beginning as early as possible before light rail openings
	Public Engagement and Participation	Holding public engagement meetings and/or interviewing, polling, or surveying stakeholders Coordinating and engaging stakeholders	Public engagement meetings being held at times, places, and in spaces accessible to all stakeholders Consistent engagement with communities (i.e.; residents, agencies, organizations)
	Acquire Adequate Funding	Securing Funding Options/Applying for Grants, Loans	Acquiring funding to support affordable housing, station and infrastructure improvements, and Acquiring funding to help maintain existing residents (i.e.; rent controls)

Table 1.1 (cont.): TOD Activities

TOD Plan Implementation/Developments	Transit-supportive Land Uses	Enabling TOD conducive zoning (in plans themselves and adopted by planning agencies and/or planning commissions)	Enabling the provision of amenities (i.e.; childcare services, parks, employment, grocery stores, recreation, etc.) for all possible residents
		Planning Mixed Land Use	Developing zoning to provide for a mix of land uses (especially to maintain existing or future affordable housing)
	People-focused Urban Design	Developing and/or Improving Infrastructure (i.e.; constructing sidewalks, lawn/greenspace maintenance, ensuring lighting)	Designing and constructing station for the needs of many possible residents
	Regional Connectivity and Multi-modal Integration	Siting transit routes	Connections to and from the TOD site without prohibitive costs (i.e.; time and money)
		Providing Transit Connectivity	Connections with other transit modes limiting travel times and costs
	Ongoing Evaluation and Monitoring of Impacts	Analyzing socio-economic and property changes in TOD neighborhoods	Ensuring inclusivity in the activities related to the other guiding principles
			Focusing on identifying if disadvantaged residents and spaces/places have negative impacts

The Delmar Loop TOD activities provide the lens to measure whether and how TOD activities are non-inclusive. The results from the spatial regressions showed that the St. Louis, Missouri Urbanized Area, in general, exhibited evidence of gentrification and also showed some of the largest decreases in public transit use in its station areas. Researchers have identified the Delmar Loop site, in particular, as a TOD site with great potential to be successful, with the American Planning Association (APA) awarding a portion of the site its Great Streets designation (APA, 2007; Forsyth, Jacobson, & Thering, 2007; Goldberg, 2007; Nittler & Boyd, 2012). Focusing on St. Louis and the Delmar Loop TOD site it allows me to identify just how

TOD activities are exclusive, but not necessarily inclusive. Additionally, St. Louis remains a relatively unexamined research area. This is largely due to light rail developments often not occurring in United States Rust Belt areas such as St. Louis which exhibit little or no overall (economic, population, and even, I contend, public transit use) development or growth (Hess & Almeida, 2007). As such, the results may not be generalizable to areas exhibiting overall growth – like San Diego, California; Portland, Oregon; or Denver, Colorado.

Dissertation Outline and Methods

I start with a review of literature on light rail transit, transit oriented development, and inclusion in **Chapter 2**. I argue that literature and research on public transit and transit-oriented development particularly will benefit from an increased focus on inclusivity. In making this argument, I bring into conversation bodies of literature on transit and transit oriented development impacts with justice and equity. I detail how existing transit research largely emphasizes the built environment (i.e.; housing, commercial developments, property values), and can be better served with more quantitative analyses emphasizing transit's impact(s) on residential characteristics. From this conversation between transit and justice literature, I bring forth the expected activities planners should undertake to establish inclusive TOD neighborhoods.

In **Chapter 3**, I examine the relationship between light rail transit (LRT) stations and changes in neighborhood characteristics associated with gentrification and TOD benefits using spatial regression analyses – along with factor analysis and locally weighted regressions – with longitudinal data across 14 U.S. Urbanized Areas (UAs). I also use the findings from the regression to select a case study site for in-depth analysis of TOD inclusivity. I expect that the

presence of a light rail transit station influences neighborhood change related to gentrification, as well as change relating to TOD benefits such as increased population densities increased public transit use, and a decrease in automobile use in station areas. I found that results for some UAs met my expectations, while other UAs showed the opposite of my expectations. Overall, I did not find any prevalent patterns throughout the UAs I studied. However, many UAs exhibited interesting findings that guided my selection of a case study site. The St. Louis, Missouri UA, in particular, exhibited evidence of gentrification but also showed some of the largest decreases in public transit use in its station areas.

In **Chapter 4**, I classify the principles used to guide TOD activities in St. Louis, Missouri's Delmar Loop TOD site. I use content analysis to categorize the guiding principles in existing TOD and light rail planning documents from St. Louis and the Delmar Loop site, as well as planning documents from regions characterized as having successful TOD plans (i.e.; Portland, Dallas, Calgary, and Minneapolis). By using content analysis, I create a composite list of guiding principles. Based on the existing literature reviewed in Chapter 2, I identify characteristics of the guiding principles that if implemented would likely help promote inclusivity. Identifying these guiding principles, as well as identifying how they can be inclusive , provides guideposts by which I analyze the actual TOD activities occurring and that have occurred at the Delmar Loop TOD site. While these guiding principles can be generalized across different regions, I only analyze St. Louis' TOD actions in relation to them.

In **Chapters 5** and **6**, I analyze TOD activities for the Delmar Loop TOD site specifically and for the St. Louis region generally. I use data collected through semi-structured, open-ended interviews with key TOD stakeholders, including: (a) 4 planners from city, transit, and regional planning agencies; (b) 2 residents and members of community/neighborhood

associations; (c) 3 developers; (d) 3 business owners; and (e) 1 university official. I use data collected through direct site observations to identify the site's key neighborhood characteristics. I analyze these activities as to whether they relate to inclusive TOD guiding principles established in chapters 2 and 4.

I separate the analysis of the TOD activities according to whether they relate to (a) procedural guiding principles or (b) substantive guiding principles. By procedural, I refer to guiding principles that relate to the planning of TOD or activities that occur before physical development occurs. By substantive, I refer to guiding principles that relate to the measurable outcomes that can largely be analyzed through the physical developments of TOD. I analyze inclusive TOD activities as they relate to procedural guiding principles in **Chapter 5**. I analyze inclusive TOD activities as they relate to substantive guiding principles in **Chapter 6**.

In **Chapter 7**, I offer policy and planning recommendations and concluding thoughts on how planners can assist in developing inclusive neighborhoods – largely by focusing on establishing effective leadership from the Metropolitan Planning Organization (MPO) and aiming to prevent displacement. Results from chapters 3, 4, 5, and 6 overall support my argument that TOD activities may assist in establishing non-inclusive neighborhoods. I found evidence of gentrification and a lack of TOD benefits in LRT station areas. I also found that residents, business owners, and neighborhood groups were marginalized from TOD public participation and engagement processes. Additionally, a lack of TOD and station area planning at the outset of light rail operations in St. Louis allowed private residents and developers to shape the developments occurring in the Delmar Loop. This lack of public involvment may eventually lead to substantial displacement and marginalization if the general public's interests are not fully represented in TOD activities.

The increase in TOD planning documents since 2011 (as shown in Chapter 4) indicates an increasing interest in TOD planning in the St. Louis region and especially the Delmar Loop TOD site. Yet, there is still opportunity for planners to: a) better engage with existing neighborhoods (residents, business owners, and community/neighborhood associations); b) provide on-going monitoring of TOD impacts; and c) properly design station area neighborhoods for residents to best be able to access public transit.

TODs can be a viable planning activity and outcome. Identifying gaps in TOD research and processes will strengthen TOD activities. In this regard, strengthening TOD activities will help better assist planners in ensuring that the residents with the most need for transit and improved neighbohrood developments have access to them.

Chapter 2: Literature Review

In this chapter, I argue that research on Light Rail Transit (LRT) and Transit-Oriented Development (TOD), as well as TOD activities undertaken by planners will benefit from an increased focus on inclusivity. By benefit, I refer to planners being better able to pursue transit and community development projects that provide transit access to disadvantaged populations. In the case of the Delmar Loop, I am specifically concerned with disadvantage due to poverty and/or racial exclusion. By inclusivity, I refer to all regional residents having access to a LRT TOD space and the residents having access to the means to shape the space. In making this argument, I review studies focusing on the impacts of LRT and TOD, as well as studies focusing on neighborhood change. Overall, existing transit research largely emphasizes changes in the built environment (i.e.; housing, commercial developments, property values) related to LRT. Existing research can therefore be better served with more quantitative analyses emphasizing transit's impact(s) on residential characteristics. More importantly, in making the argument for inclusion in TOD research, I identify the overall and inclusive TOD activities planners should undertake to establish inclusive neighborhoods. In doing so, I expound on the concept of inclusivity and how TOD activities can be inclusive in making this argument. Essentially, I refer to TOD activities as the actions planners engage in or undertake to establish TODs. I generally characterize TOD activities as involving plan making, plan implementation, and developments based on TOD planning.

The remainder of this chapter proceeds as follows. I begin by defining TODs (**Section I**). I next examine mismatch and sprawl literature, which have helped create the context for TODs to emerge, and then discuss how TODs can combat mismatch and sprawl (**Section II**). I follow by discussing the impacts of Light Rail Transit and TODs, especially as they relate to gentrification,

and also analyze how existing research has examined TOD impacts (**Section III**). I conclude by addressing the importance of inclusivity and describing how TOD activities should be inclusive (**Section IV**).

Defining TODs

Defining TODs helps in identifying the types of activities needed to establish them. For instance, by identifying TODs as mixed use neighborhoods, I indicate that planners need to undertake activities that produce mixed-use zoning in station areas. I define TODs as cohesively planned mixed-use, pedestrian- and transit-oriented neighborhoods within a quarter- to half-mile radius of a transit stop. Various sources define Transit Oriented Developments differently, but still retain similar elements. For example, the Center for Transit Oriented Development (CTOD) (n.d.) defines TOD as "a type of community development that includes a mixture of housing, office, retail and/or other commercial development and amenities integrated into a walkable neighborhood and located within a half-mile of quality public transportation" (par. 1). Similarly, the city of Austin, Texas defines TOD as "an intentional mixing of land use and transit through the creation of compact, walkable, mixed-use communities within walking distance of a transit stop or station" (City of Austin, n.d., par. 1). While the definitions vary slightly, similar elements remain: cohesive planning, design, and development of the area; mixed land use; and especially a focus on transit.

One main element in these definitions involves cohesion. That is, all structures, whether sidewalks, residences, buildings, or transit must be built in relation to public transit. This sense of cohesion has often been the subject of debate in TOD literature with authors making the distinction between Transit *Oriented* Development and Transit *Adjacent* Development (TAD).

Primarily, TAD lacks any sort of functional connectivity to transit (Hale, 2012, p. 4). Renne (2009) expounds on this TAD definition and notes that the differences reside in the physical layouts of the two. For example, TADs can be exemplified by low densities, suburban street patterns, and segregated land uses (Renne, 2009, p. 3). TODs, on the other hand, have high densities, grid street patterns, and mixed land uses with a pedestrian and bicycle focused design (Renne, 2009, p. 3). Overall, TADs lack cohesion amongst the various developments, infrastructure, and transit.

Interestingly, while still understanding the importance of cohesion, Altoon and Auld (2011) define TOD a bit differently. For Altoon and Auld (2011), TOD – as previously defined above – forms a transit-related category where a multi-use project is situated directly above a transit station (p. 14). These are mostly single buildings, mainly transit stations themselves, and form the center of the entire transit-related development area. TADs, on the other hand, are projects located contiguous to or surrounding the transit stations, but not necessarily cohesively planned or developed in connection with transit (Altoon & Auld, 2011, p. 14). Altoon and Auld (2011) refer to what is generally considered TOD as a Transit Environment District (TED) (p. 14). Semantics aside, Altoon and Auld (2011) still indicate that the surrounding built environment must be planned in cohesion with and in relation to the transit station.

Similarly, as a coordinated effort and notwithstanding the differences in context, Hale (2012) argues that TOD must be built with a majority mode share of what he terms sustainable people movement. Sustainable people movement is travel made by public transit, pedestrian, or bicycle modes. Hale (2012) argues that “a majority share to sustainable modes is an appropriate and achievable minimum goal for TOD projects” (p. 9). The planning intent and delivery of design in regards to sustainable people movement must be deliberate and foundational in TOD

for it to be actually considered TOD (Hale, 2012, p. 8). Thus, the entire area surrounding the station must be designed, planned, and built in a comprehensive manner to have such a majority mode share.

Where TODs occur (i.e.; their context) is also extremely important in considering TOD activities. TODs may emphasize different elements in different places and spaces making a singular TOD example or a too specific definition problematic when attempting to apply TOD activity in one place to other areas. Cervero et al (2004) note this explicitly when writing: "(T)here is no universally accepted definition of TOD" (p. 5). For example, density levels in a mid-size Midwestern (United States) city like St. Louis, Missouri would be different than density levels in Manhattan and determining high TOD densities may be far different for each place (Cervero et al, 2004, p. 5). Similarly, TOD may be overlooked in pre-WWII built cities (Hess & Lombardi, 2004). As such, Hess and Lombardi (2004) note that TOD literature has a tendency to show a predominance of TOD with aspects such as park and ride (P&R) facilities considering that P&R (attributed to more auto-dependent cities) are most attributed to post-WWII cities. TOD may also be used as an infill strategy in pre-WWII cities instead of as a planning tool to reduce VMT as in post-WWII cities (Hess & Lombardi, 2004).

Certain places within a region may also emphasize different elements of TOD more than other places. Many cities' planning ordinances and proposed planning guidelines designate different TOD conditions based upon pre-existing and/or proposed conditions of an area. Some cities or regions may plan for an interconnected region of TODs like in Denver or may just utilize TODs singularly as a planning tool.

The type of transit mode associated with TODs may also determine the types of inclusive TOD activities planners should undertake. Teitelbaum (2012), for example, notes that rail transit (light rail, heavy rail, and commuter rail) attracts more "discretionary" or "choice" riders than bus transit. Correspondingly, bus riders tend to come from a lower income group than rail, and especially light rail, riders (Teitelbaum, 2012, p. 2). As such, and because people are willing to walk shorter distances to a bus transit stop (meaning the area of development is much smaller), development around bus stops in the form of TOD does not tend to be an attractive option for developers (Teitelbaum, 2012). Also, LRT can be a more cost-effective measure than heavy rail systems because light rail's construction cost per mile is generally cheaper than heavy rail (Cervero, 1984; Teitelbaum, 2012). Therefore, light rail transit system stations present a public transit medium with the greatest development potential around the stations (as compared to bus and heavy rail transit) (Teitelbaum, 2012). LRT station developments in the form of TODs can have the highest rate of return for developers. However, in an attempt to attract more "choice" riders, LRT TOD developments rather than bus TOD developments can then be geared towards higher income residents. To fulfill LRT stations' development potentials, housing prices and rents near stations tend to be high which frequently prices out low-income and captive riders (Bernick and Cervero, 1997; Duncan 2011b). In this regard, inclusive TOD activities related to LRT TODs should attempt to maintain affordable housing in the station areas.

Understanding Mismatch

Constructing cities solely around the personal automobile has had disastrous social effects for many city residents. As Cervero (1998) notes: "Those who are too poor, disabled, young, or old to own or drive a car are effectively shut out of many of society's offerings" (p.

49). This isolation, then, can largely result in an inability to reach proper employment (Cervero, 1998, p. 48) or civic and social amenities such as quality schools. Mismatch studies specifically address the spatial and social exclusion that has occurred related to transportation and transit related developments. More importantly, TODs provide an alternative to mismatch by having employment and/or social amenities accessible by public transit and within reasonable walking distance for TOD area residents. By providing an alternative to sprawl type developments, planners therefore should engage in specific activities to establish TODs as a viable alternative to sprawl. For example, one way for planners to establish TODs as an alternative to sprawl includes developing zoning at TOD sites to better ensure a mix of land uses.

Researchers investigating mismatch overall point directly to the inaccessibility and social isolation produced by automobiles and auto-supportive infrastructure (Stoll, 2005b; Shen, 2000). Mismatch is generally researched in terms of spatial mismatch, transit mismatch, and geographic skills mismatch. Spatial mismatch occurs when employment sectors are not in spatial proximity to the urban area's workforce (Zax & Kain, 1996). Transit mismatch occurs when certain transit modes do not access places of employment and/or service opportunities (Taylor & Ong, 1995) as well as when people do not have access to needed transit modes (Grengs, 2010). Geographic skills mismatch occurs where employment opportunities in certain places do not match the skill set of the places' residents (Stoll, 2005a). Overall, mismatch largely involves land use stemming from transportation infrastructure and planning causing some groups of people – namely minorities, disadvantaged populations, and low-income residents - to not be able to access "desired goods, services, and activities," as well as employment opportunities (Ratner & Goetz, 2013, p. 32). Such mismatches have led to huge urban populations isolated from regional

employment, social and cultural amenities, and new housing opportunities; overall affecting resident's well-being.

In recognizing mismatch, especially as it relates to transit, many scholars call for more equitable transit solutions with equal and fair distribution of the benefits and burdens of transit decisions (Bullard, Johnson, & Torres, 2000). Correspondingly, scholars also aim to provide more practical approaches to overcoming mismatch by first determining and then providing access to the proper transit mode(s) for mismatched residents and the spaces they occupy (Grengs, 2010). While these calls for transit and transportation justice and equity are extremely important, it is also important to consider the importance of providing access to and justly developing the space(s) that makes access to transit possible.

Meanwhile, TOD studies precisely speak to mismatch by offering a direct alternative to sprawl (Belzer & Autler, 2002) by offering concentrated, mixed-use developments near transit stations. Essentially, TODs bring the destinations (i.e.; jobs, housing, or retail) closer together. Residents then would not have to own a car and can therefore rely on transit, walking, or biking to reach needed destinations. However, while TODs directly address the spatial mismatch from sprawl and automobile developments, they still may exacerbate social exclusion in the TOD neighborhoods. For example, as noted above, I define TODs as a mixed-use neighborhoods. However, TODs centered around LRT stations may unfortunately induce developments centered on higher income and more choice riders – meaning lower income residents and captive riders in the station areas may be excluded from station area developments (Duncan, 2011b; Teitelbaum, 2012).

For TODs to actually provide an alternative to both the social and spatial mismatch of automobile focused urban developments, planners must engage in inclusive TOD activities that

help ensure that all residents have access to the space and public transit. One particular activity may be to establish zoning ordinances that enable both single and multi-family residential land uses, while also seeking affordable housing programs to better assist low income residents in acquiring housing in the station area. As will be shown in Chapters 5 and 6, I analyze whether and how planners actually undertake such TOD activities, combatting sprawl and helping to establish inclusive neighborhoods in the process.

TOD and LRT Impacts

Increasing Transit Ridership through Inclusionary Zoning.

While adding or enhancing public transit can combat sprawl, public transit such as light rail can also be quite expensive. According to Corbett and Zykofsky (1996), "a significant number of potential riders must live and work near transit stops" to make up for the expense of rail based transit (p. 2). In this regard, then, actively developing in light rail station areas particularly in the form of TODs can be beneficial for transit ridership and, in turn, having a return on the expense of the transit system.

One key aspect in increasing the number of riders in transit station areas overall and TODs specifically is ensuring a mixed housing supply. Having mixed housing is beneficial in that it can both: A) entice choice riders into the area; and B) assist captive riders in having transit access. Enabling inclusionary zoning can help ensure a mixed housing supply. Pendall, Gainsborough, Lowe, and Nguyen (2012) identify inclusionary zoning as a way to better ensure housing for both choice and captive riders in station areas. Inclusionary zoning requires private developers to provide affordable housing units or pay fees if not providing the units (Pendall et al, 2012).

Catering to both types of riders is important as it can: 1) increase tax revenues by having higher income residents (with choice riders); and 2) help better ensure that the people with the most need for transit have access to it (with captive riders). However, enticing developers to develop in TOD sites with inclusionary zoning requirements may be a challenge due to developers wanting the best possible (economic) returns on their investments (Belzer, Autler, Espinosa, Feigon, & Ohland, 2004, p. 49). Meanwhile, Portland's Metropolitan Regional Council – Metro – has a specific TOD Program for transportation related inclusionary housing developments. It is mainly aimed at developers; providing incentives to them to develop in an economically feasible way around transit (Portland Metro 2015). Nevertheless, Portland Metro's TOD Strategic Plan prepared by the Center for Transit Oriented Development (CTOD) expressly discusses TOD equity stating: "one of the key challenges that future TOD implementation will need to address is fostering new transit oriented housing that is affordable to the workforce" (CTOD, 2011, p. 27). The Portland region also has strong support for TOD and affordable housing from the State of Oregon. In 1995, Oregon enacted 10-year property tax abatements for multi-family and affordable housing that can easily access major transit facilities (Cervero, Ferrel, & Murphy, 2002, p. 48). Such planning related activities may help assist planning in maintaining that housing and subsequent land use caters to both choice and captive riders.

Property Value Impacts in TODs and LRT Station Areas.

Besides reducing sprawl, a leading benefit of TODs is their potential to increase property values and tax revenues in station areas (Corbett & Zykofsky, 1996). Debrezion, Pels, and Rietveld (2007) explain that railway stations, overall, have both beneficial accessibility and environmental impacts which can directly contribute to property value impacts (p. 161). Areas

which are prone to higher property values through economic growth from transit station access will thereby receive greater attention as planners are especially interested in guiding growth and development in these station areas (Hess & Almeida, 2007).

As Debrezion, Pels, and Rietveld (2007) explain, however, the studies exploring property values have quite varied results. In their study on LRT and commercial property values in Buffalo, NY, Hess and Almeida (2007) conclude that while rail station proximity does have an impact on property values, they cannot claim with confidence that light rail transit will increase property values and help revitalize depressed areas (p.1061). Examining New Jersey's River Line, Chatman, Tulach, and Kim (2012) similarly found that the light rail line had little to no overall economic impact on home values.

On the other hand, in studying the effects light rail planning has on vacant residential property in Portland, Oregon, Knaap, Ding, and Hopkins (2001) found "that plans for light rail investments have positive effects on land values in proposed station areas" (p. 32). Their results indicate that planning for light rail, in this instance, causes housing prices to rise and thus potentially prices out certain people. In expanding on Knaap, Ding, and Hopkin's (2001) questioning of whether plans matter, Golub, Guhathakurta, and Sollapuram (2012) found that proximity to Phoenix's LRT stations in general also positively impacts housing values; while positive effects largely begin well before actual LRT operations and accrue throughout the entire implementation process (p. 11). Ko and Cao (2013) similarly found that commercial and industrial property values in Minneapolis along the Hiawatha LRT corridor increased, with revitalization occurring in some instances.

Such studies analyzing the property value impacts of TODs and LRT stations provide a necessary component to understanding how TOD affects station area neighborhoods. Still, more

research is needed for planners to fully address TOD and LRT station impacts to neighborhoods and station area residents. Such studies focusing on property value impacts only provide planners with a limited understanding of TOD impacts. Additional studies must also address the social impacts of TODs for planners to have a more comprehensive understanding of how TODs affect surrounding neighborhoods. Examining TODs' social impacts also has inclusivity implications as they can enable planners to address exclusive TOD issues by providing planners with information regarding just who or which groups and spaces they occupy are adversely impacted by TODs. In Chapter 3, I add to this existing research by focusing on the social impacts of LRT stations. In doing so, I identify residential socio-economic changes in LRT station areas to then analyze the actual TOD activities that may cause such changes to occur.

Gentrification and Neighborhood Change.

Even with the mixed results from studies examining transit impacts to neighborhoods, a key concern remains with LRT station area developments and TODs specifically: gentrification (Dawkins & Moeckel, 2014; Rayle, 2015; Saldaña & Wykowski, 2012). This potential concern largely stems from the increased interest and land use intensity, which may ultimately correspond with higher housing and property values in LRT station areas (Hess & Almeida, 2007; Revington, 2015). I define gentrification as a process of change characterized by neighborhood upgrading coupled with residential displacement. I identify TODs as one potential trigger for neighborhood change in the form of gentrification.

Gentrification studies, however, take different stances concerning gentrification. Some existing studies discuss whether or not gentrification can produce positive benefits such as social mixing to increase social capital and cohesion (Davidson, 2010; Uitermark, Duyvendak, &

Kleinhans, 2007). While not arguing that gentrification is entirely beneficial, some scholars argue that little evidence suggests that gentrification produces harmful effects such as displacement (Kohn, 2013) or that existing residents are entirely powerless in the process (Brown-Saracino, 2009; Cooley, 2010; Ross, 2014). A recent national scale empirical study also indicates that gentrification is not necessarily a wide spread phenomenon, and neighborhood decline is much more apparent (Landis, 2015). Still others counter those views by indicating that displacement is an inherent effect of gentrification processes (Grube-Cavers & Patterson, 2014; Smith, 2010b) and suggest that even if little evidence points to displacement, mitigation measures still should be in place (Freeman, 2005).

I mirror these latter takes on gentrification that displacement is inherent within gentrification. Gentrification without displacement is better characterized as neighborhood upgrading, with no change in the social make-up (i.e.; the actual residents) of the neighborhood. And, this neighborhood upgrading primarily concerns the built environment: for example, infrastructure improvements to sidewalks, street lights, or streets; developing houses on formerly empty land parcels; or the opening of new businesses in previously vacant buildings. Such improvements, by themselves, have the benefit of improving the quality of the neighborhoods for the residents. However, when the improved quality also translates to higher property values *without* planners or policy makers controlling to ensure existing residents remain in the station areas, displacement occurs.

The rent gap theory is a key theory that provides an explanation as to how gentrification occurs. With this theory, gentrification often occurs when the land is transformed to meet its potential value. The rent gap is the difference between the actual land value of a land parcel and the parcel's potential value given that the land parcel had a better or different use (Smith, 1987).

For Smith (2010b), "gentrification is a structural product of the land and housing markets. Capital flows where the rate of return is highest, and the movement of capital to the suburbs along with the continual depreciation of inner-city capital, eventually produces the rent-gap" (p. 94). Thus, gentrification is a structural process emphasizing capital gains with displacement being an essential part of it.

With transit improvements, such as the opening of a light rail station, undervalued areas potentially gain value – closing the rent gap where land prices increase to meet their potential value and thereby inducing gentrification. This potential value gain largely stems from the increased accessibility transit provides, as well as an increase in land use intensity (i.e.; increased densities) (Revington, 2015). This increase in accessibility is then capitalized into land and housing values, causing low-income residents' displacement from these station areas (Dawkins & Moeckel, 2014).

Overall, I argue that gentrification does have "inherent inequalities within the process" (Doucet, 2014, p. 132). Glass (1964) explains these inherent inequalities in this process when she first coined the term 'gentrification':

> One by one, many of the working class quarters of London have been invaded by the middle classes…Once this process of 'gentrification' starts in a district, it goes on rapidly until all or most of the original working class occupiers are *displaced*, and the whole social character of the district is changed…And this is an *inevitable development*, in view of the demographic, economic and political pressures to which London, and especially Central London, has been subjected. (pp. xviii-xix, emphasis mine)

Glass (1964) continues by noting that London's "(C)ompetition for space has become more and more intense" and this competition "is bound to get out of hand, and lead to a spiral of land values, if it is neither *anticipated* nor *controlled*" (p. *xix*, emphasis mine). These last points underscore Knaap, Ding, and Hopkins (2001), Atkinson-Palombo and Kuby (2011), and Freeman (2005) in that planners need to undertake advance planning especially when dealing with transit so as not to displace populations. It equally calls to attention the need for on-going controls to ensure equity measures remain at the forefront of new transit developments.

Inclusivity

Undertaking activities like planning to anticipate and control for negative consequences such as displacement help ensure that both choice and captive riders can access transit. Undertaking such activities, though, requires planners to actively engage in inclusive activities. Before detailing whether and how TOD activities are inclusive, I first describe inclusion for purposes of this research.

I refer to inclusion as all regional residents having access to a particular space, having access to the means to shape the space, and all social groups and the spaces they occupy having equitable treatment in the distribution of public goods. This conceptualization largely stems from Susan Fainstein's (1997, 2000, 2010) just city perspective. The just city perspective presents "a model of spatial relations based on equity" (Fainstein, 2000, p. 452) and values "participation in decision-making" (Fainstein, 2000, p. 458). At the same time, the just city approach emphasizes the spatial-social relationship previously established by Marxist geographers, specifically reacting "to the social and spatial inequality engendered by capitalism" (Fainstein, 2000, p. 453).

It especially requires principles of democracy, diversity, and equity in evaluating planning and policy decision making (Fainstein, 2010).

The just city perspective grounds itself in notions of justice and equity. Previous studies focusing on justice and equity emphasize the fair distribution of societal benefits and burdens (Rawls, 1973; Sen, 2009). They, however, typically overlook the interaction between space, as in the built environment, and society; not taking into full account how space may influence and be influenced by social interactions. Marxist scholars, and especially Marxist geographers, fill this gap by establishing the role space plays in justice. Marxism at its core recognizes human dialectical, relational aspects – the idea that humans are not mutually exclusive; but, constantly interacting with one another within various spaces (Merrifield, 2002; Harvey, 1973). The just city perspective also firmly includes space in justice conversations; but advances Marxist geographical studies by identifying and presenting just models and procedures for embracing justice instead of mainly describing injustices.

Embracing a just city theoretical perspective to examine TODs will draw attention to the interconnectedness between space and society that has often been overlooked in justice related literature; while also identifying the procedures necessary to establish accessibility and inclusiveness. It also helps provide a lens in which to view neighborhood change by examining change in terms of both social (e.g..; residential) changes and changes related to the built environment (e.g..; businesses and housing values). Additionally, embracing a just city perspective helps better identify techniques to measure and assess equitable neighborhood change and activities by focusing on social inclusion.

Key Elements in Transit Related Studies with a Focus on Social Inclusion.

In terms of methodological approaches to study TODs' impacts on neighborhoods, many studies using multivariate statistical analyses include demographic or resident indicator variables like race or income only in examining their impacts on housing values (Debrezion, Pels, & Rietveld, 2010; Chatman, Tulach, & Kim, 2012); while others (Golub, Guhathakurta, & Sollapuram, 2012; Duncan, 2011) exclude such social variables completely. While statistical analyses are absolutely necessary in discussions of neighborhood change and transit impacts; not including variables pertaining to socio-economic factors limits the analyses' overall explanatory power of addressing changes associated with transit developments.

A small contingent of transit related literature explores gentrification (Feinstein & Allen, 2011; Kahn, 2007), focuses on area residents and communities (Douglass, 2010), and advocates for equitable public transportation and TOD policies (Clagett, 2014; Grengs, 2004). Lin (2001) specifically examines gentrification and transit in Chicago by analyzing changes in residential property values and concludes that transit access spurs gentrification. However, without accounting for a measure of who occupies the housing, it is difficult to explain that gentrification is actually occurring. In Lin's study, then, the increase in property values could be better referred to as neighborhood upgrading, due to limited measures accounting for the residents themselves.

Kahn (2007) meanwhile enhances transit studies by measuring gentrification impacts of rail based transit between 1970 and 2000 in 14 U. S. cities. Kahn's (2007) evidence of gentrification is based on home price dynamics and shares of communities that are college graduates (p. 181). Kahn also found mixed results throughout the cities examined; with some cities experiencing gentrification in communities with increased access to walk and ride stations.

However, examining gentrification only in terms of college graduate percentages may be insufficient in understanding gentrification as a whole or who actually occupies the spaces.

Studies such as Lin's and Kahn's seemingly affirm that a planned activity such as LRT or TOD can trigger gentrification processes. However, as LRT's popularity continues to increase, research specifically focusing on LRT station areas and gentrification are needed. Additionally, studies examining the different factors that may make up gentrification and associated with light rail may assist planners in determining whether or not, and where, gentrification possibly occurs.

Whether or not TODs actually cause displacement, mitigation measures, guidelines, and practices should be in place to help minimize any harmful impacts. Pendall, Gainsborough, Lowe, and Nguyen (2012), correspondingly, highlight equitable practices from specific regions combatting displacement. One such practice is for regions to have actively pursue income mixing in station areas (Pendall et al, 2012). This involves maintaining affordable housing practices in higher income areas and pursuing market rate housing, without displacing existing residents, in distressed areas (Pendall et al, 2012). Similarly, regions must build a regional consensus around an equity agenda (Pendall et al, 2012). While Pendall et al's (2012) study is informative and provides needed policy directions for equitable TODs, understanding the specific neighborhood change that occurs in station areas can help better determine focused policy recommendations for the specific contexts.

Proposed Planning Strategies and Community Efforts for Inclusive Neighborhoods.

Additional scholarship and community efforts have recognized the negative impacts that can be derived from transit related developments. In turn, they have identified tools and

strategies for addressing such impacts. Pendall, Gainsborough, Lowe, and Nguyen (2012) examined four regions with fixed-rail transit: Denver, Charlotte, Miami, and Boston. Their findings indicate a number of options to produce equitable transit areas in each of these regions specifically and for adaptation in other places. Some of their findings include: engagement from local public housing authorities for developing affordable housing, land-banking interventions, de-concentrating affordable housing for more inclusive neighborhoods, local agencies prioritizing investments and services in neighborhoods in need, and overcoming local government fragmentation.

The Dukakis Center for Urban and Regional Policy also offers a "toolkit of policy tools for shaping equitable neighborhood change" (Pollack, Bluestone, & Billingham, 2010, p. 1). Some of the tools presented include developing a comprehensive TOD strategy characterized by the active engagement of local government; as well as broad-based community engagement. Overall toolkit qualities emphasize that planning efforts should "begin early", "be intentional", "include all stakeholders", "coordinate across agencies", and, most importantly, actually "be implemented" (Pollack, et al, 2010, p. 36).

Transit studies may also benefit from certain community efforts and organizations to combat negative impacts associated with transit use to assist in developing inclusive communities. One such organization is the South Orange/Maplewood Community Coalition on Race. This non-profit community organization aims to achieve, not just community diversity, but racial integration for an inclusive neighborhood (South Orange/Maplewood Community Coalition on Race, 2014). The organization focuses on integration rather than solely diversity because having a diverse group of neighborhood residents does not indicate that all neighbors

interact or equally participate in neighborhood decision making activities (South Orange/Maplewood Community Coalition on Race, 2014).

Newly formed or newly forming TOD areas from light rail may be some of the most gentrifying or gentrifiable areas in which to situate contemporary gentrification discussions. All LRT station areas, though, are not specifically designated as TOD sites. Even still, LRT station areas may be more prone to gentrification considering that they are areas with increasing developments or influxes of capital while also allowing greater regional accessibility. What follows is a brief discussion of TOD and related LRT policies and plans; especially as they relate to being mechanisms that may promote gentrification or mitigate some of its harmful effects.

Some areas incorporate sustainable community planning into their regional planning efforts. The Denver region is one such example. The Denver Regional Council of Governments (DRCOG)'s Sustainable Communities Initiative (SCI) aims to maximize the Denver region's transit investments (DRCOG, 2014). A part of the SCI is a Corridor Implementation component with a particular objective of developing strategies for TOD implementation (DRCOG, 2014). Planning with a specific focus on developing around light rail corridors as such may help the region better utilize transit. However, ensuring that existing residents are not displaced in areas affected by such an initiative needs to be part of the discussion and planning.

The Baltimore Metropolitan Council (BMC) specifically discusses transportation and environmental justice. Meanwhile, the BMC's long range transportation plan: *Plan It 2035*, has extensive discussions and mitigation strategies for environmental issues like wetland and historic place preservation; but is limited in its discussion of transportation social justice issues. Baltimore City's Planning Comprehensive Master Plan does specifically include a TOD Strategy. One guiding objective of TOD planning and policy it outlines is to provide

neighborhood benefits which includes promoting “a broad range of housing choices” (Citizens of Baltimore, 2009, p. 210). Sufficient housing choice can aid in providing a mix of residents in TODs; but, the Comprehensive Master Plan, like DRCOG, does not mention strategies ensuring existing residents are not displaced.

New Jersey’s Smart Growth strategy could partly be a cause of gentrification or could provide a mechanism to reduce its harmful effects. Jersey City is shown as a designated Smart Growth site area and some of smart growth’s key characteristics include providing mixed-use development as well as transit accessibility (State of New Jersey, 2011) resulting in minimal, if any, change due to light rail. However, both Portland, Oregon and Maryland as a whole have Smart Growth policies in place. Similar policies or initiatives in place could cause different, inconsistent impacts in different regions.

One barrier to providing affordable new housing, which may help reduce the negative impacts (i.e.; gentrification and displacement) of transit developments is funding. The Metropolitan Transportation Commission (MTC) of the San Francisco Bay Area provides its Transportation for Livable Communities Program (TLC) as part of its smart growth strategy. MTC also lays out a specific TOD policy for regional transit expansion projects (under MTC Resolution 3434) (MTC, 2005). The TOD policy provides guideline for developing TODs for different transit modes and TLC funds projects meeting the daily needs of neighborhood residents like providing local housing, amenities, and services in neighborhoods served by transit (MTC, 2014). The San Francisco Bay Area has its Transit-Oriented Affordable Housing Acquisition Fund (TOAH) to provide financing for developing affordable housing and community services like fresh food markets or health clinics near transit (CTOD, 2013, p. 59). TOAH pools money from a variety of investors, such as $10 million from MTC, to provide loans

directly for such purposes (CTOD, 2013, p. 59). Such policies and strategies from MTC for TODs provide mechanisms that may allow a more regional representation of residents in TOD areas. However, transit stops may spur gentrification processes and these mechanisms to provide affordable housing and a mix of land uses may better affect *future* residents of TODs and not necessarily *existing* residents.

Ensuring that existing residents of future TOD areas can access affordable housing and related initiatives, could be an essential mechanism to limit gentrification's harmful effects. Community engagement initiatives as part of some of these TOD strategies could provide the means to include existing residents in TOD planning processes and their intended outcomes. Part of MTC's TOD Policy is its Priority Development Area Planning Program (PDA) which emphasizes community involvement. The community involvement element details strategies to involve area residents in developing and implementing TOD plans. Dallas also has a TOD initiative: Dallas TOD, a project from the City of Dallas transforming and investing in transit related developments in five light rail station neighborhoods (DallasTOD, 2012). For each of the five station areas, the City of Dallas held and facilitated various community engagement initiatives (surveys, focus groups, and workshops among other events) to include station area residents in the process of creating or improving their own neighborhoods.

Essentially, many of the areas with LRT at least discuss TOD and station planning policies whether within the regional, city, or county level agencies. Some, like MTC or Portland's Metro, actively take steps to implement strategies for beneficial TODs which in turn may become mechanisms to stem the harmful effects of transit induced gentrification. Taking steps to ensure gentrification does not occur, agencies, like the City of Dallas, actively engage existing transit neighborhood residents to receive their input into the planning process. Some

regional TOD policies may in fact be mechanisms to spur more harmful effects of gentrification (displacement specifically) by mainly focusing on future residents. Engaging with existing residents, meanwhile, to understand their neighborhood wants and needs may be a better mechanism to help ensure displacement does not occur due to light rail TOD.

Guiding Principles and Inclusivity.

One aim of this research is to identify how TOD activities relate to inclusivity. Chapter 4 provides a fuller description of the guiding principles for TOD activities. These guiding principles include Visioning and Leadership, Public Engagement and Participation; Acquiring Adequate Funding, Transit-supportive Land Uses, People-focused Urban Design, Regional Connectivity and Multi-modal Integration, and Ongoing Evaluating and Monitoring of Impacts and Outcomes. Inclusivity, then, must permeate each guiding principle. Below, I address how each of the guiding principles can be inclusive, with many inclusivity components overlapping among the different guiding principles.

Visioning and Leadership.

Visioning and Leadership refers to transit, regional, and/or city agency planners or key decision makers firmly incorporating TOD in transit, regional, and/or city planning activities. As Belzer and Autler (2002) indicate, TODs require substantial coordination among various regional actors (i.e.; developers, transit authorities, residents, etc.) to develop and implement the neighborhood scale TOD projects. However, Belzer and Autler (2002) further note that "although local governments are usually in the best position to lead the process, many suffer from a significant leadership gap" (p. 57). Local governments must take the lead in: 1)

developing comprehensive, long-term planning efforts; 2) establishing TOD plans and policies that fully incorporate mixed-income housing; and 3) coordinating actions with key stakeholders (Belzer & Autler, 2002, p 57).

However, many regions face a "leadership gap" where local officials or planners do not properly plan for TODs (Belzer & Autler, 2002, p. 57). As a result, private developments may take charge in TOD activities and overlook the public good. Local governments are therefore "responsible for the heightened threat of displacement to low-income populations" (Clagett, 2014, p. 16). For the guiding principle of Leadership and Visioning to be inclusive, then, they must "account for the populations under threat of direct displacement" (Clagett, 2014, p. 16). Planning and accounting for displacement must begin as early as possible, "preferably at the outset of the transit planning process" (Pollack, Bluestone, & Billingham, 2010). This involves key actors (local government planners, transit planners, or regional planners) pre-planning (i.e.; planning in anticipation of TOD) with a key concern for the most disadvantaged TOD area populations.

Public Engagement and Participation.

Public Engagement and Participation refers to including all groups or individuals that may be impacted by TOD activities at all phases of planning and/or implementation. For Public Participation and Engagement to be inclusive, Bond and Thompson-Fawcett (2007) indicates that "planners must not only hear, see and learn from all voices, but must create a space where those voices that may be ignored or marginalised are heard and empowered" (p. 467). The City of Seattle's Race & Social Justice Initiative provides an *Inclusive Outreach and Public Engagement Guide* that serves as a practical guide for all city staff to use when dealing with public

engagement (2012). From this guide, I refer to inclusive engagement and participation occurring when the public sector (i.e.; planning agencies): 1) builds relationships with the impacted residents; 2) creates a welcoming atmosphere for all impacted residents to participate; 3) increases accessibility for all impacted populations to participate; 4) provides diverse methods for engagement (i.e.; not only in public participation meetings organized by the planning agency); 5) maintains a community presence; and 6) partners "with diverse organizations and agencies" (City of Seattle Race & Social Justice Initiative, 2012, p. 8-9).

Acquiring Adequate Funding.

Acquiring Adequate Funding refers to the ability to fund a diversity of TOD projects including proper station lighting, sidewalks, housing, commercial properties, among many others. As there are a diversity of TOD projects there may also be a diversity of financing options available. For Acquiring Adequate Funding to be inclusive, TOD activities must seek funding to support affordable housing options, station and infrastructure (i.e.; lighting, sidewalks), as well as developments that will support and strengthen the existing neighborhood residents such as non-profits, grocery stores, or daycares (Mueller et al, 2013).

Transit-supportive Land Uses.

Transit-supportive Land Uses refers to planning, developing, and implementing land uses supporting and strengthening the existing neighborhood by centering on transit and mixed land use. TOD activities related to Transit-supportive Land Uses are inclusive when zoning reduces barriers to mixed-use station area development (Hickey, 2013 p. 2). Such barriers include density limits (i.e.; max dwelling units per acre) or parking minimums for businesses which can allow

developers to build large parking lots and thereby reduce land for more intense uses such as multi-family residences. TOD activities relating to this guiding principle are also inclusive when they maintain affordability in the station area, especially as it relates to housing. Pollack (2006) indicates that at least 30% new or redeveloped housing in a TOD area must be "permanently affordable to the entry level salary of a child care provider from that community" (p. 9).

People-focused Urban Design.

People-focused Urban Design refers to designing the station areas and entire TOD site in a way that encourages pedestrian (and bicycle) use rather than auto-use. I take this guiding principle to be inclusive when, according to Evans-Cowley (2006) "pedestrian concerns are fully integrated into local planning and design and the construction of transportation facilities" (p. 73). People-focused Urban Design is inclusive when it allows all residents in the TOD site to access transit facilities as well as TOD amenities such as retail or parks. I also refer to People-focused Urban Design as being inclusive when it is "visually appropriate and personalized for human needs" (Kenworthy, 2006, p. 68) and when it is designed "for the needs of the widest possible audience, irrespective of age or ability" (Audirac, 2008, p. 1). That is, when the site is designed to accommodate all TOD area residents and site occupants.

Regional Connectivity and Multi-modal Integration.

Regional connectivity and multi-modal integration refers to each TOD site and/or LRT station being physically connected to the entire region. For TOD actions related to Regional Connectivity and Multi-modal Integration to be inclusive, they must enable TOD residents to be able to access regional destinations (i.e.; destinations not in the TOD site) at desirable times

(Lucas, 2011). Inclusivity should also take into consideration of the cost of travel: in terms of time and money (Kaplan, Popoks, Prato, & Ceder, 2014; Lucas, 2011). That is, the TOD site should have connections to other transit modes (i.e.; bus or car) that limits the costs and times of travelling outside of the TOD site to access needed regional destinations.

Ongoing Evaluating and Monitoring of Impacts and Outcomes.

Ongoing Evaluating and Monitoring of Impacts and Outcomes refers to consistently assessing whether or not the TOD activities adhere to the inclusiveness of the above guiding principles. Largely, as the Puget Sound Regional Council's (PSRC) Growing Transit Communities (GTC) (2013) indicates, evaluation and monitoring efforts should focus on increasing access to opportunities for station area residents. Overall, all of the guiding principles are inclusive when they aim to benefit the lives to the most disadvantaged residents. Planners consistently engaging in the guiding principle of Ongoing Evaluating and Monitoring of Impacts and Outcomes helps to better ensure that the inclusivity aspects of the other guiding principles are met.

Conclusion

This increased focus on inclusivity can better allow the people with the most need for transit and improved neighborhood developments to have access to them. It also helps identify inclusive TOD activities for planners to pursue. Overall, the existing research related to light rail transit, transit-oriented development, and gentrification inform the types of activities planners should undertake to help establish inclusive TOD neighborhoods. Still, though, whether or not planners actually engage in these activities is largely under researched. Additionally, TOD and

LRT research can benefit from analyses focusing on neighborhood change related to the social aspects of neighborhoods such as residential socio-economic characteristics that occurs in LRT station areas by showing the types of changes that occur in light rail station areas. The remainder of this dissertation analyzes neighborhood change related to socio-economic residential characteristics and analyzes whether and how planners undertake inclusive TOD activities. Both of which can better assist planners in establishing inclusive TOD neighborhoods.

Chapter 3: Gentrification and Light Rail Statistical Findings: Are Light Rail Stations Associated with Gentrification and TOD Related Neighborhood Change?

Many studies examine whether and to what extent LRT stations affect changes in property values (Duncan, 2010; Hess & Almeida, 2007; Lin, 2001). However, the relationship between LRT stations and changes in socio-economic conditions such as race, income, poverty rates, or even a composite index remains largely understudied. Changes in property values due to planned developments like LRT stations can have direct impacts on station area residents especially if prices become unaffordable. Directly highlighting the impacts of LRT stations on the changes in socio-economic characteristics of residents can add to understandings of LRT station developments' overall impacts and offer meaningful policy implications for TOD. Additionally, the purpose of identifying the impacts will assist in determining a case study site for more in-depth analysis of LRT and specific TOD planning activities.

I thus ask: To what extent is the presence of a light rail station associated with gentrification? To answer this question, I used spatial regression analyses (SAR) to investigate the connection between LRT stations and residential change longitudinally across 14 U.S. urbanized areas (UA) that built light rail systems in the 1980s and 1990s. I also examined the relationship between LRT stations and TOD related changes such as increased densities and transit ridership. I expected that the presence of a LRT station is associated with the possible presence of gentrification along with increased public transit use and population density.

Findings suggest that neither gentrification nor TOD related changes are prevalent throughout the UAs examined. However, the impacts of LRT stations can vary depending on the specific contexts of each UA. Overall, the results assist in the selection of St. Louis to explore in

a case study as St. Louis showed negative TOD effects and the possibility of gentrification occurring in LRT station areas.

Methods

Hypothesis.

I expected that the presence of a light rail station would be associated with gentrification and TOD related changes. By gentrification related change, I refer to station area increases in white population percentage, percentages of residents with at least a four-year college degree, household income, and my Residential Change Index (RCI), as well as a decrease in the light rail station area's poverty rate. By expected TOD related changes, I refer to increases in population density, public transit use, and all non-privately operated vehicle (non-POV) use in light rail station areas.

I operationalize gentrification as a process of neighborhood change characterized by neighborhood upgrading and residential displacement. Neighborhood upgrading can be viewed by increases in housing values (i.e.; rent increases and/or mortgage increases) and/or newer housing or housing renovations (Helms, 2003; Immergluck, 2009). Residential displacement can be viewed by changes in the residents' socio-economic characteristics such as race, education, or income (Kahn, 2007; Ley, 1986). This process of neighborhood upgrading and displacement often occurs in low-income and/or minority neighborhoods with initially low housing values and tenants that do not own or have control of the land (Lin, 2001; Smith, 2010b). In this regard, I expected neighborhood upgrading and residential displacement to occur with the presence of a light rail station opening. To account for neighborhood upgrading, I created a Residential Change Index which is a composite variable that includes housing characteristics (housing and rent values) as well as socio-economic variables (race, income, education, poverty, and

occupation). For residential displacement, I expected the presence of a light rail station to be associated with increases in a neighborhood's white population percentage, percentages of residents with at least a four-year college degree, income levels, as well as a decrease in the neighborhood's poverty rate. For example, if a neighborhood was predominately black prior to a light rail station opening, but is predominately white after a light rail station opening, then this change accounts for residential displacement. The expected TOD related changes align with existing research that notes TOD benefits as sprawl reduction (i.e.; increased station area population densities) and less automobile dependency (i.e.; increase in light rail, walking, and bicycle use) (Brown & Werner, 2009).

Research Strategy.

To test my hypothesis, I conducted a series of spatial autoregressive lag model analyses (SARs) to identify the relationship between the presence of a light rail station and potential gentrification TOD related neighborhood changes. I used SAR because: 1) regression analysis statistically captures the relationship between variables and 2) I wanted to capture the spatial dependence that possibly exists amongst the census tract characteristics. For spatial dependence specifically, I aimed to account for the possibility that the given dependent variable – $\boldsymbol{y}$ – from a given census tract (i.e.; neighborhood) is related to values of the same variable in nearby census tracts (Anselin, 2002; de Smith, 2014).

I used SAR to test my hypothesis based on the assumption that the variables I use have a spatial relationship with one another. This assumption is largely based on Tobler's First Law of Geography which states: "Everything is related to everything else, but near things are more related than distant things" (ESRI, 2016b). I assume that a particular socio-economic attribute is affected by the particular socio-economic attribute at nearby locations. So, the closer a

neighborhood (light rail station area) is to a low-income area, then the greater chance that the neighborhood will also be low-income.

I aim to account for the strength of the relationship between a light rail station and certain neighborhood socio-economic characteristics like income levels for example, at the census tract level. I consider and account for spatial dependence because the gentrification (i.e.; RCI, race, education, income, and poverty rates) and TOD (i.e.; population density, public transit use, and non-POV use) characteristics of nearby locations may strongly influence the station area gentrification and TOD characteristics. Controlling and accounting for spatial dependence is important for this research largely because I am measuring the relationships across different Urbanized Areas (UAs) within the United States.

Model Specification.

The general form of the SAR model can be written as:

$$y = \alpha + pWy + \beta X + \varepsilon$$

where y is the dependent variable (the change in either RCI, Race, Education, Income, or Poverty for my gentrification models and either Population Density, Public Transit use, or all Non – Privately Owned Vehicle usage for my TOD models); α is the constant term; p is the spatial autoregression parameter which is estimated from the data; W is the weighting matrix (Queen weight matrix); X represents the explanatory variables including an interactive dummy variable for the presence of a LRT station in each UA; and ε is the error term.

For X in each SAR model, I included a light rail transit station dummy variable for each UA as the main independent variable I was concerned with and control variables including: a) location characteristics of each tract, b) beginning year socio-economic characteristics, c) beginning year housing characteristics, and d) UA dummy variables. The LRT station dummy

variable accounted for whether or not a census tract's centroid is within a half-mile, straight line radius of a light rail station. The coefficient for the LRT station dummy variable helps explain the relationship between it and the given dependent variable for census tracts within a half-mile of a light rail station.

By using the regressions, I predicted that the presence of a light rail station (x or the independent variable) influenced changes in gentrification and TOD related characteristics (y or the independent variables for the separate models, such as change in: RCI, Race, Income, Education, Poverty, Population Density, Public Transit Use, and all Non-Privately Owned Vehicle Use). I also expected that other control variables related to the census tracts' beginning decade year (BY[1]) residential, BY housing, and location characteristics influenced changes in the gentrification and TOD related characteristics.

However, I only aimed to determine LRT stations' unique influence on gentrification and TOD characteristics. Adding the control variables accounted for the separate relationships that possibly existed between beginning year residential characteristics, for example, and (change in) Race. Maintaining the control variables help further isolate the relationship between LRT stations and gentrification and TOD characteristics.

I used the control variables of: UA, Core City, and Suburban Dummy Variables, and distance to the CBD for location characteristics; BY Population Density, BY Income, BY Race, BY Education, BY Poverty, and BY Professional for residential characteristics; and BY Renter Occupancy, BY Rent, BY Housing Value, Rent Gap, and Housing Age for housing

[1] By beginning decade year (BY), I refer to the decade year from before a LRT system began operation. For example, since St. Louis' LRT system began operations in 1993, I used 1990 as it's BY.

characteristics. I explain these variables in the "Variables" section below and include them in **Table 3.3**.

I picked these control variables because I expected them to have an impact on the dependent variables. For example, a census tract with a high poverty rate and low education levels in the beginning year may strongly influence changes in income because I expect high poverty and low education levels to contribute to low income levels. Similarly, a census tract located in the CBD may influence change in Population Density, because I expect CBD census tracts to have higher population densities than non-CBD tracts. So, I included the control variables to account for the various other factors besides the light rail station that can contribute to the gentrification and TOD related changes.

I used R Statistical Software to run the SAR and all other statistical models presented in this chapter. To run the SAR models, I also had to rely on a number of R packages. These packages include: (the) base (package) (R Core Team 2015), maptools (Bivand & Lewin-Koh 2015), spdeps (Bivand, Hauke, & Kossowski 2013; Bivand & Piras 2015), and McSpatial (McMillen 2013).

Testing for Spatial Dependence.

I used SAR for the estimations based on the assumption that the variables have a spatial relationship with one another. This is largely based on Tobler's First Law of Geography which states: "Everything is related to everything else, but near things are more related than distant things" (Tobler, 1970, p. 236). I assume that a particular socio-economic attribute is affected by the particular socio-economic attribute at nearby locations (i.e.; low-income areas border low-income areas).

To test this assumption, I performed two tasks. First, I ran ordinary least squares (OLS) regressions for all model sets (as identified in the next section). I list the OLS results in Appendices A (30-year change pooled dataset) and B (20-year change pooled dataset). This allowed me to examine the relationship between the dependent variable and the explanatory or independent variables. For example, the OLS regressions helped explain the (statistical) strength of the relationship between change in Income and the presence of a light rail station at the census tract level – while controlling for census tract residential (i.e.; poverty, race, education), housing (i.e., median rent), and location (i.e., core city locations) characteristics before the opening of a light rail station.

From here, I then tested whether or not spatial dependencies existed among the regression residuals. To test for spatial dependencies, I conducted a Global Moran's I analysis. A Global Moran's I analysis tests for spatial autocorrelation: how one space's characteristics are related to neighboring spaces' characteristics. I performed the Global Moran's I for each set because I assume that variation occurs throughout all UAs for the different sets and not just in specific areas (local) (Lloyd, 2010). If spatial dependencies exist as indicated by the Global Moran's I, further spatial regressions are therefore warranted. Spatial dependencies exist for the Global Moran's I if the results' p-values are significant and the z-values are positive. In the case of both of these results, the type of spatial dependency can then be determined. For the type of spatial dependency, on a scale of 1 to -1: if the *I* (or Observed Moran I) is positive (between 0 and 1), then a spatial dependency exists between like values (i.e., high RCI values are spatially dependent with high RCI values); if the *I* is negative (between 0 and -1), then a spatial dependency exists between unlike values (i.e., high RCI values are spatially dependent with low RCI values). That is, an *I* value close to 1 indicates spatial clustering (i.e.; like values are close in

space to other like values). An *I* value close to -1 indicates spatial dispersion (i.e.; unlike values are close in space). An *I* value of 0 indicates spatial randomness where the characteristics have no relationship.

Table 3.1 shows the Global Moran's I results for OLS regressions for 1980 and 1990 data. All of the results were significant at the 0.001 significance level. The positive Observed Moran's I values indicate spatial dependence among like values. The spatial dependence also indicates further spatial regressions are warranted.

Table 3.1: Global Moran I for OLS Regression Residuals

OLS Dependent Variable	Observed Moran's I 1980-2010 (30 Year Pooled Dataset)	Observed Moran's I 1990-2010 (20 Year Pooled Dataset)
RCI	0.333	0.297
Race	0.644	0.561
Education	0.330	0.250
Income	0.138	0.637
Poverty	0.197	0.127
Population Density	0.275	0.240
Public Transit Use	0.220	0.122
Non-Personally Owned Vehicle Use	0.190	0.121

For the weighting matrix, I used a queen contiguity weight. Spatial weights quantify the relationships that exist between different characteristics in different locations (Rodrigues & Tenedorio, 2011). The weights matrix determines a neighborhood around each geographic unit (census tract). The value of a particular census tract's feature (i.e.; change in RCI, Race, Education), is then compared to the average value of the census tract's neighbors. With queen contiguity, the neighborhood of a census tract is all census tracts that share either a border or vertex with a particular census tract: essentially any census tract that touches the targeted census tract.

Model sets.

I conducted two sets of SARs for two pooled datasets. One pooled data set contains UAs with 30-year change data (1980-2010) and the other set contains UAs with 20-year change data (1990-2010). Each set of SARs contained 8 SAR models using (change in) RCI, Race, Education, Income, and Poverty as well as Population Density, Public Transit use, and all Non-Privately Owned Vehicle (POV) use as the dependent variables.

I created the two pooled datasets to combine the UAs that began LRT operations in the two separate periods, separating newer light rail systems (i.e.; LRT systems beginning operations in the 1990s) from older light rail systems (i.e.; LRT systems beginning operations in the 1980s). Pooling and separating the LRT systems allows me to compare the results between the two time periods to determine if older or newer LRT systems may have more significant relationships between the dependent variables and the LRT stations.

I created 8 different SAR models to fully measure both gentrification and TOD related change characteristics. The five dependent variables I use to account for gentrification related change include (change in) the RCI, Race, Education, Income, and Poverty. The three dependent variables I use to account for TOD related change include (change in) Population Density, Public Transit Use, and all Non-Privately Owned Vehicle Use.

For the gentrification related variables, the RCI is a composite variable accounting for both socio-economic and housing aspects of neighborhood change. I also create SAR models using Race, Education, Income, and Poverty precisely because the RCI is a composite variable and the results may obscure specific changes in other residential characteristics often associated with gentrification like race, education, income, and poverty. For example, results may indicate that no statistical relationship exists between the RCI and the presence of a light rail station

(while also controlling for various census tract characteristics: location, beginning year socio-economic and housing characteristics, and UA). However, results for Race alone may indicate that Race and the presence of a light rail station have a strong statistical relationship – indicating that the presence of a light rail station strongly influences a station area census tract's racial composition. So, results may indicate that no relationship between the RCI and a LRT station exist, possibly indicating that the LRT station does not influence overall neighborhood change (i.e.; housing values, income levels, or poverty rates remain unchanged in the presence of a LRT station). However, the neighborhood may have changed from being occupied by predominately black (or minority) residents to predominately white residents. This change would assist in identifying a gentrified neighborhood, but the RCI results may not fully indicate this change. Therefore, combining the RCI model results with the Race, Education, Income, and Poverty results will provide a more robust statistical explanation of gentrification occurring in station area neighborhoods.

I conducted two SAR sets to analyze the relationships across different geographies across the different time periods. In Set 1, I identified the relationships across the different UAs using all census tracts. Set 2 is almost identical to Set 1. However, instead of incorporating all UA census tracts in each pooled set, I only used tracts I characterized as being gentrifiable. Identifying gentrifiable tracts provided a smaller subset than those in Set 1. I identified gentrifiable census tracts as follows. After calculating the RCI, if the RCI was greater than 0.5 *and* the beginning year census tract Index score was below -0.5, I deemed these tracts as gentrifiable. This indicates that the tracts had a low composite socio-economic and housing characteristics index *and* they experienced high RCI values; both of which together indicate that

the tracts underwent substantial upgrading during the change period, possibly indicating gentrification. I included these tracts because I expected that gentrifiable tracts experienced greater gentrification and TOD related change than non-gentrifiable tracts.

For both Sets 1 and 2, I interacted the LRT station dummy variable with the UA dummy variables for each pooled data set. Interacting the LRT dummy variable with the UA dummy variables provided me with a new dummy variable which indicated the LRT station areas for each specific UA: UALRT (i.e.; PortlandLRT, PittsburghLRT, or DenverLRT, etc.). This new UALRT dummy variable is the main independent variable I refer to these representative UALRT dummy variables when analyzing the relationships between it and both gentrification and TOD related changes for each urbanized area. I only aimed to understand the influence LRT stations in specific UAs (UALRT as the main independent variables) have on gentrification and TOD characteristics (dependent variables).

Study Areas.

Table 3.2 lists the urbanized areas (UAs) and their corresponding light rail lines that I examined. I used UAs to delineate the study areas as they comprise both the core city and surrounding municipalities. Such a delineation is especially important as LRT systems generally extend throughout various cities and municipalities. I only selected UAs with LRT systems that started light rail operations by or before 2000. Year 2000 provides at least a 10 year period to observe change. I use the census tract as the unit of analysis for three reasons. First, the census tract covers an area approximately the size of what is typically considered a neighborhood in terms of population and geography. Census tracts typically contain roughly 4000 people and are designed to be homogenous in terms of resident socio-economic characteristics (Glaeser &

Vigdor, 2001). Second, the census tract allowed for comparison across different time frames with relatively little census tract boundary changes across different time periods. Third, and most practically, the census tract level was the smallest geographic level provided by the dataset I used for this study.

Table 3.2: Urbanized Areas and Light Rail Transit System Characteristics

Urbanized Area	Transit Agency	Year of 1st LRT Station Opening	LRT Line(s)*	System Name	Number of Stations Examined
Cleveland	Greater Cleveland Regional Transit Authority (GCRTA)	1980	**Blue**, **Green**, **Waterfront**	The Rapid (RTD Rapid Transit)	15
San Francisco	San Francisco Municipal Transportation Agency (SFMTA)	1980	**F-Market & Wharves**, **J-Church**, **K-Ingleside**, **L-Taraval**, **M-Ocean View**, **N-Judah**, S-Castro Shuttle, **T-Third Street**	Muni Metro	52
San Diego	San Diego Metropolitan Transit System (MTS)	1981	**Blue**, Green, **Orange**, Silver	San Diego Trolley	35
Pittsburgh	Port Authority of Allegheny County	1984	**Blue-Library**, **Blue-South Hills Village**, **Red**	The T	19
Buffalo	Niagara Frontier Transportation Authority (NFTA)-Metro	1985	**Main**	Buffalo Metro Rail	7
Portland	Tri-County Metropolitan Transportation District of Oregon (TriMet)	1986	**Blue**, **Green**, **Red**, Yellow	MAX Light Rail (Metropolitan Area Express)	27
Sacramento	Sacramento Regional Transit District (RT)	1987	**Blue**, **Gold**, **Green**	RT Light Rail	16
San Jose	Santa Clara Valley Transportation Authority (VTA)	1987	**Alum Rock-Santa Teresa (Blue)**, **Mountain View-Winchester (Green)**, **Ohlone/Chynoweth-Almaden (Orange)**	VTA Light Rail	26
Los Angeles	Los Angeles County Metropolitan Transportation Authority (METRO)	1990	**Blue**, Expo, Gold, **Green**	Metro Rail	31
Baltimore	Maryland Transit Administration (MTA)	1992	**Blue**, **Yellow**, **Red**	Baltimore Light Rail	22
St. Louis	Bi-State Development Agency: METRO	1993	**Red**, Blue	MetroLink	10
Denver	Regional Transportation District (RTD)	1994	**C-Orange**, **D-Green**, **E-Purple**, **F-Red**, **H-Blue**, W-Turquoise	RTD Light Rail	10
Dallas	Dallas Area Rapid Transit (DART)	1996	**Red**, **Blue**, **Green**, Orange	DART Light Rail	17
Salt Lake City	Utah Transit Authority (UTA)	1999	**Blue**, Green, Red	TRAX (Transit Express)	12

**Lines with stops operating by or before 2000 are in bold.*

Data Sources.

I use the census tract as my unit of analysis. I collected census tract level data from numerous sources. **Table 3.3** lists the data sources and descriptions of each variable. Most of the socio-economic characteristics derived from Brown University's Longitudinal Tract Database

(LTDB). The LTDB provides decennial year census data at the census tract level normalized to 2010 census tract boundaries (Logan, Xu, & Stults, 2014). Census tract boundaries may change over time, often due to population fluctuations or political boundary changes such as the annexation of previously unincorporated lands into a city. Due to these changes, the LTDB calculates the census data for each census tract based on 2010 boundaries to make comparisons across different time periods. For example, census tract *X* may be a particular size in 1990, but be only half the 1990 size in 2010. If census tract *X* had a population of 100 people in 1990 then, using the 2010 normalized boundary, the population would be 50 people.

I also collected census tract level public transportation data from the National Historical Geographic Information System (NHGIS) database (Minnesota Population Center, 2011). The LTDB also has a crosswalk file that allows users to input non-census data to be normalized. I used the LTDB crosswalk file to normalize the public transportation data. I accessed the U.S. Census Bureau's TIGER/Line Shapefiles for 2010 Urbanized Areas and it's Shapefiles for Places to determine the urbanized areas and core cities at the census tract level. I retrieved the station point and line shapefiles from a variety of sources: U.S. Department of Transportation (USDOT), regional planning councils, planning commissions, metropolitan transit agencies, and city or regional GIS departments. A full list of these data sources for each UA is located in Appendix G.

I also used ArcGIS software to: 1) create a Euclidean buffer radius of a half-mile around every light rail station, 2) create census tract centroids; and 3) determine the distance from each census tract centroid to its given urbanized area's central business district (CBD). I used the half-mile buffer because researchers have found the half-mile catchment area to work best in predicting ridership from a station area's population, as well as it being a generally standard area for measuring LRT station impacts (Guerra, Cervero, & Tischler, 2012). As such, for the LRT

station variable, I created a dummy variable where census tracts whose centroid was inside of the half-mile buffer were scored as 1 and census tracts outside of that buffer were given scores of 0. Mirroring Kahn (2007), I used the 1982 Economic Censuses Geographic Reference Manual to determine the CBD boundaries (U.S. Bureau of the Census, 1983). I then used the LTDB to determine the 1982 CBD census tracts in 2010 census tract boundaries. While this provided the CBD for each area analyzed, it did not indicate other major economic areas for the cities.

Neighborhood Change Variables.

I operationalize gentrification as a process of change characterized by neighborhood upgrading coupled with residential displacement. As gentrification is a process, I measure change as the difference between each socio-economic variable from the beginning decade year when the first LRT station opened until 2010 at the census tract level. For example, considering that Pittsburgh's light rail stations first opened in 1984, I identify change as occurring between 1980 and 2010, or 30 years. While all UAs have differing opening dates for their LRT systems and stations, the change measured in this way can be pooled into two categories: 30-year change from 1980 to 2010 (Cleveland, San Francisco, San Diego, Pittsburgh, Buffalo, Portland, San Jose, and Sacramento); and 20-year change from 1990 to 2010 (Los Angeles, Baltimore, St. Louis, Denver, Dallas, and Salt Lake City). I only calculated this change for the dependent variables. Doing so provided two pooled data sets to conduct the analyses.

Variables Explained

I list all variables used in **Table 3.3**. I also list the descriptive statistics for the variables used in Appendices C (30-year change variables) and D (20-year change variables). Below, I

explain each variable used in the remainder of this section. I measured each variable at the census tract level.

Dependent Variables.

Residential Change Index.

I used factor analysis to calculate the residential change index (RCI), which captures a variety of indicators present in residential change. The index builds from previous indexes and methods measuring neighborhood change and gentrification – most notably Ley (1986) and Meligrana and Skaburskis (2005). Ley (1986) first computed a social status index for 1971 and 1981 at the census tract level for 22 Canadian cities. Ley (1986) determined the social status index for each year by first capturing "the mean value of the percentage of the work force employed in the quaternary sector (professional, managerial, technical, and administrative jobs) plus the percentage of the population with university education" (p. 526). Ley then calculated the difference between the 1971 and 1981 social status index to ultimately determine the gentrification index. Meligrana and Skaburskis (2005) build from Ley's approach tracing changes in census tracts' incomes and rents from 1981-2001 and then relating those changes to 1981 characteristics for 10 Canadian Census Metropolitan Areas using principal component analysis. They aim to understand the extent to which gentrification processes have changed Canadian cities since the 1970s.

My index builds from these studies in two ways. First, it includes additional characteristics, most notably race and poverty which were absent from the previous indices. Both Ley's (1986) and Meligrana and Skaburskis's (2005) studies do not provide a comprehensive view of gentrification. Ley (1986) highlights social indicators of education and occupation; while Meligrana and Skaburskis (2005) indicate only income and rent in their determinations of

gentrification. Such indices overlook race and poverty, as well as housing characteristics. I include race, poverty, and housing characteristics in the RCI. Second, the analyses are limited to discussing the changes that occur and not how or to what to attribute them. Literature indicates that transit effects can include higher property values and changing development patterns (Lewis-Workman & Brod, 1997); both of which can alter neighborhoods' social and residential statuses. Besides creating the RCI, I also analyze how changes in it can possibly be associated with a neighborhood planning activity: the opening of a light rail station.

I created the residential change index (RCI) using factor analysis (FA). Factor analysis is a statistical technique that reduces observable and measureable variables into latent, unobservable variables which share a common variance (Yong & Pearce, 2013, p. 80). That is, the FA establishes a previously unobservable variable from the observable variables. I combine multiple variables to extract one variable (i.e.; factor) that can represent the latent variable shared by the common variance. The purpose of developing the RCI is to establish a composite index by capturing both socio-economic and housing characteristics into one variable. The RCI represents residential change as a whole for a neighborhood and not just racial change or changes in income.

There are two parts to creating the RCI. First, I extracted factor scores (the single variable extracted from multiple variables using FA) for both beginning year variables and year 2010 variables. The equation I used for the FA for each year's (1980, 1990, and 2010) index is as follows:

$$x_{ij} = \lambda_{i1}\zeta_{i1} + \lambda_{i2}\zeta_{i2} + \ldots + \lambda_{ip}\zeta_{ip} + \delta$$

where x each census tract's ($_i$) index based on the combination of variables ($_j$), λ is the factor loading for the particular variable, ζ is the unobserved factors, and δ is the measurement

error. The variables I used included: race, education, income, education, professional occupation, poverty rate, median rent, and median housing value. The factor loadings show how much a particular factor explains the variable – they explain by how much each variable (i.e., race, income, education, etc.) relates to the underlying factor (i.e.; the index). The factor loadings are the unobserved factors that contribute to the index of each observed variable.

This gave me two sets of factor scores for each census tract. I then calculated the difference between 2010 and beginning year (either 1980 or 1990) factor scores to get the residential *change* index. In this way, I regressed change in the RCI variable on the LRT station variable along with various controlling independent variables accounting for beginning year census tract socio-economic and housing attributes. I calculated the index for each year using FA to make multiple variables more manageable for use in the SAR as the RCI (Shaw & Wheeler, 1994).

Race.

For Race, I measured change in white population percentage. I divided the given white population by the given total population. For the dependent variable of Race, or change in Race, I then subtracted the percentage of the first decade year when light rail began from the 2010 percentage to get the percentage change in the white population. I chose change in white population percentage as a proxy for race as gentrification studies often refer to an increase in white population percentage as a possible indicator for gentrification (Kahn, 2007; Smith, 2010b). Additionally, the white population was the consistent category for race in the data set I used; whereby other racial or ethnicity categories varied over the different decades. A positive LRT station dummy coefficient in the SARs with Race as the dependent variable potentially indicates less racial diversity.

Education.

To measure education, the LTDB provides the number of people with a 4-year or higher college degree in each given census tract. I divided the given number of people with a 4-year or higher college degree by the population aged 25 years and older for each census tract in each given decade year. I then subtracted the percentage of the first decade year when light rail began from the 2010 percentage to get the percentage change in the percentage of people with at least a 4 year college degree. In analyzing gentrification, research indicates gentrification as occurring when high-income residents (and generally with higher levels of education) replace and displace existing neighborhood residents (Kahn, 2007; Smith 2010a). In this regard, using education as a variable helped explain fluctuations in a neighborhood's (census tract's) social class composition.

Income.

To measure median household income levels, I converted each given year's (1980's and 1990's) median incomes, measured at the census tract level, to constant dollars using 2010 as the base year. I divided the 2010 Consumer Price Index for all Urban Consumers (CPI-U) by the given year's CPI-U and multiplied this quotient by the given year's Median Household Income. For each year's CPI-U, I referred to the United States Department of Labor's Bureau of Labor Statistics (2014). Similar to education, using income as a variable (whether as a dependent or independent variable) helped explain fluctuations in a neighborhood's social class composition.

To protect for linearity in the SAR models, I calculated the natural logarithm (log) using LN function in Excel of each census tract's Income. When using regression models, it is assumed that the variable values are normally distributed – that is, there are not only high or low

values. A basic, and essential, assumption of regressions is for there to be a linear relationship between the dependent and independent variable(s) (Osborne & Waters, 2002). A linear relationship among variables means that a change in one variable is proportionately related to another variable. For example, every increase in the number of years a person is in school should directly relate to their yearly income (as education increases, so should income). Having linear relationships among variables helps provide accurate estimates of variables, while having non-linear relationships will under-estimate the relationships (Osborne & Waters, 2002).

To satisfy the basic assumption of linearity, I calculated the natural logarithm of income. The natural logarithm is the converts the raw or absolute values to normalized values. Converting income to its log form helps predict the accurate estimates of the relationship(s) income may have with other variables (whether dependent or independent). For example, a $3000 increase in income for a household with a $30,000 per year income (10% of its yearly income) has much more of an impact than a $3000 increase in income for a household with a $300,000 per year income (1% of its yearly income) (Kahneman & Deaton, 2010). Taking the log of income, then, normalizes this increase to account for essentially the same percentage change regardless of the base income.

Taking the log of income, helps normalize the income changes. This helps maintain linear relationships by best assuring that relationships between income and other variables has a proportionate relationship for every change. For instance, every year increase in education will account for a 10% increase in income, rather than a $1000 increase in income.

For the Income dependent variable (which is change in Income), I then subtracted the (log) median income of the first decade year when light rail began from the 2010 (log) median income as this would provide the change in Income. For example, if light rail began in 1985, I

subtracted 1980's (log) median household income from 2010's (log) median household income to get the change in median household income.

Poverty.

To measure change in poverty rates, the LTDB provides the number of persons for whom poverty status is determined and the number of persons in poverty for each census tract. To find the poverty rate, I divided the number of persons in poverty by the number of persons for whom poverty status is determined. Doing so provided the poverty rate. For the Poverty dependent variable (i.e.; change in Poverty as a determinant of gentrification), I then subtracted the poverty rate of the first decade year when light rail began from the 2010 poverty rate to get the change in poverty rate. I used Poverty as a variable because it also helped explain fluctuations in a neighborhood's social class composition. For instance, if a neighborhood had a high poverty rate before the opening of a LRT station and a low poverty rate after the LRT station's opening, then I assumed that either: a) an influx of new residents moved into the neighborhood, replacing the existing residents (gentrification); or b) the existing residents increased their status moving themselves out of poverty.

Population Density.

To determine the population density, I determined the area of each census tract in square miles using ArcGIS. I then divided the census tract's total population by the area. I did this for both the area's beginning year (1980 and 1990) and 2010. I next took the natural logarithm of each population density measurement. For the Population Density dependent variable, I then subtracted the (log) beginning year population density from the (log) 2010 population density. I included population density as a variable because researchers cite having dense station areas is a

key criteria in improving transit ridership: “the more housing and jobs within a short walk of a transit station, the greater the ridership” (Tumlin & Millard-Ball, 2003, p. 14). I expected an increase in population density in relation to the presence of a LRT station.

Public Transit Use.

Increased public transit use is also a key criteria for establishing successful TOD as it may indicate that people are more prone to live near transit stations, providing them with access to transit (Cervero, 2004). To create the Public Transit Use variable, I gathered means of transportation to work data from the NHGIS to calculate Public Transit Use (Minnesota Population Center, 2011). The NHGIS provides data for “Public transportation” without differentiating between different travel modes for 1980, but does differentiate the modes for 1990 and 2010 data. The Public transportation data for 1990 and 2010 includes bus or trolley bus, streetcar or trolley car, subway or elevated, railroad, and ferryboat. I combined the data for these different modes for public transportation in 1990 and 2010. I divided the total number of public transportation users by the total number people travelling to work for each census tract in each year. This provided the percentage of persons travelling by public transportation for each census tract in each decade year. For the Public Transit Use dependent variable, I subtracted 1980 and/or 1990 percentages from the 2010 percentage, providing me with the change in Public Transit Use between 1980/1990 and 2010. Increased public transit use is also a key criteria for establishing successful TOD (Cervero, 2004). I expect an increase in Public Transit use in relation to the presence of a LRT station.

Non –Privately Owned Vehicle (POV) Use.

For Non-POV use, I also used the NHGIS means of transportation to work data. I combined data from all fields other than "Car, truck or van" – which included Drive alone and Carpool data, worked at home, taxicab, other means, and motorcycle. The remaining fields I combined included: a) "Public transportation", "Walked only", and other means for 1980's Non-POV use; b) All public transportation fields, bicycle, walked, and other means for 1990's Non-POV use; and c) All public transportation fields, bicycle, walked, and other means for 2010's Non-POV use. Similar to the Public Transit Use variable, I then divided these combined fields by the means of transportation to work total for each census tract in each year. This provided me with the percentage of all Non-POV use for each census tract for each year. For the Non-POV Use dependent variable, I subtracted 1980 and/or 1990 percentages from the 2010 percentage, providing me with the change in Non-POV Use between 1980/1990 and 2010.

The purpose of creating the Non-POV Use variable and measuring its relationship with the presence of a light rail station was to determine if station area neighborhoods experienced an increase both public transit use *and* walking and bicycle use in station areas. I expect an increase in Non-POV use in relation to the presence of a LRT station. An increase in station area walking and bicycle use may indicate increased employment densities where people can walk to work and lower vehicle miles travelled (VMT). Both of these possible indications pedestrian and in non-automobile use during the extent of the LRT stations' operations.

Independent Variables.

Light Rail Station Dummy.

To determine the light rail station variable, I created a dummy variable. I used ArcGIS software to first create a straight-line or Euclidean half-mile buffer around every light rail

station. I then determined whether the centroid of a census tract was part of this buffer area. If the census tract's centroid was part of or inside the buffer, I gave the census tract a value of 1 indicating the presence of a light rail station in the neighborhood; if the centroid was not inside the buffer, I gave the census tract a value of a 0. I operationalize neighborhood as any area within a half mile (800 meter) radius of a light rail transit station.

Urbanized Area Dummy Variable.

I used this dummy variable to control for a census tract's UA location. I gave each census tract a score of 1 if it is located in a specific UA (i.e.; Portland); and 0 if not in the designated UA (i.e.; all other UA tracts that are not Portland). I have 14 different urbanized area dummy variables representing each UA. I use the San Francisco UA as the reference for the 1980 pooled data set and the Denver UA as the reference UA for the 1990 pooled dataset. I created this UA Dummy variable to control for census tract location.

Urbanized Area Light Rail Transit Station Dummy.

I interacted the LRT station dummy variable with the UA dummy variables for each pooled data set, which provided me with the Urbanized Area Light Rail Transit Station Dummy variable (UALRT). The UALRT indicated the LRT station areas for each specific UA: UALRT (i.e.; PortlandLRT, PittsburghLRT, or DenverLRT, etc.). Again, this new UALRT dummy variable was the main independent variable I referred to when analyzing the relationships between it and both gentrification and TOD related changes. I only aimed to understand the influence LRT stations in specific UAs (UALRT as the main independent variables) have on gentrification and TOD characteristics (dependent variables).

Control Variables.

Core City Dummy.

I used the core city dummy variable to control for census tract location. Here, I determined whether or not a census tract is located in the urbanized area's core city. I gave each census tract a value of 1 if it is located in the core city, 0 if not. By core city, I refer to the city with the area's CBD. Similar to distance to CBD, I expected census tracts within core cities to have greater gentrification and TOD related changes.

Distance to the Central Business District (CBD).

The distance to CBD variable is used to control for census tract location. To measure the distance to the CBDs, I first determine the location of the CBDs. The 1982 Geographic Reference Manual provides the census tracts of the CBDs in 1982. Using the LTDB, I found and determined the corresponding census tracts in 2010 boundaries. I then used ArcGIS to determine the Euclidean distance between each census tract centroid and the CBD centroids for each UA in meters. I included distance to CBD as I expected the distance to the CBD as an indicator of a large employment area to impact changes in the dependent variables. For example, I expected census tracts closer to the CBD to have greater changes in Income.

Professional Employment.

I used professional employment as an independent variable to assist in controlling for a census tract's beginning year socio-economic characteristics. To calculate this variable for each census tract and only in the beginning year (1980 or 1990), I divided the number of persons in a professional occupation[2] by the total number of employed persons aged 16 and over. Similar to

[2] For 1980 and 1990, this includes employed persons in the occupations of managerial and professional specialty occupations such as executive, administrative, and managerial (Logan et al, 2012).

both education and income, I used professional employment as a variable to help explain fluctuations in a neighborhood's (census tract's) social class composition.

Renter Occupancy.

I used the beginning year renter occupancy as an independent variable, assisting in controlling beginning year housing characteristics. I calculated this variable by dividing the number of renter-occupied housing units by the total number of occupied housing units for each census tract in each pooled dataset (1980 and 1990). Again, in analyzing gentrification, research indicates gentrification as occurring when high-income residents replace and displace existing neighborhood residents (Kahn, 2007; Smith 2010a). A large part of gentrification involves the displacement of residents from their existing housing. I included renter occupancy to control for housing status. I expected that higher beginning year renter occupancy rates positively contribute to gentrification (and TOD) related change because renters cannot generally control their occupancy status. Landlords can sell their property and/or drastically raise rents to gain a profit and displace existing residents in the process.

Rent.

I used the beginning year median rent value as a control variable, assisting in controlling for beginning year housing characteristics. I calculated this variable by determining each census tract's beginning year median rent values in 2010 dollars (using the CPI-U). I then calculated the log values of each census tract's adjusted rent value. I used rent as a variable to help explain fluctuations in a neighborhood's (census tract's) housing status. Similar to renter occupancy, I expected lower beginning year rents to positively impact gentrification (and TOD) related

change because lower beginning year rents may induce higher income residents to move to cheaper neighborhoods.

Housing Value.

I used the beginning year median housing value for owner-occupied housing units as a control variable, assisting in controlling for beginning year housing characteristics. I calculated this variable by determining each census tract's beginning year housing values in 2010 dollars (using the CPI-U). I then calculated the log values of each census tract's adjusted housing value. I expected lower beginning year housing values to positively impact gentrification (and TOD) related change because lower beginning year housing values may induce higher income residents to move to cheaper neighborhoods.

Housing Age.

I used the beginning year housing age as an independent variable, assisting in controlling for beginning year housing characteristics. I calculated this variable by dividing the total amount of occupied housing by housing 30 years or older for each census tract for both pooled datasets. I expected neighborhoods with older homes to be more prone to gentrification (and TOD) related change due to older homes being cheaper and/or being more prone to needing revitalization, demolition, or replacement.

Rent Gap.

The Rent Gap variable aims to control for speculation that may occur in the census tracts. That is, whether or not rent values for the census tract are undervalued – and can be more prone to gentrification with the presence of a LRT station – or overvalued (Landis, p. 23, 2016). I follow Landis's (2016) approach to operationalizing this variable where it is essentially the

difference between actual median rents and predicted rents in the decade year prior to light rail station openings.

To calculate the predicted rents for each census tract, I utilized locally weighted regression (LWR) where I regressed each census tract's median beginning year rent against the tract's locational characteristics (the longitude and latitude of the census tract's centroid) to find the predicted rent value. Locally weighted regressions provide an estimate of a particular variable (median rent) based upon its locational characteristics. LWR smooths the values of a particular location's (census tract's) neighboring location characteristic, determining an estimated value of the particular location's characteristic (Cleveland and Devlin, 1988). For example, census tract *X*'s median rent is $500 and the median rents for *X*'s neighboring tracts range in value from $800 - $1200. Using LWR, I can estimate that *X*'s predicted rent should be roughly $1000. A rent gap therefore exists for *X* in that *X*'s actual median rent is approximately $500 below market value.

Table 3.3: Description of Variables

Variable	**Description**	**Data Source**	**Expected Sign[1]**
Dependent Variables			
RCI	Residential Change Index: 2010 Factor Score – BY[2] Factor Score	LTDB	
Race	White population percentage: (2010 WhitePopulation/2010 TotalPopulation) – (BY White Population/BY TotalPopulation)	LTDB	
Education	At least a 4-year college degree percentage: (2010 Education/2010 Population age 25 and over) – (BY Education/BY Population age 25 and over)	LTDB	
Income	(log) Median Household Income (MHI) in 2010 constant dollars: (log)2010 MHI – (log)BY MHI	LTDB	
Poverty	Poverty Rate: (2010 InPoverty/2010 PovertyDetermined) – (BY InPoverty/BY PovertyDetermined)	LTDB	
Population Density	[(log) 2010 Population/2010 Area in Square Miles] –[(log) BY Population/BY Area in Square Miles]	LTDB;; US Census TIGER/Line Files	

Table 3.3 (cont.): Description of Variables

Public Transportation Use	PT to work percentage: (2010 PT/ 2010 Total Travel to Work) – (BY PT/BY Total Travel to Work)	NHGIS	
All Non-Privately Owned Vehicle Use	Non-POV to work percentage: (2010 All Non-POV/2010 Total Travel to Work) – (BY All Non-POV/BY Total Travel to Work)	NHGIS	
Independent Variables			
Light Rail Station Dummy	Dummy Variable: 1 if a census tract's centroid is inside a half-mile station buffer, 0 if it is not.	US Census TIGER/Line Files; Various Shapefile Sources	NA
UA LRT Interaction Dummy	Interaction term: Light Rail Station Dummy*UA	US Census TIGER/Line Files; Various Shapefile Sources	+ (-)[2]
Control Variables			
Location Characteristics			
Core City	Dummy Variable: 1 if a census tract is in the core city, 0 if not	US Census TIGER/Line Files	+ (-)
Distance to CBD	(log) Euclidean distance in meters from census tract centroid to CBD	US Census TIGER/Line Files	+ (-)
Urbanized Area Dummy	Dummy Variable: 1 if census tract is in a specified Urbanized Area, 0 if it is not		
Residential Characteristics			
BY Population Density	(log) BY Population/Area in Square Miles	US Census TIGER/Line Files; LTDB	+(-)
BY Income	(log) BY MHI	LTDB	+(-)
BY Race	BY White Population/BY Total Population	LTDB	+(-)
BY Education	BY College/BY Population age 25 and over	LTDB	+(-)
BY Poverty	BY InPoverty/BY PovertyDetermined	LTDB	+(-)
BY Professional	BY Professional Employment/BY Employed Persons age 16 and over	LTDB	+(-)
Housing Characteristics			
BY Renter Occupancy	BY Renter-Occupied Housing Units/BY Total Occupied Housing Units	LTDB	-(+)
BY Rent	(log)BY Median Rent	LTDB	+(-)
BY Housing Value	(log)BY Median Housing Value	LTDB	+(-)
Housing Age	BY Total Occupied Housing/Housing 30 years or older	LTDB	-(+)
Rent Gap	BY Predicted Median Rent – BY Actual Median Rent	LTDB	+(-)

Notes:
[1] The expected signs in parentheses represent the expected coefficient value for the SAR models with Poverty as the dependent variable. I expected the same coefficient values for all other SAR models. For example, I expected the UALRT Dummy variable coefficients to all be positive, expect for the SAR models with Poverty as the dependent variable which I expected to be negative.
[2]BY refers to Beginning Decade Year. This is the beginning year of the decade in which the first light rail station opened.

Results

Factors Affecting Neighborhood Change: Analyzing the Control Variables.

I controlled for the location, beginning year residential, and beginning year housing characteristics because I recognized that census tract characteristics before a light rail station opened may strongly influence: a) the placement of the station; and b) station area development. For example, in areas with relatively low population densities prior to stations opening may be more prone to development in station areas than more relatively densely populated station areas at the onset of station area development. I explain the results here of some of the more important control variables in order to highlight factors that may influence both gentrification and TOD related neighborhood change.

Throughout both pooled datasets (i.e. representing 30 year and 20 year change), I expected that all control variables – except BY poverty, renter occupancy, and housing age – to have positive coefficient values for the SAR models with RCI, Race, Education, Income, Population Density, Public Transit Use, and Non-Privately Owned Vehicle (Non-POV) Use. I expected these same control variables to have negative coefficient values for the SAR model with Poverty as the dependent variable. I expected the BY poverty, renter occupancy, and housing age coefficients to have negative values for all SAR models other than those with Poverty as the dependent variable and positive values for the SAR models with Poverty as the dependent variable.

Table 3.4 shows the coefficient value signs I expected to occur. Overall, I expected the control variables to be associated with gentrification and TOD related change. Even though I am mainly concerned with the UALRT variable coefficient, controlling for these variables helped isolate the relationship between the presence of a LRT station and gentrification and TOD related

change dependent variables. I provide a brief overview of results focusing on these control variables below.

Table 3.4: Expected Coefficient Values for Control Variables

	RCI	Race	Education	Income	Poverty	PD	PT	Non-POV
Core City	+	+	+	+	-	+	+	+
Distance to CBD	+	+	+	+	-	+	+	+
BY Population Density	+	+	+	+	-	+	+	+
BY Race	+	+	+	+	-	+	+	+
BY Education	+	+	+	+	-	+	+	+
BY Income	+	+	+	+	-	+	+	+
BY Poverty	-	-	-	-	+	-	-	-
BY Professional	+	+	+	+	-	+	+	+
BY Renter Occupancy	-	-	-	-	+	-	-	-
BY Rent	+	+	+	+	-	+	+	+
BY Housing Value	+	+	+	+	-	+	+	+
BY Housing Age	-	-	-	-	+	-	-	-
Rent Gap	+	+	+	+	-	+	+	+

Table 3.5 shows the full SAR results for Set 1's 1980 pooled dataset and **Table 3.6** shows the full SAR results for Set 1's 1990 pooled dataset. I am primarily concerned with the coefficients for the UALRT dummy variables (which indicate the relationship between LRT stations and the gentrification and TOD related change characteristics). Before analyzing those characteristics, I will describe some general results concerning the control variables for Set 1. I provide the results for Set 2 (only using the gentrifiable tracts) in Appendices E (30-year change pooled dataset) and F (20-year change pooled dataset). Results for Set 2 are similar to Set 1.

Overall, I found mixed results in both pooled datasets. In terms of location characteristics, core city results were not significant for TOD related characteristics in the 1980 (or 30 year change period) pooled dataset. However, 1990's (or 20 year change period) location characteristics confirmed my expectations for TOD: changes in population density, transit use, and non-privately owned vehicle use increased. Such results for 1990's location characteristics indicate that the location characteristics as control variables influence TOD related change. For

gentrification related characteristics (change in RCI, Race, Education, Income, and Poverty) however, the variables controlling for location did not confirm or deny my expectations for both datasets. In some instances (1980 core city for RCI and Education SARs, 1990 distance to CBE for Income SAR), the results were not statistically significant. In cases where the results were significant, no overall pattern emerged confirming my expectations.

For residential control variables, the results were similar to location characteristics. The gentrification SAR models for 1980 dataset showed largely statistically significant results yet, the results did not provide an overall pattern confirming or denying my expectations. The 1980's and 1990's TOD SAR model results though, indicate that the residential control variables influence relative decreases in population densities, largely denying my expectations. The gentrification SAR models for the 1990s pooled dataset also showed overall mixed, but significant results. Coefficient values for the residential control variables of beginning year race in the gentrification SAR models though, largely confirmed my expectations. The results indicated that BY race (i.e., white population percentage) influenced gentrification related change (i.e., increases in RCI, education, income, and a decrease in poverty).

Both 1980 and 1990 housing control variables also showed mixed results where they confirmed my expectations across different SAR models (1990 Income SAR and 1980 RCI SAR) or denied my expectations (1980 Education SAR model). More specifically, however, the Rent Gap control variable held little significance across the different SAR models for both pooled datasets. The Rent Gap control variable was only significant for the 1980 Education and Poverty SARs (confirming my expectations) and the 1990 Public Transit Use (PT) and Non-Privately Owned Vehicle Use (Non-POV) SARs (denying my expectations). Such results

indicate that the rent gap has little influence on both gentrification and TOD related neighborhood change.

Table 3.5: Full Results Set 1, 1980 pooled dataset

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue	Coef	Pvalue
(Intercept)	0.2558	0.5489	0.3845	0***	0.1994	0.022**	7.7273	0***	0.1059	0.1045	4.4821	0***	-0.1864	0.0221**	-0.3711	0.0042***
SanFranciscoLRT	0.0911	0.0888*	0.0426	0.0002***	0.0147	0.1772	0.3074	0.002***	-0.0284	0.0005***	0.277	0***	0.0377	0.0002***	0.0693	0***
ClevelandLRT	-0.0923	0.3166	-0.0865	0***	-0.0042	0.8243	-0.1199	0.4846	-0.0081	0.5646	-0.1082	0.3521	0.0589	0.0008***	0.0281	0.3128
SanDiegoLRT	-0.012	0.8725	-0.0307	0.0575*	-0.013	0.3942	0.0037	0.9789	0.0228	0.0463**	-0.0461	0.6254	0.009	0.5266	-0.0098	0.6653
PittsburghLRT	-0.1424	0.1177	-0.0016	0.9369	-0.016	0.3894	-0.4312	0.0109**	0.0037	0.7926	-0.0726	0.5272	-0.0345	0.0457**	-0.0644	0.019**
BuffaloLRT	-0.0121	0.9233	-0.0506	0.0618*	0.0324	0.2053	-0.391	0.0943*	0.002	0.9166	0.0095	0.9522	-0.0282	0.238	-0.212	0***
PortlandLRT	-0.2766	0.0011***	-0.0295	0.1053	-0.0229	0.1836	-0.0728	0.6439	0.0397	0.0021***	0.1617	0.1298	0.0378	0.0187**	0.0083	0.745
SacramentoLRT	-0.0528	0.5883	0.0355	0.0911*	0.0031	0.8754	-0.0688	0.7041	0.0028	0.8506	-0.3471	0.0048***	0.0246	0.1845	0.0223	0.4487
SanJoseLRT	-0.0213	0.8008	0.0248	0.1742	0	0.9987	0.1596	0.3101	-0.0128	0.3208	-0.0741	0.4874	0.0063	0.6954	0.0233	0.3618
Core City	-0.0069	0.7651	-0.0261	0***	0.0042	0.3709	-0.1172	0.0068***	0.013	0.0002***	0.045	0.1243	0.0003	0.9383	0.0115	0.1001
Distance to CBD	-0.0279	0.0822*	-0.0036	0.2928	-0.0119	0.0003***	0.1089	0.0003***	0.0038	0.1202	0.0067	0.7415	0.0143	0***	0.0293	0***
Cleveland	-0.4372	0***	0.0487	0***	-0.0693	0***	-0.3469	0***	0.0495	0***	-0.2608	0***	-0.0248	0.0001***	-0.0191	0.0498**
San Diego	-0.0525	0.0999*	0.0194	0.0047***	-0.0444	0***	-0.072	0.2234	0.0216	0***	-0.024	0.5505	-0.003	0.6244	-0.0088	0.3579
Pittsburgh	-0.4131	0***	0.0785	0***	-0.0655	0***	-0.4639	0***	0.0338	0***	-0.2995	0***	-0.0329	0***	-0.0366	0.002***
Buffalo	-0.4047	0***	0.08	0***	-0.0728	0***	-0.3728	0***	0.0397	0***	-0.2071	0.0002***	-0.0059	0.4762	0.0035	0.7885
Portland	-0.0345	0.4734	0.0667	0***	-0.0375	0.0001***	-0.1041	0.245	0.0249	0.0007***	-0.0654	0.2817	0.005	0.5846	0.0403	0.0056***
Sacramento	-0.0799	0.0555*	0.0129	0.1523	-0.0618	0***	0.0407	0.5999	0.0377	0***	0.1251	0.0205**	0.0027	0.7298	0.0195	0.1214
San Jose	0.1275	0.0035***	-0.0124	0.1874	0.0045	0.6143	0.2574	0.0015***	-0.0007	0.9173	0.0042	0.9388	0.0039	0.6355	0.0074	0.5755
BY Population Density	-0.07	0***	-0.0118	0***	-0.0142	0***	0.0729	0***	0.0104	0***	-0.3896	0***	-0.0001	0.9617	0.0027	0.1875
BY Race	0.1387	0.002***	-0.2162	0***	0.0811	0***	0.1492	0.0735*	-0.0397	0***	-0.5104	0***	-0.0057	0.5054	-0.0448	0.0009***
BY Education	-0.3268	0.0341**	0.0777	0.0199**	-0.2341	0***	0.6551	0.0225**	0.0442	0.0608*	-0.0303	0.8763	0.0528	0.0717*	0.1199	0.01**
BY Income	-0.0159	0.0243**	-0.0122	0***	-0.0117	0***	-0.8983	0***	0	0.9711	-0.0475	0***	0.0011	0.3941	0.0007	0.7479
BY Poverty	1.0106	0***	0.0204	0.5055	-0.0043	0.8822	-1.169	0***	-0.4515	0***	-1.5002	0***	-0.1669	0***	-0.1893	0***
BY Professional	0.4786	0.0087***	0.1381	0.0004***	0.2739	0***	0.3527	0.2982	-0.1394	0***	-0.0026	0.9911	-0.0981	0.0046***	-0.1193	0.0301**
BY Renter Occupancy	-0.3086	0***	-0.0835	0***	-0.0124	0.1937	-0.6552	0***	0.0795	0***	0.5075	0***	0.0334	0.0002***	0.0309	0.0288**
BY Rent	0.0689	0.2081	-0.0162	0.1701	0.0252	0.0241**	0.0464	0.6493	-0.0255	0.0023***	-0.0258	0.7083	0.0154	0.138	0.0242	0.1435
BY Housing Value	0.0407	0***	0.004	0.0001***	0.0007	0.4999	0.0255	0.0049***	-0.0011	0.1522	-0.0093	0.1301	-0.0022	0.0155**	-0.0031	0.0328**
BY Housing Age	0.3907	0***	0.0241	0.0021***	0.0378	0***	0.0724	0.2836	0.0119	0.0308**	0.1178	0.0099***	-0.0214	0.0019***	-0.0409	0.0002***
Rent Gap	0.0017	0.9755	-0.0135	0.2534	0.0262	0.0189**	0.0318	0.7557	-0.0222	0.008***	-0.0141	0.8386	0.0133	0.2004	0.0208	0.2088
Rho		*0.558*		*0.7771*		*0.5882*		*0.1713*		*0.3766*		*0.4623*		*0.4249*		*0.3751*
Log Likelihood		*-2676.45*		*3141.469*		*3506.339*		*-4978.198*		*4723.878*		*-3537.477*		*3857.855*		*2069.278*
AIC (SAR)		*5414.9*		*-6220.9*		*-6950.7*		*10018*		*-9385.8*		*7137*		*-7653.7*		*-4076.6*
AIC (OLS)		*6357.9*		*-3358.1*		*-5949.9*		*10123*		*-9080.5*		*7939.2*		*-7234.4*		*-3767.7*
Number of Observations		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*

****p<0.01*

***p<0.05*

**p<0.10*

Table 3.6: Results Set 1, 1990 pooled dataset

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**
(Intercept)	0.1066	0.8062	0.374	0.0005***	0.1247	0.2198	2.4756	0.0172**	-0.1217	0.1376	2.7323	0.0001***	0.4016	0***	0.6345	0***
DenverLRT	0.2554	0.0086***	0.0432	0.0732*	0.0254	0.2628	0.1342	0.5634	-0.0175	0.3408	-0.2111	0.1738	-0.0116	0.421	-0.0251	0.2383
LosAngelesLRT	-0.0502	0.2634	-0.0308	0.0057***	-0.0221	0.0357**	-0.1465	0.1724	0.0161	0.058*	-0.0329	0.6469	0.0027	0.6809	0.0089	0.364
BaltimoreLRT	0.0491	0.4487	0.0313	0.0516*	0.0163	0.2812	-0.2714	0.0799*	0.0156	0.2004	-0.0799	0.4403	-0.0061	0.526	-0.0175	0.219
StLouisLRT	0.0874	0.3792	-0.014	0.5706	0.0454	0.0512*	0.3075	0.1958	0.0354	0.059*	0.0368	0.817	-0.0322	0.029**	-0.0392	0.0727*
DallasLRT	-0.0748	0.3619	0.0046	0.8198	0.0109	0.5711	0.0649	0.7405	-0.0285	0.0653*	-0.1111	0.3965	-0.0185	0.1272	-0.052	0.0039***
SaltLakeCityLRT	-0.117	0.2627	0.0217	0.4023	-0.0322	0.1878	0.2702	0.2791	0.0434	0.0276**	-0.2498	0.1344	-0.0124	0.4232	-0.0379	0.0984*
Core City	-0.0084	0.5221	0.0017	0.6097	0.0043	0.1606	-0.0786	0.0124**	0.0112	0***	0.036	0.0862*	0.0067	0.0005***	0.0133	0***
Distance to CBD	-0.0244	0.0032***	0.0041	0.043**	-0.0087	0***	0.0227	0.2509	0.0029	0.0597*	-0.0132	0.317	0.0009	0.4659	0.0095	0***
Los Angeles	0.0354	0.3655	-0.0049	0.6142	0.0045	0.6229	-0.4743	0***	-0.0432	0***	-0.0434	0.4893	0.0336	0***	0.0301	0.0005***
Baltimore	0.0364	0.1147	-0.0076	0.1846	0.0027	0.6165	-0.0757	0.1705	-0.0209	0***	-0.1205	0.0013***	-0.0013	0.697	-0.0097	0.0558*
St. Louis	-0.0377	0.1691	0.0088	0.1965	0.0041	0.5192	0.0276	0.6735	-0.0005	0.9185	-0.1982	0***	-0.0129	0.0016***	-0.0228	0.0002***
Dallas	-0.1179	0***	-0.0289	0***	-0.008	0.0936*	0.0683	0.1607	0.0006	0.8681	-0.0754	0.0205**	-0.0161	0***	-0.0238	0***
Salt Lake City	0.1777	0***	0.0118	0.1489	-0.0001	0.992	0.032	0.6855	-0.0183	0.0035***	0.0042	0.9367	-0.0137	0.0054***	-0.0146	0.045**
BY Population Density	-0.064	0***	-0.0022	0.0662*	-0.0121	0***	0.1529	0***	0.0085	0***	-0.317	0***	0.0021	0.0039***	0.0048	0***
BY Race	0.1953	0***	-0.1048	0***	0.0616	0***	0.1308	0.0737*	-0.0338	0***	-0.0112	0.8192	0.0032	0.4745	-0.0078	0.246
BY Education	0.1665	0.0832*	0.1124	0***	-0.2009	0***	0.3282	0.1533	-0.038	0.0361**	0.3035	0.0482**	0.0758	0***	0.0989	0***
BY Income	0.003	0.867	-0.0224	0***	-0.0281	0***	-0.9259	0***	0.0061	0.0763*	-0.1097	0.0002***	0.0017	0.5348	-0.0223	0***
BY Poverty	0.9589	0***	0.1536	0***	0.0299	0.104	-0.5341	0.0045***	-0.3969	0***	-0.3581	0.0043***	-0.0941	0***	-0.1348	0***
BY Professional	-0.2179	0.0811*	0.0641	0.039**	0.227	0***	0.0597	0.8417	-0.0234	0.3213	-0.8369	0***	-0.1426	0***	-0.1652	0***
BY Renter Occupancy	-0.1218	0.0001***	-0.0794	0***	-0.0124	0.0804*	-0.7314	0***	0.0689	0***	0.3306	0***	0.0272	0***	0.0234	0.0005***
BY Rent	-0.0144	0.8354	-0.0296	0.0849*	0.0177	0.274	0.6088	0.0002***	0.0182	0.1634	0.1143	0.3009	-0.0612	0***	-0.089	0***
BY Housing Value	0.0475	0.0001***	0.0035	0.2311	0.0177	0***	0.1962	0***	-0.0066	0.0035***	0.064	0.0008***	-0.0009	0.621	0.0101	0.0001***
BY Housing Age	0.1878	0***	0.0036	0.5049	0.0313	0***	0.0875	0.0967*	0.0035	0.3919	-0.0375	0.2886	-0.0229	0***	-0.0331	0***
Rent Gap	0.0125	0.8531	-0.0192	0.254	0.0123	0.4358	0.1951	0.2277	0.0203	0.1117	-0.0315	0.7708	-0.0648	0***	-0.1115	0***
Rho		*0.5388*		*0.7387*		*0.5064*		*0.1156*		*0.2495*		*0.4466*		*0.2961*		*0.2807*
Log Likelihood		*-2595.398*		*5276.421*		*5827.39*		*-7477.225*		*7186.533*		*-5248.621*		*8563.747*		*6299.979*
AIC (SAR)		*5244.8*		*-10499*		*-11601*		*15008*		*-14319*		*10551*		*-17073*		*-12546*
AIC (OLS)		*6448.4*		*-7132.4*		*-10649*		*15039*		*-14140*		*11394*		*-16831*		*-12321*
Number of Observations		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*

****p<0.01*
***p<0.05*
**p<0.10*

Urbanized Area Results: Sets 1 and 2.

Here, I analyze the coefficients for the UALRT dummy variables for Sets 1 and 2. These coefficient values indicate the unique, statistical relationship between the presence of a LRT station in each Urbanized Area and gentrification and TOD related change characteristics. The coefficient values for the UALRT dummy indicate how much (statistically) the presence of a LRT station influences gentrification and TOD related change in station area neighborhoods compared to non-station area neighborhoods. For example, when examining change in Race (i.e.; white population percentage) in relation to the presence of a LRT station (Set 1, **Table 3.6**) for 1990 in Denver (shown by the DenverLRT variable coefficient), Race (i.e.; the white population percentage) increased by 4% *more* in light rail station census tracts *compared to* non-light rail station tracts. Thus, Denver's LRT stations influenced a 4% *relative* increase in Race in LRT station areas. By *relative,* I refer to relative to non-LRT station areas. The P-values then indicate whether the coefficients are statistically significant or not; that is, whether or not I can be confident with the statistical representation of the relationship.

I expected that the presence of a light rail station would have positive coefficients for the RCI, Race, Education, and Income (indicating an increase in LRT station areas relative to non-LRT station census tracts) and a negative coefficient for Poverty (indicating a decrease in LRT station areas compared to non-LRT station census tracts). The results were quite mixed across the urbanized areas, mirroring previous studies examining LRT and property values with no prevalent, overall patterns. For station areas in each urbanized area, I found either: 1) the possibility of gentrification related residential change; 2) the possibility for the opposite of gentrification related residential change; or 3) no significant relationship. Overall, I found little

evidence of widespread gentrification in station areas. I also found only partial TOD impacts, primarily in terms of increased public transit use.

The overall fit or quality of regression models can best be determined by the adjusted R^2 values for the OLS regression models. However, R model outputs do not include adjusted R^2 and the Akaike Information Criterion (AIC) is suggested as a better indicator of the relative goodness of fit for SARs, especially when comparing the SARs with the OLS models (Hough et al, 2010; Kissling & Carl, 2008). The AIC is a statistical method used to discover the strengths of parameters (i.e.; variables) within a model (Mazerolle, 2004). A lower AIC value indicates a better model fit when comparing different models (Wu & Zhang, 2013). As shown in Tables 5, 6, and 7, the AIC values for the SARs are lower than those for the OLS models, indicating that the SAR models provide a better fit for the set of variables examined.

Set 1 Results.

Table 3.7 shows results for Set 1 models with only the LRT station dummy coefficient values for each UA presented. Results for Set 1 showed mixed results. UAs from the 1980-2010 (30-year change) dataset, with the exception of San Francisco and Sacramento exhibited rather counter-gentrification related aspects of neighborhood change to some degree, denying my expectations. Changes in Race were most prevalent throughout the UAs with LRT stations opening in the 1980s, with relative decreases in white populations occurring in Cleveland's (-8%), San Diego's (-3%), and Buffalo's (-5%) station tracts. Results for San Francisco (4%) and Sacramento (2%) confirmed my expectations and indicated relative increases. Meanwhile, I found no significant relationships for Education.

In the group of UAs where LRT was built in the 1980s, a few places stood out. San Francisco confirmed my expectations and exhibited both strong gentrification and TOD related

changes. San Francisco's census tracts with LRT stations performed significantly better than non-station tracts in increasing population density and retaining commute mode shares by public transit and all non-POV modes. However, these positive TOD effects were accompanied by gentrification. Station tracts exhibited substantial relative increases in income (31%) and RCI (9%), and moderate changes in white population and poverty rate.

Portland, meanwhile, exhibited a relatively strong decrease in its RCI and a slight increase in poverty rate compared to non-station census tracts. In fact, out of all UAs for both 1980 and 1990 sets, Portland had the highest magnitude RCI change: -28%. This counter-gentrification change came with positive TOD effects shown in the public transit share model. While LRT stations had also positive impacts on population density, the coefficient was not significant. These positive TOD effects imply that the counter-gentrification in LRT station areas of Portland is not due to great decline over the time period but because more residents with the most need for transit were able to occupy light rail station areas.

None in the sample of UAs that built LRT in the 1990s experienced a positive TOD related change. Rather, St. Louis, Dallas, and Salt Lake City show the negative impacts on transit and non-POV mode uses. However, there are some noteworthy results. Denver's RCI coefficient was especially striking as it indicates a 26% relative increase when compared to non-station tracts. Similarly, I also found a relative increase of 4% in white population for Denver. Such results combined with little TOD impact could indicate that Denver's light rail station areas possibly experience gentrification related residential change without gaining much on the sustainability front. Conversely, results for Los Angeles failed to meet my expectations and exhibited results indicating counter-gentrification without TOD impact. Los Angeles's white population and percentage of educated residents in station tracts relatively decreased by 3% and

2%, respectively and the poverty rate relatively increased by 2%. Los Angeles's results indicate a continued decline in the areas that are served by LRT lines.

Set 2 Results: Do gentrifiable tracts experience more change?

Table 3.8 shows results for Set 2 models with only the LRT station dummy coefficient values for each UA presented. Results for Set 2 with only gentrifiable tracts show similar patterns to Set 1 with only minor differences. Overall, Set 2's significant coefficients were of a greater magnitude than Set 1's coefficients, indicating that the gentrifiable tracts experienced greater change in their gentrification and TOD related residential change aspects. For example, results for Portland's RCI indicated station tracts experienced a decrease by 37% relative to non-station tracts (Set 2 -gentrifiable tracts), compared to a 28% decrease in Set 1 (all census tracts). Similarly, St. Louis shows larger coefficients for Public Transit use, non-POV transit use, and income changes for Set 1 than Set 2. Denver also had greater gentrification related impacts in Set 2 compared to Set 1.

The directions of changes in notable UAs are not much different from the whole sample results: strong TOD effects accompanied by gentrification in San Francisco, TOD effects with counter-gentrification in Portland, significant gentrification with little evidence of TOD in Denver, and further decline of station areas without TOD impact in Los Angeles. The only notable change in Set 2 result is that gentrification related change is a bit more pronounced in St. Louis with statistically significant coefficients in both education and income models.

Table 3.7: Summary Results: Set 1: All Census Tracts

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**
(Intercept)	0.2558	0.5489	0.3845	0***	0.1994	0.022**	7.7273	0***	0.1059	0.1045	4.4821	0***	-0.1864	0.0221**	-0.3711	0.0042***
San Francisco	0.0911	0.0888*	0.0426	0.0002***	0.0147	0.1772	0.3074	0.002***	-0.0284	0.0005***	0.277	0***	0.0377	0.0002***	0.0693	0***
Cleveland	-0.0923	0.3166	-0.0865	0***	-0.0042	0.8243	-0.1199	0.4846	-0.0081	0.5646	-0.1082	0.3521	0.0589	0.0008***	0.0281	0.3128
San Diego	-0.012	0.8725	-0.0307	0.0575*	-0.013	0.3942	0.0037	0.9789	0.0228	0.0463**	-0.0461	0.6254	0.009	0.5266	-0.0098	0.6653
Pittsburgh	-0.1424	0.1177	-0.0016	0.9369	-0.016	0.3894	-0.4312	0.0109**	0.0037	0.7926	-0.0726	0.5272	-0.0345	0.0457**	-0.0644	0.019**
Buffalo	-0.0121	0.9233	-0.0506	0.0618*	0.0324	0.2053	-0.391	0.0943*	0.002	0.9166	0.0095	0.9522	-0.0282	0.238	-0.212	0***
Portland	-0.2766	0.0011***	-0.0295	0.1053	-0.0229	0.1836	-0.0728	0.6439	0.0397	0.0021***	0.1617	0.1298	0.0378	0.0187**	0.0083	0.745
Sacramento	-0.0528	0.5883	0.0355	0.0911*	0.0031	0.8754	-0.0688	0.7041	0.0028	0.8506	-0.3471	0.0048***	0.0246	0.1845	0.0223	0.4487
San Jose	-0.0213	0.8008	0.0248	0.1742	0	0.9987	0.1596	0.3101	-0.0128	0.3208	-0.0741	0.4874	0.0063	0.6954	0.0233	0.3618
Rho		0.558		0.7771		0.5882		0.1713		0.3766		0.4623		0.4249		0.3751
Log Likelihood		*-2676.45*		*3141.469*		*3506.339*		*-4978.198*		*4723.878*		*-3537.477*		*3857.855*		*2069.278*
AIC (SAR)		*5414.9*		*-6220.9*		*-6950.7*		*10018*		*-9385.8*		*7137*		*-7653.7*		*-4076.6*
AIC (OLS)		*6357.9*		*-3358.1*		*-5949.9*		*10123*		*-9080.5*		*7939.2*		*-7234.4*		*-3767.7*
Number of Observations		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*		*3898*
(Intercept)	0.1066	0.8062	0.374	0.0005***	0.1247	0.2198	2.4756	0.0172**	-0.1217	0.1376	2.7323	0.0001***	0.4016	0***	0.6345	0***
Los Angeles	-0.0502	0.2634	-0.0308	0.0057***	-0.0221	0.0357**	-0.1465	0.1724	0.0161	0.058*	-0.0329	0.6469	0.0027	0.6809	0.0089	0.364
Baltimore	0.0491	0.4487	0.0313	0.0516*	0.0163	0.2812	-0.2714	0.0799*	0.0156	0.2004	-0.0799	0.4403	-0.0061	0.526	-0.0175	0.219
St. Louis	0.0874	0.3792	-0.014	0.5706	0.0454	0.0512*	0.3075	0.1958	0.0354	0.059*	0.0368	0.817	-0.0322	0.029**	-0.0392	0.0727*
Denver	0.2554	0.0086***	0.0432	0.0732*	0.0254	0.2628	0.1342	0.5634	-0.0175	0.3408	-0.2111	0.1738	-0.0116	0.421	-0.0251	0.2383
Dallas	-0.0748	0.3619	0.0046	0.8198	0.0109	0.5711	0.0649	0.7405	-0.0285	0.0653*	-0.1111	0.3965	-0.0185	0.1272	-0.052	0.0039***
Salt Lake City	-0.117	0.2627	0.0217	0.4023	-0.0322	0.1878	0.2702	0.2791	0.0434	0.0276**	-0.2498	0.1344	-0.0124	0.4232	-0.0379	0.0984*
Rho		*0.5388*		*0.7387*		*0.5064*		*0.1156*		*0.2495*		*0.4466*		*0.2961*		*0.2807*
Log Likelihood		*-2595.398*		*5276.421*		*5827.39*		*-7477.225*		*7186.533*		*-5248.621*		*8563.747*		*6299.979*
AIC (SAR)		*5244.8*		*-10499*		*-11601*		*15008*		*-14319*		*10551*		*-17073*		*-12546*
AIC (OLS)		*6448.4*		*-7132.4*		*-10649*		*15039*		*-14140*		*11394*		*-16831*		*-12321*
Number of Observations		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*		*5783*

Note: The coefficients are for interaction terms between LRT station dummy and UA dummies in an analysis of pooled data for each period.
****p<0.01*
***p<0.05*
**p<0.10*
All SAR models are significant at the 0.01 significance level.

Table 3.8: Summary Results: Set 2: Gentrifiable Tracts

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**
(Intercept)	0.4028	0.5808	0.7392	0***	0.0932	0.5214	7.5497	0***	0.2157	0.0737*	5.8327	0***	-0.3234	0.0458**	-0.5487	0.0306**
San Francisco	0.0612	0.4607	0.0814	0***	0.0285	0.0853*	0.4699	0.0056***	-0.034	0.0133**	0.3718	0.0005***	0.0379	0.0392**	0.069	0.0166**
Cleveland	0.0688	0.6548	-0.0217	0.5332	0.0113	0.7129	-0.2002	0.5237	-0.044	0.0846*	-0.2735	0.1659	0.0786	0.0209**	0.0611	0.2514
San Diego	-0.0603	0.5428	-0.0309	0.1676	-0.0209	0.2893	0.0491	0.8081	0.0406	0.0133**	-0.0242	0.8494	0.0099	0.6523	-0.0165	0.6303
Pittsburgh	0.1124	0.5921	-0.0132	0.7817	-0.0141	0.7351	-0.425	0.3211	-0.0161	0.6426	-0.2843	0.2917	-0.0391	0.399	0.0052	0.9428
Buffalo	0.1782	0.3582	-0.0633	0.1486	0.0854	0.027**	-0.5693	0.1502	-0.0433	0.177	-0.1305	0.5997	-0.0762	0.0755*	-0.3522	0***
Portland	-0.3714	0.0035***	-0.046	0.1097	-0.0279	0.2697	-0.0718	0.7818	0.0427	0.0424**	0.2247	0.1681	0.054	0.0549*	0.0004	0.9931
Sacramento	-0.1369	0.3426	0.049	0.1324	-0.015	0.6014	-0.1449	0.6222	0.0102	0.669	-0.485	0.0089***	0.0276	0.3858	0.0023	0.9627
San Jose	0.0399	0.7226	0.0316	0.2137	0.0181	0.4185	0.1661	0.4685	-0.0063	0.7354	-0.0424	0.7684	0.0044	0.8608	0.0154	0.6928
Rho		*0.4452*		*0.4891*		*04562*		*0.1542*		*0.2182*		*0.3389*		*0.3427*		*0.2365*
Log Likelihood		*-1391.752*		*1105.158*		*1326.075*		*-2552.985*		*1677.664*		*-1790.672*		*1173.108*		*430.03*
AIC (SAR)		*2845.5*		*-2148.3*		*-2590.2*		*5168*		*-3293.3*		*3643.3*		*-2284.2*		*-798.06*
AIC (OLS)		*3136*		*-1558.9*		*-2279.2*		*5230.6*		*-3239.5*		*3901.6*		*-2154.9*		*-738.9*
Number of Observations		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*
(Intercept)	0.0269	0.976	0.3361	0.1248	-0.2674	0.141	-0.3722	0.8676	0.3442	0.0893*	1.4939	0.228	0.8051	0***	1.1602	0***
Los Angeles	-0.0235	0.6675	-0.0056	0.6726	-0.0099	0.3725	0.1171	0.391	0.0257	0.0381**	0.1113	0.1418	-0.001	0.9288	0.0099	0.5372
Baltimore	0.0181	0.8542	0.0127	0.5984	0.0225	0.262	0.114	0.6439	0.0478	0.0324**	0.0208	0.8793	0.0107	0.6105	0.0159	0.5821
St. Louis	0.099	0.4814	0.0415	0.2271	0.0495	0.0833*	0.5898	0.0932*	0.0473	0.1376	0.1982	0.3094	-0.0788	0.0084***	-0.1043	0.0112**
Denver	0.394	0.0009***	0.108	0.0002***	0.0409	0.0891*	0.0864	0.7702	-0.018	0.5018	-0.1644	0.3164	-0.0179	0.4764	-0.0346	0.3164
Dallas	-0.0302	0.7963	0.0046	0.8198	0.0002	0.992	-0.2289	0.4331	-0.0001	0.9961	-0.1111	0.3965	-0.0185	0.1272	-0.1165	0.0007***
Salt Lake City	-0.0269	0.8376	0.0217	0.4023	-0.0396	0.1378	0.2431	0.4582	0.0542	0.0682*	-0.2498	0.1344	-0.0124	0.4232	-0.0379	0.0984*
Rho		0.3216		0.4433		0.3612		0.0965*		0.1310		0.2893		0.1674		0.1840
Log Likelihood		-944.5905		1726.129		2098.39		-2674.921		1918.968		-1565.392		2038.219		1426.629
AIC (SAR)		1943.2		-3398.3		-4142.8		5403.8		-3783.9		3184.8		-4022.4		-2799.3
AIC (OLS)		2085.9		-2975.1		-3978.8		5414.4		-3765.6		3271.1		-3995.7		-2764.1
Number of Observations		1914		1914		1914		1914		1914		1914		1914		1914

Note: The coefficients are for interaction terms between LRT station dummy and UA dummies in an analysis of pooled data for each period.
****p<0.01*
***p<0.05*
**p<0.10*
All SAR models are significant at the 0.01 significance level

Neighborhood Change Typologies in LRT Station Areas.

I further summarized the results in a way described in **Table 3.9** to better clarify the abundance of regression results and to discover typology of LRT station impacts. I categorized the results as follows. I counted the number of models where light rail station variable coefficients are statistically significant for each UA and describe the sets as possibly exhibiting strong to weak (counter-) gentrification and TOD-related aspects of residential change. When all significant coefficients were consistently counter my expectations, I refer to these as counter-gentrification and counter-TOD. The results are summarized in **Table 3.10**.

Table 3.9: Gentrification and TOD Indicators

Gentrification or Counter-Gentrification (-C) Aspects		TOD or Counter-TOD (-C) Aspects	
Level of Aspect Occurring	# of statistical significant coefficients	Level of Aspect Occurring	# of statistically significant coefficients
Strong	4 to 5	Strong	3
Moderate	2 to 3	Moderate	2
Weak	1	Weak	1
None	0	None	0
Mixed	Significant Coefficients for both Gentrification and Counter-Gentrification Present	Mixed	Significant Coefficients for both TOD and Counter-TOD Present

Note: Gentrification and TOD are characterized with positive coefficients. Counter-Gentrification and Counter-TOD are characterized with negative coefficients.

Table 3.10: UA Gentrification and TOD Impacts

	Set 4: Full Sample		**Set 5: Gentrifiable Tracts**	
	Gentrification	TOD	Gentrification	TOD
San Francisco	Strong	Strong	Strong	Strong
Cleveland	Weak-C	Weak	Weak	Weak
San Diego	Moderate-C	None	Weak-C	None
Pittsburgh	Weak-C	Moderate-C	None	None
Buffalo	Moderate-C	Weak-C	Weak	Moderate-C
Portland	Moderate-C	Weak	Moderate-C	Weak
Sacramento	Weak	Weak-C	None	Weak-C
San Jose	None	None	None	None

Table 3.10 (cont.): UA Gentrification and TOD Impacts

Los Angeles	Moderate-C	None	Weak-C	None
Baltimore	Mixed	None	Weak-C	None
St. Louis	Mixed	Moderate-C	Moderate	Moderate-C
Denver	Moderate	None	Moderate	None
Dallas	Weak	Weak-C	None	Moderate-C
Salt Lake City	Weak-C	Weak-C	None	None

I characterized four possible interpretations of the results as follows:

- Gentrification and TOD: Occurs with significant positive coefficients for both Gentrification and TOD related change aspects. This was the expected possible outcome where LRT stations possibly triggered new developments and increased transit access with higher accessibility capitalized into increased property values and rents. Low income and minority households were possibly priced out of LRT station areas;
- Counter-Gentrification and TOD: Occurs with significant negative and positive coefficients for Gentrification and TOD aspects, respectively. I view this as the best possible outcome whereby either existing residents remain and/or station areas have attracted low income and minority households who are more likely to need and use transit;
- Gentrification and Counter- or no TOD: Occurs with significant positive and negative coefficients for Gentrification and TOD aspects, respectively. I view this as the worst possible outcome whereby LRT stations may have triggered new developments and attracted high income households who are less likely to use transit; and
- Counter-Gentrification and Counter- or no TOD: Occurs with significant negative coefficients for both Gentrification and TOD related change aspects. I view this as indicative of continued decline.

The urbanized areas that fit into these categories are identified in **Table 3.11**. I initially expected that the presence of a LRT station to influence gentrification and TOD related change. By gentrification related change, I mean relative increases (positive coefficient values) in RCI, Race, Education, and Income, along with relative decreases (negative coefficient values) in Poverty. By TOD related change, I mean relative increases (positive coefficients) in Population Density, Public Transit Use, and Non-Privately Owned Vehicle Use. Only San Francisco confirmed my expectations. Cleveland confirmed my expectations as well, but only for gentrifiable census tracts. This possibly indicates that the people with the most need for improved transit access and transit developments are not receiving these benefits in San Francisco and Cleveland. Meanwhile, Denver, Sacramento, Dallas, and St. Louis all confirmed my expectations for gentrification, but not for TOD related change. This possibly indicates that gentrification possibly occurred in transit station areas, but without the benefits (increased densities and public transit use, bicycle use, and walking) commonly associated with successful TODs.

On the other hand, Portland experienced counter-gentrification related neighborhood change, but with increased TOD change characteristics. Such results possibly indicate that the residents with the most need for improved transit developments received access to them. Other UAs such as Pittsburgh, Salt Lake City, San Diego, Los Angeles, and Baltimore, though, experienced counter gentrification related change with no TOD change. For these areas, the people with the most need for transit possibly have become further marginalized.

Table 3.11: Gentrification and TOD Impact Typology

	All Tracts (Set 4)	**Gentrifiable Tracts (Set 5)**
Gentrification and TOD	San Francisco	San Francisco, Cleveland
Counter-Gentrification and TOD	Cleveland, Portland	Portland
Gentrification and Counter- or no TOD	Denver, Sacramento, Dallas, St. Louis	Denver, St. Louis, Buffalo
Counter-Gentrification and Counter- or no TOD	Pittsburgh, Salt Lake City	San Diego, Los Angeles, Baltimore

Discussion

Using spatial regressions for longitudinal data specifically focusing on socio-economic characteristics across 14 U.S. urbanized areas, I sought an answer to the question: Is the presence of a light rail station associated with gentrification? Overall, I found no evidence of prevalent gentrification in LRT station areas. An analysis of UA specific impacts gave a complicated story of possible (counter-) gentrification and TOD related changes, implying that the impacts of LRT stations can vary depending on local contexts and planning efforts by local and regional planners.

For San Francisco and Denver, especially, the results revealed that light rail station areas have become relatively occupied by whiter, richer, and better educated residents. Such changes are key indicators of gentrification possibly occurring. On the other hand, the results indicated that for areas such as Portland, Los Angeles, and Buffalo, station areas are characterized by relatively less white and educated populations as well as having relatively greater poverty rates than tracts without stations. Such changes quite possibly indicate that these station areas either are further declining or increasingly occupied by the actual residents needing improved transit access. The former looks at the cases for Los Angeles and Buffalo while improved transit access is largely enjoyed by the residents with low socio-economic status.

More importantly, the results highlight that the efforts by local and regional planners for more inclusive developments can maximize the benefits of TOD. LRT stations in both San Francisco and Portland had significant TOD impacts. Portland, for instance, is an often studied region that specifically focuses on developing around light rail stations and that seeks to maintain equitable TOD plans. The results indicating counter-gentrification could be largely due to sustained efforts by local and regional planners to ensure equitable access to transit. Portland's

Metropolitan Regional Council, Portland Metro, has a specific TOD Program for transportation related developments. It is mainly aimed at developers; providing incentives to them to develop in an economically feasible way around transit (Portland Metro, 2014). Nevertheless, Metro's TOD Strategic Plan prepared by the Center for Transit Oriented Development expressly discusses TOD equity stating: "one of the key challenges that future TOD implementation will need to address is fostering new transit oriented housing that is affordable to the workforce" (CTOD, 2011, p. 27). Additionally, development codes for municipalities in the Portland region have specifically incorporated transit supportive design guidelines (Cervero, Ferrel, & Murphy, 2002, p. 16). The Portland region also has strong support for TOD and affordable housing from the State of Oregon. In 1995, Oregon enacted 10-year property tax abatements for multi-family and affordable housing that can easily access major transit facilities (Cervero, Ferrel, & Murphy, 2002, p. 48). Such policies and legislation may help explain why the results suggest that Portland experienced counter-gentrification and TOD impacts related to light rail.

Meanwhile, San Francisco does have equitable TOD planning efforts with a specific focus on affordable housing with its Priority Development Area Planning Program (PDA) (MTC, 2014). However, the region's high housing prices and real estate market may dominate any equitable efforts and strongly influence the gentrification related residential changes that the results suggest.

Also, my results point to a strong decline in St. Louis's public transit use in its station areas which could be a result of its light rail station design and lack of TOD planning. Operating along an existing rail line that was once used for industrial purposes, the light rail line mainly runs below street-grade. As a once industrially used rail line, some of the station's immediately surrounding areas are still undeveloped or inadequately developed for commercial and

residential purposes. Additionally, even though St. Louis's light rail line began operations in 1993, the region did not develop TOD or station area plans until nearly two decades later. Such a lack of planning may support the results suggesting that St. Louis station areas experienced a relative decline in public transit use.

Case Study Selection.

Areas such as Portland and San Francisco receive much attention in LRT and TOD literature. St. Louis, though, remains a relatively unexplored research area. This is largely due to light rail developments often occurring in Rust Belt areas such as St. Louis which exhibit little or no overall (economic and/or population) development or growth. Without much economic or population growth overall, such areas garner little attention from researchers (Hess & Almeida, 2007). However, as a Rust Belt area in need of growth and improved planning efforts, St. Louis deserves more attention. As TOD is seen as a way to spur developments, analyzing the actual TOD activities in St. Louis can assist researchers in better planning for LRT and TOD in similar slow-growth regions.

St. Louis's Delmar Loop TOD site, however, has experienced increased attention from researchers and St. Louis area planners. The Delmar Loop TOD has been recognized largely in regards to its quality design principles (Forsyth, Jacobson, & Thering, 2007; Goldberg, 2007; Jacobson & Forsyth, 2008) and as it being a place conducive to revitalization (Domahidy & Ward, 2004; Nittler & Boyd, 2012); both of which may produce neighborhood change.

Similarly, the Delmar Loop area has a well-recognized history as an established entertainment district and vibrant neighborhood. The American Planning Association (APA) listed the Delmar Loop along the Delmar Boulevard as one of their 10 Great Streets in 2007 (APA, 2007). APA awarded it this designation largely based on "the sustained efforts of local

business, government and the community to achieve successful physical and economic revitalization" (APA, 2007, par. 4).

However, such studies conflict with my results that indicate the possible presence of gentrification and a sharp decline in public transit use in station areas. The possibility of gentrification, decreased transit use, as well as revitalization based planning efforts warrant further investigation into the policies affecting St. Louis's light rail developments and TODs. The following chapters will focus on an examination of St. Louis's light rail and TOD planning efforts and TOD activities undertaken by key stakeholders at the Delmar Loop TOD site.

Chapter 4: What guides TOD Planning Activities in St. Louis and at the Delmar Loop Site? A Content Analysis of TOD and Light Rail Plans

Before analyzing St. Louis's and Delmar Loop's TOD activities as they relate to inclusivity, I first identify the principles that guide TOD activity here. This chapter therefore focuses on identifying the TOD guiding principles for St. Louis and the Delmar Loop TOD site. Specifically, what guides the TOD activities in St. Louis and at the Delmar Loop site particularly? Identifying the guiding principles will better assist in identifying whether and how the actual TOD actions undertaken at the Delmar Loop site are inclusive (Chapters 5 and 6).

I performed a content analysis of St. Louis TOD plans, as well as TOD plans for various regions identified in St. Louis plans as having successful TODs (i.e. Portland, Dallas, Calgary, Minneapolis) to determine the guiding principles. Examining these other regional TOD plans helped to either: a) support St. Louis's guiding principles, or b) provide evidence for additional guiding principles overlooked in St. Louis's TOD plans. Through the content analysis, I identified 7 key guiding principles: 1) Visioning and Leadership; 2) Acquiring Adequate Funding; 3) Public Engagement and Participation; 4) Transit Supportive Land Use; 5) People-Focused Urban Design; 6) Regional Connectivity and Multi-modal Integration; and 7) Ongoing Evaluating and Monitoring of Impacts and Outcomes. As I will also discuss in this chapter, I found that little consistency exists between the guiding principles in different plans for the St. Louis region. This lack of consistency may ultimately result in planning actions contributing to marginalizing the residents most in need of improved transit access and new developments at the Delmar Loop TOD site.

Overall, in this chapter, I categorize the existing guiding principles within the various TOD planning documents for the St. Louis, Missouri region and the Delmar Loop TOD site

specifically to form a composite list of guiding principles. In Chapter 2, I identified how actions related to these seven guiding principles can be inclusive. In Chapters 5 and 6, I analyze whether and how the actual TOD activities, as they relate to these guiding principles, are inclusive.

The guiding principles I develop here are specific to St. Louis as I particularly use St. Louis planning documents to develop them and only analyze St. Louis's TOD actions in relation to them. However, this does not mean that they are not be generalizable across different regions. For example, I describe "Public Participation and Engagement" as a guiding principle. This can be understood as a guiding principle across various regions. The actions related to it, however, may be context specific. With the specific focus on St. Louis and the Delmar Loop TOD site, however, a more wide-spread analysis of different plans for different regions would need to be made to identify more generalizable guiding principles.

The remainder of this chapter proceeds as follows. First, I explain the methodology – content analysis – I use to answer: What guides the TOD activities in St. Louis and at the Delmar Loop site particularly? Next I operationalize guiding principles and why they are important to establishing TODs. Then I discuss the St. Louis and Delmar Loop TOD plans – identifying the plans, how they are connected, and the key TOD guiding principles indicated in each one. Last I identify and describe the key guiding principles for TOD inclusivity.

Methods

Content analysis is "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005). Smith (2000), similarly defines content analysis as "a technique used to extract desired information from a body of material…by systematically and objectively identifying specified characteristics of the material (p. 314).

With the content analysis, I overall determine TOD guiding principles from existing TOD planning documents. I used the plans as my data and the guiding principles as my unit of analysis. In determining the TOD guiding principles, I also aimed to assess how their consistency varied across different plans. Precisely, do different TOD plans identify the same, similar, or different guiding principles?

Content analysis typically involves coding of the particular content (Elo & Kyngäs, 2007). Coding involves assigning summary notes or keywords to particular parts of text that represent a particular concept or activity. These codes are then grouped and categorized based on similarities. In coding, I focused on the frequency in which particular words, phrases, or concepts (i.e.; the guiding principles), were repeated among the different plans (May, 2001).

Previous researchers have used various content analysis techniques to analyze plans for different purposes such as: smart growth (Talen & Knaap, 2003), sustainable development (Conroy & Berke, 2004), natural hazards (Brody, 2003), affordable housing (Hoch, 2007), as well as plan quality as a whole (Baer, 1997; Berke & Godschalk, 2009). In many of these analyses, researchers have largely based their coding scheme or plan measure on a particular concept. Talen and Knaap (2003), for example, code plans based on Smart Growth principles. Brody (2003) examines how and why plan quality, in regards to hazard mitigation, changes over time. While I base this research on TOD inclusivity, I deductively coded the documents based on codes (i.e.; guiding principles) explicitly present in the documents themselves. After identifying the existing guiding principles, I then grouped similar guiding principles together. For example, if one plan lists Public Participation as a guiding principle and another plan lists Public Engagement as a guiding principle, based on these plans, I developed the guiding principle of

Public Participation and Engagement. I then evaluated actions related to these codes (i.e.; guiding principles) and whether or not the actions are inclusive.

Deductively coding as a form of analysis refers to the retesting of existing data (Elo & Kyngäs, 2007, p. 11). In deductively coding the guiding principles in this way, I allowed the codes (i.e.; guiding principles) to emerge from the existing plans and grouped them into one guiding principle that can be examained across different plans. In doing so, I also examined the similarities and differences of different plans' guiding principles.

What are Guiding Principles and Why are They Necessary?

Guiding principles are the underlying, foundational building blocks guiding TOD activity. TOD plans require guiding principles to guide plan development and ultimately TOD implementation. They are necessary in order to provide the framework to support TOD goals and help provide a vision of TOD. More important to this research, the guiding principles serve as guidelines that I used to assess the actual TOD activities undertaken in St. Louis and at the Delmar Loop TOD site.

As indicated by Innes (1996), plans are "part intention, part feasible future" and their "prescription should be in the possible range of outcomes" (p. 464). Overall, the purpose of plans is to guide planning activities (Conroy & Berke, 2004). Identifying the guiding principles within TOD plans is important because they provide explicit guidelines directing planners' actions. The guiding principles also reflect the values planners and stakeholder hold which can support regional, local, and/or neighborhood visions for TOD. Additionally, developing TODs' guiding principles provide guidelines to analyze activities that occur at the Delmar Loop TOD site.

While I used the term "guiding principles" throughout this research, plans from various transit and city agencies refer to these concepts in different ways. For example, the

Minneapolis/St. Paul region's Metropolitan Council (Metro) (2013) lists five types of "Strategies". The Dallas Area Rapid Transit (DART) agency lists particular "Components" in its report: *Transit-Oriented (TOD) Guidelines: Promoting TOD around DART Transit Facilities*. The East-West Gateway's (EWG) *Regional Transportation Plan 2040* (RTP) establishes 10 "Principles" which guide development of the plan and represent regional values (EWG, 2011, 2). Similarly, the City of Calgary, Alberta, Canada has both a *Transit Oriented Development Best Practices Handbook* (2004) which lists "Components" and its Land Use Planning & Policy department's *Transit Oriented Development Policy Guidelines* (2005) which lists "Policies". These two Calgary TOD documents greatly overlap. For example, the *Transit Oriented Development Best Practices Handbook* (City of Calgary, 2004) lists a component as "Make Each Station a 'Place'" (p. 7), while the *Transit Oriented Development Policy Guidelines* (Land Use Planning & Policy, City of Calgary, 2005) lists a policy as "Make each station area a 'place'" (p. 9). However they are referred to in the initial plans, I describe them throughout this research as "guiding principles".

I also coded the documents based on specific challenges St. Louis faces. For example, The East-West Gateway Council of Government's *TOD Framework Plan* (2013) lists reasons TOD has not yet occurred in St. Louis. These reasons include: slow regional population growth; rail lines located in industrial corridors; low density suburban development as the norm; unfavorable TOD zoning; lack of financing for large, mixed-use projects; difficulty in assembling land parcels; lack of coordination in development processes; and a lack of leadership in developing TOD (Design Workshop, 2013, p. 17-18). Such challenges helped inform the necessary guiding principles needed to guide TOD. I therefore grouped "lack of financing for

large, mixed-use projects" under my code of "Acquiring Adequate Funding" and "low density suburban development as the norm" under my code of "Transit-Supportive Land Uses".

Overall, I grouped these different guiding principles to form a composite list of guiding principles for the planning documents. I extract these guiding principles better understand the rationale, purpose, and history of TOD planning in St. Louis (Caulley, 1983). Also, determining these guiding principles provides the guidelines to measure and analyze actual TOD activity at the Delmar Loop site (Chapters 5 and 6).

Results

Guiding Principles.

Table 4.1 identifies the seven (7) guiding principles I coded based on the content analysis. I also list the existing guiding principles from the current TOD documents that helped inform my 7 guiding principles. I characterize three of these guiding principles as Procedural. By Procedural, I refer to guiding principles that relate to the planning of TOD or activities to occur before physical development occurs. These guiding principles include: 1) Visioning and Leadership; 2) Public Engagement and Participation; and 3) Acquiring Adequate Funding. I characterize the remaining four guiding principles as Substantive. By Substantive, I refer to guiding principles that relate to the measurable outcomes that can largely be measured or analyzed through the physical developments of TOD. These guiding principles include: 4) Transit-Supportive Land Use; 5) People-Focused Urban Design; and 6) Regional Connectivity; and 7) Ongoing Evaluating and Monitoring of Impacts and Outcomes.

Table 4.1: Coded Guiding Principles and Existing Guiding Principles from Current Planning Documents

Guiding Principles for this Research	**Current Plans Existing Guiding Principles[3]**
Visioning & Leadership	*TOD Framework Plan*[4]: 1) Development of a Regional Vision for TOD; 2) Outline of Implementation Tools and Strategies; 3) Roadmap for TOD for Every Station; 4) Completion of Station Area Plans; 5) Integration with Other Planning Efforts *10 Strategies*: Revise Local Policies *Metropolitan Council*: 1) Collaboration; 2) TOD Planning; 3) TOD Development *PSRC*: 1) Establish a Regional Program; 2) Build Partnerships and Promote Collaboration
Public Engagement and Participation	*TOD Framework Plan*: 1) Education Concerning TOD; 2) Public Outreach Process *10 Strategies*: 1) Engage the Surrounding Neighborhoods; 2) Educate the Public on TOD *Metropolitan Council*: Technical Resources, Communication, and Education *PSRC*: 1) Engage with Community Stakeholders; 2) Build Capacity for Community Engagement *Calgary Policies*: Plan in Context with Local Communities
Acquiring Adequate Funding	*10 Strategies*: 1) Pursue Catalytic Public Projects; 1) Invest According to Regional Ambitions *Metropolitan Council*: TOD Funding

[3] Plans listed here include the following:
-TOD Framework Plan:
St. Louis TOD Framework Plan by Design Workshop for East-West Gateway Council of Governments, 2013
-TOD Plan Delmar Loop:
Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations by H3 Studio for the City of St. Louis, 2013
-Best Practices:
St. Louis Regional Transit-Oriented Development (TOD) Best Practices Guide, by Metro, 2011
-10 Strategies:
10 Strategies for Attracting Development in a Slow Growth Market by Citizens for Modern Transit, 2012
-DART:
Transit-Oriented (TOD) Guidelines: Promoting TOD around DART Transit Facilities, by Dallas Area Rapid Transit (DART), 2008
-Metropolitan Council:
TOD Strategic Action Plan, by Minneapolis/St. Paul Metropolitan Council, 2013
-PSRC:
The Growing Transit Communities Strategy, by Puget Sound Regional Council (PSRC) Growing Transit Communities (GTC), 2013
-Denver:
Transit Oriented Denver: Transit Oriented Development Strategic Plan, by City of Denver, 2014
-Calgary Policies:
Transit Oriented Development Policy Guidelines, by City of Calgary Land Use Planning & Policy, 2005
-Calgary Components:
Transit Oriented Development Best Practices Handbook, by City of Calgary, 2004
-Portland:
Transit-Oriented Development Strategic Plan: Metro TOD Program, by Center for Transit-Oriented Development (CTOD) for Portland Metro, 2011

[4] Planning documents are listed in italics, numbered items list the guiding principles of these planning documents

Table 4.1 (cont.): Coded Guiding Principles and Existing Guiding Principles from Current Planning Documents

Transit-Supportive Land Use	*TOD Framework Plan*: 1) Centered around Transit; 2) Sustainable, Transit-Supportive Land Uses; 3) Density; 4) Compact Development Patterns *TOD Plan Delmar Loop*: 1) Increased Intensities of Residents and Employees; 2) Us Mix Reflecting a Fin Grain, Diverse Blend of Land Uses *TOD Best Practices Guide*: 1) Increased Densities; 2) Mixing of Land Uses *10 Strategies*: Getting the Density Right *DART*: 1) Land Use; 2) Intensity of Development; 3) Circulation *Denver*: Mix (Complimentary Land Uses) *Calgary Policies*: 1) Transit Supportive Land Uses; 2) Increase Density *Calgary Components*: 1) Get the Land Uses Right; 2) Promote Density; 3) Create Compact Development Patterns *Portland*: Development Intensity and Mix of Land Use
People-Focused Urban Design	*TOD Framework Plan*: People-Focused Urban Design *Best Practices*: Pedestrian and Bicycle Orientation *10 Strategies*: 1) Increase Transit to Create Value; 2) Start Small, Invest in Walkability; 3) Create Realistic Design Standards *DART*: 1) Built Form; 2) Civic Space and Public Art; 3) Landscape; 4) Sustainable Development *Denver*: Efficient (Live, Work, Play) *Calgary Policies*: Pedestrian-oriented Design *Calgary Components*: 1) Create Convenient Pedestrian Connections; 2) Ensure Good Urban Design *Portland*: Walkability
Regional Connectivity & Multi-modal Integration	*TOD Framework Plan*: Innovative, Context-Sensitive Parking *TOD Plan Delmar Loop*: 1) Connectivity; 2) Parking Strategy *10 Strategies*: Tackle Parking *Denver*: 1) Connect; 2) Shift (From Auto-dependency to being Multi-modal) *Calgary Policies*: Manage Parking, Bus, and Vehicular Traffic *Calgary Components*: Manage Parking
Ongoing Evaluating and Monitoring of Impacts and Outcomes	*PSRC*: Evaluate and Monitor Impacts and Outcomes *Denver*: Innovate (For Sustainable, Equitable Growth) *Portland*: Meeting Future Demand

Description of Guiding Principles.

Procedural Components.

1. Visioning and Leadership

Visioning and leadership refers to the transit, regional and city agency for the region actively engaging in or planning for TOD. It also refers to these agencies pre-planning to ensure that TODs are actually implemented in station areas. Pre-planning involves incorporating the proper zoning in station areas to ensure land use conducive for TODs, building the capacity for collaboration and actively collaborating with each other and key stakeholders, and establishing a

regional vision for how TOD can benefit the region through TOD implementation. It also involves assisting in developing the necessary tools and implementation strategies for stakeholders to engage in TOD activities such as acquiring the necessary funding streams. It also involves ensuring that local station area TOD plans conform to a larger regional vision.

For Leadership and Visioning to be inclusive, the public sector (namely, planners) must "account for the populations under threat of direct displacement" (Clagett, 2014, p. 16). That is, the populations within the TOD site that may be most adversely affected by TOD activities must be identified. Planning, for TOD in general and for these disadvantaged population(s) specifically, must begin as early as possible, "preferably at the outset of the transit planning process" (Pollack, Bluestone, & Billingham, 2010). This involves key actors (local government planners, transit planners, or regional planners) pre-planning (i.e.; planning in anticipation of TOD) with a key concern for the most disadvantaged TOD area populations.

2. Public Engagement and Participation

Public engagement and participation refers to the inclusion of key stakeholders in TOD activities: involving TOD area residents, community groups, churches, and businesses in planning TOD and ongoing TOD activities. In involving TOD area residents, this refers to them having the ability to being part of planning processes and also being able to actively shape TOD activities. Along with this, it also involves planners, developers, and related professionals involved in TOD to identify key TOD area stakeholders. It also involves making all TOD information available to the public and engaging them on the TOD issues and developments occurring in the specific neighborhood and throughout the entire region. Engaging the public could be in the form of holding public open houses, online polling or surveys, or direct interviews with stakeholders.

Activities related to Public Engagement and Participation are inclusive when the public sector (i.e.; planning) establishes and/or recognizes existing spaces for all impacted TOD residents' voices to be heard and considered (Bond & Thompson-Fawcett, 2007). This also entails planning to engage with communities to understand their needs and wants on a constant and consistent basis – not only when plans are developed or implemented (City of Seattle Race & Social Justice Initiative, 2012).

3. Acquire Adequate Funding

Acquiring adequate funding refers to the ability to fund TOD developments: infrastructure (i.e.; the light rail itself, sidewalks, street lighting), housing, businesses, and/or civic space. This involves planning, regional, and city agencies, along with developers and community groups/organizations seeking funding to pursue TOD projects. Examples include city planning agencies seeking Tax Increment Financing (TIF) or Transportation Development District (TDD) taxing to fund projects such as sidewalk construction and maintenance or station lighting. It also includes private developers seeking bank loans and/or historic tax credits. Acquiring Adequate Funding is inclusive when related TOD activities seek funding to support affordable housing options, station and infrastructure (i.e.; lighting, sidewalks), and developments that will support and strengthen the existing neighborhood residents such as non-profits, grocery stores, or daycares (Mueller et al, 2013). The inclusive activities must also help ensure that future developments will not negatively affect existing residents or prohibit any future residents from occupying the TOD site.

Substantive Components.

4. Transit-Supportive Land Uses

Transit-supportive Land Uses refers to developing and implementing land uses that place transit and mixed land use in line with the existing neighborhood context. Transit-supportive land use also refers to ensuring that transit, in the form of light rail, is the central focus of land uses: that is, all other land use should be centered on the transit facility. Mixed land use refer to having residential, commercial, public space, and industrial land uses within the TOD. Residential land uses also refers to having a mix of affordable, low-income, and market rate housing options present. Commercial refers to having a variety of businesses that cater to a variety of consumers such as childcare facilities, grocery stores, and/or restaurants. Public space refers to having spaces dedicated to public use such as parks or sidewalks. Industrial refers to having areas dedicated to light, mid, and, if applicable, heavy industrial uses. The exact mix of these land uses, however, depends on the existing context. For example, some neighborhoods may be heavily commercial and would require the mix of more businesses and hardly any industrial uses. Transit-supportive land use also refers to ensuring that the proper densities are met to fully support public transit use. In order to have transit supportive developments, high enough densities whether in terms of residential or jobs, should be in the station areas to support transit use.

TOD activities related to Transit-supportive Land Uses are inclusive when zoning assists in providing mixed-use station area development (Hickey, 2013 p. 2) – and especially when the mixed-use developments establish new or maintaining existing affordable housing options. Pollack (2006) specifically indicates that at least 30% new or redeveloped housing in a TOD area must be “permanently affordable to the entry level salary of a child care provider from that

community" (p. 9). Doing so will better ensure that station area land use does not hinder the residents who may need transit access the most from accessing it.

5. People-Focused Urban Design

People-focused urban design refers to designing the station areas and entire TOD site in a way that encourages pedestrian (and bicycle) use rather than auto-use. People-focused urban design also refers to all residents within the TOD site being able to easily physically access, either through walking or bicycling, all areas of the TOD site. This component stems directly from St. Louis Metro's *St. Louis Regional Transit-Oriented Development (TOD) Best Practices Guide* (2011). St. Louis Metro (2011) specifically states: "(S)treets should be scaled to the pedestrian and include substantial public amenities, particularly sidewalks, landscaping, lighting and seating" (p. 5). Additionally, "(T)he ground level should always engage the pedestrian's mind and eyes, and foster a sense of lively activity through transparent, activated storefronts and interesting building facades" (St. Louis Metro, 2011, p. 5). Having a people-focused urban design helps foster pedestrian activity and increasing "eyes on the street" (Jacobs, 1961/1992).

Transit-supportive Land Use is inclusive when it provides the necessary conditions (i.e. zoning) to allow all regional residents access to the TOD space. Similarly, People-focused Urban Design is inclusive when it allows all residents in the TOD site to access transit facilities as well as TOD amenities such as retail or parks. Hence, the actual developments (buildings, sidewalks, streets, etc.) must be designed (and developed) "for the needs of the widest possible audience" (Audirac, 2008, p. 1).

6. Regional Connectivity & Multi-modal Integration

Regional connectivity and multi-modal integration refers to each TOD site and/or LRT station being physically connected to the entire region. It refers to linking each station with one another and the entire region. TOD actions related to Regional Connectivity and Multi-modal Integration are inclusive when they enable TOD residents to be able to access regional destinations (i.e.; destinations not in the TOD site) at desirable times (Lucas, 2011) and without any undue hardships arising from the cost (in terms of time and/or money) associated with public transit use compared to automobile use (Kaplan, Popoks, Prato, & Ceder, 2014; Lucas, 2011). That is, the TOD site should have connections to other transit modes (i.e.; bus or car) that limits the costs and times of travelling outside of the TOD site to access needed regional destinations.

7. Ongoing Evaluating and Monitoring of Impacts and Outcomes

Ongoing evaluating and monitoring of impacts and outcomes refers to consistently assessing whether or not the TOD activities are meeting the existing components as well as ensuring that negative impacts such as gentrification or displacement or unaffordable housing occur (monitoring impacts). Ongoing Evaluating and Monitoring of Impacts and Outcomes TOD activities are inclusive when they ensure that inclusivity is being achieved through the other six (6) guiding principles. Overall evaluating and monitoring should fundamentally be inclusive and focus on ensuring that the most disadvantaged residents have access to the benefits of TODs and public transit (PSRC, 2013).

St. Louis and Delmar Loop TOD Plans.

Both St. Louis's light rail system and the Delmar Loop station opened in 1993. However, LRT and TOD studies and plans were not developed until 2011. As I explain further in Chapter

5, this is largely due to planners assuming that development around station areas would occur without much public sector intervention.

It was not until 2010 that Metro, the regional transit agency, approved "the St. Louis region's first long-range transit plan, *Moving Transit Forward*" (Metro, 2011, p. 2). However, Metro's *Best Practices Guide* (2011) lists previous TOD plans and activities for the St. Louis region undertaken prior to 2011. The *Best Practices Guide* (2011) notes various workshops, forums and plans developed from 1996-1998. Particularly, Metro (2011) highlights a *Delmar MetroLink Station Area TOD and Enhancement Study* conducted in 1998. This study, though, was mainly limited to streetscape improvements and did not include guiding principles commonly associated with TOD such as TOD zoning, density, or mixed-income housing (Metro, 2011). These same streetscape improvements were listed in Metro's (also known as the Bi-State Development Agency of the Missouri-Illinois Metropolitan District) *Comprehensive Annual Financial Report* for the fiscal year ending in 2000 and Metro's *Fiscal Year 2006 Strategic Plan and Budget*. The same streetscape improvements for this one particular station (the Delmar Loop) indicate the lack of priority given to the station and TOD development as a whole prior to 2011.

Due to the lack of TOD emphasis in plans prior to 2011, I only examined planning documents focusing on LRT, TOD, or sustainability (where linking public transit and community development is a major component of TOD) for the entire region and for the Delmar Loop site specifically. The goals throughout these various studies and plans mirror the multitude of TOD plans already established throughout the U.S.: enhancing economic development opportunities, improving regional connectivity, increasing transit ridership, among many other local and regional benefits and goals. I list the St. Louis planning documents I examined in **Table 4.2**.

There are also many plans examining the Delmar Loop area and TOD in St. Louis. However, I excluded such plans from my analysis for two reasons. First, the TOD plans focused on other MetroLink stations besides the Delmar Loop site. These plans include:

- *Union Station/Civic Station Area Plan* (2013) prepared by Design Workshop for East-West Gateway;
- *Fairview Heights Station Area Plan* (2013) prepared by Design Workshop for East-West Gateway;
- *Rock Road Station Area Plan* (2013) prepared by Design Workshop for East-West Gateway;
- *North Hanley Station Area Plan* (2013) completed by Design Workshop for East-West Gateway;
- *Transit Oriented Development Study for the Proposed Northside-Southside Alignment* (2013) prepared by H3 Studio for the St. Louis Development Corporation; and
- *Transit Oriented Development Study for the Cortex District* (2012) prepared by H3 Studio for the St. Louis Development Corporation.

The plans prepared by Design Workshop all stemmed from the larger TOD Framework Plan and include the same guiding principles. Since I did not aim to compare the plans for each station, I chose to exclude these additional plans from the content analysis. Similar to the plans prepared by Design Workshop, the plans prepared by H3 Studio stemmed from the OneSTL's plan funded by the Sustainable Communities Regional Planning Grant. Since I include the larger plans from which these local plans stem, I excluded them from the content analysis.

Second, I excluded plans from the analysis for the Delmar Loop area that did not focus on TOD and thereby did not include TOD guiding principles that I could classify with existing TOD guiding principles from other plans. These plans included:

- *Skinker DeBaliviere Neighborhood Urban Design & Development Plan* prepared by H3 Studio for the Skinker DeBaliviere Community Council, 2014;
- *Parkview Gardens Neighborhood Sustainable Development Plan: Connecting People, Places, & Parks* prepared by H3 Studio for The City of University City, 2012; and
- *The Delmar Loop Area Retail Plan & Development Strategy Action Plan* prepared by HR&A for Washington University, 2011.

I list the St. Louis plans I did use in **Table 4.2**. The table lists the plan titles, year they were created, sponsor (i.e.; who the plan was prepared for if prepared by a consultant or outside agency other than the sponsor), the main author of the plans, the plans' overall purpose, and the geographic scale the plan covers (i.e.; the entire St. Louis region, a station area/neighborhood, etc.). These planning documents inform this research's guiding principles.

Table 4.2: Summary of St. Louis TOD Plans

Plan	Year	Sponsor	Author	Summary of Purpose	Geographic Scale of Interest
Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations	2013	City of St. Louis	H3 Studio	Provides recommendations for development over a 30-year period for the Delmar Loop and Forest Park light rail transit station areas	Neighborhood
St. Louis TOD Framework Plan	2013	East-West Gateway Council of Governments	Design Workshop	TOD planning guide for the St. Louis region and individual station areas	Regional
OneSTL, Many Communities, One Future: Plan for a Prosperous, Healthy, Vibrant St. Louis Region	2013	East-West Gateway Council of Governments	East-West Gateway Council of Governments	Sustainability Plan	Regional
10 Strategies for Attracting Development in a Slow Growth Market	2012	Citizens for Modern Transit	Citizens for Modern Transit	Presents guiding principles to develop TOD in St. Louis	Regional
St. Louis Regional Transit-Oriented Development (TOD) Best Practices Guide	2011	Metro	Metro	Presents guiding principles to develop TOD in St. Louis	Regional/City
St. Louis MetroLink TOD Market Study (East-West Gateway Transit Oriented Development Study)	2011	East-West Gateway Council of Governments	BAE Urban Economics	Market study examining the short and long term market potential of TOD	Regional
Regional Transportation Plan 2040	2011	East-West Gateway Council of Governments	East-West Gateway Council of Governments	Long range transportation plan	Regional

How are the TOD Plans Related to Each Other?

With the various TOD plans for St. Louis and with them focused on different geographic scales, I next question how the plans are related to each other. By related, I refer to: a) whether or not the plans at different geographic scales share the same or similar guiding principles; and b) whether or not certain plans continue or carry out guiding principles from other, larger, or previous plans (i.e.; Is the Delmar Loop TOD plan based on the St. Louis Regional TOD plan or the OneStL plan?). I initially expected that the plans would share the same guiding principles and plans for smaller geographic scales (i.e.; station specific TOD plan for the Delmar Loop) would carry out guiding principles from larger geographic scale plans (i.e.; regional TOD plans). Overall, the planning documents do not share the same or similar guiding principles. That is, each plan refers to guiding principles by a different term (i.e.; strategy, theme, or component). Also, plans do not continue or carry out guiding principles from previous or larger geographic scaled plans. Below, I provide a description of each plan before assessing how the plans relate to one another.

East-West Gateway Council of Government (EWG) produced the *Regional Transportation Plan 2040* (RTP 2040) in 2011. RTP 2040 is the long-range transportation plan for the St. Louis region. As the EWG is the region's federally mandated metropolitan planning organization (MPO), it is required by federal law to produce the long-range plan every four years outlining how the MPO will manage short-range (4 years) and long-range (20 years) transportation projects (EWG, 2011). As the MPO and under federal law, EWG is required to develop a Transportation Improvement Program (TIP) which lists and prioritizes the short range transportation projects (USDOT, 2016). Essentially, "the TIP is a short-range financing plan and schedule for federally-funded transportation projects in the region" and is "based on the RTP

priorities and principles" (EWG, 2011, p. 24). The development of the TIP is necessary for the MPO to receive federal funding. The short range initiatives identified through the TIP carry out the principles of the long-range plan and can be conducted at the local or state level (EWG, 2011). Essentially, all federally-funded projects must be included in the TIP (EWG, 2011).

RTP 2040 focuses specifically on long-range transportation planning. Meanwhile, EWG's *OneSTL, Many Communities, One Future: Plan for a Prosperous, Healthy, Vibrant St. Louis Region* (OneSTL) examines long-term regional sustainability through cohesive transportation, housing, and environmental planning and development. EWG facilitated the OneSTL plan and monitors plan implementation and activity. The OneSTL plan examines the connection between transportation and community development and the plan serves as a foundational reference point for later TOD plans

OneSTL was primarily funded by a $4.68 million grant from the U.S. Department of Housing and Urban Development (HUD) through its Sustainable Communities Regional Planning Grant Program (SCRPG). The SCRPG provides financial support for regional, collaborative planning efforts led by a MPO that focuses on HUD's Partnership for Sustainable Communities six livability principles that can guide future growth and reinvestment (HUD, 2016b). These six livability principles include: 1) Provide more transportation choices; 2) Promote equitable, affordable housing; 3) Enhance economic competitiveness; 4) Support existing communities; 5) Coordinate policies and leverage investment; and 6) Value communities and neighborhoods (HUD, 2016a). In addressing these six principles, the EWG's award intends "to connect downtown to the Mississippi River more effectively, thereby enhancing the livability aspects of the central business district" (HUD, 2016a). Similarly, the program is also intended to assist St. Louis neighborhoods in continuing to become more walk

and bike friendly to support local economic and social shifts throughout the region (HUD, 2011). Essentially, OneSTL looks to adopt, implement, and monitoring coordinated efforts to cohesively enhance transportation, housing, economic, and environmental planning and development efforts throughout the St. Louis region.

The focus of OneSTL and HUD's Sustainable Communities Partnership closely align and mirror the goals and priorities of TODs (i.e.; integrate transportation and housing, integrate mixed land use, provide pedestrian-oriented (walkable and bike able) neighborhoods, and increase economic development opportunities, among many others). As such, Design Workshop – a landscape architecture, planning, and urban design consulting firm – facilitated the completion of the *St. Louis TOD Framework Plan* (TOD Framework Plan) on behalf of the EWG using a portion of the HUD SCRPG funding provided to EWG. The TOD Framework Plan serves as a guide for overall TOD development and implementation throughout the St. Louis region, as well as guiding TOD at individual stations across the different municipalities. The TFP's main intent is "to outline a set of implementation tools and recommendations for all 37 MetroLink stations" (Design Workshop, 2013, p. 6).

The *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* (Delmar Loop TOD Plan) by H3 Studio for the City of St. Louis specifically aims to guide TOD at the Delmar Loop and Forest Park DeBaliviere LRT stations. A portion of HUD's SCRPG awarded to EWG also funded the Delmar Loop TOD Plan. It builds on the TFP, focusing on the two specific stations. The DL TOD plan also contributes to the overall OneSTL planning process (H3 Studio, 2013, p. 9). The main objective of the DL TOD plan is to provide an actionable guide that outlines implementation strategies over the course of 30-years including: providing recommendations for infrastructure improvements, describing

financing strategies, and proposing regulatory tools such as form-based codes for the city to use in implementing TOD (H3 Studio, 2013, p. 30).

BAE Urban Economics on behalf of EWG prepared the *St. Louis MetroLink TOD Market Study* (TOD Market Study).The TOD Market Study surveys the existing economic and market conditions, describes the market development potential, and provides recommendations to leverage future TOD growth in stations areas for all of the station areas in the entire MetroLink system. The long-term study was also prepared to inform the TOD Framework Plan (BAE Urban Economics, 2011, p. 3).

Additionally, Citizens for Modern Transit's (CMT) *10 Strategies for Attracting Development in a Slow Growth Market* (10 Strategies) and Metro's *St. Louis Regional Transit-Oriented Development (TOD) Best Practices Guide* provide best practices for St. Louis TOD. CMT Strategies was funded by the Missouri Foundation for Health and cites the work conducted under HUD's SCRPG to EWG as providing the basis for the Strategy's completion. Meanwhile, Metro's Best Practices Guide takes as its starting point a conclusion from EWG's RTP which was "the need to realize more sustainable development throughout the region" (Metro, 2011, p. 2). Metro's BPG combines findings from TOD across the U.S. to develop its key components that can be used as a toolkit for future St. Louis TOD.

What guiding principles are listed in St. Louis Plans?

The various planning documents for the St. Louis region have different names for similar guiding principles. **Table 4.3** lists the different St. Louis planning documents and their guiding principles. I also list the specific name each plan uses for what I termed "guiding principles" in parentheses. **Table 4.3** overall shows that little consistency exists in the terms the different plans refer to for the guiding principles.

Table 4.3: Guiding Principles of St. Louis Plans

Plans (How each plan refers to guiding principles)	RTP (Principles)	OneSTL (Theme)	TOD Framework Plan (Strategy)	TOD Plan: Delmar Loop (Strategy)	TOD Best Practices Guide (Component)	10 Strategies (Strategies/Policies)
Guiding Principles	Preserve and maintain the existing system	Collaborative	Providing Appropriate Land Use Approvals	Increased Intensities of Residents and Employees	Centered Around Transit	Engage the Surrounding Neighborhoods
	Support public transportation	Prosperous	Parking Replacement	Use Mix Reflecting a Fine Grain, Diverse Blend of Land Uses	Sustainable, Transit-Supportive Land Uses	Increase Transit to Create Value
	Support neighborhoods and communities throughout the region	Distinctive	Affordable Housing	Urban Form & Quality	Density	Start Small, Invest in Walkability
	Foster a vibrant downtown	Inclusive	Bike and Pedestrian Planning	Connectivity	Compact Development Patterns	Pursue Catalytic Public Projects
	Provide more transportation choices	Green		Parking Strategy	People-Focused Urban Design	Create Realistic Design Standards
	Promote safety and security	Prepared			Innovative, Context-Sensitive Parking	Tackle Parking
	Support a diverse economy throughout the region	Connected			"Placemaking"	Invest According to Regional Ambitions
	Support quality job development	Efficient				Revise Local Policies
	Strengthen intermodal connections	Educated				Get the Density Right
	Link transportation planning to housing, environment, education, and energy					Educate the Public on TOD

What do St. Louis TOD plans and their guiding principles show about TOD planning?

The plans are somewhat inconsistent in the guiding principles they use to guide their actions. Understandably, some of the plans cover different geographic areas and municipalities which may have very specific issues and goals. Guiding principles for plans covering TOD for the entire region (i.e.; *St. Louis TOD Framework Plan*) may be somewhat different from guiding principles specifically for the Delmar Loop site. However, considering that the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* "builds upon the existing Saint Louis TOD Framework Plan", it is odd that the two have quite different guiding principles (H3 Studio, 2013 p. 9). The *St. Louis TOD Framework Plan* itself builds upon the OneSTL's planning efforts. The Framework Plan provides guiding principles that can be used and modified depending upon the specificities of each station area. Even still, the Delmar Loop TOD plan does not emphasize, repeat, or corroborate these principles in its own plan. What the Delmar Loop TOD plan does do, however, is provide guiding principles such as introducing form-based codes to implement TOD. But without monitored and related plans, actions related to station area development, ridership, and TOD in particular may be hindered.

Conclusion

Above, I identified the seven TOD guiding principles that I used to categorize actions undertaken by TOD stakeholders at the Delmar Loop site. Identifying the TOD guiding principles help determine and categorize the TOD actions for the Delmar Loop site. Also, in keeping in line with the interconnectedness and comprehensive nature of TODs, these guiding principles are all inter-related. Inadequately addressing one of these could possibly affect other components. For example, People-focused Urban Design may not be useful or fully drive

inclusivity if there is not Transit-Supportive Land Use where there are a mix of amenities in which people can fully access their daily needs and wants (i.e.; childcare facilities, grocery stores, or civic space).

Additionally, different regions and TOD sites may engage with these guiding principles in different ways. For example, some sites may acquire adequate funding through taxation of TOD businesses to support infrastructure projects; while others may apply for federal grants or loans for affordable housing. Regardless of how TOD stakeholders engage with these guiding principles, the important issue is that TOD stakeholders do engage with them. Next, I will identify the actual activities that Delmar Loop stakeholders engage in related to these guiding principles.

Chapter 5: What are the St. Louis and Delmar Loop Planning Actions? Examining the Actions Associated with Procedural Guiding Principles

In this chapter I describe the Transit Oriented Development (TOD) activities undertaken in regards to TODs' Procedural Guiding Principles at the Delmar Loop TOD site and for St. Louis TOD in general. The Procedural Guiding Principles include: 1) Leadership and Visioning; 2) Public Participation and Engagement; and 3) Acquiring Adequate Funding. I use interviews and direct observations to determine the activities undertaken in regards to these guiding principles. Overall, I found a lack of direct and active leadership and visioning from planning and planners in TOD activities – especially regional planners from the East West Gateway Council of Governments (EWG): St. Louis's metropolitan planning organization (MPO). Additionally, while public participation and engagement have been substantial, I found that one portion of the Delmar Loop TOD site – the West End Neighborhood area – has not actively participated nor has the neighborhood been engaged in TOD activities.

By TOD activities, I refer to plan making, plan implementation(s), and development(s) related to the plans. I categorize the TOD actions as relating to either Procedural or Substantive Guiding Principles. Here, I identify and analyze actions related to Procedural Guiding Principles. In **Table 5.1**, I present the TOD actions, and more importantly, the expected inclusive TOD actions indicated by the literature as revealed in Chapter 2 for the Procedural Guiding Principles. Particularly, these inclusive activities should include: a) pre-planning to account for the most disadvantaged residents with planning beginning as early as possible before the opening of a light rail station; b) holding public engagement meetings at times, places, and in spaces accessible to all stakeholders; c) consistently engaging with communities; and d) acquiring funding to support affordable and mixed use housing and station and infrastructure

improvements. By identifying and analyzing such activities, I answer the following, respective questions: a) When did planners begin planning?; b) Who participates in TOD planning meetings?; and c) How have planners funded TOD developments? Since researchers and planning agencies consider TODs as *planning* tools (Belzer, Autler, & Strategic Economics, 2002, p. 8; City of Austin, n.d.), I identify planners as being the main actors needing to engage in these inclusive activities and I answer the above questions as they relate to planners.

Table 5.1: TOD Activities related to Procedural Guiding Principles

General	**Guiding Principles**	**Activities (Related to Guiding Principles)**	**Expected Inclusive Activities (From Existing Literature)**
TOD Plan Making	Visioning and Leadership	TOD Plan making	Pre-planning to account for the most disadvantaged residents receiving TOD benefits Planning beginning as early as possible before light rail openings
	Public Engagement and Participation	Holding public engagement meetings and/or interviewing, polling, or surveying stakeholders Coordinating and engaging stakeholders	Holding public engagement meetings at times, places, and in spaces accessible to all stakeholders Consistent engagement with communities (i.e.; residents, agencies, organizations)
	Acquire Adequate Funding	Securing Funding Options/Applying for Grants, Loans	Acquiring funding to support affordable and mixed use housing and station and infrastructure improvements Acquiring funding to help maintain existing residents (i.e.; rent controls)

The remainder of this chapter proceeds as follows. I first explain the methods I used. I next highlight the context of the St. Louis and Delmar Loop, detailing the key stakeholders of the St. Louis and Delmar Loop TOD and the geographic space of the Delmar Loop site. I next

explain the activities undertaken in regards to the Procedural Guiding Principles in the remainder of this chapter.

I developed 7 guiding principles for TOD through a content analysis. I based these guiding principles on guiding principles in existing TOD planning documents. One guiding principle I developed is Acquiring Adequate Funding. As shown in Chapter 4, the existing plans list this in some form as a key guiding principle for TOD and I in turn, developed it as a TOD guiding principle. However, the interview data I collected from the stakeholders does not directly address issues of acquiring adequate funding. I did collect limited data related to funding. With this data though, I largely analyzed it along with another guiding principle. For instance, one guiding principle is Leadership and Visioning. One TOD activity related to visioning is the construction of the Loop Trolley. A key issue dealing with the Loop Trolley is acquiring funding to construct it. Therefore, I address issues of funding along with the analysis under the guiding principle of leadership and visioning.

Methods

Below, I detail the methods I used for the results shown here and in Chapter 7.

Semi-Structured, Open-Ended Interviews.

I conducted semi-structured, open-ended interviews to assist in determining the actual TOD activities as they relate to the guiding principles. Conducting semi-structured, open-ended interviews allowed the participants to respond to questions, elaborate, and express viewpoints as freely as possible. I based the interviews on an interview prompt where the questions were informed by existing documents and direct site observations. I provide the interview prompt in **Appendix H**.

However, as the interviews were open-ended, the participants often provided answers that allowed the discussions to go beyond the interview prompt. As responses went beyond the initial questionnaire, I "snowballed" questions, adding or taking away questions based upon the participant and responses from previous participants. For example, participants from community development corporations had more insight into particular crimes occurring in the station area neighborhoods than planners from the regional planning organization: East-West Gateway. However, developers had more insight into obtaining funding for TOD projects than participants from community development corporations. The questions overall primarily focused on each participant's role in TOD activities.

I interviewed 10 stakeholder participants in city (City of St. Louis and University City), regional (East-West Gateway Council of Governments), and transit (Metro Transit) agencies, as well as developers, university officials (Washington University), business owners, and community/neighborhood association members. I interviewed the participants either by telephone or in person at their office or place of business between February 2015 and November 2015. The participants had a wide range of experience in their respective positions either as planners, developers, business owners, university officials, community development leaders, or residents. Their experience at their positions ranged from 1.5 years (Economic Development Project Manager for Metro Transit) to 8 years (Major Project Manager for St. Louis Development Corporation) to 43 years (Business Owner in the Delmar Loop Entertainment District and Delmar TOD site). The participants' years of experience provided me with a depth of knowledge and history of Delmar TOD area planning, community development, and transportation. A full list of the interview participants is listed in **Appendix I**.

I identified the participants through the planning TOD and LRT documents indicating them as key stakeholders for St. Louis and Delmar Loop TOD planning. I also identified and interviewed additional stakeholders based upon the snowball recruitment method. Snowball sampling is a sampling procedure where "the researcher accesses informants through contact information that is provided by other informants" (Noy, 2008, p. 330). The snowball sampling or recruitment technique has largely been used by researchers to identify hard to reach or vulnerable participants such as drug users (Eland-Goossensen, Goor, Vollemans, Hendriks, & Garretsen, 1997; Kaplan, Korf, & Sterk, 1987), non-heterosexual women (Browne, 2005), or participants with specific health related issues (Magnani, Sabin, Saidel, & Heckathorn, 2005). I did not engage with any vulnerable populations. I, however, used snowball sampling in order to find stakeholders who were not directly mentioned in the plans, but that other stakeholders viewed as instrumental or actively engaged in TOD activities for the Delmar Loop site particularly and in St. Louis as a whole.

Direct Observations.

I made field visits to the Delmar Loop TOD site to conduct direct observations. I observed the Delmar Loop transit station itself and the neighborhood within a half-mile radius of it. I made direct observations to provide additional evidence and description about the context and conditions of the site and who observably occupies it. I also attended conferences, workshops, and meetings held within the Delmar Loop site or which specifically addressed Delmar Loop TOD issues. The direct observations focused on observing light rail station characteristics, surrounding neighborhood characteristics, and pedestrian/resident characteristics. Elements I observed for each included: 1) *light rail station characteristics* such as safety, lighting, visibility, up-keep and facilities, transit ridership, physical connectivity to the

surrounding environments and other transit modes; 2) *surrounding neighborhood characteristics* such as pedestrian access to stations; types and conditions of built structures (residential, commercial, and/or industrial), and infrastructure (i.e.; streets, sidewalks, lighting, etc.); and 3) *pedestrian or resident characteristics* such as observed demographics (age, race, gender, and occupation). I focused on these three characteristics to indicate any observed characteristics related to inclusivity. The direct observations also served to enhance and provide "a cross-check on data obtained in interviews" (Simons, 2009, p. 55) and from the planning documents.

For the conferences, workshops, and meetings I attended, I also observed the issue or topic discussed. For example, on Thursday March 12, 2015, I attended the Citizens for Modern Transit's Speaker Series. This meeting addressed the issue of how to successfully develop around light rail transit stations, with a particular focus on gathering community support for transit station area developments.

I observed the site at mobile (walking, driving, and riding transit – the light rail train) and immobile (at one location for 30 or more minutes) vantage points. I made observations during peak commuting hours: between 7 A.M. and 9 A.M. and between 4 P.M. and 6 P.M. Monday through Friday; and at unstructured times throughout the remainder of the weekdays and during the weekends. I performed approximately 30 hours of observations during February, March, May, July, August, and November of 2015. I provide my observation log in **Appendix J**. This provides the days, times, places, and types of characteristics I observed at the sites.

I served as the primary source of data for the direct observations used detailed field notes to record observations. When taking detailed field notes, I noted what occurred rather than why something occurred in an attempt to not allow my personal biases to affect the observations (Emerson, Fretz, & Shaw, 2011). I also organized the notes based on the characteristics observed

to easily review and categorize my observations (Chiseri-Strater & Sunstein, 1997). I also photographed the site to provide additional details.

Data Analysis.

I used a deductive approach to analyze the data collected from the interviews and observations. Deductive analysis refers to the retesting of existing data which can include categories, concepts, themes, or guidelines (Elo & Kyngäs, 2007, p. 11). With deductive data analysis, the aim is to find patterns from existing themes in the data collected (Houghton, Murphy, Shaw, & Casey, 2015, p. 9). In using deductive analysis for interviews and observations, I allowed the guiding principles I established from the content analysis to guide my interpretations of the interview and observation data.

Geographic Information Systems (GIS).

I also used ESRI's (2011) ArcGIS GIS software to produce maps of the Delmar Loop site, the St. Louis region, and the region's LRT system. I produced the maps to provide a visual description of the study areas. I primarily used the ArcGIS merge function. Using merge allowed me to combine the separate shapefiles representing different areas into a single shapefile. For example, I merged the shapefiles for counties in Illinois with counties in Missouri to get a single county shapefile for the counties covered by the East-West Gateway Council of Governments.

Results

The St. Louis and Delmar Loop Context.

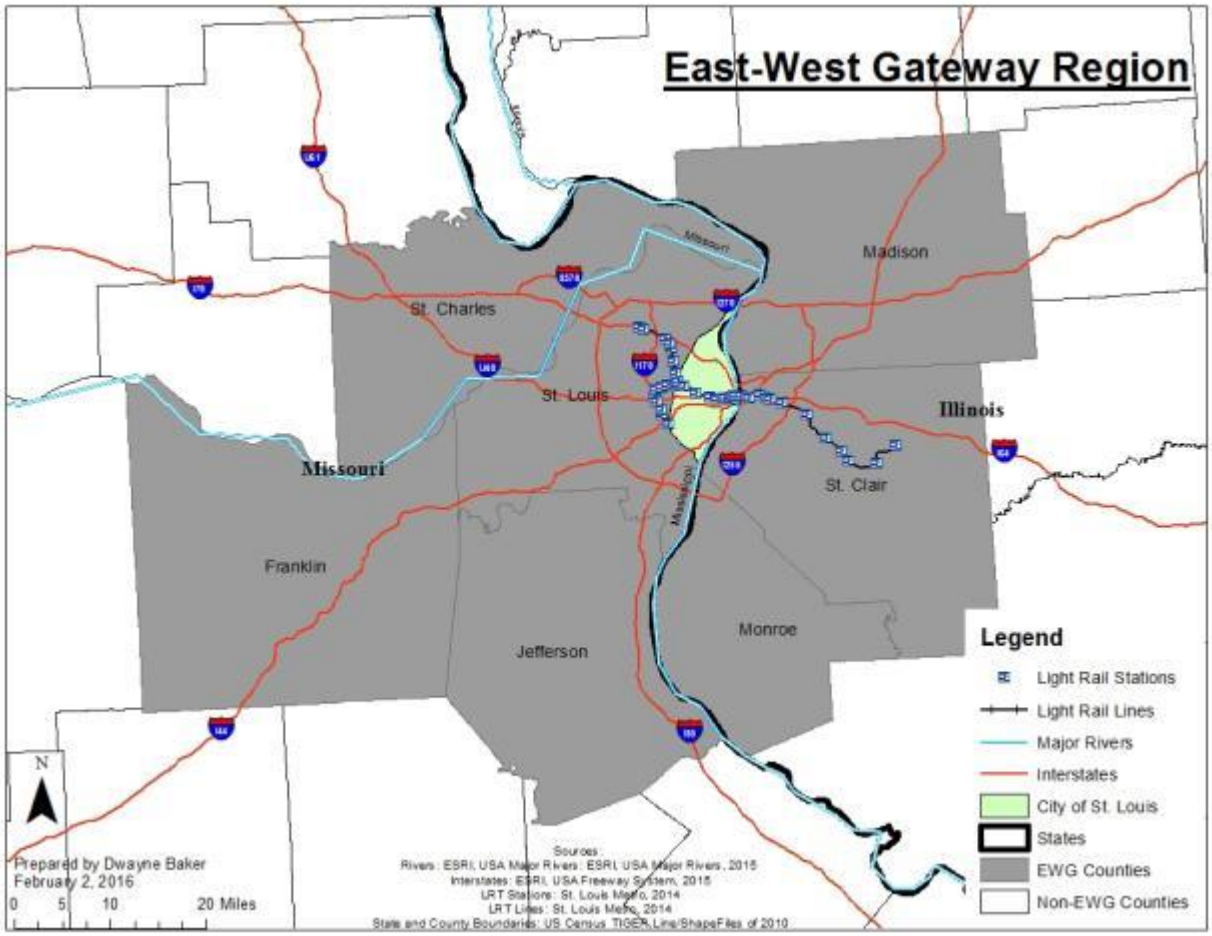
The context of the Delmar Loop (DL) plays an important role in shaping TOD activities. By context I refer to: 1) the different political and/or professional organizations operating within the St. Louis region and the Delmar Loop TOD site particularly, 2) where the Delmar Loop is

geographically/physically situated within the St. Louis region and 3) the neighborhoods, groups, and associations that make up the Delmar Loop. Providing the context before analyzing the activities provides a reference to better understand by whom, how, and where TOD activities occur.

Regional and local organizations.

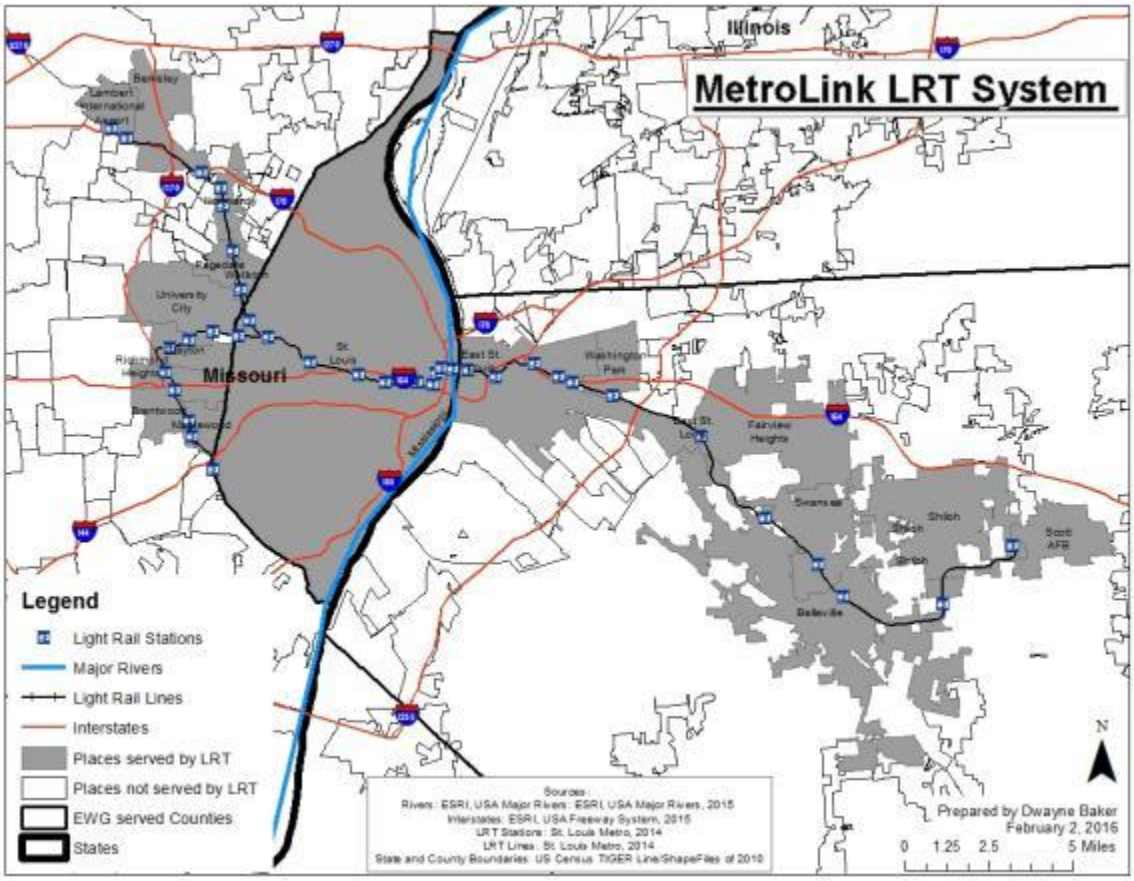
First, as indicated by the various plans for the St. Louis region, a number of organizations are key participants in St. Louis TOD activities. The East-West Gateway Council of Governments (EWG) is the Metropolitan Planning Organization (MPO) for the St. Louis region. As the federally mandated MPO, the federal government and the states of Illinois and Missouri provide EWG with the authority and responsibility to develop and adopt surface transportation system plans (EWG, 2007). EWG plans for and allocates federal and state transportation funds for the local and regional transportation projects. The EWG is also the regional council of governments (COG), which means that it serves as the region's planning agency overseeing and developing regional plans (EWG, 2007). **Figure 5.1** shows the extent of the EWG's jurisdiction.

Figure 5.1: Counties Covered by the East-West Gateway Council of Governments



Second, Metro Transit operates the St. Louis region's public transportation system. It operates MetroLink (the region's light rail system), as well as MetroBus and Metro Call-A-Ride (the region's paratransit service). **Figure 5.2** shows the extent of MetroLink. Besides opereating the light rail system, Metro also is a land-holder, owning land parcels in and around light rail station areas.

Figure 5.2: MetroLink Light Rail Transit System



The Loop Trolley Transportation Development District (TDD) is also a transportation entity in St. Louis and for the Delmar Loop specifically. The TDD is a political subdivision of the state of Missouri with the EWG serves as the project sponsor (EWG, 2014). The TDD is separate from Metro and specifically manages and operates the Delmar Loop trolley which is currently under construction. A private Delmar Loop business owner serves as the TDD board's chairman, along with the mayors of St. Louis and University City serving as part of the Board of Directors (TDD, 2015).

The St. Louis Planning and Urban Design Agency (PDA) along with two non-profit organizations also have key roles in TOD planning and projects for the St. Louis region. The PDA serves as the City of St. Louis's main planning agency. The St. Louis Development

Corporation (SLDC) is a non-profit corporation that aims to spur economic development in St. Louis. The SLDC was a key contributor to many TOD plans, especially the TOD Plan for the Delmar Loop and Forest Park-DeBaliviere. Citizens for Modern Transit (CMT) is also a non-profit transportation advocacy organization for the St. Louis region. It assists in creating, lobbying for, and acquiring funding for TOD and transportation plans and projects.

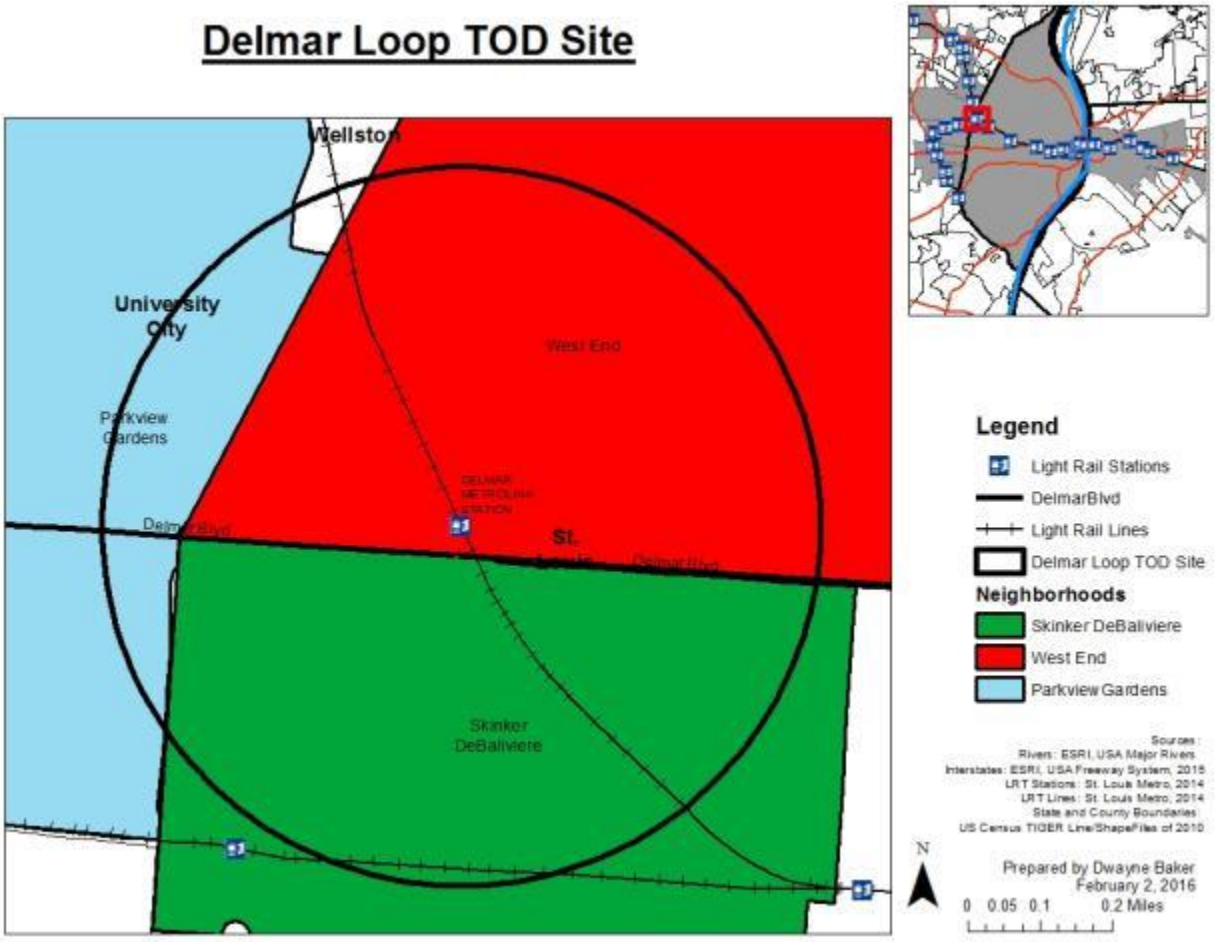
Delmar Loop divisions.

TODs are often regarded as single geographic and neighborhood spaces. However, a variety of different, long-standing neighborhoods and groups currently occupy and operate with the Delmar Loop TOD site. Figure 5.3 The Delmar Loop also extends across two municipalities and counties: the City of University City in St. Louis County to the west with the majority of the space located in the City of St. Louis. **Figure 5.3** shows the different neighborhoods within the Delmar Loop TOD site (West End, Skinker-DeBaliviere, and Parkview Gardens), the different municipalities it covers (St. Louis City and University City), and where the site is located in regards to the entire light rail (i.e.; MetroLink) system (with the inset map in upper right corner of the figure).

Delmar Loop residents reside in three existing and distinct neighborhoods: the West End in St. Louis, the Skinker-DeBaliviere neighborhood in St. Louis, and Parkview Gardens in University City (**Figure 5.3**). The West End has two main neighborhood associations: the West End Neighbors and SPUD (an acronym for the streets bordering the West End neighborhood: Skinker-Page-Union-Delmar). The St. Louis Association of Community Organizations (SLACO) is also located in the West End neighborhood. SLACO is an umbrella organization and provides resources (largely non-financial) for all St. Louis neighborhood organizations. The Skinker-DeBaliviere Community Council (SDCC) is a non-profit organization for the Skinker-

DeBaliviere (S-D) neighborhood. The Parkview Gardens Association (PGA) is also a non-profit organization fro the Parkview Gardens neighborhood. While the Delmar Loop TOD site overlaps all of these neighborhoods, these neighborhoods have vastly different histories and demographic contexts which often dictate the actual TOD and larger planning activities occuring in these spaces.

Figure 5.3: The Delmar Loop TOD Site & Neighborhoods

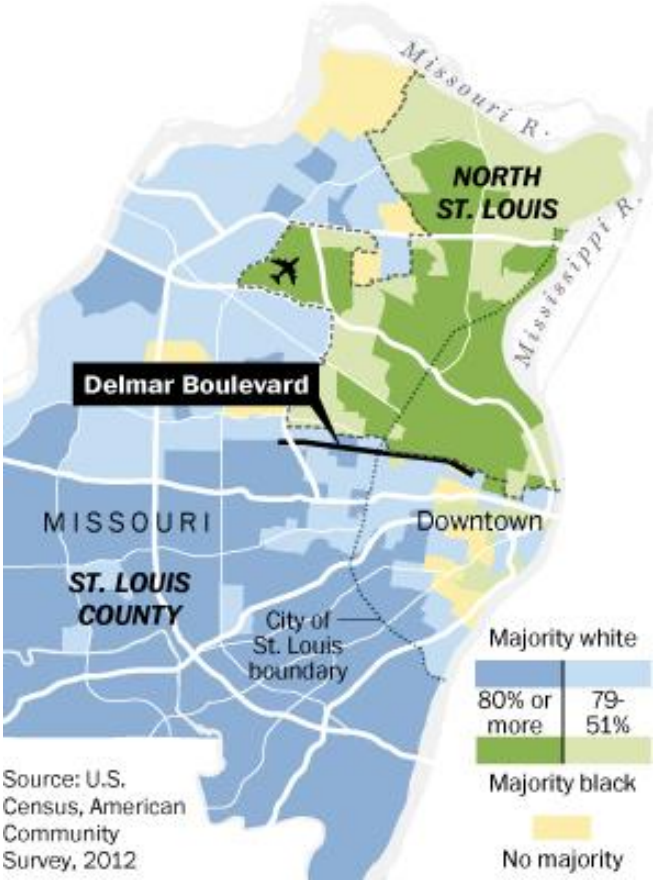


The Delmar Divide.

Delmar Boulevard separates the West End and Skinker-DeBaliviere neighborhoods. Delmar Blvd. extends throughout the St. Louis region starting near downtown St. Louis and runs west into St. Louis County. The Washington Post and BBC, though, infamously refer to Delmar

Blvd. as the Delmar Divide (Harlan, 2014; Strasser, 2012). **Figure 5.4** shows the Delmar Divide as presented by The Washington Post (Harlan, 2014). The Delmar Divide refers to Delmar Boulevard racially segregating St. Louis. Neighborhoods north of Delmar Blvd. are predominately black, while neighborhoods south of Delmar Blvd. are predominately white.

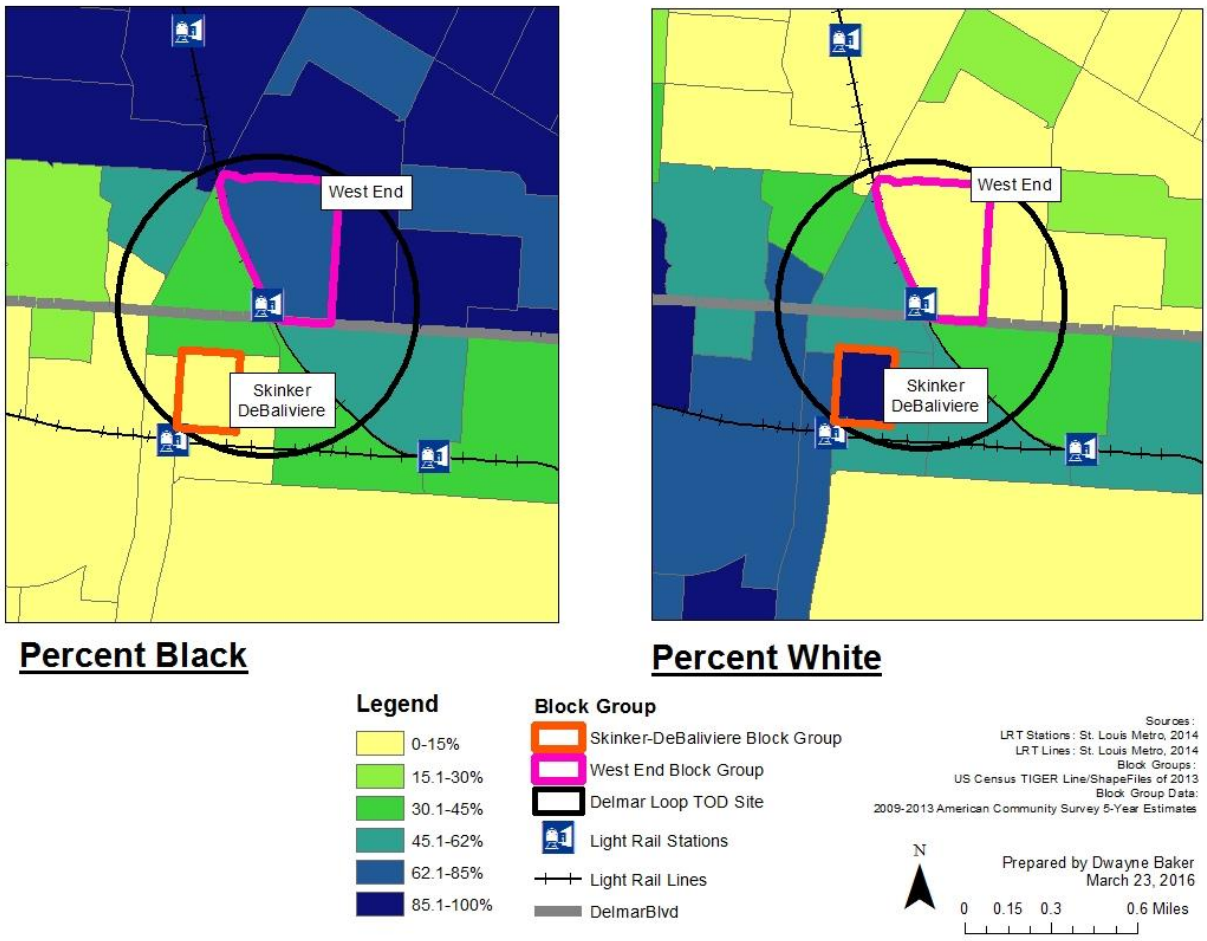
Figure 5.4: The Delmar Divide (Harlan, 2014)



The Delmar Blvd. runs directly through the Delmar Loop TOD site. Even though Delmar Blvd. is a main thoroughfare for the city and it also holds many businesses within the Delmar Loop TOD site, the TOD site's neighborhoods also adhere to this racially dividing line. The West End Neighborhood is north of Delmar Blvd. and the Skinker-DeBaliviere Neighborhood is south of Delmar Blvd. As of 2010, the West End Neighborhood as a whole was 85% black and

8% white (City of St. Louis, 2011).Meanwhile, the Skinker-DeBaliviere Neighborhood as a whole was 38% black and 50% white (City of St. Louis, 2011). However, if looking at the racial differences for block groups for each of these neighborhoods wholly within the Delmar Loop TOD site, these disparities become more startingly. **Figure 5.5** identifies racial disparities among the different block groups within the Delmar Loop TOD site – specifically between the West End Neighborhood block group outlined in purple (block group 3 in St. Louis City census tract 1053) and the Skinker-DeBaliviere Neighborhood block group outlined in orange (block group 3 in St. Louis City census tract 1051.98). As of 2013, the West End's block group had 83% black and 14% white residents (U.S. Census Bureau, 2014c). Also, the West End block group had a median housing value of $140,900 compared to $389,200 for the Skinker-DeBaliviere block group (U.S. Census Bureau, 2014b). Furthermore, the 26% of West End block group residents used public transportation as their means of transportation to work, compared with only 5% of Skinker-DeBaliviere block group residents (U.S. Census Bureau, 2014a). The Delmar Loop TOD site therefore provides a small window into viewing the larger disparities that occur throughout the St. Louis region.

Figure 5.5: Racial disparities among block groups within the Delmar Loop TOD site

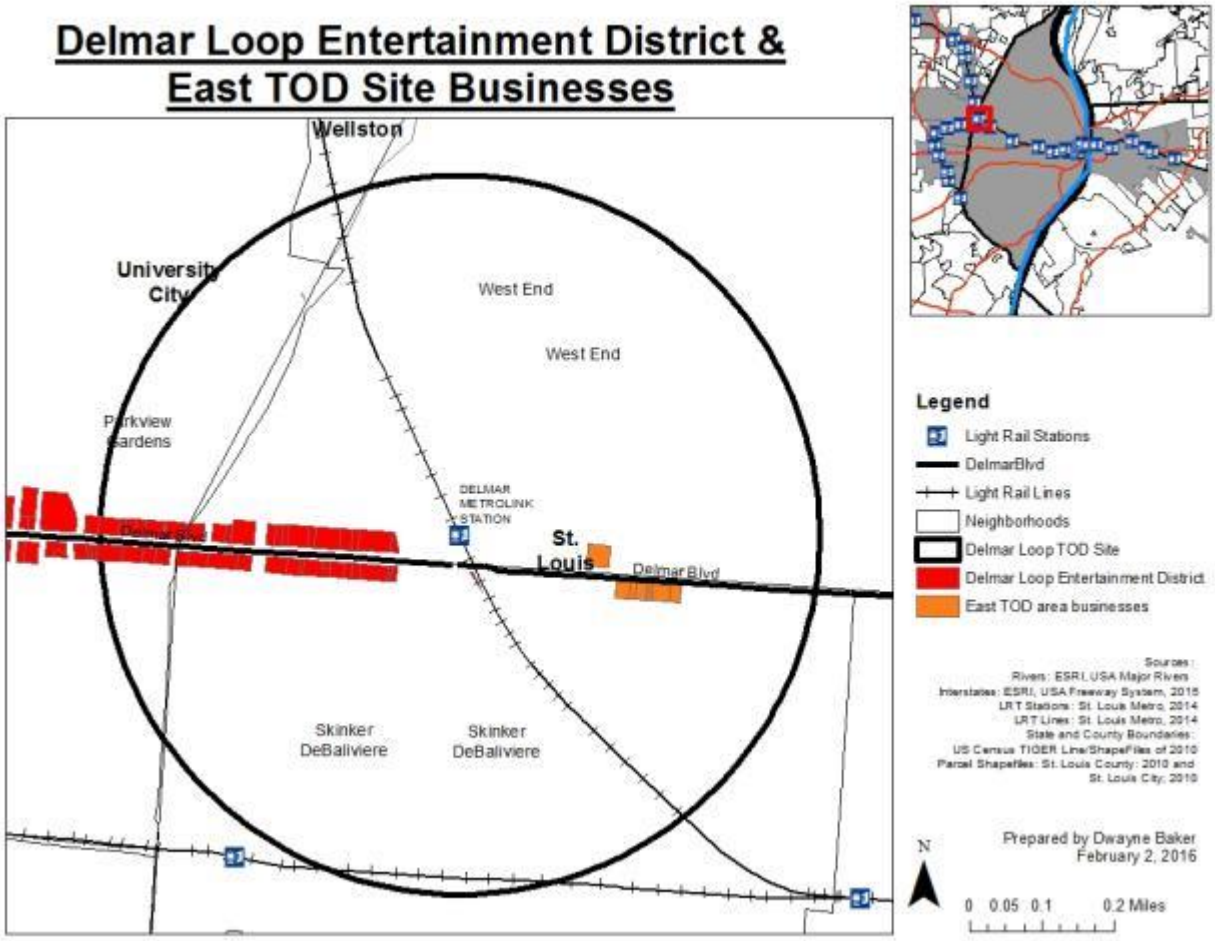


Competing and overlapping interests.

Besides overlapping multiple neighborhoods, various groups and organizations reside in the DL. Most importantly, Washington University (WashU) has a strong presence in the DL. The university's North Campus operates in the northwest portion of the DL. The North Campus is mainly administrative offices, but Washington University owns a large portion of land within the northwestern portion of the DL. Washington University's main campus resides roughly a mile south of the DL TOD site and much university housing is located close to the longer Delmar Blvd. and just west of the actual TOD site.

The more famous Delmar Loop Entertainment District or The Loop (DLED) resides on Delmar Blvd. in the eastern portion of the Delmar TOD site. It begins in University City, roughly about a mile from the DL TOD site's western edge and runs west into St. Louis City just up to the Delmar MetroLink (light rail) station. The East Loop and West Loop Business Districts make up the DLED (as seen in **Figure 5.6**). The Loop has been the site of a long-standing retail area since the 1930s when the initial Loop Trolley operated along Delmar Blvd (APA, 2007). After suburban expansion in the 1950s and 1960s, the area faced decline and desertion from businesses. However, Loop revitalization efforts began in the 1970s by local business owners and entrepreneurs. The Loop continued and continues to grow, eventually leading to the American Planning Association (APA) awarding the Loop portion of Delmar Blvd. its Great Streets designation (APA, 2007). The eastern portion of Delmar Blvd. within the DL TOD site also houses a few retail businesses (**Figure 5.6**). However, this section of the TOD site is largely deserted with many vacant lots and abandoned storefronts. It is not part of the DLED and it does not have an official business district designation.

Figure 5.6: DLED & East TOD Site Businesses



The Delmar Loop's context and planning activities?

A variety of stakeholders encompass the Delmar Loop TOD site. Each may ultimately have different interests, issues, and concerns. Politically (St. Louis City vs. University City/St. Louis County), socially (West End neighborhood associations vs. Skinker-DeBaliviere Community Council), and culturally (black vs. white, low-income vs. moderate- to high-income), then, the DL TOD site may be subject to different visions, leaders, and even participants in planning activities. Such activities can come in the form of activities related to procedural guiding principles such as developing TOD plans; designing, developing, and engaging in public participation meetings; seeking out and acquiring funding; or more activities

related to substantive guiding principles such as implementations and developments based on the procedural activities.

The remainder of this chapter identifies and analyzes the TOD activities related to the procedural guiding principles. With these activities, I refer to: a) developing a vision for the Delmar Loop TOD site – undertaken by planners and public officials; b) coordinating and engaging with key stakeholders and all impacted by this vision (i.e.; residents, business owners, developers, community groups, institutions) to implement this vision – undertaken by planners and public officials; and c) engaging with area stakeholders to create a vision for TOD – undertaken by planners and public officials.

Visioning and Leadership

Visioning and Leadership refers to the groups, agencies, or individuals pushing for TOD in the Delmar Loop and St. Louis TOD area, the plans they make for TOD, and the actions they take to make TOD a reality. Precisely, what direction did or does TOD planning take? Who decided this direction? And when and how did or does it occur? Proper visioning and leadership is essential for establishing inclusive neighborhoods as it helps ensure the involvement of all stakeholders in TOD activities as well as determining accountability for the direction and outcome of TODs throughout the region.

A late start: "We are slow to embrace it."

For the St. Louis region, there has largely been a lack of TOD visioning and leadership from the beginning of LRT operations. In this regard, then, pre-planning for TOD did not fully occur. By pre-planning, I refer to the development of plans and guidelines to guide development prior to LRT operations.

The Delmar MetroLink station opened in 1993. However, the first TOD plans for the station were made in 2013, with other regional TOD plans also not developing until 2011. Planners initially hoped that the MetroLink station itself would really spur development in the DL TOD area ("VW", personal communication, April 4, 2015). Public entities such as the Metro, East-West Gateway, or the City of St. Louis did not fully embrace TOD or general transit related developments at the onset of light rail operations. The Major Project Manager of the St. Louis Development Corporation (SLDC), who worked on the *TOD Framework Plan* (DesignWorkshop, 2012) from start to finish, noted that: "It was expected for development to occur without government intervention" ("MP", personal communication, May 21, 2015). What this project manager is indicating is that development around the station proceeded with little or no guidance from St. Louis planners.

This expectation of development proceeding without guidance, though, could be partly due to the political and cultural climate of Missouri. The Major Project Manager also noted that there is not a lot of transit funding in Missouri ("MP", personal communication, May 21, 2015). However, more funding could be acquired if the political leaders, planners, and key transit decision-makers more aggressively demanded transit funding for St. Louis ("MP", personal communication, May 21, 2015). Without planners or public officials developing transit projects, though, adequate funding cannot be identified: precisely, what transit projects are there to fund?

Additionally, the former executive director for the St. Louis Association of Community Organizations (SLACO), who also served as the planning division manager for East-West Gateway, indicated that in terms of business or housing developments, the banking community for St. Louis (and in general) is rather conservative and they do not really want to invest in something they do not know about ("CM", personal communication, May 19, 2015). Garnering

investments though, may also largely depend on governmental administration and who is in charge of particular agencies ("CM", personal communication, May 19, 2015). For instance, without the administrative head of Metro or EWG for example pushing for, prioritizing, and educating the public about TOD, investments may be difficult to acquire.

The lack of effort in trying to acquire transit funding or planning in anticipation of station openings highlights how LRT related developments and TOD specifically were not a regional priority at the onset of LRT operations ("MP", SLDC, personal communication, May 21, 2015). As SLDC's Major Project Manager explains about the regions stance on TOD: "We are slow to embrace it" ("MP", personal communication, May 21, 2015).

Past leaders and visions.

While public officials and agencies were slow to embrace TOD at the beginning of LRT operations, individual citizens, business owners, and developers did envision the future potential in developing around transit. Planning and development in the Delmar Loop area have been ongoing for roughly the past 4-four decades. Much of the past Delmar Loop activity began with local developer Joe Edwards. However, these developments were not officially TOD or even transit-related developments. Rather, they were entrepreneurial endeavors by business owners and developers seeking to revitalize a depressed area.

The developments that began in the 1970s and 1980s were to revitalize the Delmar Loop and especially University City's portion of Delmar Boulevard. The Delmar Loop got its name from the streetcars that would travel west from the City of St. Louis and into University City, "looping around" at the Delmar station before heading to other destinations (Loop Special Business District, n.d.). However, with sprawl and suburban development greatly expanding and with streetcar service officially ending in 1966, the Delmar Loop experienced a period of

decline. As with many urban areas, post-war suburban expansion caused many inner city and inner-ring suburban neighborhoods to become an afterthought in planning developments.

It was not until 1972 when Joe Edwards opened Blueberry Hill, a bar and restaurant, that the area began a push for revitalization. At the time of Blueberry Hill's opening, the Delmar Loop was in need of revitalization and the area was rather unsafe ("OS", personal communication, April 20, 2015). The public sector, though, had very little interest in this area at that particular time. Edwards, along with some of the other existing Loop area business owners formed a very loose-knit organization, one with no formal structure ("OS", personal communication, April 20, 2015). Essentially, Edwards and other business owners banded together and established a community – a community of business and land owners that would shape the Delmar Loop area's future growth. As their community was in need of safety and basic street infrastructure services like street lights and garbage removal, people would verbally commit $50 or so for things such as new lighting ("OS", personal communication, April 20, 2015). However, for the next 8 years, Edwards attempted to collect the money from the Loop business owners, but without much success ("OS", personal communication, April 20, 2015).

By 1980, though, the Loop business owners established the Loop as a special taxing district where the business owners essentially taxed themselves ("OS", personal communication, April 20, 2015). There is a limit to how much the business owners can tax themselves, though. There are two ways they can be taxed: 1) through real estate taxes from the businesses (the actual structures); and 2) they can tax themselves 50% of their business licenses. So, if a business license costs $100, the business would pay $150 with the extra $50 going to the special taxing district for neighborhood improvements ("OS", personal communication, April 20, 2015). By Edwards and early business owners taxing themselves for neighborhood infrastructure

improvements, they were filling a gap created by the lack of planning and public sector leadership.

Another important community activity undertaken in the Loop's revitalization period was the development of a neighborhood newsletter. This was very important as it let people know what was going on in the neighborhood. It also served as a voice for people to discuss some of the important topics there ("OS", personal communication, April 20, 2015). Both the taxing of business owners and the newsletter served to keep residents informed of neighborhood developments.

The LRT opening and the Delmar Loop.

Initially, not much development occurred around the station at the start of operations in 1993 due to: 1) planners expecting the private sector to initialize developments; and 2) the existing condition of the line and its surrounding area. First, as mentioned above, no public entities (Metro, the City of St. Louis, or EWG) developed any major plans or strict implementation activities to cohesively develop around the station. Planners and officials did not incentive developers to develop or entrepreneurs to open businesses near stations. At the outset, planners and public officials expected development to occur without public or government intervention ("MP", personal communication, April 20, 2015). The St. Louis region could also benefit from being the only Midwest region of its size with a light rail system.

Second, the LRT route tracks that holds the Delmar station was built on an old freight line. Metro, along with the City of St. Louis and EWG, did not build a new light rail line (i.e.; tracks and grade crossings), instead Metro used an existing freight rail line. One urban planner for the St. Louis planning and Urban Design Agency (the City of St. Louis's planning department) explained that as a freight line, early transportation planners and engineers did not

design the tracks to go through the best parts of town ("MD", personal communication, May 27, 2015). So, the light rail line now passes through some of the rough spots of town ("MD", personal communication, May 27, 2015). As such, many areas immediately surrounding the Delmar station, as well as other MetroLink stations within the city of St. Louis, sit under-used, vacant, and neglected.

In this regard, some of the areas with the most need for focused planning efforts within the City of St. Louis were not receiving them. Again, the LRT system's initial stations spanned across the city of St. Louis with extensions reaching the inner suburbs, areas in great need of revitalization and in-fill development. Additionally, these same areas (St. Louis city and inner ring suburbs and municipalities with light rail) have experienced decades of population and economic loss. Colin Gordon (2013) notes that in 1930, over 60% of St. Louis's 1.3 million regional population lived in St. Louis (p. 82). By 1970, the region expanded to include 2 new Missouri counties and almost doubled in population size to 2.36 million, but with only about 25% of the population in St. Louis City (Gordon, 2013, p. 82). By 2010, only about 10% of the total regional population of roughly 3 million people resided in St. Louis city (Gordon, 2013, p. 82). By 2010, a city that could accommoate well over 600,000 people only held under 300,000 residents. Concerted planning efforts in the mid-1990s and even early 2000s could have possibly halted or slowed the inner city decline. As vacant areas where people needed to access transit to access the regions, the light rail station areas could have and still hold development promise.

Some of the major developments for the Delmar Loop Entertainment District (DLED) and the DL TOD site, though, really began in the last 10 – 12 years, the Moonrise Hotel and the Pageant Theater among others ("HD", personal communication, May 4, 2015). According to the Vice Chancellor for Community Relations and Government Affairs at Washington University,

developers saw the light rail as really an impetus for developing in Delmar ("HD", personal communication, May 4, 2015). The station was initially not part of the DLED; there really was nothing there around the station and passengers would have to walk three or so blocks to get to the DLED ("HD", personal communication, May 4, 2015). The Vice Chancellor, whose work particularly examines off-campus community development projects in the DLED, described that once the initial developments started to come up, they showed that this was an area that could be developed and in this case, transit helped spur development ("HD", personal communication, May 4, 2015).

The development that did occur was due primarily to one local business owner turned developer and not leadership from public officials, entities, or agencies. Again, the same developer that helped revitalize the Loop in the 1970s and 1980s was the driving force behind TOD related development activities after the Delmar Loop station opened. Three or four empty blocks separated the Loop's (entertainment district) eastern edge from the Delmar Loop LRT station. Considered an "edgy" area, Joe Edwards thought that younger people would be ok going into "edgier" areas ("OS", personal communication, April 20, 2015). In 2000, he thus opened the Pageant Theater, a music venue catering to a younger (late teens to early 20s) to help draw people east of the already established Loop ("OS", personal communication, April 20, 2015). A variety of restaurants and retail establishments followed the Pageant, extending the Loop and forming the East Loop Business District.

Current leaders & future visions: No one knows what to expect.

Since the opening of the Delmar Loop station, the same organizations and individuals active prior to the station opening have been at the forefront of current DL TOD and DLED activities: namely, Citizens for Modern Transit (CMT) and individual developers. CMT holds

many public open houses attempting to educate the public on TOD and public transit use. Besides Joe Edwards, TOD or neighborhood planning for the Delmar Loop in general since the opening of the Delmar Loop station opening has been quite sparse. Again, only recently have plans or new developments occurred. This is largely due to the Obama Administration's Sustainable Communities Regional Planning Grant program (SCRPG) helped fund the current plans (re: Chapter 5). The SCRPG emphasizes collaborative planning among land use, transportation, economic development, and community development. Meanwhile, the sustained efforts from the Loop private business owners and developers have pushed for the construction of the Loop Trolley. Even with the new plans and developments, the Economic Development Project Manager for Metro Transit indicated that there are no direct steps taken by Metro for developing TODs ("WJ", personal communication, January 20, 2015).

One new mixed-use development recently opened along Delmar Boulevard to the east of the MetroLink station in anticipation of the trolley: the Gotham. The Gotham is a renovated structure which now holds market rate apartments on its upper floors with storefront commercial space. This space east of the MetroLink station has often been neglected in discussions of the Loop. However, once the Loop Trolley begins operations, there may be increased activity in this east TOD area ("OS", personal communication, April 20, 2015). This east TOD area is what one area developer with over two decades of development experience in the Delmar area referred to as a development hot-spot where developers "better jump on board now" ("FG", personal communication, March 30, 2015). This east area's potential largely stems from the anticipation of the Trolley along with developers' and planners' long-held neglect of the area. Even still, the Vice-President for the St. Louis Design Alliance, a Delmar Loop area development agency,

indicated that the Delmar MetroLink station served as a strong positive influence for developers to rehabilitate the Gotham building ("FG", personal communication, March 30, 2015).

One planner for EWG noted that TOD in light rail station areas in general and the DL specifically may spur much needed (economic and population) growth for the region's station area neighborhoods and that there are a lot of expectations and hope ("WJ", personal communication, January 20, 2015). Even with the new plans and developments, the Economic Development Project Manager for Metro Transit indicated that there are no direct steps taken by Metro for developing TODs and no one really knows what to expect ("WJ", personal communication, January 20, 2015).

Additionally, one of the biggest challenges identified by the Senior Manager for Environment and Community Planning at EWG for the Delmar Loop TOD site is ownership of land ("VW", personal communication April 1, 2015). Bi-state Metro owns much of the land surrounding the stations and they could initiate developments according to this planner ("VW", personal communication, April 1, 2015). He adds that while they have not done so in the past, Metro has shifted in recent years from a more passive role to actively trying to and planning for development where they have land ("VW", personal communication, April 1, 2015).

Conclusion on Visioning and Leadership: Private interest activities.

Private developers have been at the forefront of TOD activities in the Delmar Loop leading overall development. These leaders/developers have essentially created and are creating the Delmar Loop according to their own visions. These visions largely include developing the area as an Internet Technology (IT) center and as a regional commercial and cultural attraction.

Historically, planners and public officials took a passive role in TOD activities at the Delmar Loop site. Some stakeholders, though, view a change occurring with planners and public

officials taking a more active role in TOD activities ("VW", personal communication, April 1, 2015). Yet, other agency officials feel that there needs to be a private market for TODs ("WJ", personal communication, January 20, 2015). Metro's project manager for economic development explained that the public sector just does not go in and start developing TODs because the private sector, developers and the community, determine what the area needs and wants. ("WJ", personal communication, January, 20, 2015). Yet, the owner of the Wabash station building (which once served as the main transit terminal for the previous Trolley and now sits abandoned above the existing Delmar MetroLink station platform), hopes that Metro would decide to do something interesting with the building like turn it into the main Delmar Station ("OS", personal communication, April 20, 2015).

This hands-off approach by the public sector, though can be problematic especially if private developers only have their own interests at stake, which is largely the case. According to Joe Edwards, developers are usually bottom-line oriented and want to make money, but he would like to seem more idealistic developers come into the area ("OS", personal communication, April 20, 2015). As Edwards explains:

> My main concern is that the wrong types of businesses will come into the neighborhood. By wrong types of businesses, I mean national chains. We want to draw businesses that will draw a lot of people into the area. So, why would people come to the area to go to a Chipotle which has like 25 or 30 locations when they could go elsewhere for the same thing? We want unique businesses that draw people into the area ("OS", personal communication, April 20, 2015).

On the other hand, the area east of the MetroLink station faces a whole different set of challenges than the revitalized East and West Loop Business Districts. The east DL TOD area needs revitalization and attention. The West End neighborhood may not have the luxury to choose which types of developments come into the area, especially in the absence of a cohesive business community representing the area's interests. For example, one West End resident noted

that it would be nice to have a Starbucks come into the area ("DM", personal communication, November 23, 2015). Just having a coffee shop, period, would greatly benefit the neighborhood ("CM", personal communication, May 19, 2015).

The Delmar Loop's revitalization efforts, especially in the retail portion of the site benefitted from having a business owner and developer who has maintained an active role in developing the businesses and the community as a whole. Moving forward with TOD activities, though, this may not always be the case and it appears that the area is now a "hot-spot" that developers can profit from. Going forward, in the absence of public sector leaders shaping and navigating TOD activities, individual developers may use the LRT and the Delmar Loop TOD space as a commodity to use, develop, and potentially abandon when it becomes no longer profitable.

Public Participation and Engagement

In this section, I identify how planners engaged (and continue to engage) with key community stakeholders and how the stakeholders participated (and continue to participate) in developing TOD plans. I also identify how stakeholders have informed and continue to inform TOD development decisions such as the planning and opening of the Loop Trolley. By public participation I refer to the active role communities, community organizations, and/or individual residents take in TOD planning activities. By public engagement, I refer to the actions public agencies such as EWG, Metro, or the City of St. Louis take to include communities, community organizations, and/or individual residents. During a CMT Speaker Series event, Rosa Ortiz, the Program Director for Chicago's Enterprise Community Partners (an organization to develop affordable housing) noted that planners must know their audience and the communities in which

the TODs are built. Planners must also be prepared to revise, re-plan, and work with the community to set clear goals, making public participation and engagement a fundamental TOD activity (personal communication, March 12, 2015). Overall, planners have actively engaged the public with much participation in Delmar Loop TOD activities. However, primarily residents, groups, and/or agencies from the Skinker-DeBaliviere Neighborhood actively participate.

Main public participation and engagement activities.

TOD plans and Trolley and related activities.

When asked if public participation was vital in TOD plan making, one EWG planner emphatically responded: "Oh yeah!" ("VW", personal communication, April 1, 2015). He further elaborated that there was a pretty good community engagement process undertaken with a series of meetings to get the communities' input on the plans and their visions for the *St. Louis TOD Framework Plan* ("VW", personal communication, April 1, 2015). The plan making also had a very good steering committee which was sponsored through funding from the Sustainable Communities Regional Planning Grant and included representatives from a variety of agencies ("VW", personal communication, April, 1, 2015).

The Skinker-DeBaliviere Community Council (SDCC) was particularly involved in helping plan the *St. Louis TOD Framework Plan* as well as the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* ("MP", personal communication, May 21, 2015). Additionally, many of the meetings for the *St. Louis TOD Framework Plan* were held in Skinker ("MP", personal communication, May 21, 2015). Besides the SDCC, the previous head of the West End Neighbors also participated in planning for the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* ("DM", personal communication, November 23, 2015). The SDCC also

developed their own neighborhood master plan for the Skinker-DeBaliviere neighborhood, taking an active role in determining the direction of neighborhood planning.

Additionally, even though the Gotham building is a for-profit development, one of its principal developers noted that developers did seek residential and community input for its restoration ("FG", personal communication, March 30, 2015). St. Louis Design Alliance along with Delmar Properties re-designed and developed the Gotham into a multi-use facility. Delmar Properties owner noted that if doing any sort of development in St. Louis, or in the Delmar area particularly, it would be wise to reach out to some groups ("FG", personal communication, March 30, 2015). While it was not necessary, he also indicated that they sought out different groups in the neighborhood and got support from the local aldermen ("FG", personal communication, March 30, 2015).

As for the planning of the Loop Trolley, the TDD chairman expressed that "all (businesses) have been invited" to participate and have public input ("OS", personal communication, April 20, 2015). Due to public input, one of the trolley stops was even moved ("OS", personal communication, April 20, 2015). As the trolley is a major component of the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations,* is essential in ensuring inclusivity in TOD activities.

Non-engagement.

Delmar Loop TOD planning has benefitted from active participation and engaged communities. The revitalization of the commercial and retail area of the TOD site began with the active engagement of the business community. While much of the participation and engagement stems from the DLED business owners and the SDCC, it is also important, though, to examine who has not participated and who is not engaged in TOD activities.

The Trolley Development District (TDD) chairman indicated that all businesses were approached to provide input for the trolley ("OS", personal communication, April 20, 2015). However, some evidence suggests that not all businesses were actually reached. For example, when asked if anyone from TDD, the City of St. Louis, or any key decision makers involved with the Delmar Loop TOD and Trolley reached out to him, one business owner in the area east of the MetroLink station directly responded: "No, not at all" ("LY", personal communication, April 14, 2015). Another business owner in this area indicated: "Yea, someone came in from them (the TDD) a while ago to let us know about the plans and everything, but haven't really been back. We haven't seen them again" (personal communication, May 22, 2015). As business owners with stakes in the community, their input may have been invaluable in addressing and overcoming some of the existing disparities in the area, especially for the West End neighborhood.

Public agencies (city of St. Louis, Metro, EWG, as well as the TDD) also did not seek SLACO's input in TOD planning or trolley developments ("CM", personal communication, May 19, 2015). This may be due to not many people knowing about SLACO ("CM", personal communication, May 19, 2015). As the umbrella organization for St. Louis neighborhood and community organizations, and especially as its headquarters are in the West End, SLACO could have provided necessary input in attempts to revitalize the Delmar Loop's West End area.

Nonchalance or just years of neglect and lies?

At the same time that key TOD and transit decision makers did not engage certain groups and businesses owners to participate in development activities, these same business owners did not actively attempt to participate in on-going DL TOD activities. The business owners who previously stated that neither the TDD nor other public officials reached out to them also

indicated that they made no attempt to participate in planning activities ("LY", personal communication, April 14, 2015; "NH", personal communication, May 22, 2015). Even SLACO did not seek inclusion in any new developments in regards to the Delmar Loop TOD ("CM", personal communication, May 19, 2015).

One West End resident and recent president of West End Neighbors indicated that people need to get involved and take ownership of the neighborhood ("DM", personal communication, November 11, 2015). The SDCC has taken a proactive approach to its neighborhood development. The SDCC coordinated a neighborhood plan that the city of St. Louis plans to adopt for the neighborhood ("MD", personal communication, May 27, 2015).

The West End neighborhood has not taken such a proactive approach and generally reacts to new developments after they have direct impacts on the neighborhood (personal communication, November 14, 2015). For instance, one business owner whose business opened in the east DL TOD area within the West End three years ago thought that while the Trolley may be a good thing, he is "just waiting to see what will happen" ("LY", personal communication, April 14, 2015). Similarly, while the business owners in this same area all generally know each other and maintain good relationships, no one has collaborated with each other for any neighborhood improvements ("LY", personal communication, April 14, 2015; "NH", personal communication, May 22, 2015).

Yet, the SDCC communicates DL TOD activities to other neighborhood groups and residents and holds open (and free), public meetings to anyone interested ("DM", personal communication, November 23, 2015). However, according to one West End resident and head of West End Neighbors, people north of Delmar do not go to the SDCC meetings ("DM", personal communication, November 23, 2015). At the same time, he views this lack of participation and

community ownership as a direct result of years of the key decision-makers (i.e.; from Metro, TDD, the City of St. Louis) neglecting and lying to West End residents ("DM", personal communication, November 23, 2015).

Who participants and why?

Roughly 75 people attended the Citizens for Modern Transit (CMT) Speaker Series event where Rosa Ortiz spoke. The event, titled "Community Development through Transportation Infrastructure? Transportation's Impact on the Neighborhood," focused on how transportation and especially TOD can improve and help revitalize neighborhoods and communities. However, professionals working in transportation and community development from the public sector (i.e.; CMT, Metro, EWG, Washington University) made up the audience, with hardly any community residents present (personal communication (March 12, 2015). The main reason for this largely could be due to the meeting being held at 8 A.M. (the start of the work day) and participants needing to pay a $12 fee to attend. This indicates that the people who needed to understand the activities affecting their daily lives may have had limited access to the space and discussion which would provide useful information. Essentially, while the meeting aimed to benefit the community, it was largely targeted to professionals.

The event did show, though, that the public (whether planners or the public sector as a whole) are actively engaging in and eager to embrace TOD. However, how and why people (again, the public sector and also developers) want increased TOD activity remains in question. TOD can help spur economic development – which is much needed for the Delmar Loop site. It can also help provide access and needed neighborhood infrastructure and service improvements such as new grocery stores. One audience member specifically asked about providing grocery stores for the DL TOD site. The events' panel members (who represented a development agency,

St. Louis's Planning and Urban Design Agency, St. Vincent Greenway, and Washington University) responded that a grocery store recently opened up: United Provisions. This prompted the audience member to respond that this store really did not serve the needs of the community as a whole and mainly serviced Washington University students as it sits in the heart of the DLED and just adjacent to a Washington University housing complex. The panel provided no further response, while the event moderator promptly moved to another question (personal communication, March 12, 2015).

Many stakeholders indicate that CMT does a lot for community involvement ("WJ", personal communication, January 20, 2015; "OS", personal communication, April 20, 2015). However, which community needs to be clarified. While this is just one such meeting, it may indicate that key Delmar Loop decision makers do not have strong ties to the non-business/ development/professional community that resides in the DL space, and especially within the neglected West End neighborhood. More importantly, though, it shows that particular interests can be simply ignored.

Conclusion on Public Participation and Engagement.

Largely stemming from the lack of public sector and planning involvement in TOD at the Delmar Loop site, private business owners and developers have stepped up to lead TOD activities here. In recent years, the Skinker-DeBaliviere Community Council has also taken an active role to engage with the City of St. Louis in Delmar Loop TOD and neighborhood planning activities such as developing plans for the Skinker-DeBaliviere Neighborhood.

As I noted before, a key component of inclusivity is access to decision making processes. While I found there to be active participation and engagement in regards to TOD activities at the Delmar Loop site, mainly private developers and residents and groups located in the Skinker-

DeBaliviere neighborhood participated. In the event of Loop Trolley developments and planning, business owners east of the MetroLink station were not actively sought out for their input in the plans, indicating that business owners directly impacted by the trolley developments did not have direct access to the decision making processes that would directly impact them. This lack of participation and engagement may result in further disparities within the TOD site and especially marginalizing the West End Neighborhood.

However, the business owners also did not seek to participate themselves. East of the Delmar MetroLink station, business owners did not develop, promote, or implement their own community agendas, needs, or wants. For example, one minority business owner who has owned and operated his business in the area east of the MetroLink station for over the past five years, noted that if there should be new developments (like the trolley line construction), residents in the neighborhood (West End) should get the jobs ("LY", personal communication, April 14, 2015). He also vented that: "It don't make sense to have $40 million developments and no one in this neighborhood can get a job" ("LY", personal communication, April 14, 2015). At the same time, he also indicated that he did not go to public engagement events or reach out to the TDD ("LY", personal communication, April 14, 2015). On the one hand, this particular business owner expressed his concern for the lack of jobs for community residents, However, without him being present at meetings or consistently informing the Trolley Development District (TDD), Citizens for Modern Transit (CMT), or planners from EWG or the City of St. Louis of the issues they face in their communities, planners and public and private agencies (EWG and the TDD) may continue overlooking such issues.

Planners, especially from the EWG and the City of St. Louis were the main planners negligent in public engagement and participation activities at the site. But, they also may cover

large spaces and multiple projects which do not fully focus on the Delmar Loop TOD site. This, coupled with their indifferent approach to TOD planning activities, makes it even more important for community residents and business owners to continue making their issues known to planners.

Conclusion

TODs are often developed as one homogenous space. However, the existing conditions of these existing spaces must not be overlooked. The Delmar Loop site provides a key example of how existing conditions may include multiple neighborhoods, histories, leaders, and visions for future development. However, these existing conditions may not entirely overlap, causing disparate lived experiences for the residents.

The Delmar Loop TOD site has largely suffered from a lack of direct and active public sector leadership – and particularly leadership from transportation, community development, and TOD planners. I say "direct" and "active" leadership largely because the planning community and public sector officials are and have been conscious of the TOD activities that need to take place; they just chose to allow others (i.e.; developers and private business owners) to act without public sector hindrance.

Direct and active planning leadership, though, is essential for inclusive development because it can help ensure that private interests do not create detrimental impacts for disadvantaged groups. Effective leadership must act impartially and justly for it to be considered inclusive. That is, in the absence of complete public participation, leadership must act in accordance with the overall public good and not just based on the wants and needs of particular spaces or the most vocal and resourceful residents and groups.

Considering that the East-West Gateway (EWG) is the region's MPO, I contend that EWG planners should lead and coordinate TOD activities for the entire region. They should develop a regional TOD agenda that identifies specific aims for the region with clear indication of how each station can contribute to the aims. To actually implement the goals of these plans in TOD across the region, the EWG should allocate federal transportation funds based on how the municipalities are meeting the EWG's set transportation goals. As the MPO, the EWG does have influence over the allocation of federal transportation funds to the region's different municipalities. Doing so, may better ensure cooperation among the different agencies with planners involved in TOD planning. However, this would involve great will on the part of the EWG planners to plan and push a coordinated TOD agenda.

Unfortunately, I do not envision EWG planners leading procedural TOD planning activities such as guiding the development of TOD plans or coordinating key stakeholder efforts across the region and at the Delmar Loop TOD site specifically in the near future – within the next 5 to 10 years. This is due to outside entities (Obama Administration, private business owners and developers) other than public sector planning agencies like EWG and the City of St. Louis have so far dictated the direction of procedural TOD planning activities. First, the development of TOD plans has only occurred after 20 years of LRT operations and mainly due to the Obama Administration's Sustainable Community Regional Planning Grant (SCRPG) which provided a funding source and set goals for TOD planning. Previously, planners from EWG maintained an indifference to acquiring funding and/or setting goals for TOD planning and implementation. Additionally, the sustained revitalization efforts of Delmar Loop Entertainment District developers and business owners built the Delmar Loop into an attractive space and destination for St. Louis. Private developers and business owners have led past, present, and

foreseeable future Delmar Loop planning activities. Without the EWG or the City of St. Louis shifting from being reactionary (reacting to federal initiatives or local developers) to proactive (establishing an inclusive agenda for TOD), EWG and City of St. Louis planners may continue to abandon undertaking procedural TOD planning activities.

In the absence of public sector activities, private business owners may need to fill the void to bring attention to community concerns to drive EWG planners to undertake TOD planning activities. That is, to push planners to want to undertake procedural activities. In the absence of direct and active planning leadership, a few key citizens and groups emerged and created an identity for the Delmar Loop. These private leaders helped establish the Delmar Loop area as a regional commercial and cultural attraction. These private leaders established the Delmar area as a revitalized entertainment district in the decade prior to and the early years of the MetroLink station opening.

But, this identity was not really for the entire DL TOD site initially. Residents, business owners, and private developers initially revitalized the portion of Delmar Boulevard that was familiar to them. This is not necessarily a bad thing and the revitalization activities of the early Delmar leaders, namely Joe Edwards, can provide a blueprint for future revitalization and community development activities in other areas. The actions of Edwards and his peers, along with the current activities of the head of the West End Neighbors, highlights the importance of individuals and groups taking control over their environments to shape them as they see fit.

Meanwhile, as one area of the DL TOD site increased in importance and prominence (the Delmar Loop Entertainment District and Skinker-DeBaliviere), another area became increasingly overlooked and neglected (the West End) by the public sector and especially planners. The public sector's increasing interest in DL TOD largely revolves around the establishment of the

space as a regional commercial attraction and the accepted public participation input largely revolves around this vision. Residents and groups not necessarily part of this vision or who have been neglected in activities in previous years have largely chosen not to participate in DL TOD planning activities. Without substantial participation from these marginalized groups and especially without substantial active and direct planning leadership, the vision of private developers and influential residents may continue to silence those already marginalized voices.

Chapter 6: What are the St. Louis and Delmar Loop Planning Actions? Examining the Actions Associated with Substantive Guiding Principles

Chapter 5 identifies the Delmar Loop TOD activities related to the Procedural Guiding Principles. In this chapter, I identify and analyze the actual (and lack of) TOD activities undertaken in regards to TODs' Substantive Guiding Principles at the Delmar Loop TOD site and for St. Louis TOD in general. The Substantive Guiding Principles include: 1) Transit-supportive Land Uses; 2) People-Focused Urban Design; and 3) Regional Connectivity and Multi-modal Integration. I use interviews and direct observations as described in Chapter 5 to determine the activities undertaken in regards to these guiding principles.

By TOD activities, I refer to plan making, plan implementation(s), and development(s) related to the plans. I categorize the TOD actions as relating to either Procedural or Substantive Guiding Principles. I identified and analyzed actions related to Procedural Guiding Principles in Chapter 5. Here, I identify and analyze actions related to Substantive Guiding Principles. In **Table 6.1**, I present the TOD actions, and more importantly, the expected inclusive TOD actions indicated by the literature as revealed in Chapter 2 for the Substantive Guiding Principles. Particularly, these inclusive activities should include: a) developing and enabling zoning to provide for a mix of land uses (and especially affordable housing) conducive to transit (i.e.; particularly light rail) use throughout the site; b) constructing the necessary infrastructure for all TOD residents to access light rail transit and the transit station specifically; and c) designing and developing the site to allow all possible residents to access needed amenities (i.e.; employment or recreation destinations). By identifying and analyzing such activities, I answer the following, respective questions: a) How have plans addressed TOD zoning and mixed land use?; b) How can residents access the Delmar MetroLink station and the entire TOD site?; and c) Who

occupies and how are different spaces within the Delmar Loop TOD site occupied? Since researchers and planning agencies consider TODs as *planning* tools (Belzer, Autler, & Strategic Economics, 2002, p. 8; City of Austin, n.d.), I identify planners as being the main actors needing to engage in these inclusive activities and I answer the above questions as they relate to planners.

Table 6.1: TOD Activities related to Substantive Guiding Principles

General	Guiding Principles	Activities (Related to Guiding Principles)	Expected Inclusive Activities (From Existing Literature)
TOD Plan Implementation/Developments	Transit-supportive Land Uses	Enabling TOD conducive zoning (in plans themselves and adopted by planning agencies and/or planning commissions)	Enabling the provision of amenities (i.e.; childcare services, parks, employment, grocery stores, recreation, etc.) for all possible residents
		Planning Mixed Land Use	Developing zoning to provide for a mix of land uses (especially to maintain existing or future affordable housing)
	People-focused Urban Design	Developing and/or Improving Infrastructure (i.e.; constructing sidewalks, lawn/greenspace maintenance, ensuring lighting)	Designing and constructing station for the needs of all possible residents
	Regional Connectivity and Multi-modal Integration	Siting transit routes	Connections to and from the TOD site without prohibitive costs (i.e.; time and money)
		Providing Transit Connectivity	Connections with other transit modes limiting travel times and costs

Overall, I find that zoning for the space is not conducive to developing an inclusive site as planning has overlooked one portion of the TOD site (West End Neighborhood) in zoning decisions as well as in urban design. Also, while displacement due to new developments is not an immediate concern due to changes in land use (i.e.; housing developments), TOD activities do not include measures to stem displacement.

The remainder of this chapter analyzes key TOD activities in regards to the Substantive Guiding Principles. However, as with the guiding principle of Acquiring Adequate Funding in Chapter 5, the interview and observation data I collected does not directly address issues of Regional Connectivity and Multi-modal Integration. Regional Connectivity and Multi-modal Integration refers to the Delmar Loop station and TOD site being connected to other stations and the region. However, the interview and observation data primarily refers to the internal connectivity within the Delmar Loop site itself. I address issues related to automobile parking, as well as pedestrian and bicycle transit within the site, but largely as they relate to other guiding principles such as Transit-supportive Land Use. The lack of interview and observation data related to connectivity and integration do not however, indicate Regional Connectivity and Multi-modal Connectivity as an unimportant guiding principle. Rather, it suggests the need for further research focusing on TODs' connectivity with each other and the entire region.

Transit-Supportive Land Uses

Transit-supportive Land Uses (TSLU) refers to ensuring that transit, in the form of light rail, is the central focus of the TOD area. The *TOD Framework Plan* (2013) prepared by Design Workshop for the East-West Gateway Council of Governments (EWG) specifically states that "TOD should be served by land uses that encourage transit ridership" (p. 56). TSLU regulations should therefore support public transit and high pedestrian activity generators (Design Workshop, 2013, p. 56). The *TOD Framework Plan* (2013) further suggests the following mix of uses as ideal for TOD: 1) "a wide variety of residential choices"; 2) large office buildings located closer to the transit station and smaller office buildings located throughout the TOD site; 3) pedestrian access to community services (i.e.; libraries, museums, childcare, schools) throughout

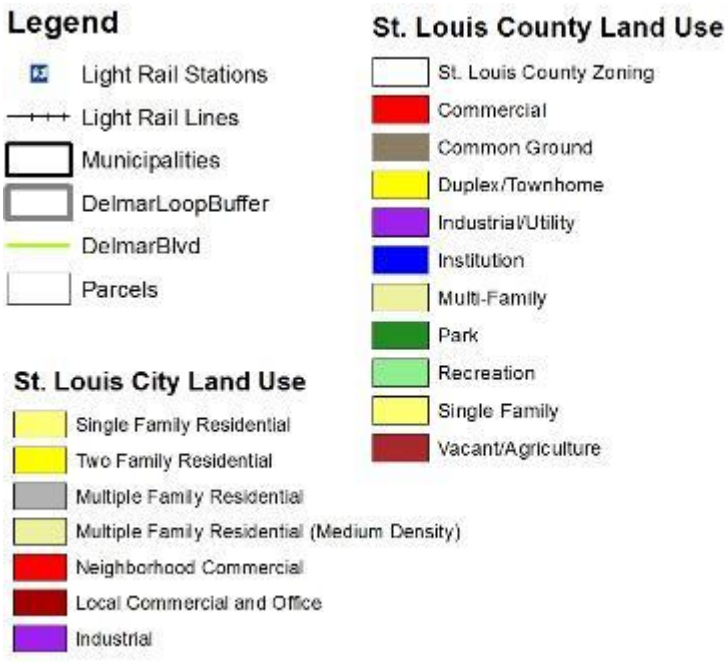
the site; 4) “public gathering places, including parks, plazas, and courtyards”; 5) ground floor of transit and parking facilities should hold retail; and 6) new developments should blend with the site’s existing architectural character (p. 56). Overall, TSLU should support a variety of land uses that support transit and can accommodate a wide range of residents.

TOD zoning.

Figure 6.1 and its accompanying legend **Figure 6.2** show the existing land use present at the Delmar Loop (DL) TOD site. The DL TOD site currently has a variety of allowable land uses with commercial land uses largely designate along Delmar Boulevard (red and maroon colored parcels in **Figures 6.1** and **6.2**) and of residential housing options (yellow and tan colored parcels in **Figures 6.1** and **6.2**) located just north and south of this main thoroughfare.

Figure 6.1: Delmar Loop TOD Site Existing Land Use

Figure 6.2: Delmar Loop Land Use Map Legend for Figure 6.1



Currently, though, the area is not covered by any distinct TOD overlay zoning. With TOD overlay zoning, an overlay zone is placed over the existing, base zoning for an area (Design Workshop, 2013, p. 60). An overlay zone "modifies, eliminates, or adds regulations to the base zone" (Design Workshop, 2013, p. 60). For example, if the base zone has parking minimum regulations, adopting TOD overlay zoning for an area with transit access may limit parking requirements to provide increased pedestrian access at the site (H3 Studios, 2011, p. 107). It allows planners and developers to implement developments that would better align with TOD and increased transit use. At the Delmar Loop site for example, large portions of the area, especially in the West End neighborhood just east of the MetroLink station, are zoned as single-family residential. Having a TOD overlay zone or a Form-Based District (FBD) regulation would allow for more multi-use housing – increasing the site's residential density which could possibly increase transit ridership. Currently, planners as the St. Louis Planning & Urban Design Agency are recommending a form based overlay district to the City Planning Commission that would supersede some of the existing zoning in some of the station areas across the City of St. Louis ("MD, personal communication, May 27, 2015). According to one St. Louis city planner, the recommendation for TOD overlay zoning was "a direct implementation as part of the plan (*TOD Framework Plan*) ("MD, personal communication, May 27, 2015). However, since the Delmar TOD site has a specific TOD plan that was prepared for the City of St. Louis (by H3 studios) rather than the East-West Gateway (by Design Workshop), the *Transit Oriented Development Plan for the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* recommends specific recommendations for the Delmar Loop site.

Conventional zoning separates land uses and has specific requirements for different types of land uses such as density floor area ratios (FAR), parking requirements, or building heights.

FBDs or Form-Based Codes (FBC) emphasize the character (or form) of developments (whether buildings or public spaces, for instance). In this regard, FBCs focus "more on scale, intensity of development, the shape of public spaces, and the interrelationships between buildings (CMAP, 2014, p. 9). While FBCs still include land use, they focus more on how the physical forms of developments interact with one another and relate to the design standards for the entire FBD.

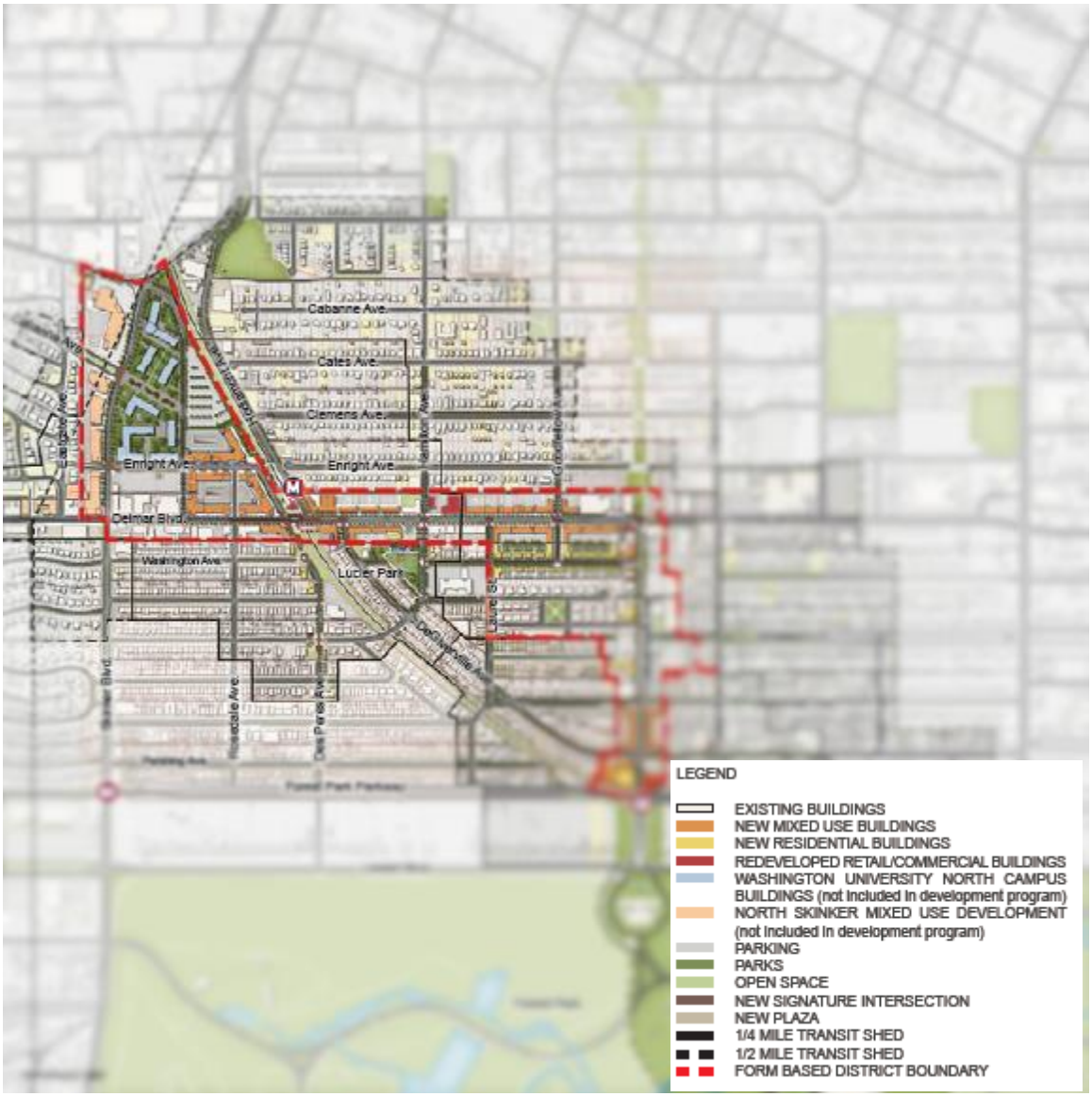
The *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* specifically recommends that the City of St. Louis implement a Form-Based District (FBD) for the DL TOD site (H3 Studios, 2013). The FBD would regulate and guide the area's developments. The FBD would serve as an overlay zone, superseding the existing zoning for the Delmar Loop parcels (H3 Studios, 2013).

According to the *Transit Oriented Development Plan*, establishing a FBD for the DL TOD site would guide more pedestrian- and transit-focused developments (H3 Studios, 2013). The Delmar Loop TOD Plan proposes to concentrate commercial activity and neighborhood services along Delmar Blvd. (and DeBaliviere Avenue which is part of the Loop Trolley route) (H3 Studios, 2013, p. 24). The FBD would enhance existing zoning and land uses already present in the area, while also encouraging infill development (H3 Studios, 2013, p. 24).

However, a major issue with the *Transit Oriented Development Plan's* FBD recommendation is that it expressly states that it "intentionally omits portions of the West End Neighborhood north of Delmar Boulevard" (H3 Studios, 2013, p. 112). The plan specifically states: "the City and planning team feel that a separate, neighborhood-based FBD that considers the West End Neighborhood as a whole would better address the needs and desires of the West End Neighborhood and its residents" (H3 Studios, 2013, p. 112). The plan only includes the Delmar Boulevard portion of the West End Neighborhood (WE) as part of the proposed FBD –

the main area conducive to commercial development. **Figure 6.3** shows the proposed FBD area for the Delmar Loop (and Skinker-DeBaliviere station area). The red outline indicates the focus area. As outlined by this red area, the FBD only covers the Delmar Boulevard portion of the West End (the main commercial area).

Figure 6.3: Form Based District as presented in the TOD Plan for the Delmar Loop (H3 Studios, 2013) (Area in focus depicts the ½ mile Euclidean Buffer, emphasis mine.)



The Delmar Loop TOD site is made up of various neighborhoods with their own histories that have shaped their existing contexts. With distinct existing conditions, the different areas within the DL TOD site may also require different planning and development approaches to include them in the DL TOD. While different approaches may be needed to include all areas in TOD planning, the main problem here is that plans do not provide any alternative approaches for the West End Neighborhood. The FBD as proposed in the TOD plan for the City of St. Louis, then, separates (in writing) the West End Neighborhood from transit related planning developments. Regardless of the neighborhood in which residents reside, planning and development approaches must not exclude certain neighborhoods from transit (i.e.; public good) developments.

The exclusion of the West End Neighborhood from the FBD planning may have resulted from years of uneven developments between the different areas within the TOD site. The Delmar Loop Entertainment District (Delmar Boulevard east of the Delmar MetroLink station) experienced revitalization due to sustained efforts from local business owners. Meanwhile, the West End portion of Delmar Boulevard never revitalized, creating disparities between the two areas and further exacerbated by the Delmar Divide and larger racial disparities within the region. Because of these different disparities, I argue that the intentional omission of the West End in TOD planning is due to City of St. Louis planners aiming to extend the successes of the DLED and cover up (by omission) the disparities in the West End.

The FBD that the Delmar Loop TOD Plan recommends intentionally omitting the vast majority of the West End Neighborhood. City of St. Louis planners involved with the Delmar Loop TOD plan overlooked the West End Neighborhood's unique "needs and desires" (H3 Studies, 2013, p. 112) in neighborhood scale planning and developments like this very TOD

plan. For example, according to two minority business owners in the West End Neighborhood as well as the former executive director for the St. Louis Association of Community Organizations (SLACO), planning for the Loop Trolley largely did not include business owners or community organizations based east of the MetroLink station and within the West End Neighborhood ("LY", personal communication, April 14, 2015; "NH", personal communication, May 22, 2015; "CM", personal communication, May 19, 2015). In addition to overlooking the West End Neighborhood in public participation activities, excluding a large portion of the West End Neighborhood from current TOD planning and future Delmar Loop developments effectively marginalizes the neighborhood and its residents.

Housing.

One particular area where the West End Neighborhood in the Delmar Loop TOD site has particular needs and desires is housing (as compared to the Skinker-DeBaliviere Neighborhood). Two key housing issues currently affect the Delmar Loop TOD site and particularly the West End: 1) the lack of availability of a diverse housing supply; and 2) vacant buildings and lots. By the TOD plan intentionally omitting a large portion of the West End Neighborhood, TOD activities related to Transit-supportive Land Uses (TSLU) in this regard are not inclusive. Specifically, as indicated in Chapter 2, one way for planners to undertake inclusive TOD activities as they relate to TSLU would be to reduce barriers to mixed-use station developments (Hickey, 2013, p. 2) and to maintain affordability in the station area. With the Delmar Loop's proposed Form Based Code not covering a large, residential portion of the site facing the above housing issues, TOD activities here are not inclusive.

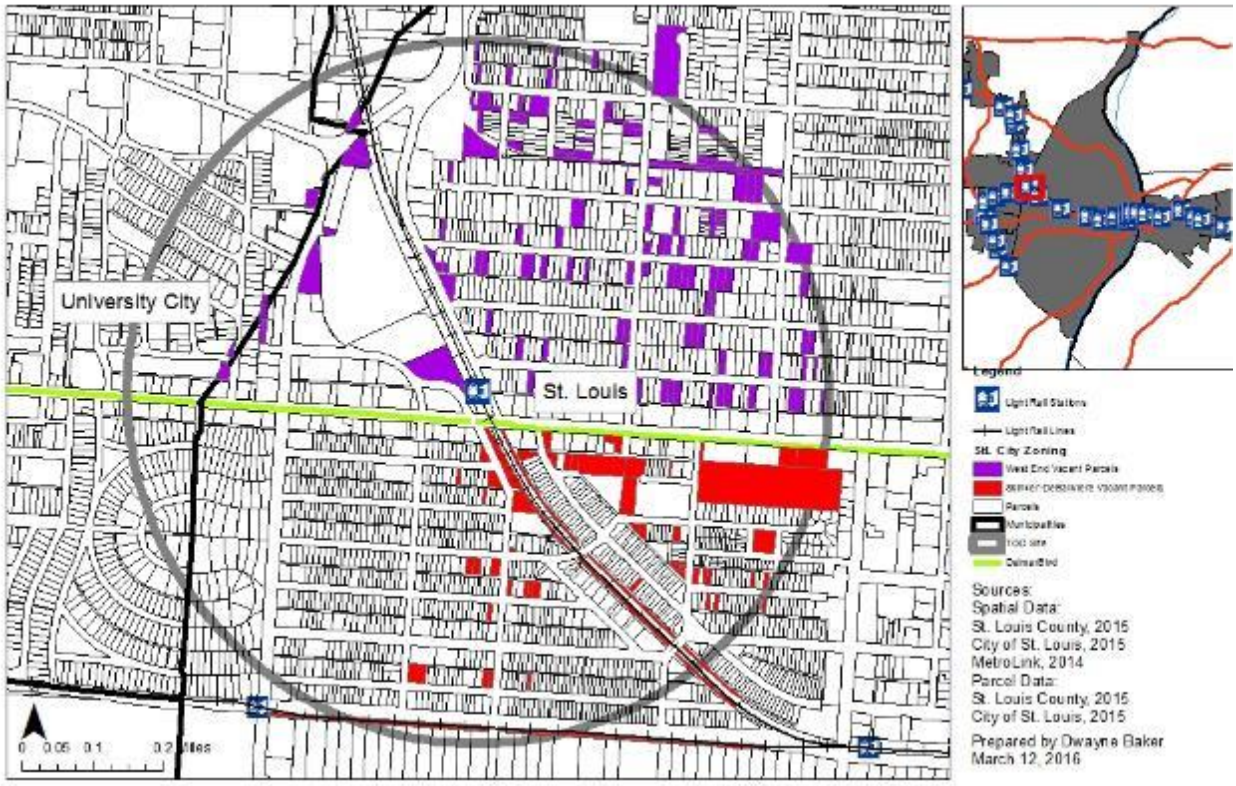
The TOD plan for the Delmar Loop (H3 Studios, 2013) could have effectively undertaken inclusive TOD activities by recommending residential zoning land uses (i.e.; multi-family housing, mixed-use areas) and infill development techniques to complement the FBD along the commercial Delmar Boulevard. The remainder of this section details how the existing conditions of the site and how such recommendations could be useful in developing an inclusive TOD site.

The West End Neighborhood, particularly, is plagued by empty, vacant, or abandoned lots (i.e.; parcels of land). **Figure 6.4** compares the amount of vacant land parcels between the West End Neighborhood and the Skinker-DeBaliviere Neighborhood portions within the DL TOD site. In the West End Neighborhood there are 140 vacant parcels, which is twice as many compared to the Skinker-DeBaliviere Neighborhood with 68 vacant parcels. The majority of the vacant land parcels are in areas zoned as residential, indicating that infill development is much more needed in the West End than the Skinker-DeBaliviere Neighborhood (SD). Additionally, many of the SD vacant parcels are located right along the light rail line and not interspersed throughout the neighborhood as are the parcels within the West End.

Where these vacant housing units are located indicates how future planning activities should proceed. According to one long-time resident of the West End Neighborhood and SLACO's former executive director, the West End Neighborhood within the DL TOD site already has an over-abundance of multi-family and affordable housing ("DM", personal communication, November 23, 2015; "CM", personal communication, May 19, 2015). The former Executive Director for SLACO explained that that developing more single family housing could be really helpful for the West End Neighborhood especially, however, there is

little interest from planners or developers in creating single-family or infill housing in areas that really it ("CM", personal communication, May 19, 2015). According to her: "We (the West End Neighborhood) have all these big buildings (and homes) that need to be revitalized, but that is really expensive" ("CM", personal communication, May 19, 2015). After years of neglect, though, St. Louis planners may not have the time to specifically focus on the Delmar Loop as it is one particular area within a larger area (St. Louis north of Delmar Boulevard) that has also experienced decades of neglect. In the absence, then, of a business owner and developer aiming to specifically revitalize the area (i.e.; Joe Edwards), planners may continue to overlook the West End.

Figure 6.4: Delmar Loop Vacant Land Parcels



Affordable housing is a contentious issue for the West End due to the area's vacancies (land and building) and the concentration of low-income households. For instance, the West End

Neighbors (WEN) recently opposed an affordable housing development in the neighborhood: the Village of Delmar Place. According to WEN's former president, developers and planners involved in the project did not inform the WEN of the development until right before it was about to get developed ("DM", personal communication, November 23, 2015). WEN did not want more affordable housing and preferred more market rate or even luxury housing options for the neighborhood ("DM", personal communication, November 23, 2015). As a long term resident within the West End, WEN's former president acknowledged that this lack of transparency has been repeated often in regards to housing decisions in the West End ("DM", personal communication, November 23, 2015).

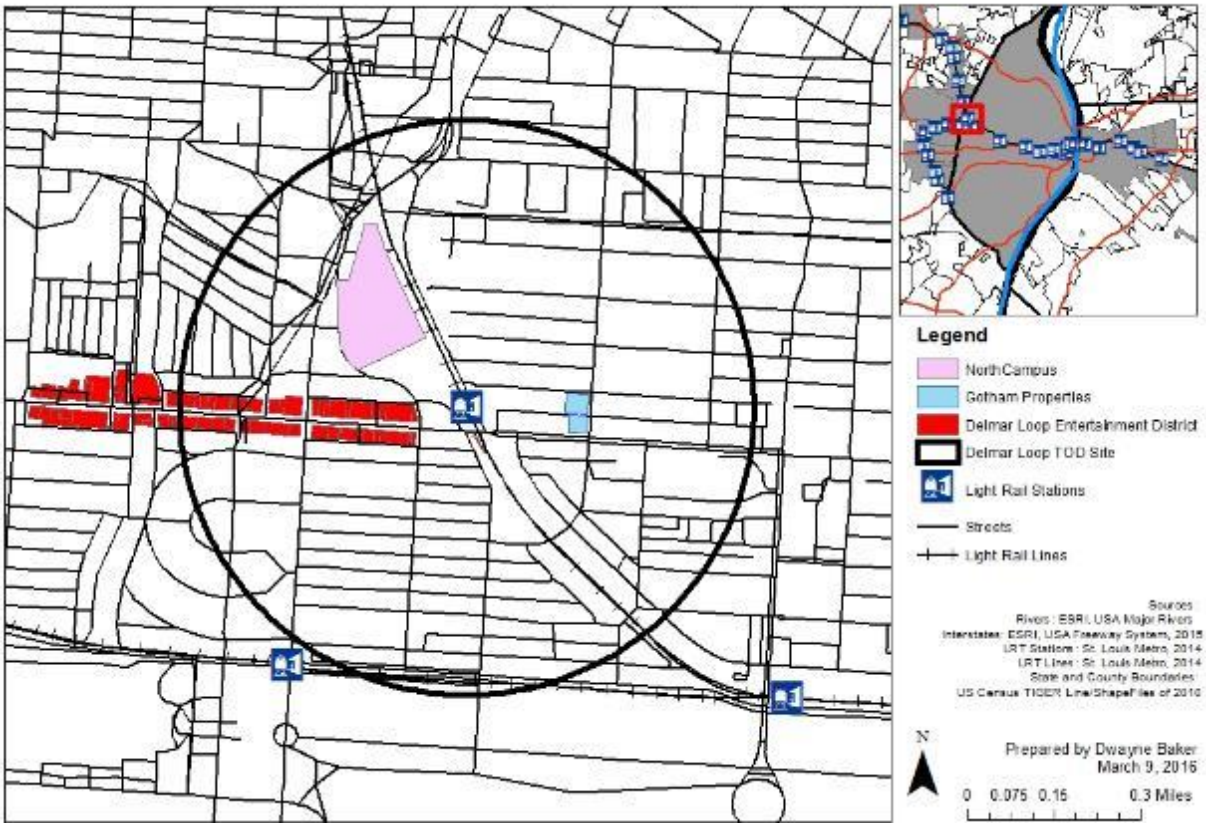
This particular incident indicates two particular issues with TOD planning activities. First, it relates to the previously discussed (Chapter 5) guiding principle of Public Engagement and Participation. Particularly, it indicates that planners did not engage in inclusive TOD activities as they did not engage with residents or the community group representing the interest of West End residents. Second, by planning and developing housing in an area where there is already an abundance of affordable housing, planners continued concentrated affordable housing in one area. Continuing to concentrate only one form of housing here does not then help provide a mix of housing to provide all residents access to the TOD site.

The recently renovated Gotham Apartments along with its newly constructed Gotham Annex are two apartment buildings that do, however, offer market rate rental units within the West End Neighborhood. The Gotham Apartments consists only of rental units, while the Gotham Annex is a mixed use building with retail space on the ground floor and residential units on its top floors. Both sites were completed in 2015. Funding for these developments came from State of Missouri (and federal) historic tax credits and Love Funding ("FG", personal

communication, March 30, 2015). The historic tax credit can be used to rehabilitate historic structures that will have income-producing purposes and provides 10% or 20% of qualified expenses. The Gotham apartments received $1.1 million of Missouri Historic Tax Credits (Lisart Capital, 2016). Love funding additionally helps provide federal homeowner assistance financing for multifamily developments (Bryant, 2012). It helped acquire a HUD Section 220 Loan which is "for multi-family housing projects in urban renewal areas, code enforcement areas, and other areas where local governments have undertaken designated revitalization activities" (HUD, 2015, par. 1). Section 220 loans are for areas targeted for revitalization. However, they do not have to be for low-income or affordable housing specifically. HUD provides these loans for developers to develop in areas in need of revitalization.

Even though the Gotham properties are in an area needing redevelopment (West End), the Gotham website, though markets the apartments as "located in the West LOOP area" (Gotham Apartments, 2015). **Figure 6.5** shows just how distant the Gotham Properties are from the entire Delmar Loop Entertainment District. This marketing distances the new development that could benefit the West End Neighborhood by providing the neighborhood with a different type of housing than what currently exists. By indicating the "West LOOP" instead of the "West End", the apartments seemingly distance themselves from the WE and exclude the WE from new developments within the TOD site.

Figure 6.5: Gotham Properties and North Campus



Gentrification.

Often, TODs are thought to induce gentrification due to new developments inducing more demand and, thereby, allowing developers, land owners, and realtors to raise housing prices. New developments (Loop Trolley and Washington University), vacancies allowing for infill development, and the want for more market rate housing can potentially create the conditions for residents (and businesses) to move into the DL TOD. This demand could in turn lead to an influx of residents that can pay higher rents and mortgages than what currently exist, especially in the West End. This increase in housing prices may thus potentially displace the existing residents. DL TOD site stakeholders, however, are either ambivalent to, not concerned with, or welcome displacement due to gentrification.

One planner for East-West Gateway with over a decade working as a planner in the St. Louis region indicated that St. Louis does not really have a gentrification problem ("VW", personal communication, April 1, 2015). According to him, St. Louis has not seen enough substantial TOD development to influence gentrification ("VW", personal communication, April 1, 2015). Additionally, there have been slow investments and decline in the area over the last 25 years. As one planner noted, the lack of investments and decline has been largely due to white flight – white and mid- to upper-income residents leaving the area ("VW", personal communication, April 1, 2015).

Gentrification may not presently occur as the area is in a state where it needs more development interest. However, the increased TOD planning as well as TOD projects like the Loop Trolley may induce residents, especially white and mid- to upper-income residents to move back into the area. This, in turn, may result in existing residents being displaced or priced out of the area.

Washington University.

Washington University also presents a gentrification threat to the Delmar Loop TOD site and specifically the West End. As shown in **Figure 6.5**, Washington University's North Campus covers a large portion of land just north of the Delmar MetroLink station. The North Campus (NC) is an 11 acre site, employing about 500 people and is maxed out in terms of office space ("HD", personal communication, May 4, 2015). As Washington University continues to grow, the campus will continue to expand and take up some of the NC space and the NC space will continue to expand throughout the DL TOD site ("HD", personal communication, May 4, 2015). Even though there is no formal guided growth for the North Campus within the DL TOD site, the Assistant Vice Chancellor of Community and Government Relations for Washington University

expects that “in 10 years or so…once people see that more development is happening they may want to move into the area” (“HD”, personal communication, May 4, 2015). The Delmar Loop does have the vacancies (both land and housing) to accommodate an influx of residents.

The expansion of the North Campus site, does, however raise an issue particularly for the West End. That is, due to the Delmar Loop’s increase in developments (i.e.; specifically the Loop Trolley), the exclusion of FBD zoning for the West End, and consequently, the inactivity of planning to address infill zoning in the area, Washington University’s expansion has the potential to raise housing and rental prices, making the space unaffordable for residents in need of increased transit access and neighborhood developments. In the short-term, the increased interest, development, and expansion of Washington University throughout the site, can bring in needed developments. However, in the long-term without planning actively developing zoning or affordable housing regulations, the West End neighborhood may potentially turn from having predominately affordable housing to housing specifically targeted to high income residents.

Neighborhood change: What has occurred.

Overall, the residents and planners I interviewed did not indicate gentrification as an imminent threat to the Delmar Loop specifically or for St. Louis as a whole. Results from Chapter 3 also indicate St. Louis as possibly undergoing only slight gentrification related neighborhood change, but undergoing substantial non-TOD related change. Chapter 3’s analyses, though, examine the entire St. Louis urbanized area. Here, however, I describe the specific change the census tracts within the Delmar Loop TOD underwent from 1990 until 2010. Describing the change that has occurred here shows: a) the Delmar Loop is not a homogeneous TOD site undergoing similar changes in all areas of the site; and b) gentrification has not

necessarily occurred in any of the Delmar Loop census tracts, but substantial neighborhood change has occurred in one area, the West End Neighborhood.

Figure 6.6 shows the different census tracts making up the Delmar Loop TOD site, specifically. The West End Neighborhood Census tract 1053.00 resides within the West End Neighborhood, while census tracts 1051.98 and 1052.00 largely reside within the Skinker DeBaliviere Neighborhood. **Table 6.2**[5] details the percent change that has occurred from 1990 to 2010 for these census tracts' socio-economic and TOD related characteristics. **Tables 6.3** and **6.4** show these same characteristics in 1990 and 2010, respectively. The time period from 1990 to 2010 indicates the period from before the Delmar MetroLink station opened until just before TOD plans and related planning documents emerged for the St. Louis region and the Delmar Loop TOD site specifically.

[5] The socio-economic and TOD related characteristics identified here are the same used as the dependent variables in Chapter 3's spatial regressions. For a full description of the variables, refer to Chapter 3.

Figure 6.6: Delmar Loop Census Tracts

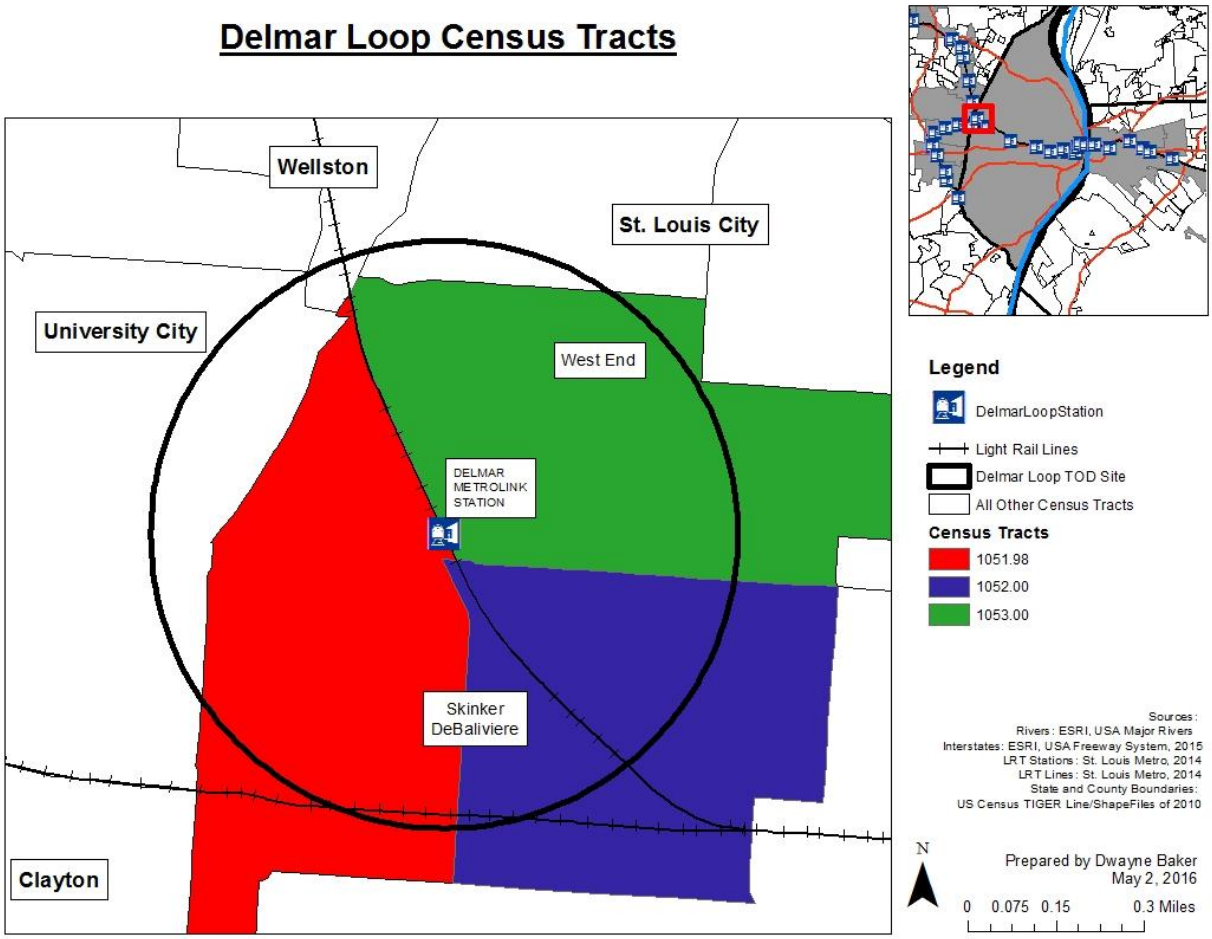


Table 6.2: Socio-economic and TOD related change in Delmar Loop Census Tracts: 1990-2010

Census Tract	NCI* Change	Race Change	Education Change	Income Change	Poverty Change	Population Density Change	Public Transit Change	Non-POV** Change
1051.98	0.73	0.04	0.17	0.01	0.01	-0.10	0.04	0.16
1052.00	0.91	0.06	0.30	0.11	-0.11	-0.14	0.01	0.04
1053.00 (West End)	-0.25	0.04	0.04	-0.42	0.24	-0.35	0.05	0.01

**NCI: Neighborhood Change Index*
***Non-POV: Non-Privately Owned Vehicle*

Table 6.3: Delmar Loop beginning year (1990) socio-economic and TOD related characteristics

Census Tract	NCI 1990	Race 1990	Education 1990	Income 1990	Poverty 1990	Population Density 1990	Public Transit 1990	Non-POV 1990
1051.98	0.64	0.64	0.57	10.81	0.22	9.05	0.03	0.11
1052.00	-0.30	0.30	0.33	10.56	0.30	9.17	0.12	0.17
1053.00 (West End)	-1.26	0.02	0.12	10.16	0.24	9.05	0.21	0.25

Table 6.4: Delmar Loop 2010 socio-economic and TOD related characteristics

Census Tract	NCI 2010	Race 2010	Education 2010	Income 2010	Poverty 2010	Population Density 2010	Public Transit 2010	Non-POV 2010
1051.98	1.37	0.95	0.74	10.92	0.23	8.96	0.07	0.27
1052.00	0.60	0.36	0.64	10.67	0.20	9.03	0.12	0.21
1053.00 (West End)	-1.51	0.06	0.16	9.74	0.48	8.70	0.26	0.27

Table 6.2 highlights some major socio-economic and TOD related disparities between these different census tracts. For starters, census tract 1053.00 experienced both a startling decrease in income levels and a large increase in poverty rates compared to the other two census tracts. No other census tract experienced a decrease in income and the census tract 1051.98 only experienced a slight poverty increase. Additionally, while all tracts experienced population density decreases, the West End's census tract decreased by more than double (-35%) the other census tracts (-10% and -14%). Also, while census tract 1053.00 did show an increase in education levels (4%), this increase was far less than the other census tract's increases (17% for census tract 1051.98 and 30% for census tract 1052.00). Most importantly, **Table 6.2** shows that the West End census tract was the only Delmar Loop census tract to experience a decreasing neighborhood change index (NCI) value. It also started out with the lowest NCI (a composite index of neighborhood socio-economic characteristics). By experiencing a decrease in its NCI, the West End Neighborhood experienced an overall decline in its census tract's socio-economic condition, whereas the census tracts for the Skinker-DeBaliviere neighborhood experienced neighborhood upgrading from 1990 until 2010.

The results of the analyses in Chapter 3 indicate the entire St. Louis Urbanized Area as exhibiting possible signs of gentrification and non-TOD related change associated with the presence of a light rail transit (LRT) station. Census tracts within the Delmar Loop site

specifically, however, experienced different types of socio-economic changes. Rather than the area gentrifying as a whole, different areas within the site experienced different types of changes. These greatly varying types of changes indicate that the Delmar Loop TOD site is not one homogenous TOD site and that TOD activities can potentially have different impacts on the different spaces within this single TOD site.

Additionally, gentrification has not necessarily occurred within the Delmar Loop TOD site. However, the West End census tract has experienced decline while changes of census tracts more in the Skinker-DeBaliviere neighborhood indicate the possible occurrence of neighborhood upgrading. Gentrification may not be a current concern Delmar Loop TOD stakeholders especially within the West End Neighborhood because the area is so depressed that it needs any form of upgrading.

Such change for the West End neighborhood though, does not necessarily mean that gentrification should not be a concern. Quite the opposite, with an increased interest in TODs (i.e.; TOD plan development and Loop Trolley construction), I recommend planners should provide increased focus in guiding development in the West End Neighborhood of the TOD site – both procedurally and substantively. Procedurally, EWG and City of St. Louis planners can aim to hold public engagement meetings for future TOD plans within the West End Neighborhood. This may better ensure that West End Neighborhood residents can better access the decision making processes for the space. Substantively, rather than exclude this area from zoning, zoning and form-based district recommendations can specifically target this space.

While the TOD plans first came about after 2010 with the Delmar Loop TOD plan developed in 2013, it may be too soon to identify change in these socio-economic and TOD related characteristics. Gathering public support to fully implement developments based on the

TOD plans will take much longer than roughly two years for the Delmar Loop to experience much change. I make this point because the period from approximately 2010 until 2013 was the first time period in the LRT station's history that planners put forth any TOD plans. Planners, especially from East West Gateway (EWG) (as they developed most of the regional plans) and the St. Louis Development Corporation (SLDC) (as the SLDC aims to redevelop and/or sell property in St. Louis) may need a substantial amount of time to convince potential business owners, developers, and private and public investors (i.e.; banks) of the possibility of developing around transit – especially considering that planners have been slow to embrace TOD in St. Louis ("MP", personal communication, May 21, 2015). As such, a 10 year period after development of TOD plans (i.e.; by 2023) would be a better time to identify changes related to the plans. This 10 year time period would allow: a) EWG and SLDC planners to market TODs to developers, private business owners, and/or community groups; b) different individuals and/or groups to develop, apply for, and receive business plans and licenses; and c) residents to move into the area.

Welcoming Gentrification and Displacement.

Due to the lack of developments and years of decline, residents and neighborhood groups (especially from the West End) welcome new developments, as well as gentrification and the displacement that may come along with them. On the one hand, new developments can cause the people that need the developments the most to not have access to them. On the other hand, some stakeholders viewed displacement as a necessary part of activities to improve the West End Neighborhood within the Delmar Loop TOD site. As one West End resident indicated: "Displacement is going to occur as the market dictates" and that when progress occurs,

displacement may go along with it ("DM", personal communication, November 23, 2015). He added that the market will cause certain types of businesses (he specifically noted STL Grillzz-a store specializing in custom made gold-teeth) to leave as rents increase and new residents not wanting to visit those types of places ("DM", personal communication, November 23, 2015).

Customers may choose to go elsewhere and inadvertently drive out existing businesses but, private land-owners can directly displace residents. For example, one West End residential property owner noted that he was currently in the process of evicting a tenant ("DM", personal communication, November 23, 2015). The monthly rent he can charge for an apartment he owns is $650. Unfortunately, with Section 8 housing assistance, the tenant can only afford $550 in monthly rent. As he stated: "Why would I rent to someone for less than what I can get from the property? I mean, I'm willing to work with tenants, but…" ("DM", personal communication, November 23, 2015). As property values increase in the area, property owners will look to maximize their profits and increase rents as well. In an area in need of more development and attention, increased property values are welcomed. However, existing residents may not be able to keep up with the increasing costs, especially if they are overlooked for jobs stemming from the new developments like trolley construction ("LY", personal communication, April 14, 2015).

Displacement and gentrification for the Skinker-DeBaliviere Neighborhood, however, was not an issue. Residents here are more likely to see an increase in their housing values than in being displaced. The biggest issue for this neighborhood may be the influx of more low-income housing. For instance, one West End Neighbors member noted that the Skinker-DeBaliviere residents would be opposed to the types of affordable housing proposed for the West End and they have a strong enough neighborhood association that they can halt such affordable or low-

income housing projects like the Village of Delmar Place ("DM", personal communication, November 23, 2015).

People-focused Urban Design

By People-focused Urban Design, I refer to designing the station areas and entire TOD site in a way that encourages both pedestrian and bicycle use rather than auto-use. People-focused urban design also refers to all residents within the TOD site being able to easily access all areas of the TOD site. By access, I refer to both physical and social access. By physical access, I refer to residents being able to physically access the site through walking or bicycling all areas of the site. This means that proper sidewalks, bike lanes, and infrastructure must be in place for residents to actually use the site. I refer to social access as the TOD site having a variety of amenities for all residents. For example, parks for teenagers, grocery stores for all resident, or bars and restaurants for young adults. Overall, People-focused Urban Design focuses on ensuring that people, rather than personal automobiles are the central focus of the site. Determining who occupies the site is also an important aspect of ensuring that all residents can access the site.

In this section I focus on observations of the site and the people who occupy the site to address how planners have yet to fully undertake TOD actions related to People-focused Urban Design. Particularly, I focus on planners' inactivity in regards to planning, designing, and developing the site to allow all possible residents to access needed amenities. Specifically, I identify how residents can and cannot access different areas within the site and who occupies and how they occupy different places within the Delmar Loop TOD site.

Physical Access

The guiding principle of People-focused Urban Design largely stems from St. Louis Metro's *St. Louis Regional Transit-Oriented Development (TOD) Best Practices Guide* (2011) It specifically states that "(S)treets should be scaled to the pedestrian and include substantial public amenities, particularly sidewalks, landscaping, lighting and seating" (p. 5). Additionally, "(T)he ground level should always engage the pedestrian's mind and eyes, and foster a sense of lively activity through transparent, activated storefronts and interesting building facades" (St. Louis Metro, 2011, p. 5). However, mainly the Delmar Loop Entertainment District and the Skinker-DeBaliviere Neighborhood sections of the TOD site exemplifies the People-focused Urban Design aspects of including public amenities such as sidewalks, and also with adequate landscaping, lighting, and seating.

Station design.

One key design issue with the Delmar Loop TOD site is the Delmar Loop MetroLink station itself. As previously noted, the LRT line was initially converted from an un-used, freight rail line. As such, the stations rests on once industrial sites and below street level. The Delmar Loop station specifically sits below street grade – meaning, transit riders need to walk up a flight of stairs (about 1 story) to get to the neighborhood from the actual transit station. For instance, to get to Delmar Boulevard (the main thoroughfare of the Delmar Loop site) from the Delmar MetroLink station by foot, passengers have two options when exiting the train. They can either walk up a flight of stairs leading to Hodiamont Avenue on the east side of the station or walk up a flight of stairs leading to Des Peres Avenue on the west side of the station. Exiting onto Hodiamont, passengers face broken, cracked sidewalks up to Delmar Boulevard (**Figure 6.7**).

Figure 6.7: East Side of Station along Hodiamont Avenue: Note the broken, narrow sidewalk.

Exiting to Des Peres, passengers face a wall covered in overgrown and un-kept foliage to the left of the staircase and just south of the station platform. To the right of the staircase is also overgrown foliage: bushes, small trees, and un-cut grass. When walking up the steps, trees shade the staircase and block the view to the street. When exiting to Hodiamont by foot, passengers encounter an open and desolate space. When exiting to Des Peres, passengers encounter a dark passageway which is also not very visible to enter (**Figure 6.8**).

Figure 6.8: Delmar MetroLink Station West Entrance from Bus Depot: Note the overgrown shrubbery just left of the Wabash Station, obscuring the station from being observed from the street.

On the other hand, a large, brick (industrial) building extends along the western side of the station platform, just north of the staircase leading to Des Peres Avenue. At the north end of

this building is a park-n-ride lot. Passengers are greeted by a more inviting walk when heading towards the park-n-ride lot. Art covers the smoothly paved walkway heading to the lot. Small streetlights illuminate the walkway. Additionally, neatly maintained grass borders the walkway (**Figure 6.9**).

Figure 6.9: Delmar MetroLink Walkway Leading to Park-n-Ride Lot: Note the artwork, wide sidewalks, and manicured green space along this pathway to the park-n-ride lot.

One way to enhance pedestrian station accessibility lies within the old Wabash Station building that overlooks the Delmar MetroLink station. The old Wabash Station building sits just south of the station platform. It is vacant and has been since the close of the initial trolley in the 1960s. The Wabash building is above the tracks and is on the north side of Delmar Boulevard (**Figure 6.10**). Its north-side windows face the station platform and would allow people to look down upon the open-air station platform.

Figure 6.10: Wabash Building Overlooking Delmar MetroLink Station

The building is all brick and provides somewhat of a grand structure that overlooks the Delmar Loop station. It once served as the transfer point for the previous Loop Trolley that ran decades earlier. The front of the building will serve as a Trolley stop for the new Loop Trolley under construction now. On the street, above the Delmar MetroLink station platform, the Wabash Station building sits about 10-15 meters off of Delmar Boulevard. Empty space that resembles somewhat of a turnaround or small parking area takes up this gap between Delmar and the Wabash building (**Figure 6.11**).

Figure 6.11: Front of Wabash Station from Delmar Boulevard

The Wabash building can serve as an entry point for the station, providing a better way for the station to blend in with the surrounding neighborhood. However, Metro (the regional

transit agency) nor the City of St. Louis have made plans to acquire this building or convert it from an empty building to a gateway to transit. Joe Edwards currently owns this building. He hopes that Metro will decide to do something interesting with the building ("OS", personal communication, April 20, 2015). According to Edwards, this is a great space for multi-modal activity ("OS", personal communication, April 20, 2015). A stop for the new Loop Trolley will be out front and there is also bus connections along Des Peres Avenue at the top of the stairs leading to the MetroLink station platform. While Edwards has been approached by people hoping to open the wrong types of businesses here (like those focusing on selling single cigarettes or calling cards), he has yet to be approached by Metro to make this building a central focus of neighborhood transit activity ("OS", personal communication, April 20, 2015).

Overall, pedestrians cannot readily access the actual Delmar Loop light rail station. The Director of Planning for the City of St. Louis indicated that creating walking and pedestrian access at or near the Delmar MetroLink station remains is a necessity for increasing transit ridership and TOD activity (personal communication, March 12, 2015). The station does not blend well with the surrounding neighborhood making pedestrian station access problematic. One way to make the station more accessible is to convert the Wabash station into a structure supporting and enhancing the space's multi-modal connectivity: making it a clear entrance to the Delmar Loop TOD site. Additionally, while the station does have lighting, manicured green space, and art, such amenities only support passengers taking cars to and from the site. Pedestrians entering the station from the neighborhood are not greeted by such amenities. This lack of pedestrian focus at the station site indicates that the Delmar Loop station lacks People-focused Urban Design.

Sidewalk design – Delmar Boulevard.

There remains a sharp contrast between the eastern and western portions of the Delmar Boulevard. Delmar Boulevard's sidewalk in the western portion of the TOD site is designed to accompany people walking. The sidewalk spans roughly 12 feet wide and holds many objects that keep the eyes moving and active. One big (40-50 gallon) flower pot rests about every 10-12 feet. A green streetlamp is placed about every 15-20 feet. Trees of various sizes also dot the sidewalk. All of which line up to provide a buffer between the automobile traffic and pedestrian traffic. In front of many of the buildings, businesses also have space to put out a few tables and chairs without interrupting the flow of pedestrian, sidewalk traffic. The sidewalk also holds unique bike racks in front of and particular to the area businesses. For instance in front of Meshuggah Café (a coffee shop), the bike rack is shaped like a coffee cup and the bike rack in front of Big Shark Bicycle Company is made up of a series of bicycle rims (**Figure 6.12**).

Figure 6.12: Bicycle Rack in Front of Big Shark Bicycle Company: Customized bicycle racks decorate the front of businesses in the Delmar Loop Entertainment section of the Delmar Loop TOD site.

Delmar Boulevard's sidewalks in the eastern portion of the TOD site are not too conducive to heavy pedestrian activity. In many places, no real buffer exists between the street traffic and the pedestrian traffic. There is just enough space for parking meters and a few broken streetlights to serve as a buffer between the sidewalk and the street (**Figure 6.13**). The street

itself is wide, holding a median, four total driving lanes (two going each way – east and west), and a parking lane on both sides (**Figure 6.14**).

Figure 6.13: East Delmar Boulevard Sidewalk: Note the wide sidewalks, but lack of a buffer between pedestrian activity and vehicle traffic.

Figure 6.14: East Delmar Street: Note the wide streets, conducive to vehicle traffic with vehicles easily able to travel straight through the Delmar Boulevard portion east of the Delmar MetroLink station.

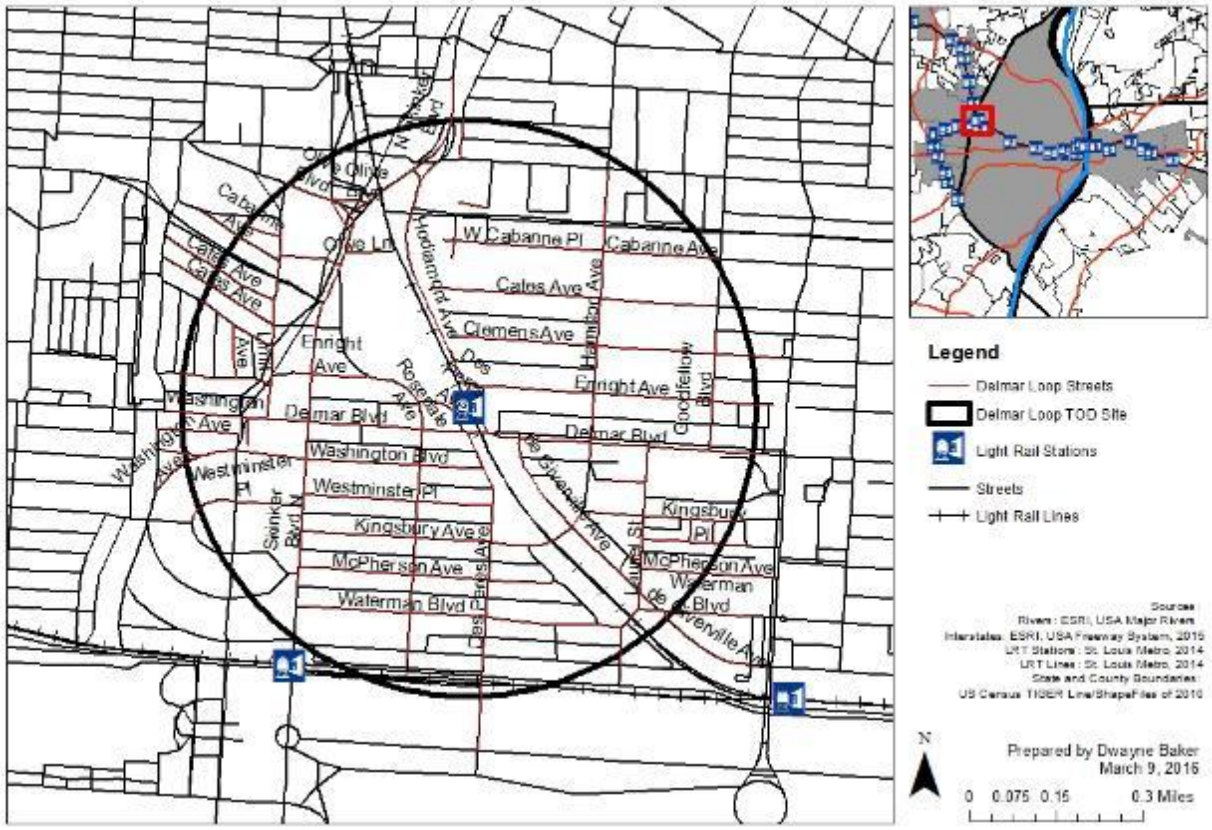
These sidewalk disparities largely stem from a lack of public activities, but also concentrated private activities. However, these private activities began well before the identification of the area as a TOD site – meaning, the activities were not necessarily concentrated around a public good such as transit. As indicated in Chapter 5, initial Delmar area activities largely stemmed from one key business owner/developer. While one area experienced

revitalization (Skinker-DeBaliviere), another area (West End) experienced deterioration. With the absence of a single developer interested in revitalizing the West End area, the public planning simply overlooked and continues to overlook the West End's public space.

Non-Delmar Boulevard Design

Different areas within the TOD site besides Delmar Boulevard also experience station inaccessibility and streetscape disparities. **Figure 6.15** shows the different Delmar Loop streets. Gates block off many streets in the site's north-east area (West End Neighborhood).

Figure 6.15: Delmar Loop TOD Streets



The north-south running Hamilton Avenue intersects Delmar Boulevard and the east-west running streets (Enright, Clemens, Cates, and Cabanne Avenues) in the West End portion of the TOD site. However, gates block Enright, Clemens, and Cates Avenue at Hamilton, separating

east-west flowing auto traffic in the West End (**Figure 6.16**). Residents at the far end of the TOD site cannot drive directly to the station.

Figure 6.16: Gates Blocking Clemens Avenue from Hodiamont Avenue

Auto traffic also cannot directly access the light rail station park-n-ride or Hodiamont Avenue which runs parallel to the light rail tracks. Small roundabouts block the western ends of Enright, Clemens, and Cates Avenues from being able to directly access the station (**Figure 6.17**). Residents can walk to the station from these streets crossing Hodiamont. However, no sidewalks directly connect to the station, the sidewalks border each street's roundabouts.

Figure 6.17: Roundabouts at Hodiamont: Note that vehicles are not able to directly access Hodiamont along the eastern border of the Delmar MetroLink station.

Besides the gates and roundabouts disconnecting the station from the surrounding streets, the unused Giles Park also separates the West End from the station. Giles Park sits at the

northern end of the TOD site, just north of Hodiamont Avenue and Cates Avenue. Overgrown weeds and a huge hill block almost the entire neighborhood from the tracks, sort of acting like a natural barrier here.

A sharp contrast exists between streets within the Skinker-DeBaliviere (SD) Neighborhood (Washington Boulevard, Westminster Place, Kingsbury Avenue, and McPherson Avenue) and the West End Neighborhood. For starters, gates and street-ending roundabouts do not cut off the streets. Rather, the streets only allow drivers to turn one way through the use of median or island diverters (**Figure 6.18**).

Figure 6.18: Island Diverter at Westminster Place and Rosedale Avenue: Note the flower pots, providing landscaping to the diverters. The diverters also divert traffic instead of cutting off traffic completely.

For example, if turning east on Westminster Place from Skinker Boulevard, once getting to Rosedale Avenue (like Hamilton Avenue, Rosedale intersects the SD TOD streets), drivers can only make a left at Rosedale. Making this left, effectively turns drivers onto Washington Boulevard travelling back west. Large flower pots also ordain these median diverters in the middle of Rosedale's intersections. While these diverters alter the flow of traffic throughout the SD, they still allow auto traffic and also provide pedestrian access throughout the area.

Additionally, many large, two and three story homes line both the West End and SD TOD streets. Nicely maintained two- and three-story homes lined the streets in the West End portion. However, many vacant or empty lots and boarded up homes also marked the West End streets. After every fourth or fifth home, a vacant or empty lot or seemingly abandoned (i.e.; boarded up, broken windows, holes in roof) structure emerged. The vacancies here possibly stem from the size of the homes. The size of the homes may be just too much for West End residents to maintain, causing the housing to fall into states of disrepair and ultimately demolished.

Furthermore, the boulevards in front of the homes hold little to "always engage the pedestrian's mind and eyes" (H3 Studios, 2011, p. 5). In the more residential area of the TOD site (as compared to Delmar Boulevard), trees can provide a way to engage pedestrians. Yet, along the boulevards separating the sidewalks from the wide streets, minimal tree coverage shades or provides a bit of visual activity for the sidewalks. Trees no taller than one story line the boulevards in some places.

The Skinker-DeBaliviere neighborhood's sidewalks, however, provided almost the exact opposite than those of the West End. Tree-lined boulevards shade the sidewalks. An abundance of parked cars occupy the narrower streets. Also, no vacant, empty, or unused lots take up the space. While many disparities exist between the different streetscapes in these areas, neither space effectively provides clear access to the Delmar MetroLink station – the center piece of the TOD site. There are two different neighborhoods separated by one street (Delmar Boulevard).

Social Access & Delmar Loop Occupants.

Besides encouraging pedestrian and bicycle use, the guiding principle of People-focused Urban Design must also take into consideration that people need destinations to access. Overall,

the portion of the TOD site east of the light rail station (primarily in the West End Neighborhood) had little to no destinations for any residents. This indicates that in the absence of actions from the private sector (i.e.; developers, business owners), the public sector has also failed to actively guide development here – whether through enabling the provision of amenities such as parks or civic space or for developments by providing incentives to developers or seeking out development proposals. Meanwhile, the western portion of the TOD site – the Delmar Loop Entertainment District (DLED) – has a variety of destinations for people to enjoy. However, who could enjoy or properly access the DLED space remains an issue. Largely, destinations (i.e. amenities) – such as bars and restaurants – within the site are designed for young- to middle-aged adults, while primarily black teenagers had limited destination options and primarily occupied the streets and sidewalks.

The Delmar Loop Entertainment District blends into the western portion of the Delmar Loop TOD. This portion of the site is filled with restaurants, bars, and local retail shops. The space is especially populated on weekend nights and when there is favorable weather. I observed on various occasions that the guiding principle of People-focused Urban Design may fall short when providing access to destinations for certain groups – particularly teenagers and especially black teenagers.

I witnessed the disparity among people occupying the Delmar Loop during one Sunday evening in July (2015) while at the Mission Taco restaurant. Mission Taco sits at the western most edge of the half-mile TOD site. It sits right at the corner of Limit Avenue and Delmar Boulevard and provides a great vantage point to observe the site's pedestrian traffic. While in Mission Taco, the first thing that struck me was the difference between the people inside and outside the restaurant. Inside was full of young, predominately white adults (early 20s-early

30s). The staff was also comprised of this same demographic. The wait staff was not very friendly or inviting – no smiles, minimal customer service, and an overall quiet atmosphere with the only noise being exhibited from the televisions. Meanwhile, outside the restaurant, many black teenagers along with a few older white adults excitedly walked the street. Over the course of an hour, only young, white adults entered the restaurant, while a steady stream of black teenagers roamed along the sidewalk.

After about an hour, I headed east from Mission Taco to Blueprint Coffee. Blueprint Coffee sits just off of the intersection of Delmar Boulevard and Skinker. Blueprint also provides a great vantage point to observe pedestrian, transit, and vehicle traffic as it is closer to the Delmar MetroLink station. The occupants of Blueprint Coffee were the same as Mission Taco: 20 something white adults. Again, this was a very different demographic than what made up the pedestrians outside (primarily black teens and young adults).

On another occasion during a Saturday night in July, I drove into the Delmar Loop area from the west (University City) and parked in a garage in the West Loop area (just west of the TOD boundary, but within the DLED). The first thing I noticed was the street construction for the trolley on the south side of the street as well as crowded sidewalks on the north side of Delmar Boulevard. Walking east toward the MetroLink station, I primarily passed teenagers, and primarily black teenagers along the sidewalk. I also encountered many young white adults entering or exiting many of the businesses during my 15 minute walk towards the station. Overall, a variety of people occupied Delmar Boulevard within the TOD site, but black teenagers primarily occupied the sidewalk space while white adults occupied the businesses.

Additionally, I noticed less pedestrian activity as I travelled from west to east. I passed no one about a block from the actual light rail station. Additionally, the northern side of Delmar

Boulevard from Skinker Boulevard in the west and Des Peres in the east (the length of one and a half blocks) was dark with only on street light illuminating the street from 2 stories up. Loop Trolley construction activity also detracted from pedestrian activity along Delmar from Skinker to Des Peres. Even though the restaurants in this East Loop area placed tables outside for diners to occupy, nobody ate or dined outside at this time. Streetlights barely illuminated the sidewalk. One hookah bar's neon business lights provided the main lights for the block.

The contrast between Delmar sidewalk and business (i.e.; bar, restaurant, retail) occupants, however, was never more distinct than on one Tuesday night in July. I caught the train to the Delmar light rail station and arrived at 8:30 PM. After exiting the station on Des Peres, I walked west along Delmar Boulevard towards the DLED. I walked west along Delmar. While there was very active sidewalk activity, there seemed to be less black teens out now than before.

Towards the western edge of the DLED, about a half mile outside of the half-mile TOD area, less teens but more adults roamed the sidewalks. After reaching the western end of the DLED, I walked back east towards the station around 9 PM. About half a block west of Limit Avenue (the western edge of the TOD site) and right in front of Meshuggah Café sat about 5-7 black male teens. They occupied Meshuggah's outdoor tables. They pulled the tables and chairs away from the building and more in the middle of the sidewalk. They positioned them in what seemed like a deliberate attempt to disrupt the sidewalk traffic, ensuring that people had to either walk through or weave around them. One kid slouched down in one chair with one leg and foot hanging over the side of another chair right in the middle of the walkway. They harassed people as they went by, often catcalling after the women. As I neared the group, a young black couple,

male and female (seemingly in their late 20s – early 30s) walked in front of me holding hands. They weaved their way through the teen group. While passing through them, the slouching teen said something to the female causing her male companion to turn around and approach the group of teens. He seemingly shrugged it off and kept walking. I am unsure what was said or if the female companion heard anything as she did not turn around.

After passing this group, about 10 feet or so away from them, the smell of weed hit me. Just before United Provisions grocery store a walkway leads towards McGinnis Alley and Enright Avenue. McGinnis Alley holds a few Washington University offices and housing complexes. The Peacock Diner is on the east side of the walkway. In this walkway, another group of about 6-8 teenage or young adult (20ish) black males sat smoking weed, passing the joint between them. This was not more than 10 feet from the main sidewalk and in clear view of anybody walking along Delmar.

One overall observation can be gathered from such incidences as well as from the distinction between business occupants and sidewalk occupants: the site does not offer activities for teens even though they are a clear presence within the site. The Pageant Theater is a music venue catering to young adults and teens albeit, those that can afford to attend the music events. However, the only space teens have in this area is sidewalk space. The teens will and have used this space to be included in the area's activities. They include themselves either by disrupting the space and activities of others or by simply being present.

Here, then, is a specific area where planning has not assisted in establishing inclusivity. A large segment of the site's occupants are not necessarily able to access the activities that occupy the site: bars (by being too young) and restaurants (by not necessarily having the income to

consistently frequent them). The practice of allowing private developers and business owners to shape the space has resulted in a certain group of people – teens and especially black teens – to be overlooked. This, however, is not a denunciation of private developers or business owners. Individual business owners helped revitalize the space. Rather, emphasizing that populations are not fully included in activities at the site, highlights St. Louis area planners' inadequacies in properly maintaining the public good.

Social access east of the MetroLink station.

Even though there is a contrast among occupants in the western portion of the site, there is no distinction in the eastern portion (West End) of the site. This is largely because there is no pedestrian activity in the eastern portion. There are minimal destinations for people to access in the TOD space east of the MetroLink station. Additionally, a bridge going over the light rail tracks separates areas east and west of the MetroLink station along Delmar Boulevard. One minority business owner who has owned and operated his business in the eastern portion for just under 3 years indicated that this bridge provides one reason why much foot traffic does not flow from the western entertainment district area to east of the station ("NH", personal communication, May 22, 2015). The bridge then serves as a barrier, physically separating the two areas.

The very first business on the east side of the Delmar MetroLink station on Delmar Boulevard is a check cashing place. Across the street, on the north side of Delmar is St. Louis ArtWorks. Artworks is an organization aiming to foster educational and career training for underserved youth through art. However, this building is currently being renovated. Two vacant lots separate ArtWorks from a Family Dollar store. A chicken restaurant, Just Chickens, sits on

the south side of Delmar Boulevard directly across from Family Dollar. Lucier Park – an empty green space without benches, playground equipment, or walking paths – a sits on the south-east corner of Hamilton Avenue and Delmar Boulevard, about a quarter mile east of the station. This corner also serves as the site of a bus stop. While walking from the Delmar MetroLink station to Hamilton Avenue on a Wednesday evening, I passed only one person along the sidewalk. Two other people waited at the bus stop. This was the most people I passed while walking through the area during four subsequent visits.

Many wide-open spaces and vacant structures mark the Delmar Boulevard in this eastern TOD area. Empty lots, vacant buildings, and only a handful of businesses provide a feeling of desolation and staleness throughout this space (**Figure 6.19**). This desolation is more pronounced when compared with the activities and liveliness of the western portion of the site. The area holds little to no destinations, making it an area where people can just pass through.

Figure 6.19: Empty Lot in Front of ArtWorks East of the Delmar MetroLink Station

Conclusion

Community groups largely welcome the new developments throughout the DL TOD site and especially the West End ("CM", personal communication, May 19, 2015). Long term

residents and business and property owners view activities pursued by Washington University and the Trolley as part of the TOD as ways to revitalize and help stabilize the area ("DM", personal communication, November 23, 2015; "NH", personal communication, May 22, 2015). However, if new developments go un-checked, according to a former planning division manager for East-West Gateway, "there may be a potential homeownership problem in the future" ("CM", personal communication, May 19, 2015).

Currently, though, gentrification and displacement are not a concern for the Delmar Loop TOD site. However, this does not indicate that gentrification will not become a substantial problem in the future. For example, Washington University's developments may end up displacing current Delmar Loop residents. Apartment buildings currently accepting Section 8 rental assistance may be in danger of Washington University buying them and eliminating Section 8 ("VW", personal communication, April 1, 2015).

The future gentrification and subsequent homeownership and displacement issues may ultimately only affect the West End section of the TOD site. The area currently suffers from public sector disinvestment and disinterest as largely shown through the design of the area and the change that has occurred throughout the West End area. Washington University's Assistant Vice Chancellor for Real Estate especially indicated the need to get rid of certain barriers to the station – particularly the gates, dead end streets, and broken sidewalks – to increase transit ridership and neighborhood pedestrian activity (personal communication, March 12, 2015). However, with current TOD plans effectively marginalizing the West End Neighborhood, the TOD section needing such improvements the most may continue to go without them.

As with TOD activities related to Visioning and Leadership, planners from the City of St. Louis and the St. Louis Development Corporation (SLDC) have largely taken a hands-off

approach to the substantive activities particularly in terms of developing zoning plans for the *entire* TOD site. Such planners have also been negligent in regards to designing and implementing amenities and destinations (i.e.; sidewalks, parks, museums) for all possible residents and especially those that frequently occupy the site. The change that has occurred in the West End Neighborhood shows that this hands-off approach and negligence has not worked. The area that needs development and interest continues to not receive it.

Chapter 7: Conclusion: How Can Planners Assist in Establishing Inclusive TOD Neighborhoods?

The results show that, while planners overall did not consciously exclude residents, planners' TOD inactivity has led to the exclusion of the West End Neighborhood from Delmar Loop TOD benefits. Planners' inactivity marginalized and continues to marginalize West End Neighborhood residents (essentially black and transit dependent riders). Overall, two important research findings stem from this dissertation research. First, the Delmar Loop TOD site is not an inclusive neighborhood. Although planners develop TOD plans with guidelines for St. Louis TOD activities, they did not take steps to promote inclusivity at the Delmar Loop TOD site or fully follow the guidelines they developed. This is a serious omission that could have resulted in the Delmar Loop as an inclusive TOD. Instead, private business owners and developers led and continue to lead activities at the site that contributed to the exclusion of some Delmar Loop residents from TOD activities. Second, planners cannot assume that a single TOD space represents a homogenous neighborhood or community of residents. Rather, planners need to determine the different constituencies affected by the TODs and engage all residents in the process. Without doing so some places within one TOD site may benefit while others suffer from TOD activities. Both of these findings indicate the need for inclusivity to be a theme of TOD planning – otherwise, planning activities could have an impact that is opposite or, more importantly, socially detrimental to the most vulnerable populations in TOD sites.

Due to the gentrification and non-TOD related neighborhood change that has occurred throughout St. Louis and the limited substantive and procedural activities undertaken by St. Louis planners, I identify St. Louis's Delmar Loop TOD site as a non-inclusive neighborhood. The results show that, while planners overall did not consciously exclude residents, planners'

TOD inactivity has led to the exclusion of the West End Neighborhood from Delmar Loop TOD benefits. Planners' inactivity marginalized and continues to marginalize West End Neighborhood residents (essentially black and transit dependent riders). Planners from the leading regional, local, and transit planning agencies did not take steps that would help ensure inclusive TOD outcomes. Instead, private businesses and developers assumed leadership roles for Delmar Loop TOD activities.

The Delmar Loop TOD site has certainly benefited from the activities undertaken by private business owners and developers – indeed, they have helped revitalize part of the Delmar Loop site, designed and implemented the Loop Trolley, and earned a portion of the Delmar Loop TOD site (the Loop Entertainment District) a Great Streets Award from the American Planners Association (APA, 2007). However, in this process planners have undertaken limited TOD activities – a shortfall that has put private developers in the leading position.

As a result of planners not maintaining active leadership and private developers and business owners leading TOD activities, TOD activities excluded a particularly vulnerable neighborhood: the West End Neighborhood. For example, planners, particularly planners from the City of St. Louis and the St. Louis Development Corporation, involved with the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere Metrolink Stations* (H3Studio, 2013) explicitly excluded portions of the West End Neighborhood in developing the Delmar Loop TOD site's Form Based Code. Additionally, planners and private actors have not engaged with neighborhood groups and businesses located east of the Delmar Loop MetroLink station within the West End Neighborhood in regards to TOD activities such as TOD plan development and the planning of the Loop Trolley – meaning that the residents who needed transit and improved neighborhood conditions did not have access to them..

How Can Planners Assist in Establishing Inclusive TOD Neighborhoods?

The current findings demonstrate a need for clear guidelines centered on inclusivity for establishing the Delmar Loop site, as well as TOD sites beyond the Delmar Loop, as an inclusive neighborhood. Specifically, I propose that planners should: 1) maintain active leadership; and 2) prevent displacement and guide growth. All three of these goals are relatively straightforward and it is important to note that researchers have previously suggested them in some form (Mueller et al., 2013; Pendall, Gainsborough, Lowe, & Nguyen, 2012; Pollack, 2006). Unfortunately this dissertation's results and the Delmar Loop TOD site's context (i.e.; especially the historical, racial context as seen with the Delmar Divide) demonstrate that these goals may not have been adopted by the planners involved in the Delmar Loop site. As a result, novel planning approaches are needed to promote more inclusivity. In the sections that follow, I detail who can undertake such activities. When recommending *who* should undertake which activities, I refer to the particular public sector planning agencies: East West Gateway (EWG), the City of St. Louis Planning and Urban Design Agency, Metro Transit, and St. Louis Development Corporation. Ideally, to assist in establishing inclusive TOD neighborhoods, I envision that: a) planners from EWG develop a regional TOD agenda with each station serving an integral part; b) planners from local municipalities – City of St. Louis Planning and Urban Design Agency – develop and implement local zoning in station areas to meet the aims of the TOD agenda established at the regional level; c) planners from Metro Transit and St. Louis Development Corporation (SLDC) lead development efforts to implement regional TOD aims established by EWG in TOD plans. Below, I provide insight into how these agencies can assist in establishing inclusive TOD neighborhoods.

Maintain Active Leadership.

If planners aim to establish inclusive TOD neighborhoods, they must, above all, maintain active leadership in guiding and implementing TOD activities. The largest part of maintaining active leadership is fostering collaboration around shared goals. Since the Loop Trolley is currently under construction, now presents a perfect time for planners from the EWG and City of St. Louis to revise and update their plans with the assistance of neighborhood residents, groups, and businesses. That is, planners should revise their plans with a focus on inclusivity, and subsequently, foster collaboration to ensure that all residents have access to the processes that shape the Delmar Loop TOD space.

TOD covers a variety of agencies, individuals, spaces, and interests. The Delmar Loop TOD site, for example, contains two different municipalities (city of St. Louis and University City in St. Louis County), multiple neighborhoods (West End Neighborhood, Skinker-DeBaliviere Neighborhood), Washington University's North Campus, and the Delmar Loop Entertainment District. However, no consistent cooperation or cohesive TOD activities have existed amongst these different groups. I found that this was largely due to these groups and spaces they occupy pursuing their own interests without stated common goals.

For example, the Loop Trolley extends from the City of St. Louis and into University City, travelling along Delmar Boulevard – the main business thoroughfare for the site. Due to its route and potential to boost business development in the area, bringing in new tax dollars for both municipalities and increased pedestrian activity to the area, the Loop Business Districts (East and West) along with the cities of St. Louis and University City collaborated to form the Trolley Development District (TDD). But, this is only one development with one developer

guiding it (Joe Edwards). No public sector oversight exists with this particular development to help ensure that certain residents (i.e.; West End Neighborhood residents) are not adversely affected by the trolley developments. The lack of oversight or leadership is an issue because without it, planners and private developers may not maintain the public good of all TOD residents having access to public transit.

The trolley developments present an example planners' in maintaining inclusivity by not engaging with the general public and fostering collaboration around shared interests. Planners from the City of St. Louis, East West Gateway (EWG), Metro Transit, and the St. Louis Development Corporation were largely uninvolved in trolley activities – the TDD led trolley developments. As indicated in Chapter 4, the TDD did not engage with business owners in the area east of the Delmar MetroLink station where the trolley will directly pass. Meanwhile, the TOD plan for the Delmar Loop station includes the trolley as a major TOD development (H3 Studio, 2013) – a development that will impact the entire TOD site.

Public sector planners – especially from EWG and Metro, two agencies involved in regional transportation issues – did not engage with the Delmar Loop residents or businesses that will be impacted by the trolley. Regional and transit planners missed an opportunity to engage with community residents and business owners to help ensure support for and/or enhancement of the trolley. This missed opportunity also indicates planners' TOD inactivity and, consequently, how planners have been negligent in assisting in establishing the Delmar Loop site as an inclusive space where all residents have access to the decision making processes that shape the Delmar Loop site. Yet, with all the different public agencies involved in TODs, no particular agency has fully taken charge to guide inclusive TOD activities, whether the trolley or otherwise, at the Delmar Loop site.

Thus, planners for the East-West Gateway Council of Governments (EWG) – the St. Louis region's federal Metropolitan Planning Organization (MPO) – should take the lead in fostering collaboration among the different stakeholders at the Delmar Loop site. Guiding TOD activities does not necessarily mean blocking or stymying private sector activities. Rather, it means that the EWG should develop a regional agenda for TODs (i.e.; developing TOD plans), support and encourage development interests that adhere to that agenda, and foster collaboration (from willing municipalities, agencies, organizations, and residents) to set and support that agenda.

The Center for Transit-Oriented Development (CTOD) notes that because MPOs identify regional priority projects for transportation funding, they are in a unique position to "support region-wide planning efforts, and to encourage local jurisdictions to implement TOD strategies" (CTOD, 2010, p. 11). Essentially, the MPO is the most appropriate institution because its overall activities encompass multiple municipalities, and it should take the lead in guiding regional TOD activities.

Various TOD and smart growth planning documents also recognize the MPOs and regional transit agencies as leading and developing a regional TOD agenda. For example, the Puget Sound's Growing Transit Communities Strategy (2013) maintains that the Puget Sound Regional Council implement a regional TOD program fostering collaboration across different sectors and agencies to enhance transportation and economic development opportunities (GTC, 2013, p. 19). It also emphasizes that transit agencies, local governments, and additional partners (i.e.; community agencies, developers, etc.) participate in and support ongoing TOD regional collaboration.

As the MPO for the St. Louis region, the EWG is best positioned to establish and lead a TOD agenda for the region. Since 2013, various TOD framework plans prepared for the EWG (by Design Workshop, a consulting agency) have emerged, signaling the EWG as guiding TOD activities in the region. Local municipalities may then need to guide TOD activities at specific sites in accordance with a general, regional framework plan. With the *Transit Oriented Development Plan: For the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* (H3 Studio, 2013), the City of St. Louis is also assisting in guiding TOD activities at the Delmar Loop site specifically. Meanwhile, Metro Transit is best positioned to actually implement some of the plan's development objectives under the guidance of the EWG and along with the zoning support from the City of St. Louis planners considering that Metro owns much of the parcels surrounding the Delmar Loop station.

Still, just developing TOD plans may not be enough to guide TOD activities overall or inclusively. Plans without public and key stakeholder support and approval may ultimately fail. With the Loop Trolley construction, now presents a perfect time for planners from the EWG and City of St. Louis to revise and update their plans with the assistance of neighborhood residents, groups, and businesses. That is, revising their plans with a focus on inclusivity – fostering collaboration and better ensuring that all residents have access to the processes that shape the Delmar Loop TOD space. In this regard, I recommend that planners from both EWG and the City of St. Louis meet with Delmar Loop business owners both east and west of the MetroLink station to begin to foster support, not only for current trolley developments, but also to foster dialogue with the more neglected businesses in the area.

However, that the EWG and the City of St. Louis have taken so long to develop TOD plans (20 years after the opening of the Delmar MetroLink station and the St. Louis LRT system

overall) may indicate whether and how they will guide TOD activities in the future. As noted earlier (Chapter 5), planners showed little interest in guiding TOD activities nor were they (planners from EWG and Metro) aggressive in trying to acquire TOD or transit related funding ("MP", personal communication, May 21, 2015).

Additionally, while not directly stated, the EWG and City of St. Louis may not have had the adequate funding to be able to guide TOD activities. Only in 2010 did TOD plans begin to emerge and they only emerged as part of the Obama Administration's Sustainable Communities Regional Planning Grant. Still, this points back to the lack of will in trying to acquire funding for transit and TOD. Over two decades, planners from EWG have not taken the initiative to fully develop regional TOD plans.

Besides the lack of initiative from the EWG and City of St. Louis in establishing TOD, another reason for the lack of leadership and activity from planners may be due to the private sector undertaking revitalization activities at the Delmar Loop site. The Delmar Loop TOD site benefitted from private business owners and developers undertaking revitalization and redevelopment activities beginning in the 1970s. Revitalization activities began well before LRT operations and carried over after LRT operations. Planners may have been less prone to guide TOD activities because some form of development was already occurring at the site as a result of private sector leadership.

As a result of a lack of public sector planning leadership, the West End Neighborhood within the Delmar Loop site has not experienced infrastructure development to support transit use. Neither EWG planners nor private sector actors (i.e., the Loop Trolley Development District) have adequately engaged businesses or residents within this space. Such results show how TOD activities largely reflect private sector interests. When it comes to TODs, these private

interests are represented spatially. That is, certain spaces benefit from the private sector activities (namely the Delmar Loop Entertainment District and the area west of the Delmar MetroLink station), while private sector activities representing private interests overlook and marginalize other spaces (i.e.; the West End Neighborhood).

Prevent Displacement and Guide Growth

Additionally, to assist in establishing inclusive TOD spaces, planners should act to both prevent displacement and guide growth. Preventing displacement and guiding growth primarily includes approaching displacement prevention and guiding growth as complementary entities. First, a necessary part of preventing displacement and guiding growth is for planners to take the approach that preventing displacement and guiding growth are not two separate entities. That is, planners should not take an "either-or" approach when engaging in TOD activities. So far, planners have not firmly taken one approach or the other. For example, Metro and SLDC planners: a) allowed private developers to take the lead in Delmar Loop developments; b) have not actively sought out developers or private business owners to undertake TOD related projects; and c) have not worked with private developers to establish developments conducive to transit (i.e., with the Wabash building and Joe Edwards).

Additionally, I found that planners (especially City of St. Louis EWG planners) consciously and unconsciously excluded West End Neighborhood residents from TOD activities. However, by including the West End Neighborhood in TOD planning activities, planners for Metro Transit and the St. Louis Development Corporation can better ensure both increased transit ridership and neighborhood development are more likely to occur. Both of these issues are intertwined. As indicated in Chapter 6, by not including the West End Neighborhood from

zoning decisions, planners for the City of St. Louis excluded the areas and residents that use transit the most. Excluding this neighborhood directly affects LRT ridership, reducing the amount of people who have access to and use transit, as a result, severely limits the development potential in transit areas. In short, excluding and displacing the West End Neighborhood residents from transit and neighborhood developments decreases the number of light rail riders. Without people routinely using light rail, developments to support TOD will not be effective. In this regard, including the West End Neighborhood in TOD planning activities assists in establishing the development potential for the Delmar Loop TOD site.

I contend that planners for the City of St. Louis and EWG overlooked and consciously excluded the West End Neighborhood in TOD planning activities based on a history of racial exclusion that precedes TOD. This was demonstrated by a previous example where Delmar Boulevard physically and socially separates black and white St. Louis residents. Planners could have used TODs as a manner of overcoming this history and establishing a new one based on a shared need (public transportation and regional access). Instead, planners (particularly from the City of St. Louis – with the exclusion of the West End Neighborhood in Delmar Loop TOD zoning) and TOD planning activities have allowed this exclusive and segregationist history and activities to continue. By allowing this history to continue, it excludes the predominately black population of the West End Neighborhood from any future TOD benefits. Planners who overlook and marginalize certain groups from and in TOD activities fail to guide growth (in terms of business growth and increased transit ridership). By doing so, unfortunately, planners may assist in potentially gentrifying the Delmar Loop TOD site in the future and/or continuing to exclude and contribute to the decline of the West End Neighborhood.

To assist in preventing displacement and guiding growth in the Delmar Loop TOD site, the St. Louis Development Corporation (SLDC) should approve and seek developments and/or provide land to developers with interests aligned with regional TOD guidelines. However, these developments must begin in the West End Neighborhood and aim to ensure the existing residents receive the benefits. In doing so, Metro and/or SLDC would need to actively assist in guiding developments into this area. In this regard, Metro and SLDC planners can work in conjunction with private developers and business owners to better ensure that developments have equitable impacts for the TOD area neighborhoods.

What can planners do differently as a result of this dissertation?

To maintain active leadership and also prevent displacement and guide growth for the case of the Delmar Loop, I recommend that planners first begin by evaluating and monitoring development impacts at the local level. One key finding of this dissertation is that planners have not undertaken activities relating to the guiding principle of Ongoing Evaluating and Monitoring of Impacts and Outcomes at the Delmar Loop site. Considering that planners largely took a hands-off approach to Delmar Loop TOD activities as a whole, not evaluating and monitoring outcomes of activities is not surprising considering the lack of activities undertaken by planners. But, the lack of evaluation and monitoring is troubling because the private developments may have detrimental impacts especially for the West End Neighborhood where residents need transit the most. Understanding the effects of the trolley, for example, may help planners (especially from EWG and the City of St. Louis) understand the outcomes of developments, know where and for whom the different outcomes occur.

The Puget Sound Regional Council's Growing Transit Communities, an action plan for guiding growth around transit stations in Puget Sound region, identifies evaluation and monitoring as a necessary strategy for success (PSRC, 2013). The plan specifically notes that "public agencies should evaluate the equity impacts of policies and investments before they are implemented in transit communities" (PSRC, 2013, p. 22). As one recommended action of this strategy, the PSRC (2013) maintains that the regional council, transit agencies, and local governments should "Evaluate social equity impacts when considering new or updated (regional) policies and programs" (p. 22). PSRC (2013) also maintains that the regional council should "develop and monitor indicators of progress toward achieving transit community goals" which include monitoring housing affordability and employment growth (p. 22).

I found that St. Louis planners have not developed or presented monitoring indicators in regards to achieving transit community goals or evaluating the social impacts of public and private sector developments. Granted, St. Louis and Seattle are different regions. St. Louis has experienced decades of stagnate and/or declining economic and population development. Seattle is looking to better guide its ongoing growth to help ensure all residents benefit from it (PSRC, 2013).

Yet, TOD plans undertaken for the EWG and the City of St. Louis focus on identifying the Delmar Loop site's current characteristics – mainly providing descriptive statistics for the plans. Identifying how change has occurred in the station areas as a result of or in conjunction with the plans has not occurred. The spatial regressions in Chapter 3 directly address change over time in light rail station areas. Additionally, the regression results provide a step in identifying the impacts of the presence of light rail transit stations. I do not specifically examine St. Louis. However, the results can help point planners in the direction of regions where the results show

possible positive neighborhood changes in regards to inclusive neighborhood changes and expected TOD impacts associated with light rail transit stations.

When looked at as a whole, the Delmar Loop site is diverse: a mix of income levels, varying housing prices, and racial diversity. However, when examined further, the site is actually quite segregated. Results of this dissertation indicate that TOD spaces are not homogeneous spaces where all residents benefit from TOD activities. More importantly, for the sake of progress or area enhancements, planners from EWG, the City of St. Louis, Metro, and SLDC overlooked, ignored, and consciously excluded spaces and people (i.e.; the West End Neighborhood) from TOD activities.

There are two key lessons that planners working beyond the Delmar Loop and even St. Louis can take away from this work. First, planners from elsewhere can learn that not actively leading or being involved in inclusive or TOD activities in general may result in some residents being marginalized from TOD benefits. As such, planners should not solely rely on outside entities (i.e.; private developers or federal funding) to assist in developing inclusive TOD neighborhoods. Second, approaching TOD sites as homogeneous spaces or neighborhoods may overlook some key contextual issues that can lead to the further marginalization of vulnerable residents. In this regard, not fully recognizing, monitoring, or evaluating the different spaces and how developments impact them may potentially result in segregated spaces.

Based on these lessons, for planners to ideally assist in establishing inclusive neighborhoods, I envision that: 1) Planners from MPOs or regional planning agencies should play a leadership role by coordinating TOD activities throughout a region. In the case of the St.

Louis region, I recommend that planners from EWG develop a regional TOD agenda with each station serving an integral part; 2) Planners from local or municipal planning agencies support the TOD agenda set by the regional planning agency – largely by developing and implementing local zoning in station areas in accordance with the regional plans and which would best benefit all TOD station area residents. In the case of the Delmar Loop, I recommend that City of St. Louis planners re-examine the zoning recommended in the *Transit Oriented Development Plan for the Delmar Loop and Forest Park-DeBaliviere MetroLink Stations* and fully include all spaces part of the TOD site. 3) Planners from transit; local, public development; and municipal planning agencies lead station area development efforts to implement neighborhood scale planning efforts in accordance with regional planning goals. In the case of the Delmar Loop, I recommend Metro Transit and City of St. Louis planners lead infrastructure development efforts at the Delmar MetroLink station – ensuring proper lighting, landscaping, and pedestrian infrastructure (i.e.; sidewalks and/or bike paths) for pedestrians to access the station from all directions. I also recommend City of St. Louis and St. Louis Development Corporation planners actively seek out private developers to convert the abundance of vacant lots in the area in accordance with the TOD goals and zoning established by regional and local planners and which can fit the needs of the local residents.

Such recommendations overall involve planners better understanding the interaction between space (i.e.; as in the built environment, and society) and the processes that shape the space (i.e.; public participation, leadership). Planners, especially from the EWG, have been negligent in guiding and leading TOD activities for the site, resulting in a missed opportunity that might otherwise have helped make the Delmar Loop TOD space more accessible to and for

the West End Neighborhood. This inaccessibility, in turn, has lead, and I suspect will continue to lead to, the people of the West End Neighborhood of the Delmar Loop site cut off from the decision making processes that shape the space. Unless planners – EWG and City of St. Louis planners particularly – step in to provide leadership and guide growth for the Delmar Loop site as a whole and the West End Neighborhood particularly, the West End Neighborhood residents will continue to experience social exclusion and a lack of transit access.

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Appendix A: 30-year change (1980-2010) OLS Regressions Results

	RCI	Race	Education	Income	Poverty	PD	PT	Non-POV
(Intercept)	1.32 **	0.66 ***	0.40 ***	8.63 ***	0.11	5.41 ***	-0.42 ***	-0.69 ***
	(0.50)	(0.14)	(0.10)	(0.81)	(0.07)	(0.61)	(0.09)	(0.14)
SanFranciscoLRT	0.16 **	0.14 ***	0.04 **	0.38 ***	-0.04 ***	0.48 ***	0.08 ***	0.12 ***
	(0.06)	(0.02)	(0.01)	(0.10)	(0.01)	(0.08)	(0.01)	(0.02)
ClevelandLRT	-0.20 *	-0.18 ***	-0.02	-0.13	-0.01	-0.10	0.03 *	-0.01
	(0.11)	(0.03)	(0.02)	(0.17)	(0.01)	(0.13)	(0.02)	(0.03)
SanDiegoLRT	-0.01	0.03	-0.02	-0.02	0.02 *	-0.08	0.02	0.00
	(0.09)	(0.03)	(0.02)	(0.14)	(0.01)	(0.11)	(0.02)	(0.02)
PittsburghLRT	-0.17	-0.00	-0.01	-0.46 **	-0.00	-0.08	-0.06 **	-0.10 **
	(0.11)	(0.03)	(0.02)	(0.17)	(0.01)	(0.13)	(0.02)	(0.03)
BuffaloLRT	0.01	-0.12 **	0.04	-0.37	-0.01	0.06	-0.03	-0.24 ***
	(0.15)	(0.04)	(0.03)	(0.24)	(0.02)	(0.18)	(0.03)	(0.04)
PortlandLRT	-0.30 **	-0.06 **	-0.03	-0.11	0.04 **	0.22 *	0.05 **	0.02
	(0.10)	(0.03)	(0.02)	(0.16)	(0.01)	(0.12)	(0.02)	(0.03)
SacramentoLRT	-0.10	0.07 **	-0.01	-0.07	0.01	-0.72 ***	0.04 **	0.02
	(0.11)	(0.03)	(0.02)	(0.18)	(0.02)	(0.14)	(0.02)	(0.03)
SanJoseLRT	0.04	0.07 **	0.00	0.13	-0.02	-0.06	0.01	0.03
	(0.10)	(0.03)	(0.02)	(0.16)	(0.01)	(0.12)	(0.02)	(0.03)
Core City	-0.01	-0.06 ***	0.01	-0.14 **	0.02 ***	0.05	0.00	0.02 **
	(0.03)	(0.01)	(0.01)	(0.04)	(0.00)	(0.03)	(0.00)	(0.01)
Distance to CBD	-0.07 ***	-0.01 **	-0.02 ***	0.12 ***	0.01 **	0.08 ***	0.03 ***	0.05 ***
	(0.02)	(0.01)	(0.00)	(0.03)	(0.00)	(0.02)	(0.00)	(0.01)
Cleveland	-0.89 ***	0.11 ***	-0.13 ***	-0.44 ***	0.07 ***	-0.46 ***	-0.04 ***	-0.03 **
	(0.04)	(0.01)	(0.01)	(0.06)	(0.01)	(0.05)	(0.01)	(0.01)
San Diego	-0.13 ***	0.03 **	-0.09 ***	-0.07	0.03 ***	0.06	0.00	-0.01
	(0.04)	(0.01)	(0.01)	(0.06)	(0.01)	(0.05)	(0.01)	(0.01)
Pittsburgh	-0.82 ***	0.21 ***	-0.11 ***	-0.59 ***	0.05 ***	-0.53 ***	-0.06 ***	-0.06 ***
	(0.05)	(0.01)	(0.01)	(0.07)	(0.01)	(0.06)	(0.01)	(0.01)
Buffalo	-0.83 ***	0.18 ***	-0.13 ***	-0.48 ***	0.06 ***	-0.38 ***	-0.01	0.00
	(0.05)	(0.01)	(0.01)	(0.08)	(0.01)	(0.06)	(0.01)	(0.01)
Portland	-0.15 **	0.13 ***	-0.07 ***	-0.15 *	0.04 ***	-0.02	0.02 **	0.07 ***
	(0.06)	(0.02)	(0.01)	(0.09)	(0.01)	(0.07)	(0.01)	(0.02)
Sacramento	-0.17 ***	0.03 **	-0.12 ***	0.01	0.05 ***	0.49 ***	0.02 *	0.04 **
	(0.05)	(0.01)	(0.01)	(0.08)	(0.01)	(0.06)	(0.01)	(0.01)
San Jose	0.16 **	-0.08 ***	0.01	0.30 ***	0.00	0.06	0.02 *	0.02
	(0.05)	(0.01)	(0.01)	(0.08)	(0.01)	(0.06)	(0.01)	(0.01)
BY Population Density	-0.11 ***	-0.02 ***	-0.02 ***	0.06 ***	0.01 ***	-0.51 ***	0.00	0.01 **
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)
BY Race	0.18 ***	-0.32 ***	0.13 ***	0.15 *	-0.04 ***	-0.61 ***	-0.02 **	-0.08 ***
	(0.05)	(0.02)	(0.01)	(0.09)	(0.01)	(0.06)	(0.01)	(0.01)
BY Education	-0.21	0.26 ***	-0.22 ***	0.78 **	0.06 **	-0.02	0.07 **	0.15 **
	(0.18)	(0.05)	(0.04)	(0.29)	(0.02)	(0.22)	(0.03)	(0.05)
BY Income	-0.02 **	-0.02 ***	-0.01 ***	-0.93 ***	0.00	-0.06 ***	0.00	-0.00
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)
BY Poverty	1.35 ***	0.08 *	-0.02	-1.21 ***	-0.49 ***	-1.74 ***	-0.29 ***	-0.33 ***
	(0.17)	(0.05)	(0.03)	(0.27)	(0.02)	(0.20)	(0.03)	(0.05)

	RCI	Race	Education	Income	Poverty	PD	PT	Non-POV
BY Professional	0.83 ***	0.23 ***	0.39 ***	0.28	-0.18 ***	-0.14	-0.12 **	-0.14 **
	(0.21)	(0.06)	(0.04)	(0.35)	(0.03)	(0.26)	(0.04)	(0.06)
BY Renter Occupancy	-0.33 ***	-0.09 ***	0.00	-0.66 ***	0.09 ***	0.56 ***	0.04 ***	0.04 **
	(0.05)	(0.02)	(0.01)	(0.09)	(0.01)	(0.07)	(0.01)	(0.01)
BY Rent	0.06	-0.06 **	0.03 **	-0.03	-0.03 ***	-0.07	0.03 **	0.04 **
	(0.06)	(0.02)	(0.01)	(0.10)	(0.01)	(0.08)	(0.01)	(0.02)
BY Housing Value	0.05 ***	0.01 ***	0.00	0.02 **	-0.00 *	-0.01	-0.00	-0.00
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)
Housing Age	0.58 ***	0.08 ***	0.06 ***	0.10	0.01 **	0.11 **	-0.02 **	-0.04 ***
	(0.04)	(0.01)	(0.01)	(0.07)	(0.01)	(0.05)	(0.01)	(0.01)
Rent Gap	-0.01	-0.05 **	0.03 **	-0.05	-0.03 **	-0.06	0.03 **	0.03 *
	(0.06)	(0.02)	(0.01)	(0.10)	(0.01)	(0.08)	(0.01)	(0.02)
R^2	0.38	0.33	0.25	0.69	0.23	0.62	0.21	0.20
Adj. R^2 0.38	0.33	0.68	0.22	0.24	0.62	0.21	0.19	
Num. obs.	3898	3898	3898	3898	3898	3898	3898	3898
RMSE	0.54	0.16	0.11	0.88	0.08	0.67	0.10	0.15

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
(Standard Errors in Parentheses)

Appendix B: 20-year change (1990-2010) OLS Regressions Results

	RCI	Race	Education	Income	Poverty	PD	PT	Non-POV
(Intercept)	1.22 **	1.54 ***	0.18	2.29 **	-0.16 *	2.56 ***	0.53 ***	0.85 ***
	(0.50)	(0.15)	(0.11)	(1.04)	(0.08)	(0.76)	(0.07)	(0.10)
DenverLRT	0.49 ***	0.11 **	0.06 **	0.15	-0.03	-0.31 *	-0.02	-0.04
	(0.11)	(0.03)	(0.03)	(0.23)	(0.02)	(0.17)	(0.01)	(0.02)
LosAngelesLRT	-0.01	-0.01	-0.03 **	-0.16	0.02 *	0.02	0.00	0.01
	(0.05)	(0.02)	(0.01)	(0.11)	(0.01)	(0.08)	(0.01)	(0.01)
BaltimoreLRT	0.07	0.06 **	0.02	-0.29 *	0.01	-0.10	-0.01	-0.03 **
	(0.07)	(0.02)	(0.02)	(0.16)	(0.01)	(0.11)	(0.01)	(0.01)
StLouisLRT	0.12	-0.01	0.06 **	0.31	0.04 *	0.07	-0.04 **	-0.05 **
	(0.11)	(0.04)	(0.03)	(0.24)	(0.02)	(0.17)	(0.02)	(0.02)
DallasLRT	0.01	0.10 ***	0.04 *	0.08	-0.04 **	-0.15	-0.03 **	-0.07 ***
	(0.09)	(0.03)	(0.02)	(0.20)	(0.02)	(0.14)	(0.01)	(0.02)
SaltLakeCityLRT	-0.23 *	-0.02	-0.06 **	0.27	0.05 **	-0.29	-0.01	-0.04 *
	(0.12)	(0.04)	(0.03)	(0.25)	(0.02)	(0.18)	(0.02)	(0.02)
Core City	-0.01	0.02 ***	0.00	-0.08 **	0.01 ***	0.04	0.01 ***	0.02 ***
	(0.02)	(0.00)	(0.00)	(0.03)	(0.00)	(0.02)	(0.00)	(0.00)
Distance to CBD	-0.05 ***	-0.00	-0.01 ***	0.02	0.00 **	0.00	0.00	0.01 ***
	(0.01)	(0.00)	(0.00)	(0.02)	(0.00)	(0.01)	(0.00)	(0.00)
Los Angeles	0.10 **	0.05 ***	0.01	-0.52 ***	-0.05 ***	-0.26 ***	0.04 ***	0.05 ***
	(0.04)	(0.01)	(0.01)	(0.09)	(0.01)	(0.07)	(0.01)	(0.01)
Baltimore	0.08 **	-0.05 ***	0.01 **	-0.09	-0.03 ***	-0.30 ***	-0.00	-0.01 **
	(0.03)	(0.01)	(0.01)	(0.06)	(0.00)	(0.04)	(0.00)	(0.01)
St. Louis	-0.09 **	-0.01	0.01 **	0.02	-0.00	-0.42 ***	-0.02 ***	-0.04 ***
	(0.03)	(0.01)	(0.01)	(0.07)	(0.01)	(0.05)	(0.00)	(0.01)
Dallas	-0.24 ***	-0.11 ***	-0.02 ***	0.05	0.00	-0.15 ***	-0.02 ***	-0.03 ***
	(0.02)	(0.01)	(0.01)	(0.05)	(0.00)	(0.04)	(0.00)	(0.00)
Salt Lake City	0.40 ***	-0.02	0.01	0.04	-0.03 ***	-0.07	-0.02 ***	-0.02 ***
	(0.04)	(0.01)	(0.01)	(0.08)	(0.01)	(0.06)	(0.01)	(0.01)
BY Population Density	-0.10 ***	-0.01 ***	-0.02 ***	0.15 ***	0.01 ***	-0.40 ***	0.00 **	0.01 ***
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)
BY Race	0.29 ***	-0.15 ***	0.10 ***	0.13 *	-0.03 ***	0.04	0.01	-0.00
	(0.04)	(0.01)	(0.01)	(0.07)	(0.01)	(0.05)	(0.00)	(0.01)
BY Education	0.13	0.22 ***	-0.22 ***	0.29	-0.03 *	0.46 **	0.10 ***	0.14 ***
	(0.11)	(0.03)	(0.03)	(0.23)	(0.02)	(0.17)	(0.01)	(0.02)
BY Income	-0.02	-0.03 ***	-0.04 ***	-0.93 ***	0.01 **	-0.10 **	0.00	-0.02 ***
	(0.02)	(0.01)	(0.00)	(0.04)	(0.00)	(0.03)	(0.00)	(0.00)
BY Poverty	1.52 ***	0.44 ***	0.09 ***	-0.50 **	-0.44 ***	-0.31 **	-0.12 ***	-0.17 ***
	(0.09)	(0.03)	(0.02)	(0.19)	(0.02)	(0.14)	(0.01)	(0.02)
BY Professional	0.10	0.14 **	0.31 ***	0.12	-0.04 *	-1.27 ***	-0.19 ***	-0.23 ***
	(0.14)	(0.04)	(0.03)	(0.30)	(0.02)	(0.22)	(0.02)	(0.03)
BY Renter Occupancy	-0.19 ***	-0.13 ***	-0.02 **	-0.73 ***	0.08 ***	0.32 ***	0.03 ***	0.03 ***
	(0.03)	(0.01)	(0.01)	(0.07)	(0.01)	(0.05)	(0.00)	(0.01)
BY Rent	-0.13 *	-0.23 ***	0.02	0.64 ***	0.02 *	0.23 *	-0.08 ***	-0.13 ***
	(0.08)	(0.02)	(0.02)	(0.17)	(0.01)	(0.12)	(0.01)	(0.02)
BY Housing Value	0.07 ***	0.02 ***	0.03 ***	0.20 ***	-0.01 ***	0.08 ***	0.00	0.01 ***
	(0.01)	(0.00)	(0.00)	(0.03)	(0.00)	(0.02)	(0.00)	(0.00)

	RCI	Race	Education	Income	Poverty	PD	PT	Non-POV
Housing Age	0.28 ***	0.02 **	0.05 ***	0.10 *	0.00	-0.16 ***	-0.03 ***	-0.04 ***
	(0.03)	(0.01)	(0.01)	(0.05)	(0.00)	(0.04)	(0.00)	(0.00)
Rent Gap	-0.09	-0.20 ***	0.02	0.23	0.02 *	0.06	-0.09 ***	-0.15 ***
	(0.08)	(0.02)	(0.02)	(0.16)	(0.01)	(0.12)	(0.01)	(0.02)
R^2	0.24	0.31	0.19	0.13	0.19	0.40	0.11	0.12
Adj. R^2	0.23	0.31	0.18	0.13	0.19	0.40	0.11	0.11
Num. obs.	5783	5783	5783	5783	5783	5783	5783	5783
RMSE	0.42	0.13	0.10	0.89	0.07	0.65	0.06	0.08

*** p < 0.01, ** p < 0.05, * p < 0.1
(Standard Errors in Parentheses)

Appendix C: Descriptive Statistics – 30-year change (1980-2010) Variables

	1980 All Tracts					1980 Gentrifiable Tracts				
	# of Observations	Minimum	Max	Mean	Std.Dev.	# of Observations	Minimum	Max	Mean	Std.Dev.
RCI	3629	-1.6646	3.76425	0.60473	0.68925	1460	-1.55249	3.76425	0.61638	0.78202
Race	3894	-0.96391	1	-0.19009	0.19112	1682	-0.96391	1	-0.21174	0.22741
Education	3893	-0.4687	0.85704	0.14903	0.12895	1681	-0.39886	0.85704	0.13443	0.14451
Income	3890	-11.1485	12.29413	0.27519	1.57034	1678	-11.1485	12.29413	0.49017	2.25333
Poverty	3888	-0.70035	0.75486	0.02933	0.08529	1676	-0.70035	0.75486	0.03631	0.11061
PD	3894	-6.05288	10.91341	0.3617	1.08286	1682	-4.73362	10.91341	0.44531	1.33876
PT	3870	-1.22705	0.521	-0.0117	0.10706	1667	-1.22705	0.46667	-0.01466	0.14408
Non-POV	3893	-2.78985	0.97362	-0.01939	0.16517	1681	-2.78985	0.97362	-0.0259	0.21912
LRTStation	304	0	1	0.07799	0.26819	188	0	1	0.11151	0.31485
CC	1393	0	1	0.35736	0.47928	858	0	1	0.5089	0.50007
iCC	235	0	1	0.06029	0.23805	165	0	1	0.09786	0.29722
Suburb	2505	0	1	0.64264	0.47928	828	0	1	0.4911	0.50007
iSuburb	69	0	1	0.0177	0.13188	23	0	1	0.01364	0.11603
DistCBD	3898	5.69371	11.245881	9.50394	0.8254	1686	6.15352	11.245881	9.23947	0.93262
HousingAge80	3727	0	1.3125	0.34993	0.30961	1591	0	1.3125	0.42509	0.33472
RentGap80	3898	-1.36637	6.62143	-0.00412	1.26577	1686	-1.34452	6.62143	0.48293	1.77698
PD1980	3875	0	15.27516	8.16923	1.43625	1663	0	13.03929	8.3732	1.67832
Race1980	3875	0	0.99809	0.76502	0.26057	1663	0	0.9973	0.61108	0.30381
Edu1980	3821	0	0.86059	0.19361	0.13743	1609	0	0.86059	0.12021	0.09675
Inc1980	3830	0	11.95032	10.60545	1.46424	1618	0	11.68489	10.09771	2.10272
Pov1980	3815	0	0.84	0.09959	0.09153	1604	0	0.84	0.15536	0.11142
Prof1980	3818	0	1	0.23967	0.11973	1606	0	1	0.1653	0.08674
Rent1980	3748	0	7.2326	6.18983	1.28825	1536	0	7.22302	5.69425	1.81206
HVal1980	3762	0	13.290711	11.63848	2.28088	1550	0	13.254833	10.862033	3.267
RtOc1980	3808	0	1	0.36935	0.24304	1597	0	1	0.47732	0.25471
Cleveland	576	0	1	0.14777	0.35492	158	0	1	0.09371	0.29152
San Francisco	777	0	1	0.19933	0.39955	370	0	1	0.21945	0.414
San Diego	610	0	1	0.15649	0.36337	303	0	1	0.17972	0.38406
Pittsburgh	595	0	1	0.15264	0.35969	189	0	1	0.1121	0.31558
Buffalo	261	0	1	0.06696	0.24998	72	0	1	0.0427	0.20225
Portland	333	0	1	0.08543	0.27955	174	0	1	0.1032	0.30431
Sacramento	394	0	1	0.10108	0.30147	205	0	1	0.12159	0.32691
San Jose	352	0	1	0.0903	0.28665	215	0	1	0.12752	0.33365

Appendix D: Descriptive Statistics – 20-year change (1990-2010) Variables

	1990 All Tracts					1990 Gentrifiable Tracts				
	# of Observations	Minimum	Max	Mean	Std.Dev.	# of Observations	Minimum	Max	Mean	Std.Dev.
RCI	5536	-2.25968	3.85716	0.18163	0.48109	1818	-1.40064	3.85716	0.21697	0.49987
Race	5773	-0.93655	0.8332	-0.16552	0.15705	1904	-0.93655	0.8332	-0.10632	0.16347
Education	5772	-0.71127	0.972	0.06713	0.10639	1904	-0.36719	0.972	0.04354	0.09493
Income	5771	-11.6615	11.72264	-0.07142	0.94854	1902	-11.3314	11.72264	-0.05033	1.14449
Poverty	5770	-0.6	0.74323	0.01727	0.07897	1901	-0.52974	0.74323	0.00644	0.10353
PD	5772	-11.191	8.481	0.26822	0.83192	1904	-10.3484	8.45477	0.08362	0.64811
PT	5594	-1.24679	0.51055	0.01293	0.05961	1875	-1.24679	0.51055	0.0169	0.09327
Non-POV	5767	-1.54987	0.68373	0.0192	0.08834	1900	-1.54987	0.63014	0.01915	0.13158
LRTStation	172	0	1	0.02974	0.16989	119	0	1	0.06217	0.24153
CC	1877	0	1	0.32457	0.46826	979	0	1	0.51149	0.5
iCC	96	0	1	0.0166	0.12778	70	0	1	0.03657	0.18776
Suburb	3906	0	1	0.67543	0.46826	935	0	1	0.48851	0.5
iSuburb	76	0	1	0.01314	0.11389	49	0	1	0.0256	0.15798
DistCBD	5783	-23.567	11.29157	9.79823	0.90829	1914	-23.567	11.29157	9.30279	1.16579
HousingAge90	5566	0	1.2	0.3938	0.29761	1891	0	1.2	0.55752	0.23861
RentGap90	5783	-1.08653	12.99393	0.00697	0.47444	1914	-0.58958	12.99393	0.2716	0.68895
PD1990	5768	-0.34648	15.11768	8.40339	1.37736	1899	0	14.3155	8.94832	1.3575
Race1990	5768	0	1	0.60231	0.32361	1899	0	1	0.29361	0.30301
Edu1990	5763	0	0.82013	0.23687	0.1645	1894	0	0.53125	0.09075	0.0649
Inc1990	5765	0	12.42576	10.9204	0.75422	1896	0	11.3314	10.42043	1.06951
Pov1990	5757	0	0.84842	0.12315	0.11499	1893	0	0.84842	0.23967	0.12029
Prof1990	5763	0	0.74875	0.27822	0.13935	1894	0	0.45492	0.14147	0.06338
Rent1990	5767	-6.04241	7.42038	6.6987	0.53826	1898	-6.04241	7.18619	6.41672	0.73403
HVal1990	5760	0	13.63399	12.24894	1.02121	1891	0	13.31571	11.7914	1.44488
RtOc1990	5768	0	1	0.42878	0.2579	1899	0	1	0.5762	0.23284
Los Angeles	2777	0	1	0.4802	0.49965	1028	0	1	0.5371	0.49875
Baltimore	585	0	1	0.10116	0.30156	183	0	1	0.09561	0.29413
St. Louis	508	0	1	0.08784	0.28309	131	0	1	0.06844	0.25257
Denver	587	0	1	0.1015	0.30202	188	0	1	0.09822	0.29769
Dallas	1111	0	1	0.19211	0.394	295	0	1	0.15413	0.36117
Salt Lake City	215	0	1	0.03718	0.18921	89	0	1	0.0465	0.21062

Appendix E: Set 2 Results, 30-year change (1980-2010)

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**
(Intercept)	0.4028	0.5808	0.7392	0***	0.0932	0.5214	7.5497	0***	0.2157	0.0737*	5.8327	0***	-0.3234	0.0458**	-0.5487	0.0306**
SanFranciscoLRT	0.0612	0.4607	0.0814	0***	0.0285	0.0853*	0.4699	0.0056***	-0.034	0.0133**	0.3718	0.0005***	0.0379	0.0392**	0.069	0.0166**
ClevelandLRT	0.0688	0.6548	-0.0217	0.5332	0.0113	0.7129	-0.2002	0.5237	-0.044	0.0846*	-0.2735	0.1659	0.0786	0.0209**	0.0611	0.2514
SanDiegoLRT	-0.0603	0.5428	-0.0309	0.1676	-0.0209	0.2893	0.0491	0.8081	0.0406	0.0133**	-0.0242	0.8494	0.0099	0.6523	-0.0165	0.6303
PittsburghLRT	0.1124	0.5921	-0.0132	0.7817	-0.0141	0.7351	-0.425	0.3211	-0.0161	0.6426	-0.2843	0.2917	-0.0391	0.399	0.0052	0.9428
BuffaloLRT	0.1782	0.3582	-0.0633	0.1486	0.0854	0.027**	-0.5693	0.1502	-0.0433	0.177	-0.1305	0.5997	-0.0762	0.0755*	-0.3522	0***
PortlandLRT	-0.3714	0.0035***	-0.046	0.1097	-0.0279	0.2697	-0.0718	0.7818	0.0427	0.0424**	0.2247	0.1681	0.054	0.0549*	0.0004	0.9931
SacramentoLRT	-0.1369	0.3426	0.049	0.1324	-0.015	0.6014	-0.1449	0.6222	0.0102	0.669	-0.485	0.0089***	0.0276	0.3858	0.0023	0.9627
SanJoseLRT	0.0399	0.7226	0.0316	0.2137	0.0181	0.4185	0.1661	0.4685	-0.0063	0.7354	-0.0424	0.7684	0.0044	0.8608	0.0154	0.6928
Core City	-0.0378	0.3679	-0.0427	0***	-0.0044	0.5975	-0.1388	0.105	0.004	0.5651	0.0904	0.093*	0.0082	0.3761	0.0244	0.0941*
Distance to CBD	-0.045	0.1002	-0.0104	0.0896*	-0.014	0.0104**	0.2012	0.0003***	-0.0027	0.5479	0.0283	0.4175	0.0196	0.0012***	0.0437	0***
Cleveland	-0.6268	0***	-0.001	0.9478	-0.0829	0***	-0.3844	0.0051***	0.1143	0***	-0.4189	0***	-0.0596	0.0001***	-0.0755	0.0013***
San Diego	-0.0444	0.413	0.0474	0.0001***	-0.0517	0***	0.0488	0.6587	0.0177	0.048**	-0.1163	0.0934*	-0.0061	0.6096	-0.0088	0.6401
Pittsburgh	-0.5697	0***	0.1362	0***	-0.0817	0***	-0.7033	0***	0.0723	0***	-0.4229	0***	-0.0705	0***	-0.1117	0***
Buffalo	-0.6874	0***	0.0669	0.001***	-0.0843	0***	-0.5251	0.0046***	0.1018	0***	-0.294	0.0119**	-0.0041	0.8355	0.0013	0.967
Portland	0.1117	0.1896	0.1543	0***	-0.0072	0.6713	0.0538	0.757	0.0151	0.2838	-0.288	0.0085***	-0.0069	0.7142	0.0425	0.1493
Sacramento	-0.0068	0.9241	0.0474	0.0034***	-0.0543	0.0002***	0.4503	0.002***	0.043	0.0003***	0.1141	0.2189	0.0013	0.9343	0.0232	0.3481
San Jose	0.1608	0.0292**	-0.0067	0.6883	0.0259	0.0779*	0.5884	0.0001***	-0.019	0.1194	-0.1666	0.0782*	0.002	0.9029	0.0132	0.6058
BY Population Density	-0.0674	0***	-0.0225	0***	-0.0159	0***	0.1239	0***	0.0159	0***	-0.4495	0***	0.0013	0.5744	0.0055	0.1241
BY Race	0.0216	0.7278	-0.3713	0***	0.0831	0***	0.0354	0.7794	-0.0239	0.0199**	-0.4983	0***	0.0041	0.7659	-0.0591	0.006***
BY Education	-0.3611	0.1806	0.1752	0.0042***	-0.2733	0***	0.9932	0.0712*	0.0409	0.3586	-0.0415	0.9045	0.1753	0.0033***	0.3927	0***
BY Income	-0.0178	0.0438**	-0.0119	0***	-0.0107	0***	-0.8928	0***	0	0.9831	-0.0392	0.0005***	0.0002	0.9024	-0.0017	0.5863
BY Poverty	1.0948	0***	0.031	0.4868	0.0073	0.8522	-0.968	0.016**	-0.5567	0***	-1.396	0***	-0.1737	0.0001***	-0.2041	0.0028***
BY Professional	0.8699	0.004***	0.2178	0.0015***	0.2998	0***	-0.8435	0.1718	-0.1518	0.0024***	0.1992	0.6074	-0.2004	0.0027***	-0.2887	0.0059***
BY Renter Occupancy	-0.2646	0.0011***	-0.029	0.1144	0.0078	0.6307	-0.4201	0.0111**	0.077	0***	0.5544	0***	0.006	0.7399	-0.0132	0.6392
BY Rent	0.0873	0.3557	-0.0606	0.0047***	0.0483	0.0103**	-0.1502	0.438	-0.0375	0.0168**	-0.2025	0.0958*	0.0301	0.151	0.0321	0.3269
BY Housing Value	0.0345	0***	0.0038	0.0039***	-0.0002	0.8824	0.0151	0.201	-0.0007	0.4887	-0.0037	0.6201	-0.0018	0.1562	-0.0017	0.3904
BY Housing Age	0.4846	0***	0.0887	0***	0.0443	0.0009***	0.3734	0.0064***	-0.0119	0.2804	-0.0385	0.653	-0.0028	0.848	-0.0124	0.5936
Rent Gap	0.0331	0.7278	-0.054	0.0121**	0.0517	0.0064***	-0.1494	0.4438	-0.0355	0.0244**	-0.1896	0.1215	0.0263	0.2122	0.0254	0.4411
Rho		*0.4452*		*0.4891*		*4562*		*0.1542*		*0.2182*		*0.3389*		*0.3427*		*0.2365*
Log Likelihood		*-1391.752*		*1105.158*		*1326.075*		*-2552.985*		*1677.664*		*-1790.672*		*1173.108*		*430.03*
AIC		*2845.5*		*-2148.3*		*-2590.2*		*5168*		*-3293.3*		*3643.3*		*-2284.2*		*-798.06*
Observations		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*		*1686*

Appendix F: Set 2 Results, 20-year change (1990-2010)

	RCI		Race		Education		Income		Poverty		PD		PT		Non-POV	
	Coef	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**	**Coef**	**Pvalue**
(Intercept)	0.0269	0.976	0.3361	0.1248	-0.2674	0.141	-0.3722	0.8676	0.3442	0.0893*	1.4939	0.228	0.8051	0***	1.1602	0***
DenverLRT	0.394	0.0009***	0.108	0.0002***	0.0409	0.0891*	0.0864	0.7702	-0.018	0.5018	-0.1644	0.3164	-0.0179	0.4764	-0.0346	0.3164
LosAngelesLRT	-0.0235	0.6675	-0.0056	0.6726	-0.0099	0.3725	0.1171	0.391	0.0257	0.0381**	0.1113	0.1418	-0.001	0.9288	0.0099	0.5372
BaltimoreLRT	0.0181	0.8542	0.0127	0.5984	0.0225	0.262	0.114	0.6439	0.0478	0.0324**	0.0208	0.8793	0.0107	0.6105	0.0159	0.5821
StLouisLRT	0.099	0.4814	0.0415	0.2271	0.0495	0.0833*	0.5898	0.0932*	0.0473	0.1376	0.1982	0.3094	-0.0788	0.0084***	-0.1043	0.0112**
DallasLRT	-0.0302	0.7963	0.0007	0.9811	0.0002	0.992	-0.2289	0.4331	-0.0001	0.9961	-0.0561	0.7293	-0.0463	0.0622*	-0.1165	0.0007***
SaltLakeCityLRT	-0.0269	0.8376	0.0048	0.8818	-0.0396	0.1378	0.2431	0.4582	0.0542	0.0682*	-0.0111	0.9514	-0.0041	0.8824	-0.0279	0.4663
Core City	-0.0174	0.4407	-0.0045	0.4169	0.0087	0.0589*	-0.0425	0.4508	0.0178	0.0005***	0.0672	0.0315**	0.0135	0.0049***	0.0255	0.0001***
Distance to CBD	-0.0241	0.0242**	-0.0041	0.1181	-0.0077	0.0004***	-0.0057	0.8317	0.0044	0.0666*	0.0109	0.4604	0.0027	0.2337	0.0131	0***
Los Angeles	0.0486	0.4723	-0.0109	0.5089	-0.0179	0.1937	-0.872	0***	-0.0407	0.0079***	-0.1177	0.2103	0.0702	0***	0.0708	0.0004***
Baltimore	0.0426	0.3646	-0.009	0.4337	-0.0108	0.2569	-0.5179	0***	-0.0412	0.0001***	-0.3202	0***	-0.0272	0.0065***	-0.053	0.0001***
St. Louis	-0.1928	0.0004***	-0.0316	0.0176**	-0.0142	0.1974	0.0153	0.9102	0.0085	0.4897	-0.3241	0***	-0.0131	0.2571	-0.0294	0.0641*
Dallas	-0.2191	0***	-0.0469	0***	-0.013	0.1269	0.0822	0.4287	0.0079	0.3997	-0.0684	0.2359	-0.0253	0.0044***	-0.0403	0.001***
Salt Lake City	0.2984	0***	0.0517	0.0005***	0.0053	0.6689	0.1852	0.2256	-0.0547	0.0001***	0.043	0.6123	-0.0338	0.0096***	-0.0406	0.0238**
BY Population Density	-0.062	0***	-0.0165	0***	-0.0109	0***	0.289	0***	0.011	0***	-0.0691	0***	0.0118	0***	0.0214	0***
BY Race	0.0908	0.0608*	-0.2571	0***	0.0663	0***	0.0956	0.4296	-0.0159	0.1474	0.1498	0.0262**	0.0342	0.0009***	0.0186	0.1894
BY Education	1.4471	0***	0.2682	0***	-0.1699	0.0019***	-2.2331	0.0009***	-0.2248	0.0002***	-0.5627	0.1314	-0.0276	0.6291	-0.0319	0.6843
BY Income	-0.0096	0.6639	-0.0142	0.0085***	-0.0225	0***	-1.0965	0***	0.0057	0.2561	-0.2337	0***	-0.0028	0.551	-0.0321	0***
BY Poverty	1.4758	0***	0.1351	0***	0.0457	0.0629*	-0.8822	0.0034***	-0.5291	0***	-0.603	0.0003***	-0.1711	0***	-0.2563	0***
BY Professional	-0.4324	0.1095	0.0745	0.2606	0.2323	0***	1.7351	0.0102**	-0.0208	0.7345	0.2647	0.4796	-0.1135	0.048**	-0.1132	0.1518
BY Renter Occupancy	-0.2335	0.0004***	-0.0049	0.7622	0.0138	0.3003	-0.569	0.0005***	0.118	0***	-0.01	0.9126	0.0454	0.0011***	0.031	0.1057
BY Rent	0.0172	0.9021	-0.0218	0.5237	0.0747	0.0086***	1.1872	0.0007***	-0.0563	0.0757*	0.214	0.2699	-0.1297	0***	-0.1758	0***
BY Housing Value	0.0292	0.0402**	0.0067	0.0535*	0.0099	0.0007***	0.1975	0***	-0.0043	0.1818	0.0338	0.0871*	-0.0016	0.5854	0.0086	0.0399**
BY Housing Age	0.4171	0***	0.046	0.0001***	0.0657	0***	0.1165	0.3376	-0.0162	0.1416	-0.1382	0.0401**	-0.0295	0.0043***	-0.036	0.0114**
Rent Gap	0.0256	0.8541	-0.0044	0.8964	0.0771	0.0066***	0.6868	0.0487**	-0.0517	0.1017	0.1238	0.5222	-0.1306	0***	-0.1982	0***
Rho		*0.3216*		*0.4433*		*0.3612*		*0.0965**		*0.131*		*0.2893*		*0.1674*		*0.184*
Log Likelihood		*-944.5905*		*1726.129*		*2098.39*		*-2674.921*		*1918.968*		*-1565.392*		*2038.219*		*1426.629*
AIC		*1943.2*		*-3398.3*		*-4142.8*		*5403.8*		*-3783.9*		*3184.8*		*-4022.4*		*-2799.3*
Observations		*1914*		*1914*		*1914*		*1914*		*1914*		*1914*		*1914*		*1914*

Appendix G: Light Rail Line and Station Shapefile Sources

Shapefile Sources for each Urbanized Area

Urbanized Area: Baltimore
Station Source: U.S. Department of Transportation (US DOT)
Station Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html
Line Source: US DOT
Line Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html

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Urbanized Area: Buffalo
Station Source: US DOT
Station Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html
Line Source: US DOT
Line Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html

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Metro Area: Cleveland
Station Source: US DOT
Station Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html
Line Source: US DOT
Line Link:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html

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Urbanized Area: Dallas
Station Source: North Central Texas Council of Governments: NCTCOG
Station Link: http://www.nctcog.org/trans/sustdev/bikeped/access_to_rail/atrgis.asp
Line Source: North Central Texas Council of Governments: NCTCOG
Line Link: http://www.nctcog.org/trans/sustdev/bikeped/access_to_rail/atrgis.asp

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Urbanized Area: Denver
Station Source: Regional Transportation District (RTD)
Station Link: http://maps.rtd-denver.com/GisDatadownload/datadownload.aspx
Line Source: Regional Transportation District (RTD)
Line Link: http://maps.rtd-denver.com/GisDatadownload/datadownload.aspx

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Urbanized Area: Los Angeles
Station Source: Los Angeles County Metropolitan Transportation Authority (Metro)
Station Link: http://developer.metro.net/introduction/gis-data/download-gis-data/
Line Source: Los Angeles County Metropolitan Transportation Authority (Metro)
Line Link: http://developer.metro.net/introduction/gis-data/download-gis-data/

Urbanized Area: Pittsburgh
Station Source: City of Pittsburgh and US DOT
Station Link: City of Pittsburgh: http://pittsburghpa.gov/dcp/gis/gis-data
US DOT:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html
Line Source: City of Pittsburgh and US DOT
Line Link: City of Pittsburgh: http://pittsburghpa.gov/dcp/gis/gis-data
US DOT:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html

Shapefile Sources for each Urbanized Area

Urbanized Area: Sacramento
Station Source: City of Sacramento
Station Link: http://www.cityofsacramento.org/gis/data.html
Line Source: City of Sacramento
Line Link: http://www.cityofsacramento.org/gis/data.html

Urbanized Area: Salt Lake City
Station Source: Utah Automated Geographic Reference System (Utah AGRC)
Station Link: http://gis.utah.gov/data/sgid-transportation/transit/
Line Source: Utah Automated Geographic Reference System (Utah AGRC)
Line Link: http://gis.utah.gov/data/sgid-transportation/transit/

Urbanized Area: San Diego
Station Source: San Diego Association of Governments (SANDAG)
Station Link: http://www.sandag.org/index.asp?subclassid=100&fuseaction=home.subclasshome
Line Source: San Diego Association of Governments (SANDAG)
Line Link: http://www.sandag.org/index.asp?subclassid=100&fuseaction=home.subclasshome

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Urbanized Area: San Francisco
Station Source: San Francisco Department of Public Health and US DOT
Station Link: San Francisco Department of Public Health:
https://204.68.210.15/gis/Transportation/SanFranciscoTransitFrequency.zip
US DOT:
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2013/polyline.html
Line Source: Metropolitan Transportation Commission
Line Link: http://www.mtc.ca.gov/maps_and_data/GIS/data.htm

Urbanized Area: San Jose
Station Source: Metropolitan Transportation Commission
Station Link: http://www.mtc.ca.gov/maps_and_data/GIS/data.htm
Line Source: Metropolitan Transportation Commission
Line Link: http://www.mtc.ca.gov/maps_and_data/GIS/data.htm

Urbanized Area: St. Louis
Station Source: Metro
Station Link: Personal Correspondence/Email
Line Source: Metro
Line Link: Personal Correspondence/Email

Appendix H: Initial Interview Question Guide

Questions	**Participants***
What have you identified as some of the particular community/transportation or transit needs or goals for your region? For the Delmar Loop site in particular?	Transit, MPO, City
How were local residents involved in any planning processes? How did you decide to include certain residents?	Transit, MPO, City
Were neighborhood churches or community groups involved in the area's TOD activities? If so, what were their concerns?	MPO, City
Were certain projects funded using public funding? Public-private partnerships? Which ones?	Transit, MPO
Do any specific developments get priority? Why so?	MPO, City
With the Delmar Loop being an established Entertainment District, is greater attention given to maintaining the Entertainment District businesses? If so, how so?	MPO, City
Is there a concerted effort from local businesses for development in the Delmar Loop? If so, what is their focus, what seems to be their most pressing issue(s)?	City, MPO
What types of developments are given priority?	Transit, City, MPO
Are any plans for affordable housing activities undertaken? If there are plans, what do they consist of?	City, MPO
When planning for new transit, like the trolley, what neighborhood infrastructure is given priority in developing?	Transit, City, MPO
What other agencies/organizations do you communicate with in regards to Delmar Loop planning activities?	Transit, City, MPO, Developers
Are there any particular (federal, state, local) policies/regulations that guide your activities? If so, which ones? And how so?	Transit, MPO, Developers
Are there any measures in place to avoid residents being displaced by any new developments? Is this a concern when planning & implementing TODs?	MPO, City
How long have you lived/operated in the Delmar Loop neighborhood?	Residents, Businesses, Neighborhood Associations, Developers
Have you been involved in any transit-related development processes or planning? If yes, how so? If no, why not?	Residents, Businesses, Neighborhood Associations, Developers
What are some of the transit needs of the community? For yourself? For your business?	Residents, Businesses, Neighborhood Associations
In what ways do you think the Delmar Loop has changed due to the light rail station and related developments? Do you perceive these changes to be beneficial or harmful? In what way(s)?	Residents, Businesses, Neighborhood Associations
Have you initiated or been directly involved in any plans or processes for transit related developments or overall community development/revitalization/improvement/maintenance?	Businesses, Neighborhood Associations
What is your primary mode of transportation?	Residents
How often do you ride light rail? Bus? Drive?	Residents
How easily are you able to access or reach public transportation?	Residents
Which mode of transportation do or would you prefer? Why?	Residents, Businesses
Do you feel that you have direct access to public transit? Do your members/customers?	Residents, Businesses, Neighborhood Associations

**The participants include stakeholders from transit (METRO), the Metropolitan Planning Organization (MPO) (East-West Gateway), and City of St. Louis (City) planning and development organizations/agencies, developers, Delmar Loop residents, neighborhood association members, and Delmar Loop business owners. Certain questions are geared toward planners and non-planners from each of these areas.*

Appendix I: Interview Log

Name*	Position	Organization/Place of Employment	Years in Position (at time of interview)	Place of Interview	Date of Interview	Time of Interview
"WJ"	Project Manager, Economic Development	Bi-State Development Agency/Metro Transit	1.5	Phone	January 20, 2015	2-2:35pm
"FG"	Vice-President/Principal	St. Louis Design Alliance	28	Phone	March 30, 2015	5:30-6:00pm
"VW"	Environment and Community Planning Planner, Senior Manager	East-West Gateway Council of Governments	14	Phone	April 1, 2015	3-3:20pm
"LY"	Business Owner & West End Neighborhood Resident	Tayler-Made Barbershop	>4	Phone	April 14, 2015	2:10-2:25pm
"OS"	Developer and Business Owner	Delmar Loop Entertainment District	43	Phone	April 20, 2015	1:50-2:15pm
"HD"	Assistant Vice Chancellor of Community and Government Relations	Washington University	10	Phone	May 20, 2015	3:30-3:50pm
"CM"	Executive Director	St. Louis Association of Community Organizations (SLACO)	2	SLACO Community Center	May 19, 2015	3:30-4:15pm
"MP"	Major Project Manager	St. Louis Development Corporation	8	St. Louis Development Corporation Offices	May 21, 2015	10:30-11am
"NH"	Business Owner	Mr. Nice Guy	2	Mr. Nice Guy	May 22, 2015	11:20-11:45am
"MD"	Urban Planner	St. Louis Planning & Urban Design Agency	>3	Phone	May 27, 2015	3-3:25pm
"DM"	West End Resident & West End Neighbors President	West End Neighbors (Neighborhood Association)	2	Phone	November 23, 2015	12:30-1:10pm

**To keep the identity of the participants confidential, I identified them with random initials.*

Appendix J: Direct Observations Log

Day	Time	Place(s) of Observation(s)	Mobile/Immobile Vantage Point	Transportation Mode (If Mobile Vantage Point)	Type of Characteristic(s) Observed*	Event (If Applicable)
Thursday, January 8, 2015	9-10:30am	Lofts of Washington University	Immobile		3, 4	St. Louis Association of Realtors Urban Affairs Forum: Real Estate Development Potential for the Delmar MetroLink Station area
Thursday, March 12, 2015	8-10:30am	Regional Arts Commission (6128 Delmar Boulevard)	Immobile		3, 4	Citizens for Modern Transit Speaker Series: Community Development Through Transportation Infrastructure
Thursday, March 12, 2015	11am-12pm	Intersection of Limit Avenue and Delmar Boulevard	Immobile		3, 4	Loop Trolley Groundbreaking
Tuesday, April 28, 2015	8:30-9:30am	Delmar MetroLink Station, Convention Center MetroLink Station, and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Tuesday, April 28, 2015	2-3pm	Delmar MetroLink Station and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Tuesday, April 28, 2015	4:30-5:30pm	Delmar MetroLink Station and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Wednesday, April 29, 2015	8:45-9:30am	Delmar MetroLink Station, Lambert MetroLink Station and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Wednesday, April 29, 2015	2-3pm	Delmar MetroLink Station, Laclede's Landing MetroLink Station, and Light Rail Train (Red Line and Blue Line)	Mobile, Immobile	Train	1, 3	
Wednesday, April 29, 2015	4:30-5:30pm	Delmar MetroLink Station and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Tuesday, May 19, 2015	4:20-6pm	Entire TOD site	Mobile, Immobile	Car, Walking	2	

Day	Time	Place(s) of Observation(s)	Mobile/Immobile Vantage Point	Transportation Mode (If Mobile Vantage Point)	Type of Characteristic(s) Observed*	Event (If Applicable)
Tuesday, May 19, 2015	8:30-10pm	Delmar Loop Entertainment District	Mobile	Walking	2,3	
Wednesday, May 20, 2015	8:30-9:45 am	Delmar MetroLink Station, Belleville MetroLink Station, and Light Rail Train (Red Line)	Mobile, Immobile	Train	1,3	
Wednesday, May 20, 2015	10am-12pm	Meshuggah Café	Immobile		3	
Thursday, May 21, 2015	9:20-10:20am	Delmar MetroLink Station, Union Station MetroLink Station, and Light Rail Train (Red Line)	Mobile, Immobile	Train	1, 3	
Thursday, May 21, 2015	11:15am-12pm	Light Rail Train (Red Line) and Delmar MetroLink Station	Mobile, Immobile	Train	1, 3	
Thursday, May 21, 2015	2:30-3:30pm	Delmar MetroLink Station and Delmar Boulevard East of the MetroLink Station	Mobile	Walking	2, 3	
Thursday, May 21, 2015	4-4:45pm	Heman Park Community Center, University City	Immobile		3,4	Economic Development Retail Sales Tax Boardd Meeting of University City
Thursday, May 21, 2015	6:30-7:30pm	Heman Park Community Center, University City	Immobile		3,4	Human Relations Commission Meeting
Thursday, May 21, 2015	7:30-8:30pm	Delmar Boulevard West of the MetroLink Station (Entertainment District) and Delmar Boulevard East of the MetroLink Station	Mobile	Car, Walking	2, 3	
Friday, May 22, 2015	9-10:15am	Delmar MetroLink Station and Light Rail Train (Red Line)	Immobile, Mobile	Train	1, 3	
Friday, May 22, 2015	10:15-11:20am	West End Neighborhood	Mobile	Walking	2, 3	
Friday, May 22, 2015	1-2pm	Skinker-DeBaliviere	Mobile	Walking	2, 3	
Friday, May 22, 2015	2-3pm	Delmar Loop Entertainment District	Immobile		3	
Friday, May 22, 2015	5-5:30pm	Delmar MetroLink Station	Immobile		1, 3	

Day	Time	Place(s) of Observation(s)	Mobile/Immobile Vantage Point	Transportation Mode (If Mobile Vantage Point)	Type of Characteristic(s) Observed*	Event (If Applicable)
Friday, May 22, 2015	6-6:45pm	Delmar TOD site	Mobile	Car	2	
Saturday, May 23, 2015	8:30-9:30am	Delmar MetroLink Station and Delmar Boulevard East of the MetroLink Station	Immobile, Mobile	Walking	1, 3	
Saturday, July 18, 2015	5-6pm	Delmar MetroLink Station and Light Rail Train (Red Line)	Mobile, Immobile	Train	1,3	
Sunday, July 19, 2015	10-10:45am	Delmar MetroLink Station and Delmar Boulevard East of the MetroLink Station	Mobile, Immobile	Walking	1,3	
Sunday, July 19, 2015	3-4pm	Skinker-DeBaliviere	Mobile	Walking	2,3	
Sunday, July 19, 2015	7-7:45pm	Entire TOD site	Mobile	Car	2	
Monday, July 20, 2015	9-9:30am	Delmar MetroLink Station	Immobile		1,3	
Monday, July 20, 2015	10:30am-12pm	Meshuggah Café	Immobile		3	
Monday, July 20, 2015	2-4pm	Entire TOD site	Mobile	Car	2	
Tuesday, July 21, 2015	8:30-9am	Delmar MetroLink Station	Immobile		1,3	
Tuesday, July 21, 2015	9-9:30am	West End Neighborhood	Mobile	Walking	2,3	
Tuesday, July 21, 2015	9:30-10:15am	Blueprint Coffee East Loop	Immobile		1	
Tuesday, August 19, 2015	3-5pm	Entire TOD site	Mobile	Car	2	
Tuesday, August 19, 2015	5-5:30pm	Delmar Boulevard East of the MetroLink Station	Mobile	Walking	2, 3	
Tuesday, August 19, 2015	5:30-7pm	Delmar Boulevard West of the MetroLink Station	Mobile, Immobile	Walking	2, 3	
Wednesday, August 20, 2015	8:30-10am	Delmar MetroLink Station, Light Rail Train (Red Line), West End Neighborhood	Mobile, Immobile	Walking, Train	1,2,3	

Day	Time	Place(s) of Observation(s)	Mobile/Immobile Vantage Point	Transportation Mode (If Mobile Vantage Point)	Type of Characteristic(s) Observed*	Event (If Applicable)
Wednesday, August 20, 2015	12-12:30pm	Blueprint Coffee East Loop	Immobile		3	
Wednesday, August 20, 2015	3-5pm	Entire TOD site	Mobile	Car	2	
Friday, November 13, 2015	6:30-8pm	Pi Pizzeria (West Loop), Delmar MetroLink Station	Mobile, Immobile	Car, Walking	1, 3	
Saturday, November 14, 2015	8am-2:30pm	Harriet Stowe State University, St. Louis, MO	Immobile		3, 4	St. Louis Association of Community Organizations Neighborhood Conference

**Type of Characteristic(s) Observed:*
1. Light Rail Station and/or Train
2. Surrounding Neighborhood Design/Physical
3. People: Pedestrians, Transit Riders, Business Occupants
4. Issue