THE ANTICIPATORY EFFECTS OF COMMUTER RAIL ON ECONOMIC DEVELOPMENT IN ORANGE COUNTY, FL

By

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LIST OF ABBREVIATIONS

BART	Bay Area Rapid Transit. BART is a much-researched heavy rail transit system in the San Francisco Bay Area.
BRT	Bus Rapid Transit. BRT is a type of premium bus transportation system usually characterized by high frequencies, dedicated right-of-way, traffic signal priority, and other efficiency improvements over conventional bus service.
FDOT	Florida Department of Transportation. The state agency responsible for owning and operating regionally significant transportation facilities in Florida, including SunRail.
FGDL	Florida Geographic Data Library. The FGDL was a source for some of the base map GIS data and for the 2012 parcel just value data.
GIS	Geographic Information System. GIS data consists of databases linked to geographic information that can be analyzed and processed.
MARTA	Metropolitan Atlanta Rapid Transit Authority. MARTA is a heavy rail rapid transit system in the Atlanta region.
TOD	Transit Oriented Development. TOD is a concept in land use planning to refer to high density mixed-use development located adjacent to transit with an urban design intended to encourage transit ridership and walkability.
USA	Urban Service Area. The USA includes the areas in the county where urban development is planned and where utilities are usually provided.

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This study quantifies the anticipatory effects of the SunRail commuter rail line on property values, building permits and land use in Orange County, FL from 2007 to 2013. Parcel data for each year starting in 2007 (when the interlocal agreements necessary for SunRail to become a reality were signed) was analyzed to determine the effect of proximity to SunRail on property values using a hedonic pricing model with linear distance, quarter, half, one and two mile buffer coefficients. Additionally, building permit data was assembled for each jurisdiction with a station to determine the share and total value of residential and nonresidential building permits near each station. Building permit data was investigated in greater depth for one station within each TOD typology (as described in Olore, 2011) present in Orange County. The researcher found that the anticipatory effects of SunRail were predominantly related to increasing the value of residential properties located closer to stations. The share of building permits and building permit value located near stations increased between 2007 and 2013, with an increasing shares of permits near non-downtown stations. Finally, the areas near SunRail have maintained their original mix of land uses except for a reduction in

institutional land uses. Overall this suggests that SunRail did not substantially change the mix of land uses near stations, but that residential properties near stations increased in value. Downtown and Urban Center stations had smaller gains in the share of building permits near stations than Village Center stations, because those have greater potential for growth.

CHAPTER 1
INTRODUCTION

As funding for transportation projects has become more scarce due to reductions in per-vehicle revenue from the gas tax, transportation projects are routinely justified on the grounds that they are catalysts for economic development. Often, such projects take years to plan and construct. During that time, it stands to reason that the real estate market would adjust based on the expectation of the new infrastructure's presence and generate much of that change before the infrastructure becomes available. This is called the anticipatory effect, and it was first investigated within the context of the Washington DC Metro, where it was found to have a significant effect on retail and residential property values (Damm et al., 1980).

Using Orange County parcel data from the Orange County Property Appraiser's Office and building permit data from each jurisdiction with a SunRail station, the researcher analyzed the anticipatory effect of SunRail on Orange County, FL.

SunRail and Orange County

Premium transit systems such as commuter rail, light rail and bus rapid transit have been proposed for most larger cities in the southeast United States in recent years. Unlike older cities in the northeast or Midwest, most of these cities became large metropolitan areas after the decline of the historic streetcar systems and the rise of the automobile after World War II. Because of this, these cities grew predominately when it was assumed that transportation would be provided only by automobile or bus. Because of this, these cities often lack the smaller scale, pedestrian oriented areas around transit stations in older cities. Therefore, the viability of such systems are often questioned by citizens and the public alike on the grounds that once a passenger gets off the train, they would have no way of getting to their destination without a car.

Orange County, FL is the largest county in the Orlando metro area with an estimated population of over 1.2 million people (US Census Bureau, 2014). Before SunRail opened, it was one of the largest metro areas in the United States without some form of rail transit.

SunRail was not the first regional premium transit system proposed in Orlando. In the late 1990s, a light rail system along much of the same alignment as SunRail was studied and federal money was received, however it was cancelled when the Orange County Commission voted not to support the project in 1999. Studies on the feasibility of such a project continued throughout the early 2000s, but they seemed certain to face strong political opposition (Krueger, 2001).

In July 2007, Orange, Osceola, Volusia, and Seminole counties and the City of Orlando entered into an interlocal agreement with each other and FDOT to create and provide funding for the Central Florida Commuter Rail (SunRail) system (USDOT, FTA & FDOT, 2008). Phase 1 of this system, identical to what opened in May 2014, was scheduled to open in 2010, followed by a Phase 2 opening in 2013 (Hamburg & Pino, 2007). This system was conceived as a way to offer alternative transportation modes as a way to avoid congestion along the Interstate 4 corridor, to allow for an increase in the densities and to better serve high density residential and employment areas as called for in the local comprehensive plans, and as a way to prevent congestion that stifles economic growth (USDOT, FTA & FDOT, 2008).

Following this agreement, FDOT began negotiating with CSX to purchase the right of way for the train. Negotiations stalled in 2008 when the two parties could not come to an agreement about the distribution of liability (Tracy, 2009). Because the tracks were to be owned by the FDOT but CSX would have the right to operate freight trains, concerns over who would be liable in the event of an accident involving CSX prevented the state from approving the purchase of the right-of-way (2009). Eventually, an agreement was reached between CSX and the FDOT where SunRail would be held liable for CSX's equipment in case of an accident on SunRail's tracks, regardless of who is at fault. This agreement was approved by the Florida legislature when it was bundled together with additional funding for South Florida's Tri-Rail commuter rail system. As soon as an agreement was reached between the FDOT and CSX, Amtrak contested the deal for the same liability concerns as CSX by lodging a complaint with the US Surface Transportation Board, which would prevent SunRail from receiving the $300 million in federal funding set aside for the project. In December 2010, Amtrak agreed to end its opposition to SunRail in a meeting brokered by the US Department of Transportation Secretary (Tracy, 2010). With the sale of the tracks finally approved in late 2010, the projected opening date had been moved to summer 2013 (Tracy & Deslatte, 2011a).

In January 2011, newly elected Governor Rick Scott froze all state contracts worth over $1 million for review by the newly created Office of Fiscal Accountability, including four critical SunRail contracts (Tracy & Deslatte, 2011a). After a six-month review, the project was given permission to proceed, and the opening date of spring 2014 was established (Tracy & Deslatte, 2011b).

On May 1st, 2014, the first phase of SunRail running north-south through the Orlando metropolitan area opened to passengers. This commuter rail system runs approximately parallel to the busy Interstate 4 corridor along the former CSX A-line right-of-way. When the second phase is complete in 2017, it will be approximately 61 miles long and have 17 stations (Tracy, 2013). Currently, the system is 31 miles long with 12 stations and is expected to be carrying about 4,300 passengers per day by the end of the year (Tracy, 2014). Each Phase 1 station in Orange County has between 666 and 3707 boardings per week (Table C-1).

Research Questions

In addition to providing additional capacity along this busy north-south corridor, SunRail was hoped to spur economic development along the line, but a recent report in the Orlando Sentinel suggested that development near stations has been slow (Shankin, 2013). The purpose of this study is to determine the extent to which this has actually been the case. Because Orange County has a car-dependent growth pattern typical of other cities in the southeast, and because the SunRail stations in Orange County range from suburban park and ride-type stations to the stations in the heart of downtown Orlando, this county was seen as a useful case study that may apply to other places with similar growth patterns considering commuter rail.

The purpose of this study was to determine the impact of proximity to SunRail on property values, building permit rates, permitted project values, and land use changes from 2007 to 2013. If there was an impact on these economic development indicators, at what distance from the station was it significant, and did it affect some land uses more than others?

Organization

This research is presented in six chapters. Chapter 2 includes a literature review that gives an overview of the current state of knowledge on the relationship between transit access and property values, the viability of transit oriented design, and the anticipatory effect of transit in different contexts. Chapter 3 is a description of the data collected for this study and the methodology used to analyze the data and answer the research question. Chapter 4 is a discussion of the results, including the land use changes on property close to SunRail, the impact of SunRail proximity on property values and the changes in the number of building permits issued and their values at a jurisdictional and at an individual station level. Chapter 5 discusses some of the results within the context of the history of the project. Chapter 6 discusses the results and synthesizes some of the findings that could be applied to other transit projects in an similar cities. Additionally this chapter discusses changes and improvements to the methodology that can be used for further research.

CHAPTER 2
LITERATURE REVIEW

Theoretical Impact of Transit

Prior to the 1960s, economists and policy analysts understood the distribution of property values to be largely a function of history. As described by Alonso (1964), this idea was that as a city grows, the wealthier citizens desire newer, bigger houses. But because land is scarce in the city, they have to move to the periphery to be able to assemble enough land to build their desired houses. Their previous houses are sold to less wealthy people, and because those houses are older the less wealthy people can afford them (Alonso, 1964).

Alonso added the idea that households also value open space and lower densities in addition to proximity to the center. His major contribution to this question was the idea that proximity is an inferior good, meaning that if given the choice at a given price between proximity and lower density, the wealthy will choose lower density. An implication of this is that if a new transportation facilities such as highways are built that make it easier to get to the center from a given location, the property value would raise because the property now has both proximity and space (Alonso, 1964).

This framework is the theoretical basis for the idea that transportation infrastructure improvements increase property values where accessibility is improved (Damm et al. 1980). The economic theory behind this idea was developed long after it was commonly understood to be true. In 1930, E. H. Spengler published his conclusions on the effects of the rail transit opening in New York City in the early 1900s:

> (1) New transit lines tend to shift value rather than to create increased aggregate value. While owners of land in the vicinity of a new transit line may benefit, owners of land elsewhere may be disadvantaged. (2) Transit lines are only one of the numerous factors

> influencing land values, and they often cannot outweigh the effects of other factors which are acting to depress land values. (3) Transit acts to enhance land values in centres of concentration at the expense of outlying areas. (4) Areas already developed do not generally show a marked increase in land value when new transit lines are opened. (5) In areas already supplied with a number of transit lines, addition of another one will have only a mild stimulative effect compared with the effect it would have in an area not already supplied with transit. (6) In newly developing areas with transit service, increased land values are likely to be attributable in large part to the process of subdivision rather than to transit access (as cited in Damm et al., 1980, p. 317).

Although the connection between property values and transit facilities has long been taken as a given by many politicians and decision makers, the literature is decisively less conclusive. To best understand the actual effect of transit on property values, the researcher consulted a variety of case studies on premium transit facilities like commuter rail, heavy rail, light rail, and bus rapid transit (BRT).

The majority of the literature focused on the heavy rail systems built in the United States after World War II or light rail systems built in the last 30 years. Heavy rail systems included the Washington Metro, the Metropolitan Atlanta Rapid Transit Authority (MARTA) rapid transit system, the Bay Area Rapid Transit (BART) system in San Francisco and a handful of international examples selected because of the frequency of the literature from which their methodology was found. Light rail systems included studies on systems in automobile-oriented cities such as Los Angeles, Charlotte, Dallas and others. Very few studies on commuter rail were reviewed because of their rarity in the literature.

Case Studies

The first study on the anticipatory effects of transit was conducted by Damm et al. (1980) on the Washington Metro. This study adapted methodologies originally developed to describe the effects of freeways on property values. This study replaced the highway proximity variables with proximity to transit stations for parcel and real estate transaction data within the District of Columbia between 1969 and 1978. A hedonic pricing model was used to identify the impact of the Washington Metro system on property values before the system opened. Like several later studies, commercial and retail properties had the strongest increase in property values at a close proximity to stations while residential property values increased modestly (Damm et al., 1980).

The stronger effect of rail infrastructure on commercial property was not found by a study by Cervero and Landis (1993). Their quasi-experimental research methodology matched sites in Atlanta and Washington DC and found that office rents were slightly higher in areas served by rail transit than those that were not. However, the magnitude of the effect was not great enough to say that owners of buildings near rail transit were able to capture a monetary benefit from their proximity to rail transit (Cervero & Landis, 1993).

A large scale study by Landis et al. (1994) was conducted on five fixed rail transit systems in California to provide a consistent methodology that allows a comparison of the effects of each system. The five systems studied included the BART heavy rail system, the CalTrain commuter rail system, and three light rail systems in Sacramento, San Diego, and San Jose. Homes located close to BART stations sold at a $2.29 premium for every meter closer they were to the station (Landis et al., 1994, p. 21), however there was not a statistically significant increase in property values near the other transit systems. Landis et al. speculate that this difference was related to the lower frequency of service and a relative lack of parking capacity near the other four systems in suburban areas, thereby limiting their potential ridership outside of walking distance (Landis et al., 1994).

The positive impact of additional parking was also found in a study on the MARTA rapid transit system in Atlanta by Bowes and Ihlanfeldt (2001). This study also used a hedonic price model in addition to models of neighborhood crime and retail activity to determine the impact of rail transit stations on property values. This analysis found that in lower income areas, property values were negatively correlated with proximity. However, in higher income areas, there was a premium for residential units between 1 and 3 miles away, suggesting that most gains from proximity to rail transit were more closely connected to park and ride than to pedestrian access (Bowes and Ihlanfeldt, 2001).

However, the impact of transit access was generally found to be less than that of freeway access within the first 20 years of San Francisco's BART system (Cervero & Landis, 1997). Additionally, this study found that the effect of transit access was limited significantly by public policy. In many station areas, greater density growth was prevented because of successful opposition from local residents. However, BART was found to have a positive economic development impact on the traditional downtown areas due to supportive public policy and a relative lack of opposition to densification (Cervero & Landis, 1997).

Internationally, transit systems have been shown to have potentially massive impacts on property values. A study by Cervero and Kang (2011) on land use changes and property values in Seoul, Korea found that land values increased up to 10% for residential land uses within 300 meters (984 feet) and 25% for commercial land uses within 150 meters (492 feet) of bus rapid transit (BRT) stations (Cervero & Kang, 2011).

Property around Line 5 of the Seoul subway (Bae, Jun & Park, 2003) found that proximity to stations increased property values before the subway opened, but property values flattened or declined upon the opening of the line. This suggested that the majority of the effects of property values from transit improvements were realized before the system opens and that potentially the market corrected itself by lowering slightly after the system opened (Bae, Jun & Park, 2003).

Although Seoul has few similarities to a Sunbelt, auto-oriented metropolitan area like Orlando, this study was relevant because it showed an extreme case of the potential for property value change caused by transit in a place with significant latent demand and strong levels of growth (two factors frequently identified as being necessary for changes in property values).

A study of the anticipatory effects of light rail in Sheffield, England (Henneberry, 1998) utilized hedonic models and found a negative anticipatory effect followed by a lack of statistical significance two years after the system opened. This was likely to have been caused by the nuisance effects of the construction of the system. Once the system opened, property values may have not risen due to a relatively low growth level and potentially a lack of latent demand (Henneberry, 1998).

Additionally, Cervero and Kang (2011) noted that if demand for the system and growth existed, theoretically the land value premium for proximity to transit was the result of an increase in the accessibility of a parcel. This accessibility was given by an increase in level of service. Therefore, the technology that provides the increase in level of service (commuter rail, heavy rail, light rail, BRT) is not as important as the actual increase in level of service (Cervero & Kang, 2011).

This might at first appear to be at odds with the findings of the meta-analysis by Debrezion, Pels & Rietveld (2007), which found that commuter rail has a consistently higher impact on property values than metro rail systems, but this could instead be a result of differences in level of service and potentially the provision of parking at stations as described by Landis et al. (1994).

Finally, Cervero and Kang (2011) conclude that land use regulation needs to allow an increase in density, or else such increases in property value are unlikely to take place. The City of Orlando and other jurisdictions along SunRail have provisions in their comprehensive plans to allow for TOD and other higher density developments near stations (City of Orlando, 2012, Orange County Community, Environmental & Development Services Planning Division, 2012, City of Maitland, 2010).

A literature review on the effects of transit on land use and travel mode by Badoe & Miller (2000) found that there is a variation in the literature between no effect and some effect. The differences in the studies outcomes depends on whether or not the researchers used an integrated model that takes into account the different actors and interactions driving development. However, studies including other accessibility variables like highways reduces the reported impact of railway proximity. In general, the meta-analysis revealed that the impact of railway stations is different for separate land use categories. Residential properties at a greater distance from stations are influenced than commercial properties. However, commercial properties are often reported to have greater effects at close proximity (Debrezion, Pels & Rietveld, 2007). These studies were conducted using hedonic pricing models which are a common statistical regression technique that allows one to determine the value of an individual component of a value derived from multiple attributes (Debrezion, Pels & Rietveld, 2007).

To understand the mechanics of the economic development near transit stations, the researcher briefly reviewed studies including alternative data sources such as surveys and building permit data. A study by Loukaitou-Sideris & Banerjee (2000) explored the difficulties of creating economic development along new transit corridors like the Los Angeles Blue Line light rail system through inner city and industrial areas. Like many recent transit projects, this system alignment was opportunistically selected to save time and money on real estate acquisition, but little thought was given to the utility the line would have to the communities along its length. In addition to the low income single family housing present along much of the line, significant portions are surrounded by heavy industrial uses while each end of the line has commercial, light industrial and some mixed use development (Loukaitou-Sideris & Banerjee, 2000).

Ten years after the Blue Line opened, much of the corridor along the line was in the same state as before: large areas lacking any type of destination or amenity, poverty and underinvestment. An analysis of building permit data showed that in all but one year, the areas around Blue Line stations had proportionally less investment than the cities they are in, and that the station areas did not generally participate in the economic upswing in the mid-1990s (Loukaitou-Sideris & Banerjee, 2000).

The authors conclude that The Blue Line had not succeeded in its goal of economic development in the first ten years of its operation. The primary reasons of this failure were the location of the route along the backs of buildings and through nondescript industrial areas (the "back-door problem"), low population densities near stations, difficulty in accessing stations as a result of the distance from dense areas combined with almost no feeder bus service to stations or park and rides at stations, poor urban design, land cost, regulatory barriers, lack of institutional commitment, and lack of community participation in the planning process (Loukaitou-Sideris & Banerjee, 2000).

Another analysis by Loukaitou-Sideris (2010) looks at the anticipatory effect of transit in its environment directly. The author reviewed the area around the Metro Gold Line in Los Angeles with building permit data to identify the changes in the years leading up to its opening. These changes in the land use and ownership escalated in the years immediately prior to the line's opening (Loukaitou-Sideris, 2010). Because of better urban design, fewer regulatory barriers to transit oriented development (TOD) and better institutional commitment, the economic development and ridership goals were reached by the Gold Line (Loukaitou-Sideris, 2010).

Overall, this literature review revealed that SunRail could have a positive impact on property values and building permit activity near stations. Theoretically, Alonso (1964) suggests that transit like SunRail can have an effect on property values if it improves the accessibility of property near the stations. But property in Orange County already generally has good accessibility because of the existing and expansive roadway and expressway network. Therefore, the low service frequency and relatively small number of destinations (compared to existing automobile accessibility) would suggest a relatively modest premium. This premium is likely to be different for different land use types. Commercial properties often exhibit large premiums at short distances while residential properties exhibit smaller premiums at much larger distances (Debrezion, Pels & Rietveld, 2007). Transit through built-out corridors of an industrial nature like the Los Angeles Blue Line may fail to generate any significant changes because of the location of the line and barriers to changing land use (Loukaitou-Sideris & Banerjee, 2000). But where land use regulation changes along with the introduction of the transit service in the case of the Los Angeles Gold Line (Loukaitou-Sideris, 2010) and BART in traditional downtown areas (Cervero & Landis, 1997) it is possible for economic development to occur.

CHAPTER 3
METHOLOGY

Data Availability

To understand the anticipatory effects of SunRail, the researcher utilized a methodology based on the Loukaitou-Sideris Gold Line study (2010). The impacts of transportation facilities on land use and economic development were understood through a combination of factors including information about the use and value of land throughout the study period, information about construction and renovation on those properties. The indicators identified by Loukaitou-Sideris included the following:

- Population Density
- Race
- Population Average Age
- Proportion Foreign-born
- Poverty Rate
- Educational Achievement
- Land Use Type: Commercial, Institutional, Residential
- Percent change in land use type
- Parcel sale rates
- Parcel Value
- Built Square Footage
- Building Permit Issuance
- Building Permit Value

The following section describes the data publically available and the data made available to the researcher for this project. It also describes the data created by the researcher for the use in this project and the ways in which the data was processed.

Parcel Data

GIS Parcel data from 2007 to 2013 from the Orange County Property Appraiser's Office was provided by the GIS Division of the Orange County Government. This data contained polygons representing the property boundaries of all the parcels in Orange County along with data for each parcel. Information about the physical characteristics of the parcel such as the size of the parcel in acres, the combined living area of any structures on the property in square feet, and the Department of Revenue land use code (DOR Code) were included with this data.

Additionally, this data included the just value of each parcel for every year except 2012 and 2013. The just value is the assessed value of the parcel and all structures contained on it before January 1st of that year. The assessed value represents the property appraiser's best estimate of the probable sale price of the property if the property was sold on the open market with adequate sale time and buyers and sellers behaving in a rational, self-interested manner, free of duress (Value Adjustment Board, n.d.).

Just value data from 2012 was collected from the statewide parcel data available on the Florida Geographic Data Library (FGDL) (Panda Consulting, 2012) and joined to the parcel data provided by Orange County.

Just value data for 2013 was calculated based on two fields included in the data: just value change and previous year just value. The two fields were added together for each parcel to determine the 2013 just value.

Creating proximity indicators

To identify the relationship between SunRail stations and property values, the researcher first had to create GIS data including the location of SunRail. This was accomplished by creating a new line feature within ArcGIS 10.1 along the center of the CSX/SunRail right-of-way parcel. Referencing satellite imagery in Google Maps, and station design information from the SunRail Corporate Website (Project Documents, 2013), the researcher created point data representing the center of each station along the line within Orange County. Additionally, each grade crossing was documented following a similar methodology to allow the creation of a noise indicator.

Once the location of each station was identified, the researcher created two models within ArcGIS ModelBuilder to automatically generate the proximity indicators. Each proximity indicator was created based on straight line distance because of the relative simplicity of the process compared to network distances and because there is some evidence suggesting that the differences between the outcomes of the two approaches are insignificant from a ridership perspective (Guerra, Cervero & Tischler, 2011).

This model generated a raster dataset of the Euclidian distance from the center of each station at 25 foot intervals, generating a surface showing the straight line distance from any point within Orange County to the nearest SunRail station. Such linear distance based proximity indicators were used by several studies on the impacts of transportation facilities on property values (Baum-Snow & Kahn, 2000; Billings, 2011; Celik & Yankaya, 2006; Cervero & Kang, 2011; Damm et al., 1980; Grimes & Young, 2010; Henneberry, 1997; Hanneberry, 1998; McMillen & McDonald, 2004). The parcels were converted to points (the points were created at the centroid of each parcel) and the value of the raster at each point was added to the point parcel dataset.

In addition to determining the linear distance from each parcel to a SunRail station, the researcher created a model to identify which parcels fall within quarter, half, one and two mile buffers around stations. Many studies have found significant impacts on commercial land uses within a quarter of a mile of transit stations (Bowes & Ihlanfeldt, 2001; Cervero & Duncan, 2002; Guerra, Cervero & Tischler, 2011; Petheram et al., 2013; Weinstein & Clower, 2002) and impacts on residential land uses for half a mile from stations (Bowes & Ihlanfeldt, 2001; Knaap et al., 2001; Loukaitou-Sideris, 2010; Petheram et al., 2013). Because SunRail is a commuter rail system with park and ride facilities at several stations, longer buffers of one and two miles were created to account for the greater distances riders arriving by car may have to their homes like several other studies (Billings, 2011; Bowes & Ihlanfeldt, 2001; Garrett, 2004; Knaap et al., 2001; Petheram et al., 2013).

Creating noise indicators

The increase in accessibility to a parcel located close to a commuter rail station may be offset by the nuisance created by the noise of trains traveling along the tracks and sounding their horns at grade crossings. A study by Bellinger (2006) found that residential properties lose an estimated $48,000 for each 10dB increase in horn noise over 50dB. Research on the effects of rail noise on property values generally use similar methodologies as those identifying the impacts of airport or highway noise on property values. Generally, these studies calculate the noise level above a given threshold at a given parcel as an input to a hedonic pricing model. The coefficient within the model is called a Noise Depreciation Sensitivity Index (NDSI) (Brons, et. al, 2003). A similar methodology was used here. The linear distance from the SunRail track and grade crossings were input into separate Euclidian distance rasters. The distance to the nearest grade crossing was used to calculate the horn noise in dB using the following variation of the sound pressure level equation (Equation 3-1).

$$L_{p2} = L_{p1} + 20\ \log_{10}\left(\frac{r_1}{r_2}\right) \tag{3-1}$$

where L_{p2} is the estimated noise level at each parcel at a distance of r_2 from the source of the horn noise; and L_{p1} is the known higher-end estimated sound level of a train horn of 150dB when measured at r_1, a distance of 100 feet (FRA, n.d.).

Equation 3-1 was used to model the noise generated by the sound of the train, with an L_{p1} of 95dB as the known noise level of a locomotive at a distance of 100 feet (FRA, n.d.).

Once the noise level of the train noise and horn noise were calculated, they were converted to a scale from zero to one, with zero representing 50dB or less and one representing the highest possible noise level from a train of 150 dB. Train noise less than 50 dB was disregarded because it was below the average background noise level where train noise does not affect property values (Bellinger, 2006).

Creating land use indicators

The parcel data included a Department of Revenue land use code (DOR Code) that included 188 different land use classifications within Orange County. The DOR Code was used to create a dummy variable identifying Residential, Commercial, Institutional and Industrial land uses. Table A-1 includes the complete classification table.

Creating control group indicators

Orange County has a wide range of land use intensities, from wild swamplands to relatively dense urban districts. Therefore, trends in property values would be expected to vary based on the location of the parcel. This diversity of contexts was the primary reason for choosing Orange County for this study. However, this variety of land uses could potentially interfere with the effectiveness of the hedonic modeling. To avoid this problem, properties outside of the Urban Service Area (USA) were excluded from this analysis. Orange County discourages development outside the USA by restricting the services provided by the county. Because of this, the majority of new development was contained within the USA, so it was used as a good indicator that a parcel could potentially become developed and would therefore be subject to the market.

The USA GIS shape file provided by the Orange County Planning Division was used to generate a raster indicating whether a given point was inside or outside the USA. Parcels located within the USA were given a dummy value of one and were included in the parcel data analysis.

Permit Data

Permit data was collected from the cities of Orlando, Maitland and Winter Park including all building permits issued from 2007 through 2013 containing the land use type (residential or nonresidential), the address or location of the permitted project, the project type, and the value of the project. Additional permit data from unincorporated Orange County was provided from 2010 to 2013, however the Orange County data did not include the approximate value of each project. Combined, this data covers the building permits approved within the jurisdictions of all eight Orange County SunRail stations.

Data from Maitland, Orlando and Orange County were geocoded using the addresses contained within the data. The address locator identified the actual location of 83% of the permits from Orlando, 96% of the permits from Maitland, and (according to the variables left in the geocoded data provided by Orange County) 87% of the permits from Orange County. Data from Winter Park included the latitude and longitude of each permit parcel.

Finally, the distance, noise and control group indicators created for the parcel data were generated for the permit data.

Missing Data

Employment data was not considered for this study because of the difficulty of collecting the data and inconsistencies within the commonly used Info-USA employment data. Likewise, parcel sale rates were absent from this analysis due to the difficulty of consistently identifying sales rates from the parcel data.

Because this study covers the years 2007 to 2013, no useful source of demographic data exists to analyze trends. Census 2000 was seven years before the study, so it would not make a fair baseline for the purposes of this study. The 2010 census occurred in the middle of the sample, so it is useful for neither the before or after sample. Likewise, American Community Survey data from 2009, 2010 and 2011 fall neatly into the middle of the time period being analyzed. Additionally, the margins of error are relatively high for many of the factors called for by this study. Therefore, demographic data such as total population, race, average age, proportion foreign born, poverty rate, educational attainment, and household vehicle availability were not analyzed in this study.

In regard to the parcel data, the researcher hoped to utilize additional building characteristics common to other hedonic models in the literature such as number of bedrooms and bathrooms. However, only 2012 and 2013 property parcel data included those variables. Therefore, these variables were not included in this study.

Analysis Procedure

Parcel Data Analysis

This study identifies the changes in just value based on five different measures of proximity for each year 2007 to 2013 using property parcel data from the Orange County Property Appraiser's Office. The impact of these proximity measures was calculated for residential, commercial, industrial, institutional and all land uses. The researcher created a linear regression for each combination of distance variables and land use types for each year using SPSS Statistics 22. For the buffer-based distance models, the regression was run using just the Phase One Orange County SunRail stations (every station in Orange County opened with Phase 1 except for the Meadow Woods station on the south side of the county) and using all Orange County stations. For all land use types, the regression was based on Equation 3-2.

$$\mathrm{JustValue} = \beta_{\mathrm{constant}} + \beta_{\mathrm{acreage}} \times \mathrm{Acres} + \beta_{\mathrm{livingarea}} \times \mathrm{LivingArea} + \beta_{\mathrm{residential}} \times \mathrm{Residential} + \beta_{\mathrm{institutional}} \times \mathrm{Institutional} + \beta_{\mathrm{commercial}} \times \mathrm{Commercial} + \beta_{\mathrm{industrial}} \times \mathrm{Industrial} + \beta_{\mathrm{distance}} \times \mathrm{Distance} \tag{3-2}$$

Where: Acres is the size of the parcel in acres; LivingArea is the interior square footage of all buildings on the parcel; Residential is a dummy variable for whether the parcel has a residential use; Institutional is a dummy variable for whether the parcel has an institutional use; Commercial is a dummy variable for whether the parcel has a commercial use; Industrial is a dummy variable for whether the parcel has an industrial use; and Distance is either the distance to the nearest SunRail station in feet or is a dummy variable for Half Mile, Quarter Mile, One Mile or Two Mile.

Each distance variable was also used in a model for each individual land use type, Residential, Commercial, Institutional or Industrial. Models were referred to by their distance coefficient type followed by their land use type:

$$\text{JustValue} = \beta_{\text{constant}} + \beta_{\text{acreage}} \times \text{Acres} + \beta_{\text{livingarea}} \times \text{LivingArea} + \beta_{\text{distance}} \times \text{Distance} \tag{3-3}$$

Where the coefficients are the same as above and land uses are selected before the regression is run.

Similar to the analysis technique employed by Henneberry (1998) and Bae, Jun & Park (2003) each year's regression coefficients were compared to identify trends in the distance coefficients across the analysis period. For each set of regressions, the distance coefficient and t-statistic was noted for every year in addition to the adjusted R square for the model. The model combinations that made statistically significant distance coefficients for each year were analyzed to determine the changes in the relationship between distance to SunRail and the property values between the project announcement in 2007 and 2013.

Permit Data Analysis

Overall trends in building construction along the SunRail line was determined by calculating the total number and total value of permits issued within the quarter mile, half mile, one mile and two mile buffers around stations within each jurisdiction. Additionally, the number and value of all permits within the buffers around each individual station was analyzed to determine the changes in the percent of total development work contained within the permit data was near each individual station.

This station-level permit data allowed the researcher to identify station neighborhoods that experienced an increase in development and to identify stations that did not. Station design and local area characteristics were explored as possible explanations for the local development patterns.

This quasi-experimental case study allowed the researcher to identify trends at a countywide level for three important characteristics identified in the literature review as possible effects of new transit services. Longitudinal land use information was identified and simplified into four basic categories using countywide parcel data from 2007 to 2013 to compare changes occurring within half a mile of stations to all parcels countywide. A retrospective longitudinal methodology utilizing hedonic regression models for each land use to determine the share of the value of parcels attributable to proximity to SunRail stations using five different proximity indicators. Additionally, permit data was used to develop a description of the economic development impacts of SunRail in terms of the number and value of permits. The building permit analysis was conducted at a jurisdictional level with the permits located outside the proximity indicators within each city acting as the control group. At a neighborhood level, the process was repeated for one station in each neighborhood type utilizing all building permits collected outside the proximity indicators as the control group. When considered together, these mixed methods describe the anticipatory effects of property values and permitted building activity within Orange County near SunRail stations.

CHAPTER 4
RESULTS

Overall Land Use Change

As seen in Table 4-1, the percentage of residential and industrial parcels within a half mile of stations remained relatively constant over the study period. Likewise, the percentage of commercial properties remained fairly constant except for a potentially anomalous bump in Orange County as a whole and within half mile of stations in 2012. The percentage of institutional parcels declined from 8.59% in 2007 to 4.57% in 2013 while institutional parcels in Orange County as a whole declined by only 0.9%. Industrial land uses declined within a half mile of stations in 2012 and 2013, but between 2007 and 2013 they only dropped 0.2%. This shows that the land use has mostly remained stable across the study period across the county without much major changes near stations.

Table 4-1. Land use changes within a half mile of stations compared to total parcels in Orange County.

Year		2007	2008	2009	2010	2011	2012	2013
All Land Uses	Total	358820	366568	368904	370263	373732	439906	431679
	Half Mile	5178	5171	5125	5102	5188	8095	8081
Residential	Total	89.0%	88.9%	89.5%	89.7%	89.6%	86.6%	89.5%
	Half Mile	62.7%	62.6%	63.1%	63.1%	62.7%	63.5%	63.3%
Commercial	Total	3.6%	3.9%	3.9%	3.9%	3.9%	8.0%	4.8%
	Half Mile	20.3%	19.4%	20.0%	19.8%	19.8%	25.7%	24.2%
Institutional	Total	2.3%	1.7%	1.5%	1.5%	1.5%	1.2%	1.4%
	Half Mile	8.6%	8.3%	6.5%	6.4%	6.3%	3.8%	4.6%
Industrial	Total	1.2%	1.3%	1.2%	1.2%	1.3%	1.1%	1.1%
	Half Mile	3.8%	4.2%	4.1%	4.1%	4.1%	3.7%	3.6%
Other	Total	3.9%	4.2%	3.8%	3.7%	3.8%	3.1%	3.2%
	Half Mile	4.7%	5.6%	6.4%	6.6%	7.1%	3.3%	4.3%

Land Value Change: All Land Use Types

Two Mile Buffer

To see the complete results of the land value regression models, see Table A-2 and Table A-3. The model that captures the most significant changes in land value for all land use types used the Two Mile distance metric (with a t-statistic between 7.332 and 9.418 for the distance coefficient and an adjusted R-square between .606 and .679). In 2007, properties located within two miles of SunRail stations were worth approximately $103,726 more than those located more than two miles away. Between 2008 and 2009, the premium for SunRail proximity fell by over $20,000. Whether this decrease in land values is due to SunRail or complicated changes in land values because of the recession cannot be determined with this methodology. However, this temporary decrease in the two one mile distance coefficient ended in 2011when the premium had a high of $115,082 before settling back to $109,203 in 2013.

Additionally, when comparing the size of the coefficient for Phase 1 stations and all stations, it becomes obvious that property values in parcels located close to the Meadow Woods station (the only Phase 2 station in Orange County) diverged from the values of parcels near Phase 1 stations in 2009. This suggests that the imminent opening of SunRail Phase 1 began to impact property values in 2009 (Figure 4-1). The overall change in the value of the distance coefficient for properties located within the two mile buffer of SunRail stations between 2007 and 2013 was an increase of $5,477.

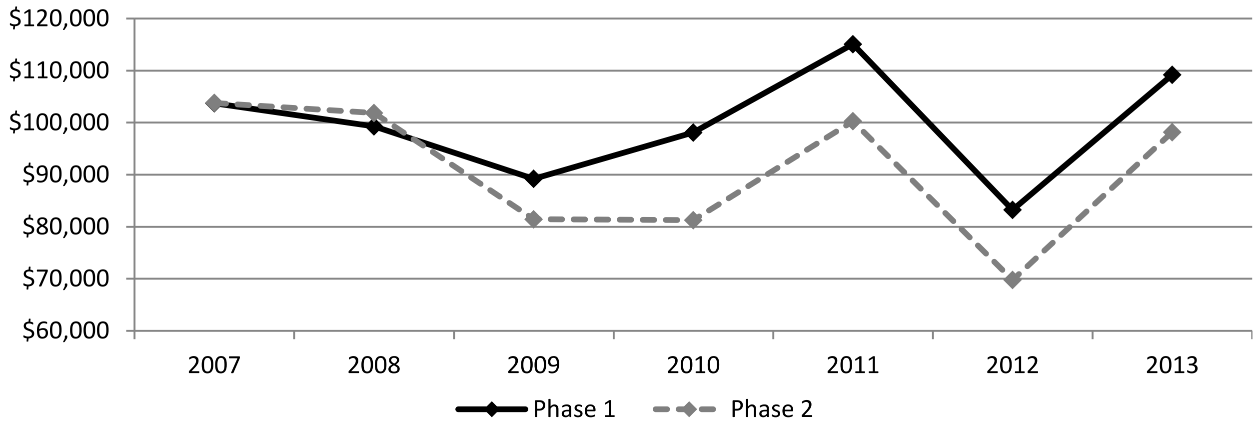

Figure 4-1. Two mile coefficient model, all land use types.

One Mile Buffer

The models utilizing the One Mile coefficient were also statistically significant (with a t-statistic between 4.337 and 7.622 for the distance coefficient and an adjusted R-square between .606 and .679). Between 2007 and 2013, the properties located within one mile of SunRail Phase 1 stations increased in value by an average of $28,232 (Figure 4-2).Unlike the two mile buffer, the one mile buffer coefficient was consistently greater for Phase 1 stations. However, like the two mile coefficient difference, the Phase 1 one mile coefficient was furthest from the Phase 2 coefficient in 2010 and 2011.

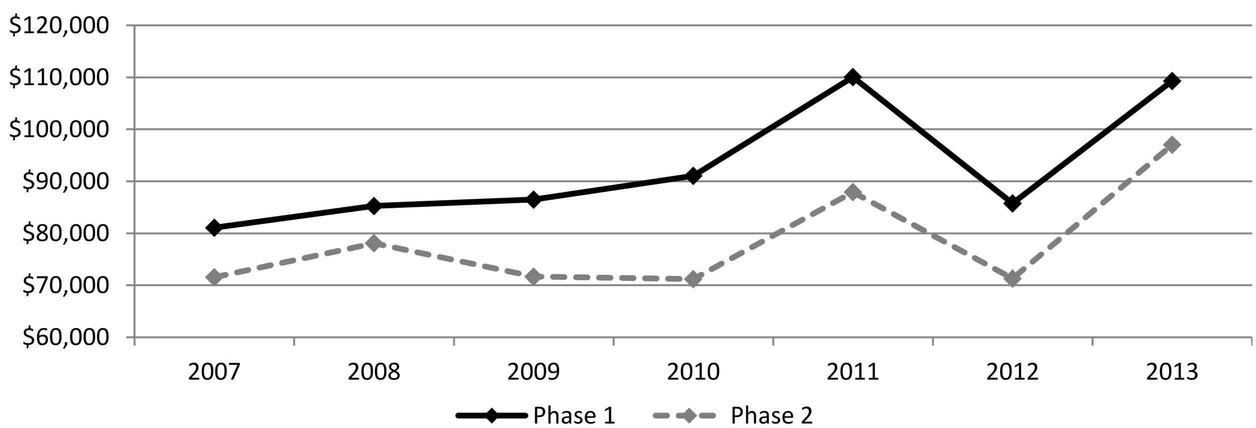

Figure 4-2. One mile coefficient model, all land use types.

Other Distance Measures

The half mile and coefficient was not statistically significant in 2007 or 2008 (t-statistic of 1.855 and 1.790, respectively) while the quarter mile coefficient was not statistically significant in 2008 (t-statistic of 1.296). However, both generated significant results from 2009 to 2013, suggesting that any increase in property values within these two buffers was entirely unrelated to other pre-existing factors as shown by the lack of significance in the first two years after SunRail was announced.

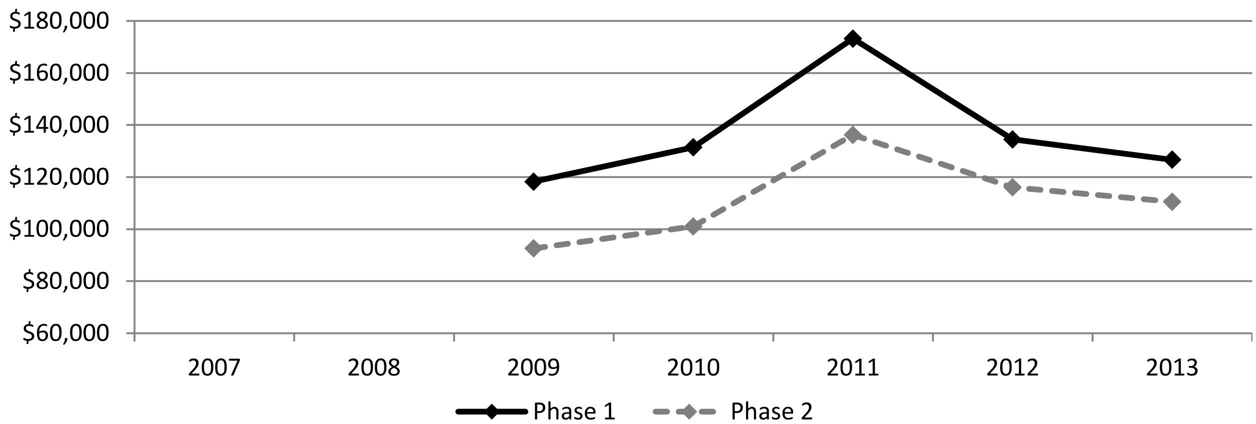

Figure 4-3. Half mile coefficient model, all land use types.

More than the other buffers, the most striking feature of the half mile coefficient model is the peak in 2011. This could mean there was a jump in the demand for property within half a mile of SunRail stations or that property within half a mile of stations did not decline in value as much as property further away. The latter explanation is more compelling because of general changes in the real estate market throughout the study period (Figure 4-4). If that was all that was affecting this coefficient, the peak should have been in 2012, not 2011. Regardless of the true cause, the overall change in the coefficient's magnitude of $8,475 was much smaller than that of the one mile model.

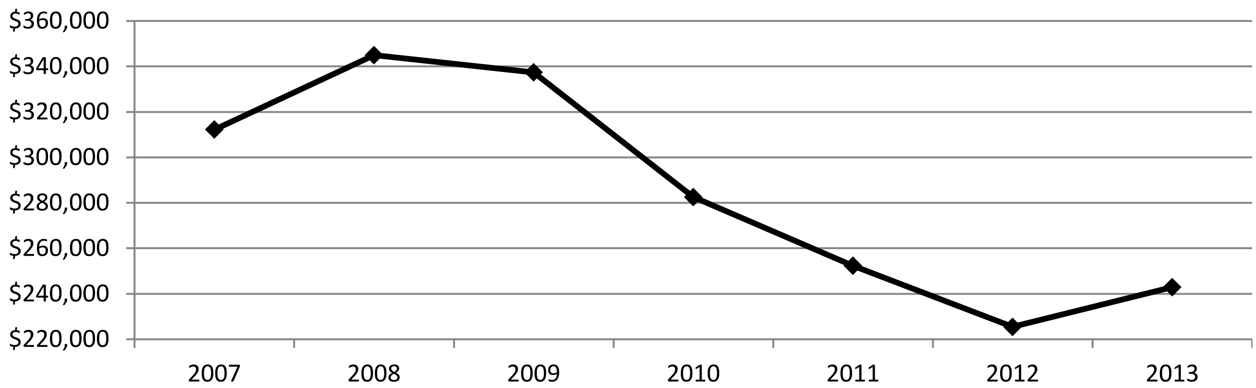

Figure 4-4. Orange County mean parcel just value, from Table A-4.

The quarter mile coefficient model showed a strong upward trend from 2007 to 2013 with a total increase of $133,010 (Figure 4-5). However, the lack of statistical significance in 2008 lead the researcher to believe that it may be inappropriate to include 2007, since theoretically the coefficient should be significant for a continuous stretch if the effect was real. Starting in 2009, the increase in the coefficient's value was still a substantial $41,669.

The linear distance coefficient was only statistically significant in 2011, 2012 and 2013. In 2011 the coefficient was -1.040, suggesting that for every linear foot a parcel's center is further from a SunRail station, the property value declined by $1.04. In 2013, the coefficient rose to 1.332. A positive coefficient means that property values rise as the distance from a SunRail station increases. This positive distance coefficient was found in all of the other statistically significant linear distance models except for the industrial land use model.

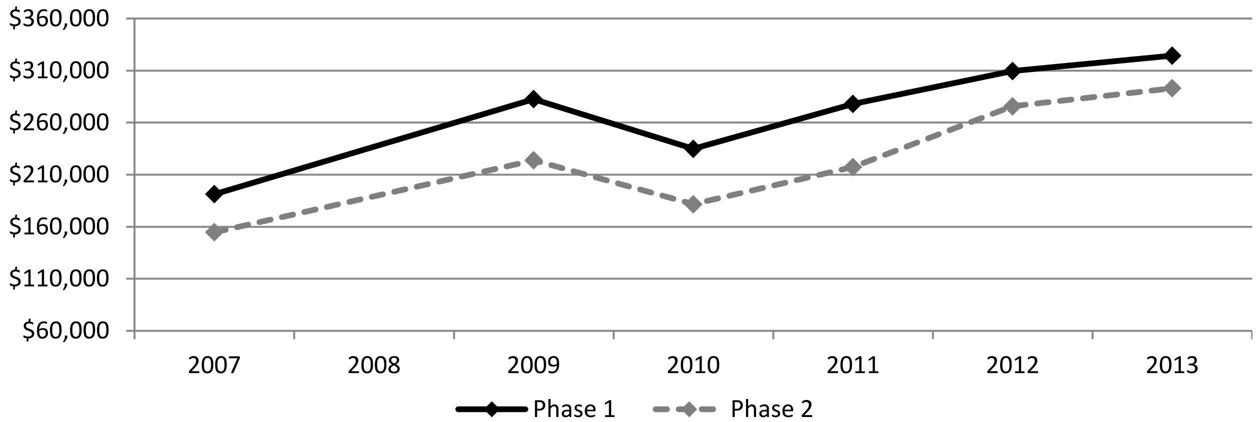

Figure 4-5. Quarter mile coefficient model, all land use types. Note that the 2008 coefficient was not statistically significant, so the trend line connects 2007 and 2009.

Land Value Change: Residential Land Use

The regressions for residential land uses found a substantial increase in the premium for proximity to SunRail over the study period in all four buffer models, with larger coefficients in the smaller buffers. This suggested that the proximity premium to SunRail had stronger effects at closer proximity.

Two Mile Buffer

The two mile buffer model remained relatively flat, with an increase of only $1,086 between 2007 and 2013. More interesting here was the reduction in the coefficient for the Phase 2 station model from 2009 to 2010 of $11,403. This observation was consistent with the divergence in the coefficients for the two mile buffer all land use model. Residential property located close to the Meadow Woods station did not experience an increase in value from SunRail until later than property located closer to other stations. Additionally, the property close to this station was located on a golf course that closed in 2007, so the housing market crash was likely to impact this area worse (Shanklin, 2011). In 2011, the foreclosure rate in this neighborhood was 20% greater than the Orlando area as a whole (Shanklin, 2011).

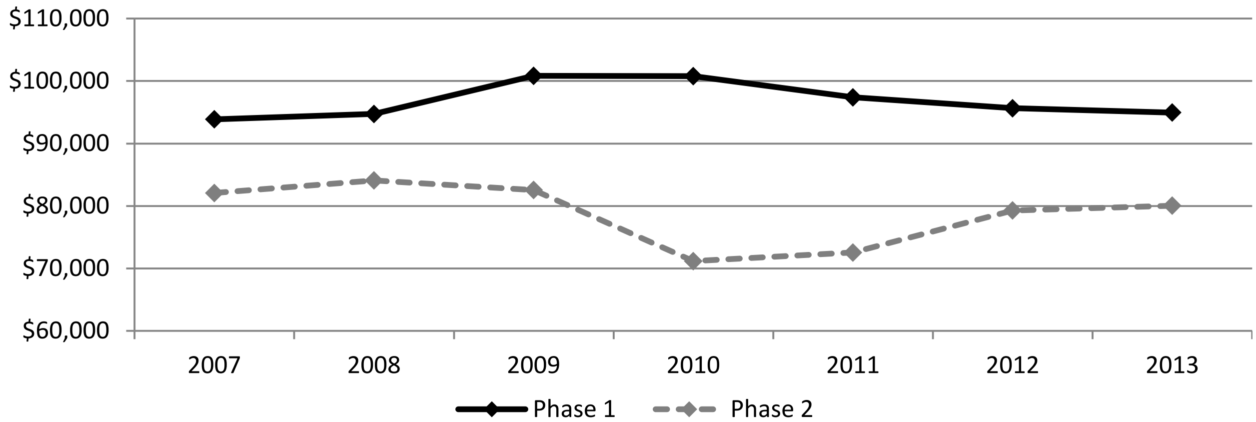

Figure 4-6. Two mile coefficient model, residential land types.

One Mile Buffer

The mile coefficient remained relatively flat just under $70,000 range but increased in 2008 and 2013 for a combined total increase of $10,793 (Figure 4-7). Like the two mile buffer model, the difference between phase one and phase two was striking, especially considering how stable the Phase 1 coefficient was.

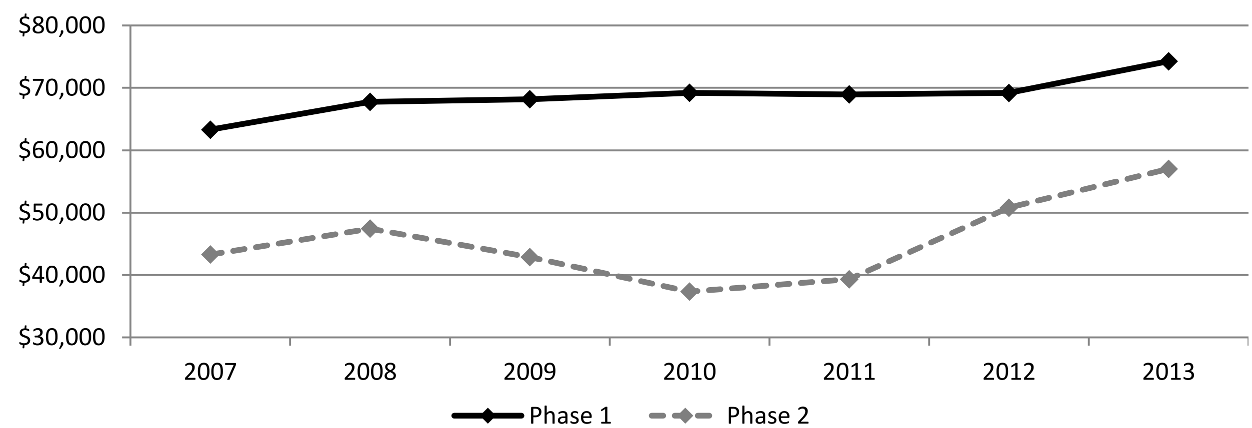

Figure 4-7. One mile coefficient model, residential land types.

Half Mile Buffer

The half mile coefficient for Phase 1 stations was statistically significant throughout and rose $18,705. The Phase 2 station model was not statistically significant, prior to 2012. This model had much greater variation than the one and two mile models and the t-statistics were lower (between 4.190 and 12.100), so these findings have a greater chance of error.

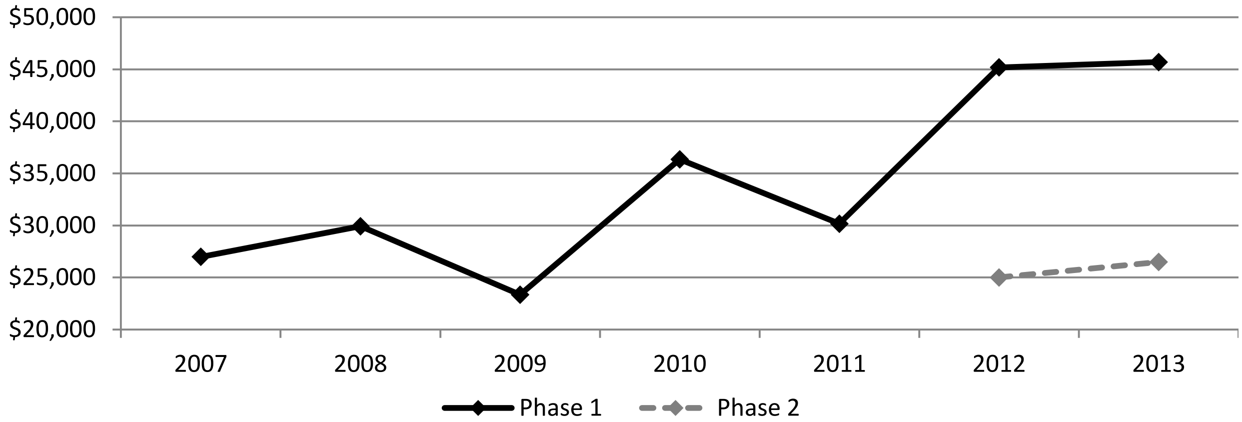

Figure 4-8. Half mile coefficient model, residential land types.

Quarter Mile Buffer

The 2007, 2008 and 2009 quarter mile coefficient was not statistically significant at the 95% confidence interval, and between 2010 and 2013, the quarter mile coefficient fell $22,491. Unlike the Phase 1 model, the Phase 2 model was statistically significant every year except 2008. In 2007, residential properties within a quarter mile of future SunRail stations were worth $43,042 less than parcels located further away. By 2014, those parcels were worth more than further parcels by $86,765, an increase of $129,807 (Figure 4-9).

Because of the relatively small number of residential parcels within a quarter mile of stations, this change could probably be attributed to a relatively small number of big new residential projects as opposed to slow changes at existing properties.

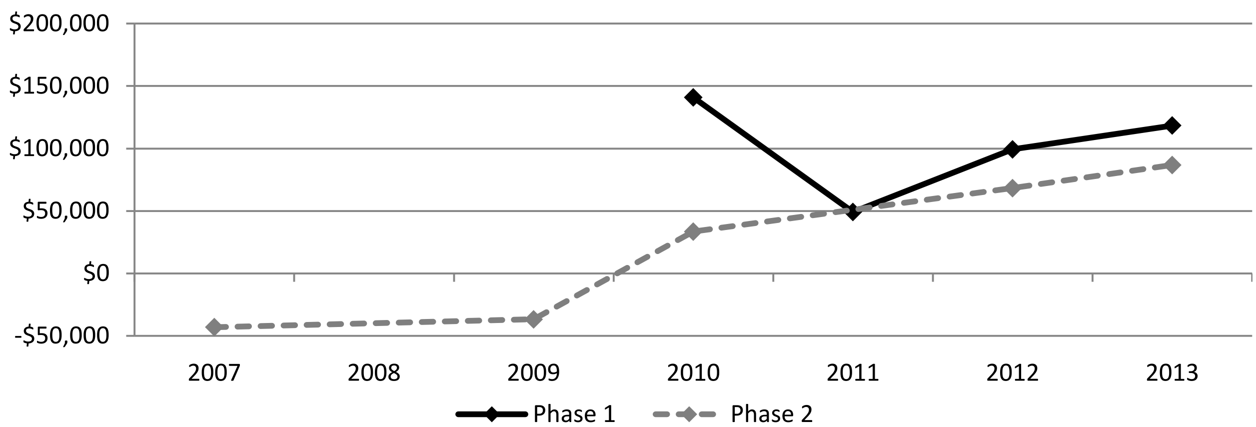

Figure 4-9. Quarter mile coefficient model, residential land types.

Linear Distance

The linear distance coefficient was also statistically significant, with a $0.91 increase in property values for each additional foot a property is from a SunRail station in 2007 to $1.24 increase in value for the same metric in 2013 (Table A-2). This would suggest that proximity premiums to SunRail are declining overall. However, SunRail travels along the most densely populated corridor in the region, and the distance variable rose continuously as the distance from stations increases. So this change in the variable could also be interpreted to mean that the residential property values in the suburbs recovered in that time period.

Land Value Change: Commercial Land Use

Linear Distance

All five distance coefficients were statistically insignificant for at least one year. However, the linear distance coefficient was statistically significant for every year except 2011. It declined from 2007 to 2012, before rising sharply in 2013 (Figure 4-10). This could mean that SunRail was making commercial property close to stations more valuable from 2007 to 2012. However, there is no clear explanation for the change in 2013. Like the residential linear distance coefficient, the researcher believes this says more about the performance of property values in the suburbs than it says about areas near SunRail.

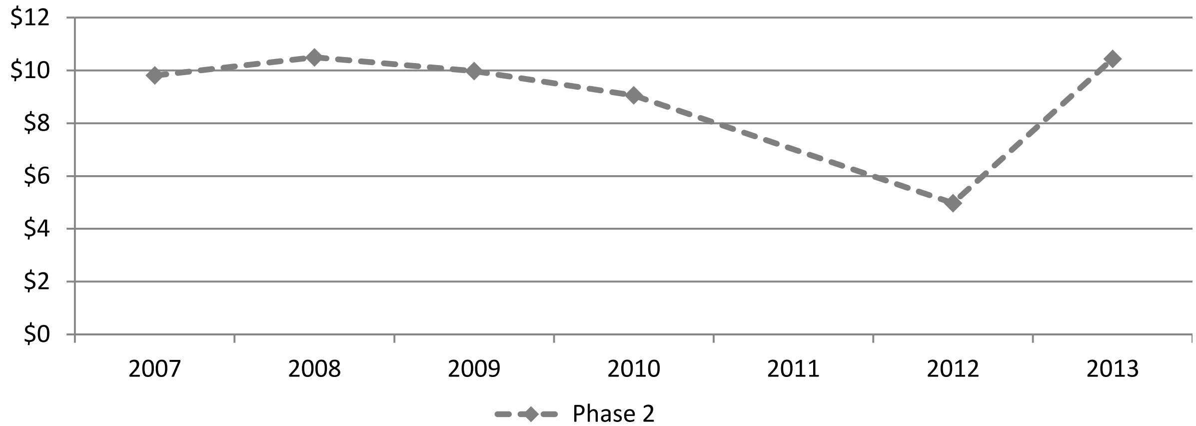

Figure 4-10. Linear distance coefficient model, commercial land types.

Half Mile Buffer

The half mile buffer model was remarkable in that the Phase 1 and Phase 2 station datasets were so similar for commercial land use. However, firm conclusions could not be drawn from this model because the 2013 data was statistically insignificant. If SunRail was an important driver of the change in commercial property values, the effect would get stronger as it got closer to the opening of the system.

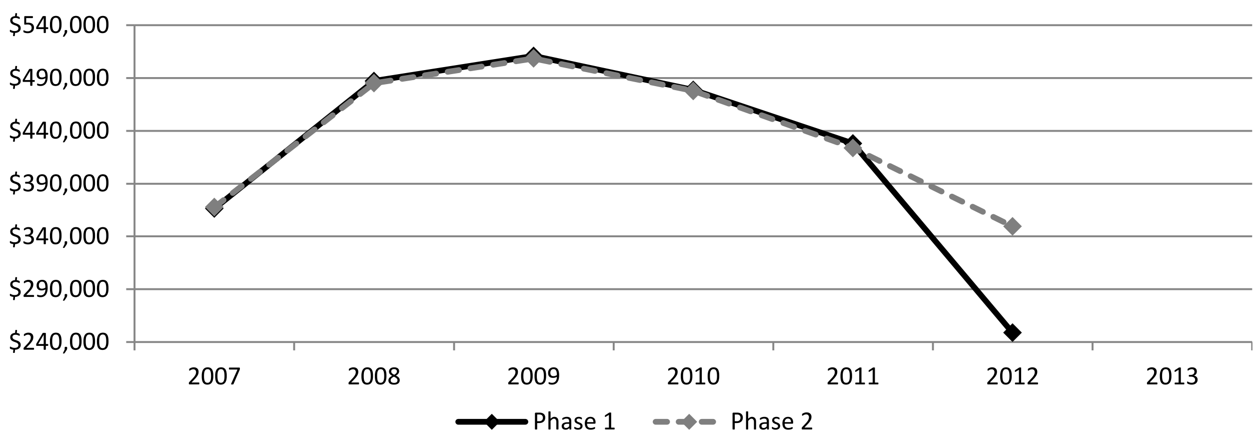

Figure 4-11. Half mile coefficient model, commercial land types.

Quarter Mile Buffer

The quarter mile coefficient suggested an even stronger negative impact on commercial property values than the half mile model. Like that model, however, this model was not statistically significant for 2013, therefore the likelihood that it accurately reflected the anticipatory effect of SunRail is low.

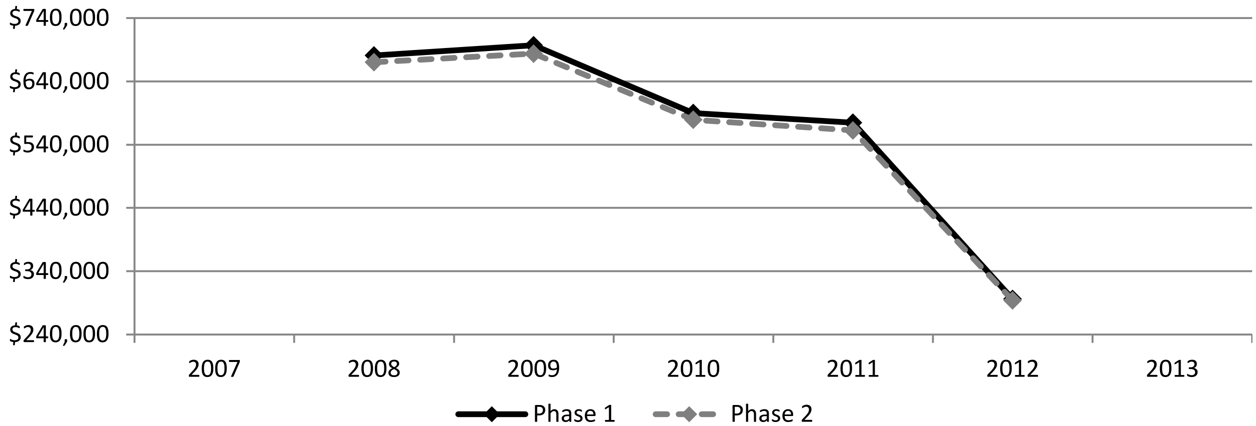

Figure 4-12. Quarter mile coefficient model, commercial land types.

Land Value Change: Institutional Land Use

None of the five models found statistically significant coefficients for institutional land uses for more than one year of the study period. This was not particularly surprising because the percentage of institutional land uses near SunRail stations declined over the study period (Table A-5), suggesting that there was little additional institutional development.

Land Value Change: Industrial Land Use

The only model with any statistical significance for industrial land uses was the linear distance model. In 2007, for every foot an industrial parcel is further from a SunRail station the property value declined by $6.09. In 2013, that decline dropped to $3.96 (Figure 4-12).

Like the other linear distance models, this change was either a function of the suburban industrial land increasing in value or the industrial land near SunRail stations declining in value. This could be a reasonable interpretation, because the zoning changes around stations had increased the number of potential neighbors who might not appreciate having industrial neighbors. This increase in nuisance liability could theoretically reduce the value of industrial land. Additionally, because frequent passenger trains now run along the corridor, it may be more difficult to schedule freight deliveries by rail to the properties along the tracks. However, none of the buffer based models had any sort of statistical significance, so it is far more likely that this result was a result of industrial land use changes in the suburbs.

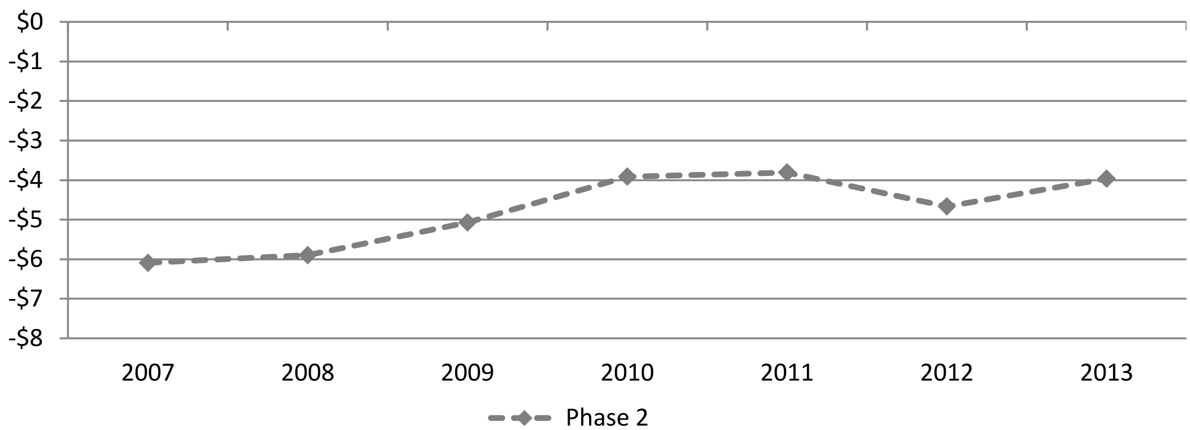

Figure 4-13. Linear distance coefficient model, industrial land types.

Building Permits by Jurisdiction

Overall trends in building construction along the SunRail line were determined by calculating the total number and total value of permits issued within the quarter mile, half mile, one mile and two mile buffers around stations. These were compared to the total number and value of permits within each jurisdiction.

Maitland

Within the City of Maitland, overall building permit activity declined from 1,738 permits issued in 2007 to 1,608 permits issued in 2013 (Table C-2). However, the total number of permits issued for the half, one and two mile buffers increased throughout the study period. This is what one would expect if SunRail was stimulating development near the station. Despite a general reduction in the volume of permits issued in the city, the areas near the SunRail station gradually began to represent a higher percentage of overall activity (Figure 4-14).

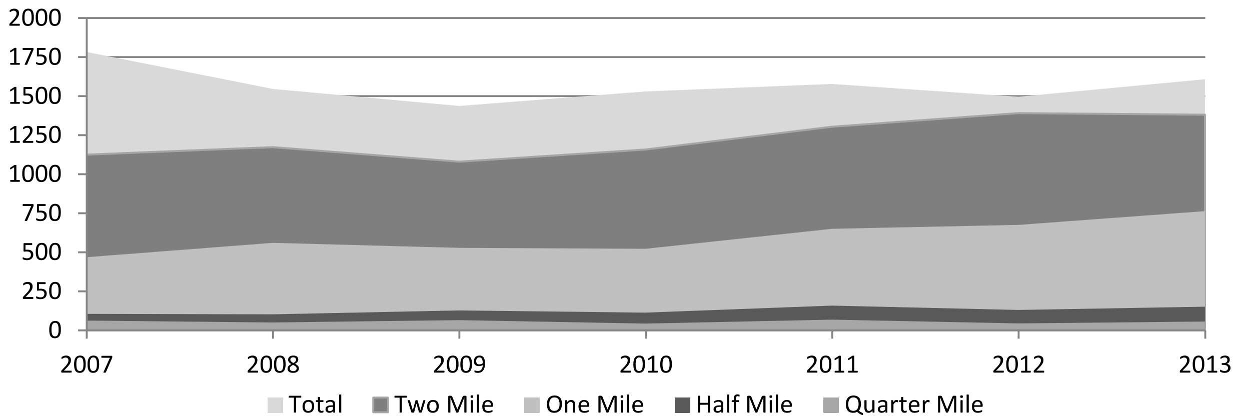

Figure 4-14. Building permits issued by City of Maitland over study period.

The value of the building permits issued in Maitland also declined over the study period. However, the share of the permit value located near the SunRail station increased (Figure 4-15) while the value of the permits located within the quarter and half mile buffers increased in value substantially.

Within the half mile buffer, it was apparent that permits increased in both value and number while the types of permits also changed. The share of residential permits increased by 14.3% from 2007 to 2013 while the residential share of the value of permits increased 18.5%. This suggests that residential developments closer to SunRail were more valuable or larger than those outside the half mile buffer and that the makeup of the neighborhoods near the stations was becoming more residential in character.

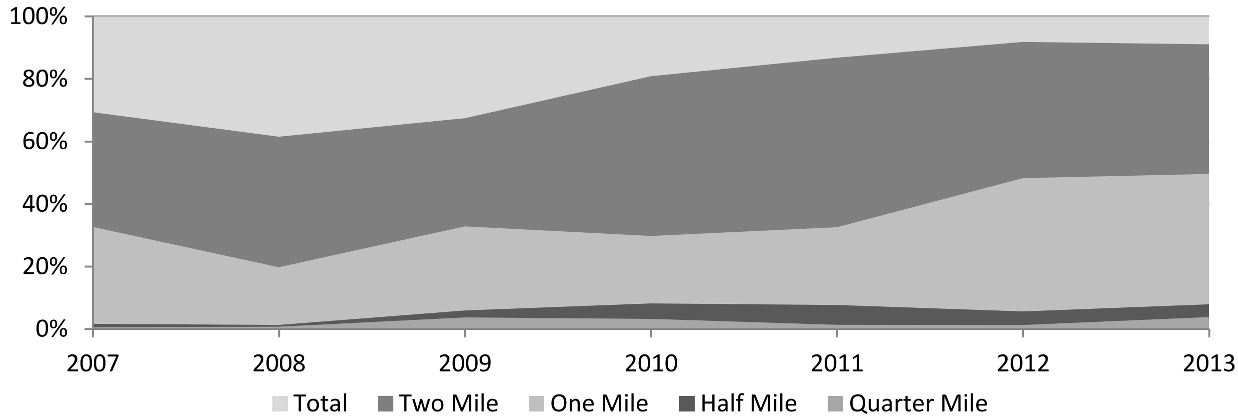

Figure 4-15. Percent of total building permit value issued by City of Maitland for each distance measure over study period.

Table 4-2. Permits issued within a half mile of SunRail stations compared to all permits issued by the City of Maitland.

Year	Total	Percent residential	Percent nonresidential	Percent of total
Number of permits				
2007	105	48.6%	51.4%	5.9%
2008	102	58.8%	41.2%	6.6%
2009	127	53.5%	46.5%	8.8%
2010	113	49.6%	50.4%	7.4%
2011	158	51.3%	48.7%	10.0%
2012	130	53.8%	46.2%	8.7%
2013	151	62.9%	37.1%	9.4%
Value of permits				
2007	$972,429.62	36.5%	63.5%	1.6%
2008	$903,951.00	53.6%	46.4%	1.3%
2009	$1,421,767.84	50.3%	49.7%	5.9%
2010	$2,524,051.22	37.4%	62.6%	8.2%
2011	$1,653,279.31	59.4%	40.6%	7.7%
2012	$1,092,892.00	22.9%	77.1%	5.6%
2013	$1,962,674.27	55.0%	45.0%	7.9%

Winter Park

Within the City of Winter Park, overall building permit activity declined from 6,199 permits issued in 2007 to 5,336 permits issued in 2013. However, like in Maitland, the total number of permits issued for the half, one and two mile buffers increased throughout the study period. This is what one would expect if SunRail was stimulating development near the station. Despite a general reduction in the volume of permits issued in the city, starting in 2009 the areas near the SunRail station gradually increased the pace of development (Figure 4-16).

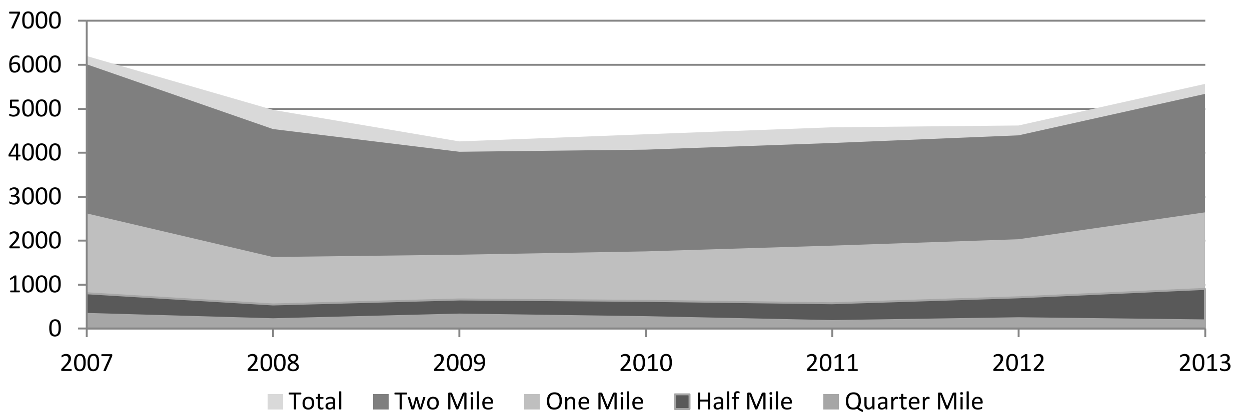

Figure 4-16. Building permits issued by City of Winter Park over study period.

The value of the building permits issued in Winter Park also declined over the study period. However, the share of the permit value located within the quarter half and one mile buffers began to increase in 2011 (Figure 4-17).

Within the half mile buffer, it was apparent that permits increased in both value and number starting in 2012 after declining from 2007 to 2011 (Table 4-3). The share of permit value falling within the half mile buffer also fluctuated until it began to rise in 2012. The share of residential permits declined by 6.9% from 2007 to 2013 while the residential share of the value of permits fluctuated without a particular pattern.

Figure 4-17. Percent of total building permit value issued by City of Winter Park for each distance measure over study period.

Table 4-3. Permits issued within a half mile of SunRail stations compared to all permits issued by the City of Winter Park.

Number of permits				
Year	Total	Percent residential	Percent nonresidential	Percent of total
2007	803	79.3%	20.7%	13.0%
2008	549	72.7%	27.3%	11.0%
2009	662	75.4%	24.6%	15.6%
2010	630	74.8%	25.2%	14.3%
2011	576	68.8%	31.3%	12.6%
2012	711	68.5%	31.5%	15.4%
2013	902	72.4%	27.6%	16.2%
Value of permits				
2007	$16,728,214.00	74.6%	25.4%	13.3%
2008	$8,232,511.00	59.2%	40.8%	9.3%
2009	$9,449,177.00	67.0%	33.0%	13.4%
2010	$9,390,259.00	73.1%	26.9%	4.7%
2011	$22,370,385.00	73.9%	26.1%	11.9%
2012	$55,159,761.00	80.8%	19.2%	21.7%
2013	$89,847,973.00	52.2%	47.8%	20.5%

This lack of strong trends in the Winter Park data was somewhat expected because Winter Park is fairly built out with relatively high value residential and commercial developments near the SunRail station. There may be fewer opportunities for redevelopment in Winter Park than in other places along SunRail because of Winter Park's pre-existing affluence.

Orlando

Within the City of Orlando, overall building permit activity declined from 1,571 permits issued in 2007 to 788 permits issued in 2013. However, unlike Maitland and Winter Park, the total number of permits issued for all distances from the rail stations decreased throughout the study period (Figure 4-18). This is not what one would expect if SunRail was stimulating development near the stations. However, the four Orlando stations were meant to be destinations instead of origins, so perhaps the ability of a destination station to generate redevelopment is limited by the strength of the overall economy. After all, a commuter rail system such as this is designed to increase the accessibility of downtown, but if the economy is contracting like it did for much of the study period, one would not expect the increase in accessibility to be important in a time when overall congestion is decreasing due to the weak economy.

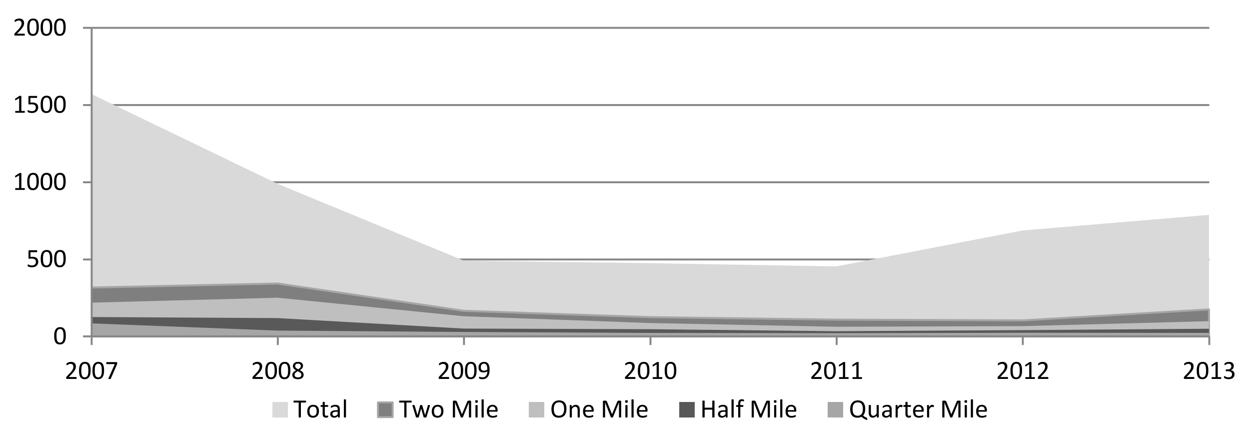

Figure 4-18. Building permits issued by City of Orlando over study period.

The value of the building permits issued in Orlando also declined over the study period. However, the share of the permit value located within the quarter half and one mile buffers peaked in 2008 and 2011 (Figure 4-19). The fluctuating results can be explained by the average high value of a relatively small number of permits close to the stations.

Figure 4-19. Percent of total building permit value issued by City of Orlando for each distance measure over study period.

Table 4-4. Permits issued within a half mile of SunRail stations compared to all permits issued by the City of Orlando.

Number of permits				
Year	Total	Percent residential	Percent nonresidential	Percent of total
2007	126	3.2%	96.8%	8.0%
2008	119	12.6%	87.4%	12.0%
2009	51	7.8%	92.2%	10.4%
2010	47	10.6%	89.4%	9.9%
2011	34	5.9%	94.1%	7.5%
2012	41	4.9%	95.1%	6.0%
2013	50	12.0%	88.0%	6.3%
Value of permits				
2007	$25,084,939.00	2.0%	98.0%	4.4%
2008	$205,261,718.00	10.2%	89.8%	29.5%
2009	$50,515,973.00	0.9%	99.1%	16.6%
2010	$44,059,882.00	1.7%	98.3%	24.0%
2011	$37,940,520.00	1.7%	98.3%	17.0%
2012	$49,496,978.00	2.1%	97.9%	14.4%
2013	$75,258,615.00	35.4%	64.6%	23.4%

Within the half mile buffer, permits decreased in both value and number until 2012 when they began to increase modestly (Table 4-4). The share of permit value falling within the half mile buffer fluctuated throughout the study analysis period. The share of the value of residential permits remained between 1.7% and 2.1% except for in 2008 and 2013 which had much larger shares of 10.2% and 35.4%, respectively. This lack of strong trends in the Orlando data fits into the issue related to destination stations and accessibility described above.

Orange County

Building permit data from unincorporated Orange County did not include data from 2007 to 2009 and it did not include permit value data. With only four years permits, it is difficult to establish a trend. Countywide, there was an increase in the number of permits from 2010 to 2012, followed by a decline in 2013 (Figure 4-20). The permits ranged from 70.4% residential in 2011 to 76.5% residential in 2012. The number of permits issued within the buffers varied greatly, but generally it could be said that there were very few permits at the quarter to half mile buffers. This is not what one would expect if SunRail was stimulating development near the stations. However, of the two stations in unincorporated Orange County, the Sand Lake Road station is a park-and ride located in a predominately industrial area while Meadow Woods is the Phase 2 station in Orange County.

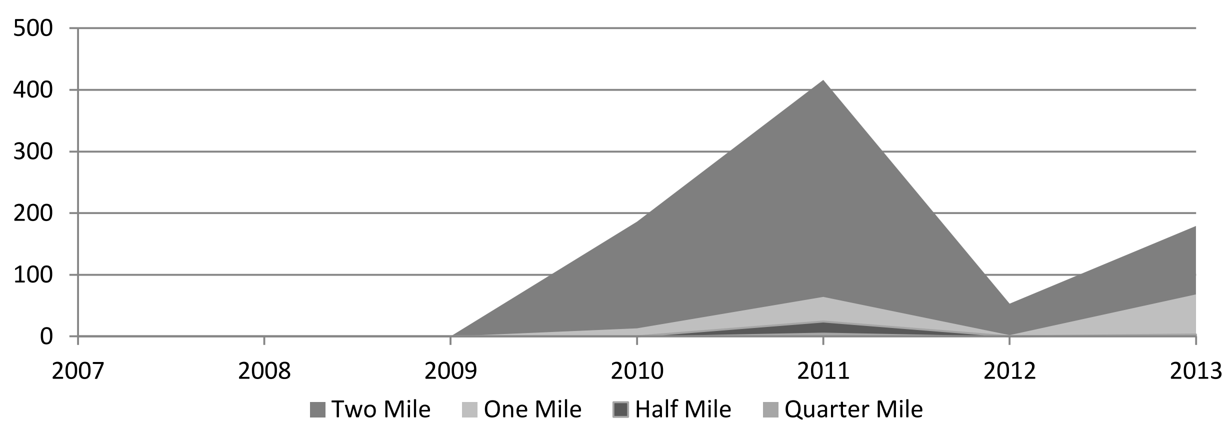

Figure 4-20. Building permits issued by Orange County from 2010 to 2013.

Table 4-5. Permits issued within a half mile of SunRail stations compared to all permits issued by Orange County.

Year	Total	Percent residential	Percent nonresidential	Percent of total
2010	0	0.0%	0.0%	0.0%
2011	40	60.0%	40.0%	1.1%
2012	0	0.0%	0.0%	0.0%
2013	3	100.0%	0.0%	0.1%

Building Permits by Station

The *SunRail Transit Oriented Development (TOD) Workshop Sketchbook* (Olore, 2011) identified five TOD typologies that were recommended for SunRail station areas to address their existing conditions and expected growth. Orange County stations fall into four of these typologies: Downtown, Urban Center, Village Center and Neighborhood Center. The researcher identified one station in each typology to analyze in greater detail. Complete station-level data for all eight stations is located in Table C-2.

Downtown (Church Street Station)

Olore (2011) defined the Downtown typology as having high density, mixed uses with a compact pedestrian oriented environment, an active defined center, limited structured parking and urban parks and open space. The Church Street station is located on South Street in downtown Orlando and is a short walking distance to the offices and attractions downtown. It was the second busiest station in Orange County with 2,638 passengers on the first week of paid service (Fluker, 2014).

As seen in Figure 4-21, the number of building permits issued near Church Street station declined between 2008 and 2011. The percent of total permits issued within a quarter mile declined from 0.9% in 2007 to 0.2% in 2011. As discussed above, this may be due to the fact that downtown Orlando was already built out and that the station is a destination for commuters in an area traditionally used as a destination for commuters.

Unlike some of the other stations, the area around this station was already well suited for commuter rail.

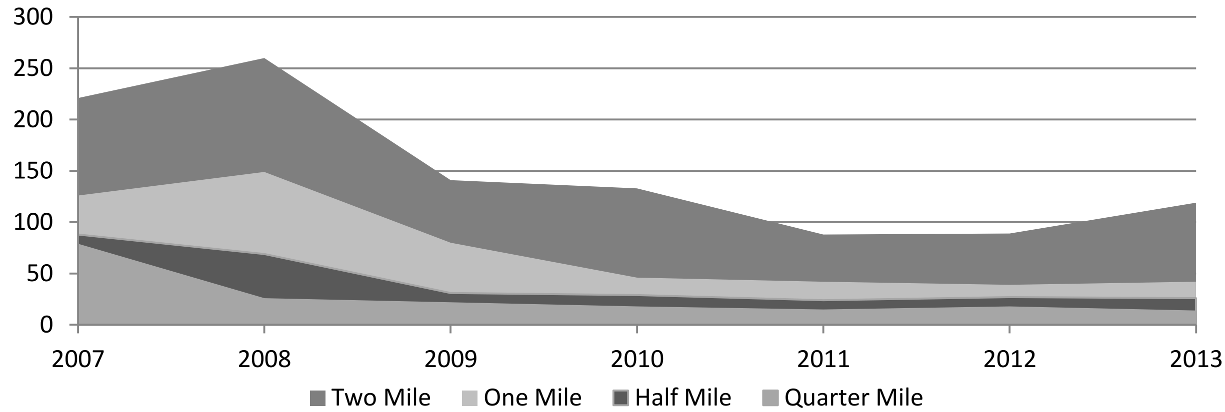

Figure 4-21. Building permits issued near Church Street station over study period.

A substantial portion of all permits issued during the study period were made for projects located within two miles of the Church Street station. In 2008 and 2011, 23.6% and 24.9% of the value of projects permitted were issued near this station. However, most of this value was located in the one and two mile buffers (outside of the conventional half-mile circle walking distance).

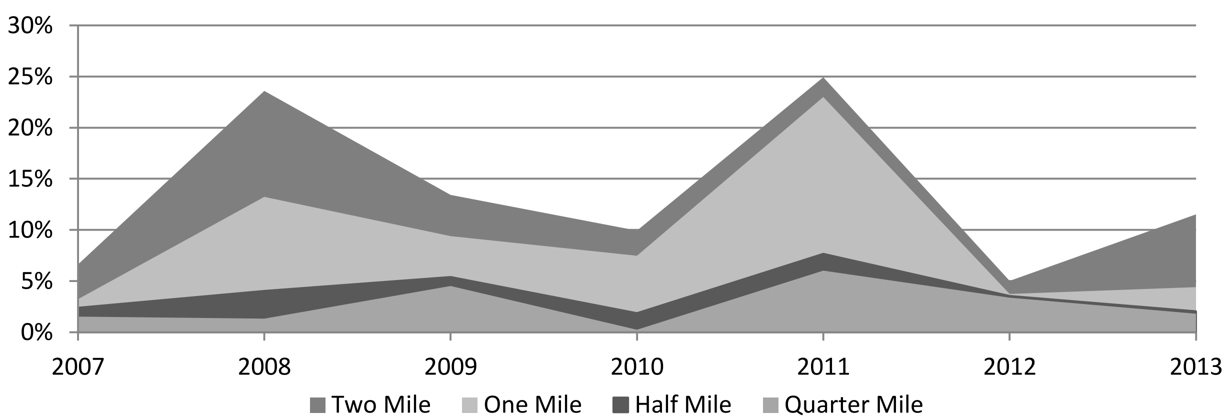

Figure 4-22. Building permit value distribution issued near Church Street station over study period.

However, within the half-mile buffer, over $153 million worth of investments were permitted in this area (Table 4-6). Much of the development downtown was nonresidential. In 2008, there was a single $15 million residential building permit issued. Other than that, there were no residential permits issued until 2012 and 2013 which both had a single residential permit.

Table 4-6. Permits issued within a half mile of Church Street station compared to all permits issued from 2007 to 2013.

Year	Total	Percent residential	Percent nonresidential	Percent of total
Number of permits				
2007	88	0.0%	100.0%	0.9%
2008	69	1.4%	98.6%	0.9%
2009	31	0.0%	100.0%	0.5%
2010	29	0.0%	100.0%	0.3%
2011	24	0.0%	100.0%	0.2%
2012	27	3.7%	96.3%	0.2%
2013	26	3.8%	96.2%	0.2%
Value of permits				
2007	$17,980,306.00	0.0%	100.0%	2.4%
2008	$34,568,860.00	46.3%	53.7%	4.0%
2009	$21,575,317.00	0.0%	100.0%	5.4%
2010	$7,752,345.00	0.0%	100.0%	1.9%
2011	$33,178,850.00	0.0%	100.0%	7.7%
2012	$21,925,532.00	4.6%	95.4%	3.5%
2013	$16,078,790.00	0.0%	100.0%	2.1%

Urban Center (Florida Hospital Health Village Station)

The Urban Center typology was defined as having high density (predominately residential), mixed uses with a compact pedestrian oriented environment, an active defined center, limited structured parking and urban parks and open space (Olore, 2011). The main difference between the Urban Center and Downtown typologies was the lower density of the Urban Center. The Florida Hospital Health Village station is located between two parking garages on the Florida Hospital campus and is a short walking distance to the museums in Loch Haven Park. This station is currently less residential than the typology suggests, with very little high density residential. It was one of the less busy stations in Orange County with 937 passengers on the first week of paid service (Fluker, 2014).

As seen in Figure 4-23, the number of building permits issued near this station declined between 2007 and 2010. The vast majority of permits were issued for projects in the one or two mile buffers. The percent of total permits issued within a half mile declined from 0.3% to 0.2%, with a high of 0.7% in 2008. One possible cause for the relatively low number of permits is that much of the land within walking distance of the station is either a part of the Florida Hospital, Loch Haven Park, or medical offices. Like the area around Church Street station, this area is already built out and that the station is a destination for commuters in an area traditionally used as a destination for commuters. The majority of the area outside of the institutional land uses within walking distance of the station are single family homes.

According to the head of Strategic Property Development with Florida Hospital's parent company, they are in the midst of planning to develop some higher density residential uses on site in the near future. However, the main reason the hospital supported SunRail was to reduce parking demand on their landlocked site. Because of SunRail, the Florida Hospital is building 1,600 fewer parking spaces in their current expansion efforts than they would have otherwise (J. Barry, personal communication, September 9, 2013).

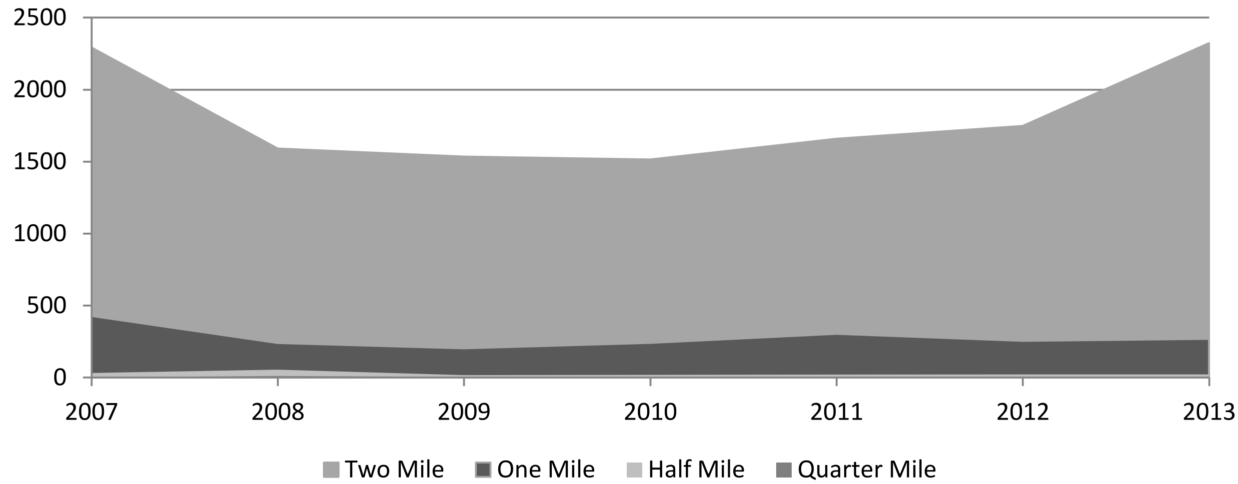

Figure 4-23. Building permits issued near Florida Hospital Health Village station over study period.

An increasing portion of all permits issued during the study period were made for projects located within two miles of the station. In 2008 and 2013, 24.8% and 32.8% of the value of projects permitted were issued were near this station. In 2008 16.4% of the permitted building value was located within a quarter mile of the station (Figure 4-24).

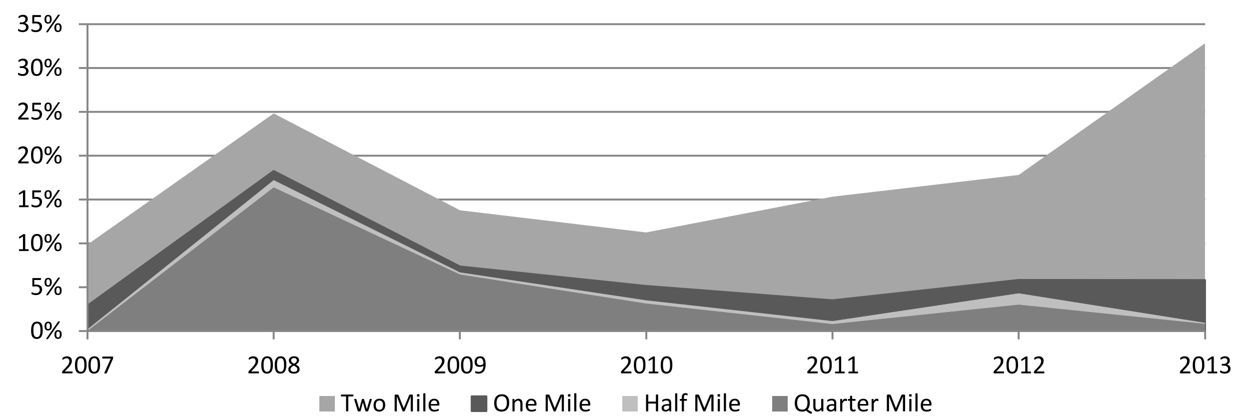

Figure 4-24. Building permit value distribution issued near Florida Hospital Health Village station over study period.

Within the half-mile buffer, over $228 million worth of investments were permitted in this area (Table 4-7). Much of the permits were residential, but in most years the nonresidential permits accounted for over 90% of the value of the projects.

Table 4-7. Permits issued within a half mile of Florida Hospital Health Village station compared to all permits issued from 2007 to 2013.

Number of permits Year	Total	Percent residential	Percent nonresidential	Percent of total
2007	32	59.4%	40.6%	0.3%
2008	55	58.2%	41.8%	0.7%
2009	17	41.2%	58.8%	0.3%
2010	19	57.9%	42.1%	0.2%
2011	21	57.1%	42.9%	0.2%
2012	22	59.1%	40.9%	0.2%
2013	22	50.0%	50.0%	0.2%
Value of permits				
2007	$1,405,411.00	37.8%	62.2%	0.2%
2008	$147,083,419.00	3.9%	96.1%	17.2%
2009	$26,693,879.00	1.8%	98.2%	6.7%
2010	$14,494,837.00	9.3%	90.7%	3.5%
2011	$4,868,241.00	27.5%	72.5%	1.1%
2012	$26,535,298.00	0.5%	99.5%	4.3%
2013	$7,293,995.00	11.1%	88.9%	0.9%

Village Center (Maitland Station)

The Village Center typology had medium density (predominately residential, higher densities within a quarter mile of stations with a gradual shift to lower densities), mixed uses integrating residential and local serving retail, a compact pedestrian oriented environment, an active defined center, limited managed parking, including on street parking and urban parks and open space (Olore, 2011). The Maitland station is located on North Orlando Avenue (US Route 17-92), one of the major six-lane north-south arterials through Maitland. The station currently is the site of a park-and-ride lot and is located across the street from a car dealership. It was one of the least busy stations in Orange County with 892 passengers on the first week of paid service (Fluker, 2014).

As seen in Figure 4-25, the number of building permits issued near this station rose gradually starting in 2010. The vast majority of permits were issued for projects in the one or two mile buffers. The percent of total permits issued within a half mile rose gradually from 0.1% to 0.3%, with a high of 0.6% in 2010. This suggested that the pace of development near the station was increasing and that the areas near the station were receiving a greater portion of the developments than before. This makes sense, because the area around the station currently has little in common with the Village Center typology, so there was more potential here than other more developed station areas. A large share of permits were located in the one and two mile buffer area. This could indicate that the station's park and ride lot makes the station's influence area wider because passengers arrive by car.

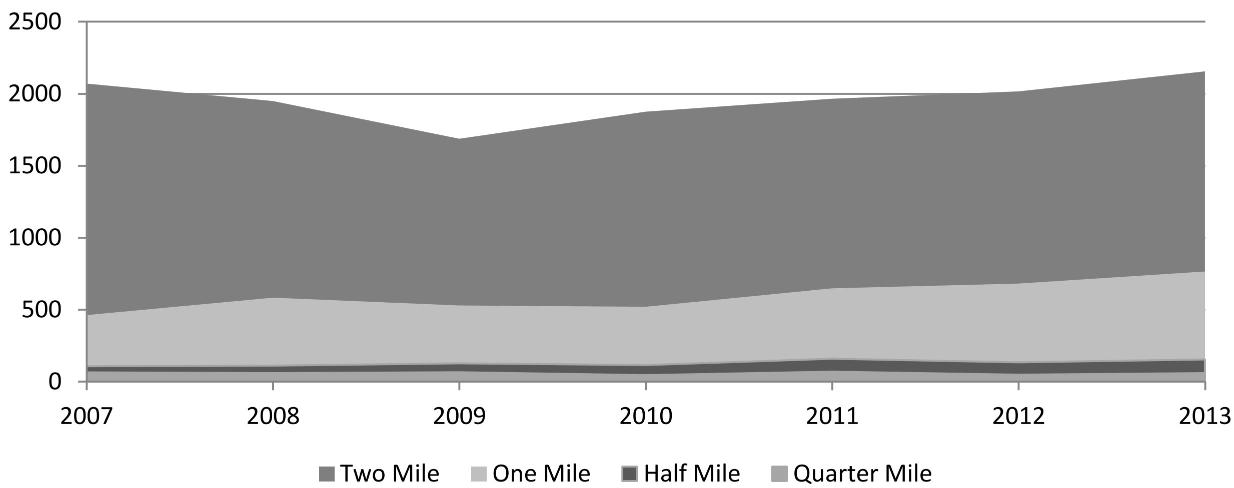

Figure 4-25. Building permits issued near Maitland station over study period.

An increasing portion of all permits issued during the study period were made for projects located within two miles of the station. In 2010, 33.1% of the value of projects permitted were issued were near this station (Figure 4-26).

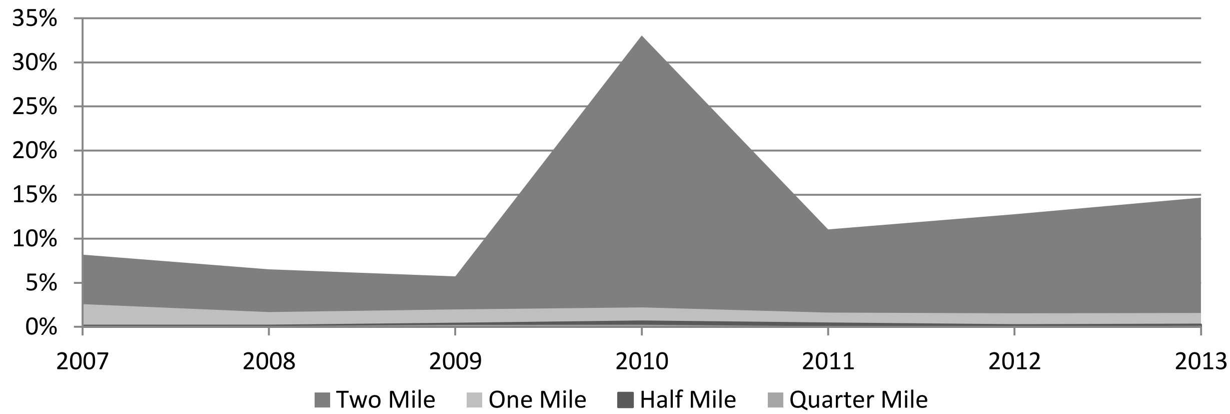

Figure 4-26. Building permit value distribution issued near Florida Hospital Health Village station over study period.

Within the half-mile buffer, over $10 million worth of investments were permitted in this area from 2007 to 2013 (Table 4-8). The mix of residential to nonresidential permits generally fluctuated around an even split, suggesting a relative consistency in the types of projects being built in the station area. However, the increase in absolute number of permits suggested that the area is growing in part because of SunRail.

Table 4-8. Permits issued within a half mile of Maitland station compared to all permits issued from 2007 to 2013.

Number of permits Year	Total	Percent residential	Percent nonresidential	Percent of total
2007	107	49.5%	50.5%	1.1%
2008	111	62.2%	37.8%	1.5%
2009	127	53.5%	46.5%	2.1%
2010	115	50.4%	49.6%	1.2%
2011	159	51.6%	48.4%	1.5%
2012	134	55.2%	44.8%	1.2%
2013	154	63.6%	36.4%	1.5%
Value of permits				
2007	$972,429.62	36.5%	63.5%	0.1%
2008	$1,154,446.00	72.3%	27.7%	0.1%
2009	$1,421,767.84	50.3%	49.7%	0.4%
2010	$2,524,051.22	37.4%	62.6%	0.6%
2011	$1,653,279.31	59.4%	40.6%	0.4%
2012	$1,155,892.00	27.1%	72.9%	0.2%
2013	$1,974,674.27	55.3%	44.7%	0.3%

Neighborhood Center (Meadow Woods Station)

The Neighborhood Center typology is defined as having a low density primarily residential uses with a compact pedestrian friendly environment, on street parking and urban parks and open space (Olore, 2011). The Meadow Woods station is a SunRail Phase 2 station located on Fairway Woods Boulevard on the former site of a small strip mall. The neighborhood around the station was built in the late 1980's and consists primarily of single family houses. The neighborhood was built around a golf course that closed in 2007 and is now owned by a church (Shanklin, 2011).

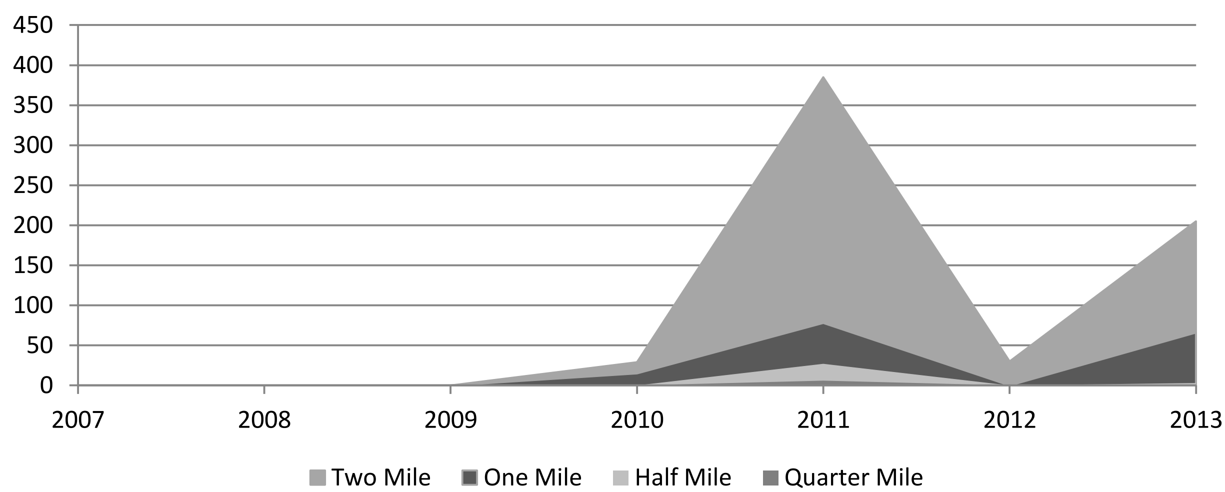

Figure 4-27. Building permits issued near Meadow Woods station over study period.

As seen in Figure 4-27, there was a large number of permits issued within the one and two mile buffers in 2011. However, in each year data was available, the number of permits issued within walking distance was negligible. One possible cause for the relatively low number of permits is that the residential property near the station is built along a closed golf course, so there is uncertainty about the future characteristics of the neighborhood. One plan to redevelop the golf course involved turning the 176 acre site into a New Urbanist style town center in the midst of the existing neighborhood

(Shanklin, 2011). However, the researcher could not find any indication that the plans to redevelop the golf course were making any progress on this project as of this writing.

Table 4-9. Permits issued within a half mile of Meadow Woods station compared to all permits issued from 2010 to 2013.

Year	Total	Percent residential	Percent nonresidential	Percent of total
2010	0	NA	NA	0.0%
2011	27	88.9%	11.1%	0.3%
2012	0	NA	NA	0.0%
2013	3	100.0%	0.0%	0.0%

This study investigated the anticipatory effects of SunRail on land use, parcel just value, number and value of building permits in each jurisdiction, and the number and value of building permits at each station area type in Orange County. The analysis of land use within a half mile of stations found minimal changes in the share of property in each land use category. The hedonic regressions of the parcel data found statistically significant changes in the value of residential property located near SunRail stations. All jurisdictions within Orange County saw a reduction in the number of annual permits between 2007 and 2013. However, Maitland and Winter Park saw an increase in the share of permits and permit value located near their stations. The Village Center-type station (Maitland Station) was the only station out of the four station types that saw an increase in the number and value of permits near the stations. The three other station types analyzed did not have an increase in the number or value of permits, probably because of a combination of the recession and physical site constraints near stations.

CHAPTER 5
DISCUSSION

The results described above must be understood within the context of Orlando's recent transportation history. In the late 1990s, a light rail system was studied and federal money was received, but it was cancelled when the Orange County Commission voted not to support the project in 1999 (Krueger, 2001). Because of this, when Orange, Osceola, Volusia, and Seminole counties and the City of Orlando entered into an interlocal agreement with the FDOT to create SunRail, developers had reason to be skeptical about the likelihood that it would actually be built. Phase 1 of this system, identical to what opened in May 2014, was originally scheduled to open in 2010 (Hamburg & Pino, 2007). From the time that the original interlocal agreements were made in 2007 until Governor Scott approved the spending on the project in July 2011, numerous approval delays made the future of SunRail less than certain (Tracy & Deslatte, 2011b).

In addition to the uncertainty surrounding the creation of SunRail's between 2007 and 2011, that period also saw a severe recession that significantly impacted residential property values. Therefore, it is no surprise that even the strongest residential property value models presented above showed little growth in the proximity indicators until after 2011. The idea that the impact of SunRail shouldn't have been felt significantly until after 2011 seems to hold up relatively well in the permit data as well. In particular, the shares of permit value within a mile of stations in Maitland and within a half mile in Winter Park seems to have risen substantially after 2011. However, large increases in shares of building permit value were not seen in Orlando. This could also be a result of the station areas in Orlando being more densely developed than the other jurisdictions. But the effect here may be less robust than the results in those two cities may suggest.

With confidence, it would be difficult to draw any strong conclusions about SunRail's impact on property values or building permit activity near stations. However, the results from the permit data for residential property cannot be dismissed out of hand. They seem to show at least a modest positive effect of commuter rail proximity in this study. The residential one mile buffer model saw a much more modest premium over the half mile model suggesting that all else being equal, the anticipatory effects of SunRail on residential land uses decreases as distance from the station increases. This is probably a function of the zoning changes allowing higher densities near stations for TOD. Likewise, there was a definite trend in the permit data towards having a larger share of permits being issued near stations. This may be attributable to other investments made in these areas or to changes in zoning to allow for greater density.

Many of the effects to did appear to have occurred mirrored the observations of E. H. Spengler in 1930 on the effects of new rail transit opening in New York City. In particular, the changing distribution of the location of building permit values due to SunRail matches Spengler's observation that new transit shifts value rather than creating much new value, and that previously developed areas tend to have smaller changes in value (as cited in Damm et al., 1980, p. 317).

A potential barrier to SunRail's ability to raise property values is the "back-door problem", described by Loukaitou-Sideris and Banerjee (2000) as a situation where a transit route is located along the backs of buildings and through nondescript industrial areas lacking easy access to high density residential areas or adequate park-and-ride parking capacity. (Loukaitou-Sideris & Banerjee, 2000). In this respect, SunRail's prospects may be better than other transit services on former freight right-of-ways because many of these barriers are not present at most SunRail stations due to pro-active land use policy targeting station areas for higher density development and pedestrian infrastructure improvements (City of Orlando, 2012, Orange County Community, Environmental & Development Services Planning Division, 2012, City of Maitland, 2010).

It was outside of the scope of this thesis to determine if these changes in property value or building permit distributions were more dependent upon zoning than SunRail. Due to the large capital costs associated with building commuter rail systems, if upzoning was all that was necessary to spur this type of economic development, it would be important to know by how much. However, if the changes in zoning were made politically possible only because of the presence of SunRail, it would be wrong to attribute the changes to zoning alone.

CHAPTER 6
CONCLUSION

The purpose of this study was to determine the extent of the impacts of SunRail on land use, property values, and building permit activity from 2007 to 2013. Orange County has a car-dependent growth pattern typical for the southeast whose lessons may apply to other places with similar growth patterns.

This study found a statistically significant relationship between the proximity of residential land uses and SunRail stations with the buffer distance models. The half mile buffer distance models showed that property values near stations were over $18,000 higher than they would be without SunRail. The one mile buffer model saw a much more modest premium over the same time period suggesting that all else being equal, the anticipatory effects of SunRail on residential land uses decreases as distance from the station increases. This was probably a function of the zoning changes allowing higher densities near stations for TOD. The reduction in effect size as distance increased suggests that the market assigns value to being within walking distance from the stations.

Building permit data at a municipal level showed that between 2007 and 2013 the share of development located close to stations increased. In Maitland, the station area saw an overall increase in permit activity despite an overall decline in the number of permits issued citywide. Winter Park and Orlando both saw smaller increases in the number and value of permits probably because they were developed to begin with.

Permit activities in station areas depended on the context of the station. Downtown and Urban Center stations generally did not see a substantial increase in the number or value of permits over time. However, they remained areas of high investment throughout the study period. This is likely because these areas were already developed in ways that take advantage of the new commuter rail service. Village center stations saw a general increase in the number and value of permits while there was not enough data to draw firm conclusions about the Neighborhood Center station.

Further Research

The other effects of proximity to SunRail are less easy to draw conclusions from. In particular the linear distance models probably showed the changes in property values in the suburbs more than any direct effect of SunRail. This problem might be remedied by restricting the distance in which models are included in the study. Originally, the researcher included the entire county in the control group and found similar results. Apparently, limiting the control group to properties within the Orange County Urban Service Area was still too broad. Future research might investigate GIS-based methods to select parcels based on the existing built density of an area matching that of SunRail station areas.

Additionally, these models could probably be improved if they included more details about the parcels, like number of restrooms or bedrooms in residential buildings. A potential area for future refinement of this study would be to include the built square footage of each land use type instead of the number of parcels. This was not done for this study because of known inconsistencies with the way built square footage is reported in this dataset for timeshares or condo hotels. This land use change could also be improved if it included changes within a land use classification. For instance, if a multifamily dwelling was built on the site of a single family house, the methodology used here would not reflect that change.

Additionally, not all SunRail stations in Orange County are TODs. The Maitland and Sand Lake Road stations opened as park and ride stations with low density suburban developments surrounding them. It is conceivable that such stations would be less likely to increase property values nearby because the station would primarily benefit people who arrive by car from a larger catchment area.

Limitations

The property and building permit value data were not adjusted for inflation throughout the study period. This was not taken into consideration because of the relatively short period of the study and because of the low inflation levels between 2007 and 2013. However, this could potentially account for a significant share of the statistically significant impacts reported in this study.

Overall, this research shows that the anticipatory effects of SunRail were predominantly related to increasing the value of residential properties closer than one mile of stations. Additionally, the areas near SunRail have maintained their original mix of land uses except for a reduction in institutional land uses. Further research should address the issues above and expand the demographic analysis once data becomes available. Without these additions, it would still appear that SunRail has had a positive effect on economic development near station areas for residential land uses.

APPENDIX A
PARCEL DATA

Table A-1. Land Use Code Classifications.

DOR Code	Description	DOR Code	Description
Residential land uses			
1003	Vacant Multi-Family (10 Units Or More)	300	Multi-Family 10+ Units
1004	Vacant Condo Site	301	Apartment-Low Income Housing Tax Credit
2801	Manufactured Home Park	310	Modern Apartment Complex
3905	Hotel Extended Stay	311	Student Housing
7400	Retirement Community	315	High Rise Apartment
7800	Rest Home	400	Condominium-Residential
1	Vacant Residential	401	Condominium-Single Family Residential
4	Vacant Condo	450	Condominium-Manufactured Home
19	Vacant Home Owners Association	471	Residential Condo Cls 1
20	Mfr Home With Sticker	472	Residential Condo Cls 2
100	Single Family	473	Residential Condo Cls 3
101	Single Family	474	Residential Condo Cls 4
102	Single Family Class II	475	Residential Condo Cls 5
103	Single Family Class III	494	Condominium-Single Family Residential Class 2
104	Single Family Class IV	500	Cooperatives
105	Single Family Class V	550	Cooperatives Manufactured Home
119	Improved Home Owner Association	600	Retirement Homes
120	Townhouse	610	Assisted Living
121	Class II Townhouse	800	Multi-Family
130	Single Family Residential - Lake Front	801	Multi-Family 1 Unit
131	Single Family Residential - Canal Front	802	Multi-Family 2 Units
135	Single Family Residential - Lake View	803	Multi-Family 3 Units
140	Single Family Residential - Golf	804	Multi-Family 4 Units
		805	Multi-Family 5-9 Units

Table A-1. Continued

DOR Code	Description	DOR Code	Description
Residential land uses continued			
154	Townhomes Class II	814	Quadraplex
175	Rooming House	821	Class II Duplex 1 Unit
181	1 Unit Of Duplex	822	Class II Duplex
182	1 Unit Of Class 2 Duplex	823	Class II Triplex
194	Single Family	824	Class II Quadraplex
195	Single Family Class 3	830	Multi-Family
196	Single Family Class 4	890	Multi-Family
197	Single Family Class 5	891	Multi-Family Class II 1 Unit
200	Manufactured Home	892	Multi-Family Class II 2 Units
201	Manufactured Home	893	Multi-Family Class II 3 Units
202	Manufactured Home	894	Multi-Family Class II 4 Units
210	Manufactured Home	895	Multi-Family Class II 5-9 Units
299	Manufactured Home Community	900	Rooming House
Commercial land uses			
1000	Vacant Commercial	3100	Drive-In/Open Stadium
1019	Vacant Commercial Association	3200	Theater/Auditorium
1100	Stores, 1 Story	3300	Nightclub/Bars
1101	Condo-Retail I	3400	Recreational/Meeting
1102	Condo-Retail II	3500	Tourist Attraction
1103	Condo-Retail III	3501	T.A. Sound Stage
1110	Convenience Store	3502	T.A. Stadium
1119	Improved Commercial Association	3503	T.A. Theater
1200	Store/Office/Converted Residential	3504	T.A. Ridehousing
1210	Store/Office/Res Class 2	3505	Tourist Attraction
1220	Store/Office/Res Class 3	3506	Tourist Attraction
1300	Department Store	3507	Tourist Attraction
1400	Supermarket	3508	Tourist Attraction
1500	Regional Shopping	3509	T.A. Cubic
1600	Community Shopping	3510	Tourist Attraction
1700	Office Buildings	3511	Tourist Attraction
1701	Condo-Prof Bldg	3513	T.A. Theater M.K.
1702	Modular Office	3514	T.A. Ridehousing M.K.
1703	Condo-Office I	3515	T.A. Restaurant M.K.
1704	Condo-Office II	3517	T.A. Retail M.K.
1705	Condo-Office III	3520	Tourist Attraction
1706	Cond-Office Medical I	3525	Tourist Attraction
1707	Cond-Office Medical II	3575	Tourist Attraction
1710	Cond-Off Prof I	3700	Race Tracks
1711	Cond-Off Prof II	3800	Golf Course

Table A-1. Continued

DOR Code	Description	DOR Code	Description
Commercial land uses continued			
1712	Cond-Off Prof III	3900	Motel
1715	Condo-Office 2-3 Stories I	3901	Condo-Hotel I
1716	Condo-Office 2-3 Stories II	3902	Condo-Hotel II
1717	Condo-Office 2-3 Stories III	3903	Condo Hotel III
1800	Multi Story Office 2-3 Stories	3904	Condo Hotel IV
1801	High-Rise Condo 4+ Stories	3910	Hotel Limited Services
1802	Office 4-8 Stories	3915	Select Service Hotel
1803	Office High Rise 9+	3920	Hotel Full Service
1900	Professional Building	3925	Hotel Luxury
1910	Professional Child Care Center	3930	Convention Center
2100	Restaurants/Cafe	3940	Undeclared Timeshare
2101	Condo-Restaurant	7720	Country Club
2200	Restaurant Chain	9011	Lease Retail
2300	Financial Building/Bank	9017	Lease Office
2400	Insurance Company	9610	Movie Studio
2500	Flex Space	410	Condominium-Professional Building
2504	Condo Flex Space I	411	Condominium-Office Building Retail
2505	Condo Flex Space II	412	Condominium-Office Building
2506	Condo Flex Space III	417	Condominium-Office Building 2 Or More Stories
2510	Telecom/Data Center		
2600	Service Station	419	Condominium-Professional Building (Architectural Design)
2700	Vehicle Sale Showroom		
2710	Vehicle Service Building	420	Condominium-Medical Building
2720	Tire Dealer	421	Condominium-Restaurant
2730	Lube Facility	425	Condominium-Flexible Space
2740	Vehicle Repair	430	Condominium-Time Share
2900	Wholesale Outlet	439	Condominium-Hotel/Motel
3000	Florist/Greenhouse		
Industrial land uses			
4000	Vacant Industrial	4806	Condo Warehouse II
4100	Light Manufacturing	4810	Distribution Warehouse
4110	Class A Manufaturing	4820	Mini Warehouse
4200	Heavy Manufacturing	4830	Truck Terminal
4210	Class A Heavy Industry	4840	Sales Warehouses
4300	Lumber Yards	4900	Open Storage
4400	Packing Plants	8920	Utility, Gas, Electricity, Communications, Water & Sewer
4500	Bottlers		
4600	Food Processing	9100	Utility
4610	Food Processing Freezer	9110	Communication Tower Sites

Table A-1. Continued

DOR Code	Description	DOR Code	Description
Industrial land uses continued			
4700	Mineral Processing	9810	Railroad Termial/Station/Yard Centrally Assessed
4800	Warehousing		
4801	Condo-Warehouse Distribution I I	440	Condominium-Warehouse (Distribution)
4802	Condo-Warehouse Distribution II		
4805	Condo Warehouse I	448	Condominium-Warehouse
Institutional land uses			
2000	Airports, Commercial	8300	School
2010	Transit Terminals	8400	College
7000	Vacant Institutional	8500	Hospital
7100	Religious	8600	County (Other Than Public Schools, Colleges,Hospitals) Including Non-Municip Govt
7200	School - Private		
7300	Hospital - Private		
7301	Hospital - Private	8620	Utility, Gas, Electricity, Communications, Water & Sewer
7500	Charitable		
7700	Lodge/Union Hall	8700	State (Other Than Military,Forests, Pks,Rec Areas,Hosp,Colleges)
7900	Cultural		
8100	Military	8800	Federal
8286	County Owned	8900	Municipal (Other Than Parks, Rec Areas, Colleges, Hospitals)
8287	State Owned		
8288	Federal Owned	8910	Airport
8289	Municipal Owned		

Code and titles from Property (DOR) Use Codes. (2010). *Orange County Property Appraiser*. Retrieved June 24, 2013, from http://www.ocpafl.org/Searches/Lookups.aspx/Code/PropertyUse

Table A-2. Summary of all Phase 1 regression models.

Year	2007	2008	2009	2010	2011	2012	2013
Distance Coefficient Model, All Land Use Types							
Distance Coefficient	-0.476 *	-0.510 *	-0.350 *	-0.593 *	-1.040	1.233	1.332
t-statistic	-1.185	-1.320	-0.866	-1.481	-2.887	5.006	3.551
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
Quarter Mile Coefficient Model, All Land Use Types, Phase 1 Stations							
Quarter Mile Coefficient	191377.487	86280.812 *	282718.218	234877.401	278066.931	309619.435	324387.553
t-statistic	2.812	1.296	4.012	3.323	4.406	9.537	6.653
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.65
Half Mile Coefficient Model, All Land Use Types, Phase 1 Stations							
Half Mile Coefficient	61813.557 *	58054.510 *	118231.546	131475.457	173227.950	134471.763	126707.027
t-statistic	1.855	1.790	3.518	3.922	5.766	7.597	4.693
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
One Mile Coefficient Model, All Land Use Types, Phase 1 Stations							
One Mile Coefficient	81066.512	85245.762	86482.844	91061.656	110063.430	85747.671	109298.088
t-statistic	4.337	4.696	4.611	4.884	6.561	7.622	6.382
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
Two Mile Coefficient Model, All Land Use Types, Phase 1 Stations							
Two Mile Coefficient	103726.868	99292.233	89221.082	98101.270	115082.201	83245.927	109203.643
t-statistic	7.396	7.332	6.372	7.043	9.158	9.418	8.119
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
Distance Coefficient Model, Residential Land Use Types							
Distance Coefficient	0.972	1.149	0.964	0.971	1.100	1.221	1.240
t-statistic	16.609	20.411	16.816	18.902	23.534	26.847	25.774
Model Adjusted R-Square	0.780	0.825	0.837	0.840	0.838	0.824	0.833

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Quarter Mile Coefficient Model, Residential Land Use Types, Phase 1 Stations							
Quarter Mile Coefficient	-14965.537 *	10104.149 *	12466.640 *	140933.410	49177.547	99288.684	118442.240
t-statistic	-0.936	0.617	0.739	9.186	3.560	12.264	14.157
Model Adjusted R-Square	0.779	0.825	0.837	0.840	0.837	0.823	0.833
Half Mile Coefficient Model, Residential Land Use Types, Phase 1 Stations							
Half Mile Coefficient	26988.295	29916.427	23343.238	36347.907	30159.116	45193.416	45693.352
t-statistic	4.827	5.500	4.190	7.254	6.624	12.100	11.491
Model Adjusted R-Square	0.779	0.825	0.837	0.840	0.837	0.823	0.833
One Mile Coefficient Model, Residential Land Use Types, Phase 1 Stations							
One Mile Coefficient	63290.511	67761.635	68185.837	69218.937	68964.673	69184.011	74263.611
t-statistic	23.648	26.083	25.653	29.051	31.787	33.279	33.612
Model Adjusted R-Square	0.779	0.825	0.837	0.840	0.837	0.823	0.834
Two Mile Coefficient Model, Residential Land Use Types, Phase 1 Stations							
Two Mile Coefficient	93881.253	94726.892	100834.320	100790.093	97390.415	95643.041	94968.050
t-statistic	48.547	50.830	52.952	59.097	62.589	60.466	56.590
Model Adjusted R-Square	0.781	0.827	0.838	0.842	0.840	0.825	0.835
Distance Coefficient Model, Commercial Land Use Types							
Distance Coefficient	9.811	10.493	9.976	9.057	6.387 *	4.969	10.438
t-statistic	3.128	3.415	3.318	3.015	2.212	3.168	2.895
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
Quarter Mile Coefficient Model, Commercial Land Use Types, Phase 1 Stations							
Quarter Mile Coefficient	463411.961 *	681041.282	697147.976	590018.718	574745.635	296149.412	306406.789 *
t-statistic	2.538	3.645	3.773	3.154	3.192	3.256	1.600
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Half Mile Coefficient Model, Commercial Land Use Types, Phase 1 Stations							
Half Mile Coefficient	366408.305	487136.434	510926.158	478756.915	428012.962	248832.291	314222.188 *
t-statistic	2.866	3.738	3.968	3.695	3.435	3.775	2.254
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
One Mile Coefficient Model, Commercial Land Use Types, Phase 1 Stations							
One Mile Coefficient	259640.252 *	345642.695	349891.085	305798.746	263390.483 *	209880.866	288097.367 *
t-statistic	2.355	3.117	3.192	2.778	2.481	3.338	2.158
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
Two Mile Coefficient Model, Commercial Land Use Types, Phase 1 Stations							
Two Mile Coefficient	-12591.548 *	-27499.838 *	-38392.214 *	-12890.748 *	27525.428 *	67047.839 *	135665.027 *
t-statistic	-0.121	-0.267	-0.380	-0.127	0.280	1.124	1.073
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
Distance Coefficient Model, Institutional Land Use Types							
Distance Coefficient	-16.197 *	-21.665 *	-18.900 *	-16.868 *	-16.551 *	3.520 *	-16.754 *
t-statistic	-2.266	-2.365	-1.495	-1.415	-1.377	0.309	-0.911
Model Adjusted R-Square	0.909	0.911	0.877	0.887	0.881	0.748	0.763
Quarter Mile Coefficient Model, Institutional Land Use Types, Phase 1 Stations							
Quarter Mile Coefficient	-778217.785 *	-657720.145 *	1925516.915 *	1789043.328 *	1322105.574 *	3048256.997	2448170.109 *
t-statistic	-1.380	-1.104	1.859	1.833	1.351	3.329	1.731
Model Adjusted R-Square	0.909	0.911	0.877	0.887	0.881	0.748	0.764
Half Mile Coefficient Model, Institutional Land Use Types, Phase 1 Stations							
Half Mile Coefficient	-456033.466 *	-384133.357 *	1214531.476 *	1433421.875 *	1344442.377 *	1571856.506	851335.845 *
t-statistic	-1.330	-0.953	2.089	2.596	2.405	2.930	1.023
Model Adjusted R-Square	0.909	0.911	0.877	0.887	0.881	0.748	0.763

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
One Mile Coefficient Model, Institutional Land Use Types, Phase 1 Stations							
One Mile Coefficient	-128577.687 *	-86760.761 *	167590.043 *	230787.162 *	200244.629	273248.080 *	172929.438 *
t-statistic	-0.439	-0.253	0.352	0.515	0.439	0.627	0.249
Model Adjusted R-Square	0.909	0.911	0.876	0.887	0.881	0.748	0.763
Two Mile Coefficient Model, Institutional Land Use Types							
Two Mile Coefficient	-13451.715 *	-59747.417 *	-253480.540 *	-128963.261 *	-145289.338 *	-83960.788 *	-57265.750 *
t-statistic	-0.051	-0.183	-0.549	-0.296	-0.329	-0.200	-0.086
Model Adjusted R-Square	0.909	0.911	0.876	0.887	0.881	0.748	0.763
Distance Coefficient Model, Industrial Land Use Types							
Distance Coefficient	-6.094	-5.899	-5.072	-3.911	-3.806	-4.664	-3.964
t-statistic	-4.727	-4.316	-4.003	-3.425	-4.218	-5.643	-5.222
Model Adjusted R-Square	0.807	0.823	0.862	0.864	0.882	0.859	0.865
Quarter Mile Coefficient Model, Industrial Land Use Types, Phase 1 Stations							
Quarter Mile Coefficient	130401.218 *	228355.900 *	174963.434 *	150372.209 *	96790.284 *	-37929.261 *	-50594.987 *
t-statistic	1.256	1.974	1.613	1.498	1.227	-0.713	-1.025
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.864
Half Mile Coefficient Model, Industrial Land Use Types, Phase 1 Stations							
Half Mile Coefficient	51527.124 *	101181.197 *	83715.451 *	43025.887 *	15953.186 *	-62284.547 *	-79823.238 *
t-statistic	0.749	1.405	1.224	0.687	0.321	-1.529	-2.110
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.864
One Mile Coefficient Model, Industrial Land Use Types, Phase 1 Stations							
One Mile Coefficient	-57414.549 *	1788.096 *	8147.360 *	-26209.191 *	-15215.915 *	-80157.467 *	-79674.360 *
t-statistic	-1.168	0.034	0.167	-0.590	-0.433	-2.534	-2.728
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.865

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Two Mile Coefficient Model, Industrial Land Use Types, Phase 1 Stations							
Two Mile Coefficient	-116922.377 *	-73031.046 *	-96792.543 *	-121358.343	-93821.292	-123819.783	-135238.955
t-statistic	-2.606	-1.523	-2.172	-3.000	-2.937	-4.240	-5.021
Model Adjusted R-Square	0.807	0.822	0.862	0.864	0.882	0.859	0.865

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-3. Summary of all Phase 2 regression models.

Year	2007	2008	2009	2010	2011	2012	2013
Quarter Mile Coefficient Model, All Land Use Types, Phase 2 Stations							
Distance Coefficient	154776.572	66919.211 *	223905.916	181604.913	217338.924	275719.250	293160.173
t-statistic	2.471	1.094	3.470	2.810	3.758	8.860	6.265
Model Adjusted R-Square	0.707	0.634	0.642	0.646	0.679	0.611	0.650
Half Mile Coefficient Model, All Land Use Types, Phase 2 Stations							
Quarter Mile Coefficient	47911.872 *	47409.355 *	92602.325	101024.833	136203.365	116088.370	110506.297
t-statistic	1.552	1.578	2.976	3.257	4.892	6.856	4.281
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
One Mile Coefficient Model, All Land Use Types, Phase 2 Stations							
Half Mile Coefficient	71543.633	78095.564	71652.707	71180.761	87927.931	71278.078	97041.394
t-statistic	3.968	4.471	3.968	3.965	5.441	6.492	5.806
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
Two Mile Coefficient Model, All Land Use Types, Phase 2 Stations							
One Mile Coefficient	103810.845	101861.895	81424.784	81258.872	100294.523	69777.870	98171.402
t-statistic	7.112	7.234	5.577	5.599	7.659	7.658	7.080
Model Adjusted R-Square	0.606	0.634	0.642	0.646	0.679	0.611	0.650
Quarter Mile Coefficient Model, Residential Land Use Types, Phase 2 Stations							
Two Mile Coefficient	-43042.438	-32282.619 *	-36835.118	33446.430	-19794.214 *	68255.956	86764.948
t-statistic	-3.363	-2.519	-2.798	2.808	-1.834	9.173	11.229
Model Adjusted R-Square	0.779	0.825	0.837	0.840	0.837	0.823	0.833
Half Mile Coefficient Model, Residential Land Use Types, Phase 2 Stations							
Distance Coefficient	-724.382 *	3598.717 *	-6311.599 *	-1986.214 *	-5178.794 *	24997.048	26489.119
t-statistic	-0.147	0.751	-1.286	-0.450	-1.290	7.190	7.158
Model Adjusted R-Square	0.779	0.825	0.837	0.840	0.837	0.823	0.833

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-3. Continued

Year	2007	2008	2009	2010	2011	2012	2013
One Mile Coefficient Model, Residential Land Use Types, Phase 2 Stations							
Quarter Mile Coefficient	43290.259	47433.505	42878.053	37344.946	39310.902	50778.260	57010.918
t-statistic	16.940	19.176	16.945	16.456	19.011	25.205	26.636
Model Adjusted R-Square	0.780	0.825	0.837	0.840	0.838	0.824	0.833
Two Mile Coefficient Model, Residential Land Use Types, Phase 2 Stations							
Half Mile Coefficient	82067.582	84092.022	82559.529	71156.232	72537.055	79285.741	80052.467
t-statistic	40.465	43.053	41.360	39.755	44.416	48.381	46.097
Model Adjusted R-Square	0.781	0.826	0.838	0.841	0.838	0.825	0.834
Quarter Mile Coefficient Model, Commercial Land Use Types, Phase 2 Stations							
One Mile Coefficient	459096.907 *	670355.641	683785.124	579403.052	562412.996	293868.141	307638.442 *
t-statistic	2.531	3.617	3.734	3.126	3.152	3.243	1.612
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
Half Mile Coefficient Model, Commercial Land Use Types, Phase 2 Stations							
Two Mile Coefficient	367772.534	485188.364	508613.963	477746.173	423721.799	349499.560	319367.846 *
t-statistic	2.883	3.735	3.963	3.700	3.411	3.784	2.291
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
One Mile Coefficient Model, Commercial Land Use Types, Phase 2 Stations							
Distance Coefficient	264603.585 *	346973.076	350493.654	309673.235	262142.609 *	213850.057	301134.981 *
t-statistic	2.392	3.119	3.183	2.802	2.458	3.386	2.245
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642
Two Mile Coefficient Model, Commercial Land Use Types, Phase 2 Stations							
Quarter Mile Coefficient	-10204.356 *	-47130.331 *	-56727.723 *	-16713.162 *	-162.724 *	61869.193 *	139623.039 *
t-statistic	-0.097	-0.452	-0.551	-0.162	-0.002	1.270	1.092
Model Adjusted R-Square	0.749	0.785	0.810	0.813	0.756	0.754	0.642

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-3. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Quarter Mile Coefficient Model, Institutional Land Use Types, Phase 2 Stations							
Half Mile Coefficient	-772414.894 *	-657720.145 *	1925516.915 *	1789043.328 *	1322105.574 *	2969435.057	2365016.451 *
t-statistic	-1.375	-1.104	1.859	1.833	1.351	3.277	1.695
Model Adjusted R-Square	0.909	0.911	0.877	0.887	0.881	0.748	0.764
Half Mile Coefficient Model, Institutional Land Use Types, Phase 2 Stations							
One Mile Coefficient	-489043.057 *	-419086.971 *	1196224.131 *	1417342.092 *	1330942.837 *	1592065.798	806084.592
t-statistic	-1.433	-1.041	2.061	2.572	2.386	2.977	0.973
Model Adjusted R-Square	0.909	0.911	0.877	0.887	0.881	0.748	0.763
One Mile Coefficient Model, Institutional Land Use Types, Phase 2 Stations							
Two Mile Coefficient	-162326.834 *	-119522.146 *	124944.484 *	184711.731 *	157408.501 *	289973.182 *	127971.118 *
t-statistic	-0.554	-0.347	0.261	0.411	0.344	0.661	0.183
Model Adjusted R-Square	0.909	0.911	0.876	0.887	0.881	0.748	0.763
Two Mile Coefficient Model, Institutional Land Use Types							
Distance Coefficient	-31507.827 *	-95000.137 *	-389464.283 *	-263409.846 *	-277074.166 *	-71045.871 *	-128256.353 *
t-statistic	-0.115	-0.282	-0.816	-0.585	-0.606	-0.163	-0.184
Model Adjusted R-Square	0.909	0.911	0.876	0.887	0.881	0.748	0.764
Quarter Mile Coefficient Model, Industrial Land Use Types, Phase 2 Stations							
Quarter Mile Coefficient	130401.218 *	228355.900 *	174963.434 *	150372.209 *	96790.284 *	-37929.261 *	-50594.987 *
t-statistic	1.256	1.974	1.613	1.498	1.227	-0.713	-1.025
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.864
Half Mile Coefficient Model, Industrial Land Use Types, Phase 2 Stations							
Half Mile Coefficient	51527.124 *	101181.197 *	83715.451 *	43025.887 *	15953.186 *	-62284.547 *	-79823.238 *
t-statistic	0.749	1.405	1.224	0.687	0.321	-1.529	-2.110
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.864

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-3. Continued

Year	2007	2008	2009	2010	2011	2012	2013
One Mile Coefficient Model, Industrial Land Use Types, Phase 2 Stations							
One Mile Coefficient	-59831.621 *	499.862 *	30402.575 *	-4639.281 *	3805.057 *	-66533.841 *	-64971.795 *
t-statistic	-1.220	0.010	0.626	-0.105	0.109	-2.110	-2.232
Model Adjusted R-Square	0.806	0.822	0.862	0.864	0.881	0.858	0.865
Two Mile Coefficient Model, Industrial Land Use Types, Phase 2 Stations							
Two Mile Coefficient	-167644.265	-168061.431	-113373.559 *	-119603.447	-100639.571	-119828.736	-117585.839
t-statistic	-3.774	-3.440	-2.489	-2.893	-3.077	-4.031	-4.295
Model Adjusted R-Square	0.807	0.823	0.862	0.864	0.882	0.859	0.865

* indicates statistically insignificant coefficient at the 95% confidence level.

Table A-4. Orange County parcel mean just value, all land uses

Year	Mean Just Value	Number of Parcels	Standard Deviation
2007	$312,276.24	358820	3427201.68
2008	$344,949.40	366568	3484422.69
2009	$337,415.02	368904	3598650.11
2010	$282,537.13	370263	3547286.72
2011	$252,353.12	373732	3342377.08
2012	$225,453.13	439906	2443412.89
2013	$242,937.38	431679	3790686.22

Table A-5. Land use types as a percent of total parcels within a half mile of stations.

Year	2007	2008	2009	2010	2011	2012	2013
All land use types							
Total	358820	366568	368904	370263	373732	439906	431679
Half Mile	5178	5171	5125	5102	5188	8095	8081
Residential land uses							
Total	88.97%	88.92%	89.53%	89.67%	89.59%	86.55%	89.49%
Half Mile	62.69%	62.56%	63.06%	63.07%	62.70%	63.53%	63.32%
Commercial land uses							
Total	3.62%	3.90%	3.92%	3.88%	3.91%	8.03%	4.81%
Half Mile	20.26%	19.40%	19.98%	19.82%	19.83%	25.66%	24.16%
Institutional land uses							
Total	2.30%	1.68%	1.49%	1.51%	1.49%	1.21%	1.36%
Half Mile	8.59%	8.26%	6.48%	6.37%	6.32%	3.84%	4.57%
Industrial land uses							
Total	1.20%	1.26%	1.23%	1.24%	1.25%	1.10%	1.14%
Half Mile	3.75%	4.22%	4.12%	4.10%	4.05%	3.66%	3.61%
Other land uses							
Total	3.91%	4.24%	3.84%	3.70%	3.77%	3.11%	3.21%
Half Mile	4.71%	5.57%	6.36%	6.64%	7.09%	3.31%	4.34%

APPENDIX B
JURISDICTION-LEVEL PERMIT DATA

Table B-1. Summary of building permit data by jurisdiction.

Maitland Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Quarter Mile							
Number of Permits	62	50	65	43	68	44	56
% Residential	51.6%	56.0%	49.2%	53.5%	50.0%	45.5%	57.1%
% Other	48.4%	44.0%	50.8%	46.5%	50.0%	54.5%	42.9%
% of Total in Jurisdiction	3.5%	3.2%	4.5%	2.8%	4.3%	2.9%	3.5%
Total Value of Permits	$328,037	$517,087	$888,436	$996,878	$287,020	$247,832	$950,284
% Residential	54.5%	52.4%	47.0%	76.4%	64.9%	13.6%	56.2%
% Other	45.5%	47.6%	53.0%	23.6%	35.1%	86.4%	43.8%
% of Total in Jurisdiction	0.6%	0.7%	3.7%	3.2%	1.3%	1.3%	3.8%
Half Mile							
Number of Permits	105	102	127	113	158	130	151
% Residential	48.6%	58.8%	53.5%	49.6%	51.3%	53.8%	62.9%
% Other	51.4%	41.2%	46.5%	50.4%	48.7%	46.2%	37.1%
% of Total in Jurisdiction	5.9%	6.6%	8.8%	7.4%	10.0%	8.7%	9.4%
Total Value of Permits	$972,430	$903,951	$1,421,768	$2,524,051	$1,653,279	$1,092,892	$1,962,674
% Residential	36.5%	53.6%	50.3%	37.4%	59.4%	22.9%	55.0%
% Other	63.5%	46.4%	49.7%	62.6%	40.6%	77.1%	45.0%
% of Total in Jurisdiction	1.6%	1.3%	5.9%	8.2%	7.7%	5.6%	7.9%
One Mile							
Number of Permits	468	560	528	522	650	675	763
% Residential	51.9%	58.4%	50.2%	58.6%	52.2%	54.1%	56.2%
% Other	48.1%	41.6%	49.8%	41.4%	47.8%	45.9%	43.8%
% of Total in Jurisdiction	26.2%	36.2%	36.7%	34.1%	41.2%	45.1%	47.5%
Total Value of Permits	$19,334,082	$13,832,411	$7,881,384	$9,184,329	$7,014,849	$9,398,038	$12,322,852
% Residential	76.2%	59.5%	33.3%	42.0%	48.2%	33.4%	44.3%
% Other	23.8%	40.5%	66.7%	58.0%	51.8%	66.6%	55.7%
% of Total in Jurisdiction	32.6%	19.8%	32.8%	29.8%	32.6%	48.3%	49.6%

Table B-1. Continued

Maitland Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Two Mile							
Number of Permits	1125	1173	1080	1158	1304	1391	1381
% Residential	50.8%	57.3%	52.6%	56.3%	51.0%	53.3%	56.1%
% Other	49.2%	42.7%	47.4%	43.7%	49.0%	46.7%	43.9%
% of Total in Jurisdiction	63.1%	75.9%	75.2%	75.7%	82.6%	93.0%	85.9%
Total Value of Permits	$41,069,505	$43,051,925	$16,189,558	$24,953,673	$18,697,809	$17,882,973	$22,622,765
% Residential	68.5%	72.3%	32.1%	45.7%	38.5%	39.3%	48.6%
% Other	31.5%	27.7%	67.9%	54.3%	61.5%	60.7%	51.4%
% of Total in Jurisdiction	69.3%	61.5%	67.4%	80.9%	86.8%	91.8%	91.1%
Total in Jurisdiction							
Number of Permits	1783	1546	1437	1530	1578	1496	1608
% Residential	50.8%	57.6%	52.5%	55.2%	50.8%	53.7%	56.8%
% Other	49.2%	42.4%	47.5%	44.8%	49.2%	46.3%	43.2%
% of Total in Jurisdiction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Value of Permits	$59,224,700	$69,993,812	$24,006,617	$30,857,213	$21,544,320	$19,471,988	$24,841,515
% Residential	71.1%	48.2%	29.8%	42.0%	38.3%	42.8%	49.8%
% Other	28.9%	51.8%	70.2%	58.0%	61.7%	57.2%	50.2%
% of Total in Jurisdiction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Winter Park Permits							
Quarter Mile							
Number of Permits	357	235	342	283	194	258	209
% Residential	80.1%	75.3%	75.4%	76.0%	66.0%	66.7%	141.1%
% Other	19.9%	24.7%	24.6%	24.0%	34.0%	33.3%	-41.1%
% of Total in Jurisdiction	5.8%	4.7%	8.0%	6.4%	4.2%	5.6%	3.8%
Total Value of Permits	$4,981,551	$5,021,486	$4,548,399	$5,067,468	$10,006,686	$14,882,889	$49,362,365
% Residential	92.9%	44.5%	67.7%	69.3%	62.1%	73.8%	41.9%
% Other	7.1%	55.5%	32.3%	30.7%	37.9%	26.2%	58.1%
% of Total in Jurisdiction	4.0%	5.6%	6.5%	2.5%	5.3%	5.8%	11.3%

Table B-1. Continued

Winter Park Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Half Mile							
Number of Permits	803	549	662	630	576	711	902
% Residential	79.3%	72.7%	75.4%	74.8%	68.8%	68.5%	72.4%
% Other	20.7%	27.3%	24.6%	25.2%	31.3%	31.5%	27.6%
% of Total in Jurisdiction	13.0%	11.0%	15.6%	14.3%	12.6%	15.4%	16.2%
Total Value of Permits	$16,728,214	$8,232,511	$9,449,177	$9,390,259	$22,370,385	$55,159,761	$89,847,973
% Residential	74.6%	59.2%	67.0%	73.1%	73.9%	80.8%	52.2%
% Other	25.4%	40.8%	33.0%	26.9%	26.1%	19.2%	47.8%
% of Total in Jurisdiction	13.3%	9.3%	13.4%	4.7%	11.9%	21.7%	20.5%
One Mile							
Number of Permits	2621	1628	1680	1756	1887	2032	2643
% Residential	78.6%	70.7%	73.7%	72.1%	69.1%	69.3%	74.0%
% Other	21.4%	29.3%	26.3%	27.9%	30.9%	30.7%	26.0%
% of Total in Jurisdiction	42.3%	32.7%	39.5%	39.7%	41.2%	44.0%	47.5%
Total Value of Permits	$51,618,000	$25,665,778	$25,075,465	$36,022,099	$72,006,221	$118,647,099	$211,527,040
% Residential	72.0%	72.3%	73.6%	70.9%	80.1%	72.4%	65.3%
% Other	28.0%	27.7%	26.4%	29.1%	19.9%	27.6%	34.7%
% of Total in Jurisdiction	41.1%	28.8%	35.7%	18.0%	38.4%	46.6%	48.3%
Two Mile							
Number of Permits	6011	4538	4021	4069	4220	4394	5336
% Residential	78.7%	70.2%	73.7%	71.2%	68.7%	68.9%	74.3%
% Other	21.3%	29.8%	26.3%	28.8%	31.3%	31.1%	25.7%
% of Total in Jurisdiction	97.0%	91.2%	94.5%	92.1%	92.2%	95.1%	95.9%
Total Value of Permits	$115,975,873	$78,987,590	$68,588,297	$184,530,952	$157,727,606	$248,127,499	$426,980,736
% Residential	76.6%	66.9%	67.2%	29.7%	83.7%	68.2%	67.7%
% Other	23.4%	33.1%	32.8%	70.3%	16.3%	31.8%	32.3%
% of Total in Jurisdiction	92.3%	88.8%	97.6%	92.1%	84.2%	97.5%	97.6%

Table B-1. Continued

Winter Park Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Total in Jurisdiction							
Number of Permits	6199	4974	4257	4419	4577	4618	5563
% Residential	78.6%	70.1%	73.9%	71.0%	68.6%	68.9%	74.1%
% Other	21.4%	29.9%	26.1%	29.0%	31.4%	31.1%	25.9%
% of Total in Jurisdiction	1	1	1	1	1	1	1
Total Value of Permits	$125,683,664	$88,999,266	$70,293,614	$200,460,213	$187,336,672	$254,529,130	$437,615,748
% Residential	72.9%	67.6%	66.6%	28.6%	84.7%	68.3%	67.5%
% Other	27.1%	32.4%	33.4%	71.4%	15.3%	31.7%	32.5%
% of Total in Jurisdiction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Orlando Permits							
Quarter Mile							
Number of Permits	85	38	29	23	21	24	23
% Residential	0.0%	2.6%	0.0%	0.0%	0.0%	4.2%	4.3%
% Other	100.0%	97.4%	100.0%	100.0%	100.0%	95.8%	95.7%
% of Total in Jurisdiction	5.4%	3.8%	5.9%	4.8%	4.6%	3.5%	2.9%
Total Value of Permits	$11,792,564	$160,099,068	$44,919,195	$14,352,100	$29,458,473	$40,331,177	$35,501,459
% Residential	0.0%	1.8%	0.0%	0.0%	0.0%	2.5%	0.0%
% Other	100.0%	98.2%	100.0%	100.0%	100.0%	97.5%	100.0%
% of Total in Jurisdiction	2.1%	23.0%	14.7%	7.8%	13.2%	11.7%	11.0%
Half Mile							
Number of Permits	126	119	51	47	34	41	50
% Residential	3.2%	12.6%	7.8%	10.6%	5.9%	4.9%	12.0%
% Other	96.8%	87.4%	92.2%	89.4%	94.1%	95.1%	88.0%
% of Total in Jurisdiction	8.0%	12.0%	10.4%	9.9%	7.5%	6.0%	6.3%
Total Value of Permits	$25,084,939	$205,261,718	$50,515,973	$44,059,882	$37,940,520	$49,496,978	$75,258,615
% Residential	2.0%	10.2%	0.9%	1.7%	1.7%	2.1%	35.4%
% Other	98.0%	89.8%	99.1%	98.3%	98.3%	97.9%	64.6%
% of Total in Jurisdiction	4.4%	29.5%	16.6%	24.0%	17.0%	14.4%	23.4%

Table B-1. Continued

Orlando Permits							
Year	2007	2008	2009	2010	2011	2012	2013
One Mile							
Number of Permits	219	251	131	87	63	67	99
% Residential	32.4%	26.7%	36.6%	20.7%	19.0%	17.9%	28.3%
% Other	67.6%	73.3%	63.4%	79.3%	81.0%	82.1%	71.7%
% of Total in Jurisdiction	13.9%	25.4%	26.7%	18.3%	13.9%	9.8%	12.6%
Total Value of Permits	$52,236,514	$329,104,953	$69,374,106	$53,129,573	$107,424,042	$53,406,701	$91,344,363
% Residential	36.2%	10.5%	23.6%	9.2%	3.3%	7.0%	38.4%
% Other	63.8%	89.5%	76.4%	90.8%	96.7%	93.0%	61.6%
% of Total in Jurisdiction	9.2%	47.3%	22.7%	28.9%	48.0%	15.5%	28.4%
Two Mile							
Number of Permits	317	343	166	125	109	104	175
% Residential	36.0%	33.2%	38.0%	24.0%	27.5%	25.0%	25.7%
% Other	64.0%	66.8%	62.0%	76.0%	72.5%	75.0%	74.3%
% of Total in Jurisdiction	20.2%	34.7%	33.8%	26.3%	24.0%	15.1%	22.2%
Total Value of Permits	$84,590,196	$369,445,479	$83,195,840	$60,953,087	$120,470,059	$62,252,421	$108,344,550
% Residential	46.2%	13.5%	26.3%	14.6%	7.1%	12.3%	36.9%
% Other	53.8%	86.5%	73.7%	85.4%	92.9%	87.7%	63.1%
% of Total in Jurisdiction	15.0%	53.1%	27.3%	33.2%	53.9%	18.1%	33.7%
Total in Jurisdiction							
Number of Permits	1571	989	491	475	454	687	788
% Residential	56.1%	45.0%	44.8%	45.9%	54.4%	64.3%	54.2%
% Other	43.9%	55.0%	55.2%	54.1%	45.6%	35.7%	45.8%
% of Total in Jurisdiction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Value of Permits	$565,512,909	$695,946,159	$305,086,964	$183,579,657	$223,703,017	$343,864,785	$321,839,508
% Residential	55.4%	31.2%	30.6%	30.6%	39.6%	47.2%	52.6%
% Other	44.6%	68.8%	69.4%	69.4%	60.4%	52.8%	47.4%
% of Total in Jurisdiction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table B-1. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Orange County Permits							
Quarter Mile							
Number of Permits				0	6	0	1
% Residential				0.0%	100.0%	0.0%	100.0%
% Other				0.0%	0.0%	0.0%	0.0%
% of Total in Jurisdiction				0.0%	0.2%	0.0%	0.0%
Half Mile							
Number of Permits				0	40	0	3
% Residential				0.0%	60.0%	0.0%	100.0%
% Other				0.0%	40.0%	0.0%	0.0%
% of Total in Jurisdiction				0.0%	1.1%	0.0%	0.1%
One Mile							
Number of Permits				35	117	2	69
% Residential				37.1%	54.7%	100.0%	98.6%
% Other				62.9%	45.3%	0.0%	1.4%
% of Total in Jurisdiction				1.0%	3.1%	0.0%	2.8%
Two Mile							
Number of Permits				285	542	67	232
% Residential				65.3%	76.8%	79.1%	77.2%
% Other				34.7%	23.2%	20.9%	22.8%
% of Total in Jurisdiction				8.2%	14.3%	1.7%	9.3%
Total in Jurisdiction							
Number of Permits				3464	3800	4059	2506
% Residential				74.6%	70.4%	76.5%	76.4%
% Other				25.4%	29.6%	23.5%	23.6%
% of Total in Jurisdiction				100.0%	100.0%	100.0%	100.0%

APPENDIX C
STATION-LEVEL DATA

Table C-1. Total SunRail boardings by station for the week of May 19, 2014.

Station	Boardings
Maitland	892
Winter Park	3707
Florida Hospital Health Village	937
Lynx Central	1406
Church Street	2638
Orlando Health/Amtrak	666
Sand Lake Road	2035
Meadow Woods	NA

Fluker, A. (2014, May 28). See which SunRail stations drew the biggest numbers in Week 1 - Orlando Business Journal. *Orlando Business Journal*. Retrieved June 8, 2014, from http://www.bizjournals.com/orlando/blog/2014/05/see-which-sunrail-stations-drew-the-biggest.html?ana=twt

Table C-2. Summary of building permit data by station.

Maitland Station Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Quarter Mile							
Number of Permits	64	59	65	45	69	48	59
% Residential	53.1%	62.7%	49.2%	55.6%	50.7%	50.0%	59.3%
% Other	46.9%	37.3%	50.8%	44.4%	49.3%	50.0%	40.7%
% of Total	1%	1%	1%	0%	1%	0%	1%
Total Value of Permits	$328,037	$767,582	$888,436	$996,878	$287,020	$310,832	$962,284
% Residential	54.5%	67.9%	47.0%	76.4%	64.9%	31.1%	56.7%
% Other	45.5%	32.1%	53.0%	23.6%	35.1%	68.9%	43.3%
% of Total	0.0%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%
Half Mile							
Number of Permits	107	111	127	115	159	134	154
% Residential	49.5%	62.2%	53.5%	50.4%	51.6%	55.2%	63.6%
% Other	50.5%	37.8%	46.5%	49.6%	48.4%	44.8%	36.4%
% of Total	1%	1%	2%	1%	2%	1%	1%
Total Value of Permits	$972,430	$1,154,446	$1,421,768	$2,524,051	$1,653,279	$1,155,892	$1,974,674
% Residential	36.5%	72.3%	50.3%	37.4%	59.4%	27.1%	55.3%
% Other	63.5%	27.7%	49.7%	62.6%	40.6%	72.9%	44.7%
% of Total	0.1%	0.1%	0.4%	0.6%	0.4%	0.2%	0.3%
One Mile							
Number of Permits	462	583	529	520	648	681	765
% Residential	52.2%	59.0%	50.3%	58.8%	52.2%	54.5%	56.3%
% Other	47.8%	41.0%	49.7%	41.2%	47.8%	45.5%	43.7%
% of Total	4.8%	7.8%	8.6%	5.3%	6.2%	6.3%	7.3%
Total Value of Permits	$19,325,449	$14,337,534	$7,887,384	$9,149,329	$7,005,819	$9,474,855	$12,324,067
% Residential	76.2%	60.8%	33.4%	41.7%	48.2%	33.9%	44.3%
% Other	23.8%	39.2%	66.6%	58.3%	51.8%	66.1%	55.7%
% of Total	2.6%	1.7%	2.0%	2.2%	1.6%	1.5%	1.6%

Table C-2. Continued

Maitland Station Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Two Mile							
Number of Permits	2070	1949	1687	1875	1965	2016	2155
% Residential	62.9%	62.1%	60.2%	61.0%	57.6%	58.3%	62.6%
% Other	37.1%	37.9%	39.8%	39.0%	42.4%	41.7%	37.4%
% of Total	21.7%	26.0%	27.3%	19.0%	18.9%	18.6%	20.6%
Total Value of Permits	$61,447,419	$55,781,679	$22,874,429	$137,150,840	$47,822,120	$78,937,078	$114,921,226
% Residential	73.7%	75.1%	47.1%	14.3%	69.7%	38.1%	56.6%
% Other	26.3%	24.9%	52.9%	85.7%	30.3%	61.9%	43.4%
% of Total	8.2%	6.5%	5.7%	33.1%	11.1%	12.8%	14.7%
Winter Park Station Permits							
Quarter Mile							
Number of Permits	355	226	342	281	193	254	406
% Residential	80.0%	74.3%	75.4%	75.8%	65.8%	66.1%	71.9%
% Other	20.0%	25.7%	24.6%	24.2%	34.2%	33.9%	28.1%
% of Total	3.7%	3.0%	5.5%	2.8%	1.9%	2.3%	3.9%
Total Value of Permits	$4,981,551	$4,770,991	$4,548,399	$5,067,468	$10,006,686	$14,819,889	$49,350,365
% Residential	92.9%	41.6%	67.7%	69.3%	62.1%	73.7%	41.8%
% Other	7.1%	58.4%	32.3%	30.7%	37.9%	26.3%	58.2%
% of Total	0.7%	0.6%	1.1%	1.2%	2.3%	2.4%	6.3%
Half Mile							
Number of Permits	779	512	655	621	563	692	885
% Residential	79.6%	72.5%	75.6%	74.6%	68.2%	68.1%	72.2%
% Other	20.4%	27.5%	24.4%	25.4%	31.8%	31.9%	27.8%
% of Total	8.2%	6.8%	10.6%	6.3%	5.4%	6.4%	8.5%
Total Value of Permits	$16,687,367	$7,195,594	$9,389,854	$8,786,459	$21,486,364	$55,012,656	$88,911,978
% Residential	74.6%	54.0%	66.8%	71.2%	72.8%	80.7%	51.8%
% Other	25.4%	46.0%	33.2%	28.8%	27.2%	19.3%	48.2%
% of Total	2.2%	0.8%	2.4%	2.1%	5.0%	8.9%	11.3%

Table C-2. Continued

Winter Park Station Permits							
Year	2007	2008	2009	2010	2011	2012	2013
One Mile							
Number of Permits	2241	1418	1492	1543	1598	1787	2398
% Residential	78.8%	70.7%	74.1%	71.5%	69.0%	69.1%	73.9%
% Other	21.2%	29.3%	25.9%	28.5%	31.0%	30.9%	26.1%
% of Total	23.5%	18.9%	24.1%	15.6%	15.4%	16.5%	22.9%
Total Value of Permits	$42,649,616	$22,390,741	$23,708,935	$31,005,852	$61,648,160	$110,916,227	$178,572,363
% Residential	75.8%	69.1%	75.5%	70.2%	80.5%	72.0%	60.9%
% Other	24.2%	30.9%	24.5%	29.8%	19.5%	28.0%	39.1%
% of Total	5.7%	2.6%	5.9%	7.5%	14.3%	18.0%	22.8%
Two Mile							
Number of Permits	6148	4725	4176	4285	4590	4776	5644
% Residential	77.3%	69.5%	72.1%	70.4%	67.5%	67.6%	73.3%
% Other	22.7%	30.5%	27.9%	29.6%	32.5%	32.4%	26.7%
% of Total	64.4%	62.9%	67.5%	43.3%	44.1%	44.0%	53.9%
Total Value of Permits	$127,366,585	$98,579,069	$71,167,783	$188,610,971	$161,567,066	$247,695,752	$432,090,146
% Residential	77.3%	63.8%	65.8%	30.1%	82.8%	68.0%	67.6%
% Other	22.7%	36.2%	34.2%	69.9%	17.2%	32.0%	32.4%
% of Total	17.0%	11.5%	17.8%	45.5%	37.3%	40.1%	55.1%
Florida Hospital Health Village Station Permits							
Quarter Mile							
Number of Permits	2	11	5	5	6	5	7
% Residential	0.0%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%
% Other	100.0%	90.9%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Total	0.0%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
Total Value of Permits	$41,350	$140,011,614	$25,722,728	$12,971,000	$3,387,300	$18,538,297	$6,365,000
% Residential	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Other	100.0%	98.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Total	0.0%	16.4%	6.4%	3.1%	0.8%	3.0%	0.8%

Table C-2. Continued

Florida Hospital Health Village Station Permits							
Year	2007	2008	2009	2010	2011	2012	2013
Half Mile							
Number of Permits	32	55	17	19	21	22	22
% Residential	59.4%	58.2%	41.2%	57.9%	57.1%	59.1%	50.0%
% Other	40.6%	41.8%	58.8%	42.1%	42.9%	40.9%	50.0%
% of Total	0.3%	0.7%	0.3%	0.2%	0.2%	0.2%	0.2%
Total Value of Permits	$1,405,411	$147,083,419	$26,693,879	$14,494,837	$4,868,241	$26,535,298	$7,293,995
% Residential	37.8%	3.9%	1.8%	9.3%	27.5%	0.5%	11.1%
% Other	62.2%	96.1%	98.2%	90.7%	72.5%	99.5%	88.9%
% of Total	0.2%	17.2%	6.7%	3.5%	1.1%	4.3%	0.9%
One Mile							
Number of Permits	428	240	203	241	304	255	269
% Residential	76.4%	67.9%	68.0%	72.2%	66.8%	67.8%	70.3%
% Other	23.6%	32.1%	32.0%	27.8%	33.2%	32.2%	29.7%
% of Total	4.5%	3.2%	3.3%	2.4%	2.9%	2.3%	2.6%
Total Value of Permits	$21,641,048	$155,941,455	$29,352,186	$21,270,271	$15,104,811	$35,913,154	$45,474,959
% Residential	60.1%	8.7%	6.6%	31.6%	56.3%	20.5%	72.2%
% Other	39.9%	91.3%	93.4%	68.4%	43.7%	79.5%	27.8%
% of Total	2.9%	18.2%	7.3%	5.1%	3.5%	5.8%	5.8%
Two Mile							
Number of Permits	2293	1591	1535	1515	1659	1748	2323
% Residential	76.8%	72.0%	74.2%	71.9%	67.6%	68.4%	72.9%
% Other	23.2%	28.0%	25.8%	28.1%	32.4%	31.6%	27.1%
% of Total	24.0%	21.2%	24.8%	15.3%	15.9%	16.1%	22.2%
Total Value of Permits	$73,934,273	$212,103,836	$54,967,238	$46,623,316	$66,238,265	$109,949,289	$257,274,765
% Residential	69.1%	16.3%	33.1%	51.0%	72.6%	55.0%	63.0%
% Other	30.9%	83.7%	66.9%	49.0%	27.4%	45.0%	37.0%
% of Total	9.9%	24.8%	13.8%	11.2%	15.3%	17.8%	32.8%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Lynx Central Station Permits							
Quarter Mile							
Number of Permits	2	1	2	1	0	0	2
% Residential	0.0%	0.0%	0.0%	0.0%	NA	NA	0.0%
% Other	100.0%	100.0%	100.0%	100.0%	NA	NA	100.0%
% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Value of Permits	$162,325	$700,000	$700,000	$350,000	$0	$0	$273,000
% Residential	0.0%	0.0%	0.0%	0.0%	NA	NA	0.0%
% Other	100.0%	100.0%	100.0%	100.0%	NA	NA	100.0%
% of Total	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
Half Mile							
Number of Permits	26	58	13	12	7	13	19
% Residential	0.0%	1.7%	7.7%	0.0%	14.3%	0.0%	26.3%
% Other	100.0%	98.3%	92.3%	100.0%	85.7%	100.0%	73.7%
% of Total	0.3%	0.8%	0.2%	0.1%	0.1%	0.1%	0.2%
Total Value of Permits	$6,186,378	$20,486,561	$17,772,407	$1,027,795	$7,801,727	$1,316,680	$38,126,856
% Residential	0.0%	0.0%	0.1%	0.0%	2.2%	0.0%	69.9%
% Other	100.0%	100.0%	99.9%	100.0%	97.8%	100.0%	30.1%
% of Total	0.8%	2.4%	4.4%	0.2%	1.8%	0.2%	4.9%
One Mile							
Number of Permits	130	157	50	43	42	38	55
% Residential	8.5%	11.5%	8.0%	4.7%	9.5%	10.5%	21.8%
% Other	91.5%	88.5%	92.0%	95.3%	90.5%	89.5%	78.2%
% of Total	1.4%	2.1%	0.8%	0.4%	0.4%	0.3%	0.5%
Total Value of Permits	$25,649,936	$125,283,845	$23,850,729	$8,908,611	$99,956,244	$23,183,334	$60,136,045
% Residential	13.3%	15.6%	4.5%	5.5%	0.7%	7.7%	47.7%
% Other	86.7%	84.4%	95.5%	94.5%	99.3%	92.3%	52.3%
% of Total	3.4%	14.7%	6.0%	2.1%	23.1%	3.8%	7.7%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Lynx Central Station Permits							
Two Mile							
Number of Permits	241	243	133	91	98	91	123
% Residential	33.2%	27.6%	44.4%	28.6%	26.5%	100.0%	28.5%
% Other	66.8%	72.4%	55.6%	71.4%	73.5%	0.0%	71.5%
% of Total	2.5%	3.2%	2.2%	0.9%	0.9%	0.8%	1.2%
Total Value of Permits	$64,116,293	$289,518,438	$78,103,099	$50,711,750	$112,510,164	$58,316,541	$97,434,343
% Residential	44.6%	11.9%	26.8%	10.9%	6.4%	12.1%	37.1%
% Other	55.4%	88.1%	73.2%	89.1%	93.6%	87.9%	62.9%
% of Total	8.5%	33.9%	19.6%	12.2%	26.0%	9.4%	12.4%
Church Street Station Permits							
Quarter Mile							
Number of Permits	78	25	21	17	14	17	13
% Residential	0.0%	0.0%	0.0%	0.0%	0.0%	5.9%	7.7%
% Other	100.0%	100.0%	100.0%	100.0%	100.0%	94.1%	92.3%
% of Total	0.8%	0.3%	0.3%	0.2%	0.1%	0.2%	0.1%
Total Value of Permits	$11,487,889	$11,387,454	$18,067,467	$1,031,100	$26,068,723	$20,899,542	$14,231,590
% Residential	0.0%	0.0%	0.0%	0.0%	0.0%	4.8%	0.0%
% Other	100.0%	100.0%	100.0%	100.0%	100.0%	95.2%	100.0%
% of Total	1.5%	1.3%	4.5%	0.2%	6.0%	3.4%	1.8%
Half Mile							
Number of Permits	88	69	31	29	24	27	26
% Residential	0.0%	1.4%	0.0%	0.0%	0.0%	3.7%	3.8%
% Other	100.0%	98.6%	100.0%	100.0%	100.0%	96.3%	96.2%
% of Total	0.9%	0.9%	0.5%	0.3%	0.2%	0.2%	0.2%
Total Value of Permits	$17,980,306	$34,568,860	$21,575,317	$7,752,345	$33,178,850	$21,925,532	$16,078,790
% Residential	0.0%	46.3%	0.0%	0.0%	0.0%	4.6%	0.0%
% Other	100.0%	53.7%	100.0%	100.0%	100.0%	95.4%	100.0%
% of Total	2.4%	4.0%	5.4%	1.9%	7.7%	3.5%	2.1%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Church Street Station Permits							
One Mile							
Number of Permits	126	149	80	46	42	39	42
% Residential	9.5%	12.8%	47.5%	8.7%	9.5%	5.1%	16.7%
% Other	90.5%	87.2%	52.5%	91.3%	90.5%	94.9%	83.3%
% of Total	1.3%	2.0%	1.3%	0.5%	0.4%	0.4%	0.4%
Total Value of Permits	$24,292,629	$113,187,741	$37,546,084	$31,035,828	$99,509,505	$23,142,984	$34,601,589
% Residential	11.3%	16.6%	36.5%	1.7%	0.4%	4.6%	4.7%
% Other	88.7%	83.4%	63.5%	98.3%	99.6%	95.4%	95.3%
% of Total	3.2%	13.2%	9.4%	7.5%	23.0%	3.7%	4.4%
Two Mile							
Number of Permits	221	260	141	133	88	89	119
% Residential	33.0%	27.3%	36.9%	45.9%	26.1%	29.2%	25.2%
% Other	67.0%	72.7%	63.1%	54.1%	73.9%	70.8%	74.8%
% of Total	2.3%	3.5%	2.3%	1.3%	0.8%	0.8%	1.1%
Total Value of Permits	$49,773,754	$201,757,626	$53,634,070	$41,242,265	$107,869,228	$31,049,021	$90,402,419
% Residential	41.2%	16.6%	36.0%	9.3%	5.6%	19.1%	37.6%
% Other	58.8%	83.4%	64.0%	90.7%	94.4%	80.9%	62.4%
% of Total	6.6%	23.6%	13.4%	9.9%	24.9%	5.0%	11.5%
Orlando Health/Amtrak Station Permits							
Quarter Mile							
Number of Permits	3	1	1	0	1	2	1
% Residential	0.0%	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.0%
% Other	100.0%	100.0%	100.0%	#DIV/0!	100.0%	100.0%	100.0%
% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Value of Permits	$10,100	$8,000,000	$429,000	$0	$2,450	$893,338	$14,631,869
% Residential	0.0%	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.0%
% Other	100.0%	100.0%	100.0%	#DIV/0!	100.0%	100.0%	100.0%
% of Total	0.0%	0.9%	0.1%	0.0%	0.0%	0.1%	1.9%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Orlando Health/Amtrak Station Permits							
Half Mile							
Number of Permits	9	3	5	3	1	4	4
% Residential	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Other	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Total	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Total Value of Permits	$3,111,108	$8,373,375	$1,804,000	$22,050,500	$2,450	$944,253	$15,292,169
% Residential	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Other	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Total	0.4%	1.0%	0.5%	5.3%	0.0%	0.2%	1.9%
One Mile							
Number of Permits	126	66	87	55	28	27	33
% Residential	23.8%	24.2%	43.7%	30.9%	21.4%	11.1%	27.3%
% Other	76.2%	75.8%	56.3%	69.1%	78.6%	88.9%	72.7%
% of Total	1.3%	0.9%	1.4%	0.6%	0.3%	0.2%	0.3%
Total Value of Permits	$28,205,436	$61,512,452	$21,511,731	$34,923,038	$28,719,701	$22,668,921	$33,743,411
% Residential	26.2%	5.2%	64.6%	4.1%	8.1%	7.0%	8.3%
% Other	73.8%	94.8%	35.4%	95.9%	91.9%	93.0%	91.7%
% of Total	3.8%	7.2%	5.4%	8.4%	6.6%	3.7%	4.3%
Two Mile							
Number of Permits	215	235	123	229	66	81	106
% Residential	27.9%	23.4%	35.8%	48.0%	19.7%	18.5%	23.6%
% Other	72.1%	76.6%	64.2%	52.0%	80.3%	81.5%	76.4%
% of Total	2.3%	3.1%	2.0%	2.3%	0.6%	0.7%	1.0%
Total Value of Permits	$45,259,337	$181,875,205	$46,602,491	$39,839,280	$104,538,003	$26,936,479	$85,876,348
% Residential	36.3%	15.2%	33.1%	7.2%	3.4%	9.2%	37.4%
% Other	63.7%	84.8%	66.9%	92.8%	96.6%	90.8%	62.6%
% of Total	6.0%	21.3%	11.7%	9.6%	24.2%	4.4%	10.9%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Sand Lake Road Station Permits							
Quarter Mile							
Number of Permits				0	0	0	0
% Residential				NA	NA	NA	NA
% Other				NA	NA	NA	NA
% of Total				0.0%	0.0%	0.0%	0.0%
Half Mile							
Number of Permits				0	11	0	0
% Residential				NA	0.0%	NA	NA
% Other				NA	100.0%	NA	NA
% of Total				0.0%	0.1%	0.0%	0.0%
One Mile							
Number of Permits				0	36	2	3
% Residential				NA	5.6%	100.0%	66.7%
% Other				NA	94.4%	0.0%	33.3%
% of Total				0.0%	0.3%	0.0%	0.0%
Two Mile							
Number of Permits				22	127	16	28
% Residential				72.7%	33.9%	87.5%	71.4%
% Other				27.3%	66.1%	12.5%	28.6%
% of Total				0.2%	1.2%	0.1%	0.3%
Meadow Woods Station Permits							
Quarter Mile							
Number of Permits				0	6	0	1
% Residential				NA	100.0%	NA	100.0%
% Other				NA	0.0%	NA	0.0%
% of Total				0.0%	0.1%	0.0%	0.0%

Table C-2. Continued

Year	2007	2008	2009	2010	2011	2012	2013
Meadow Woods Station Permits							
Half Mile							
Number of Permits				0	27	0	3
% Residential				NA	88.9%	NA	100.0%
% Other				NA	11.1%	NA	0.0%
% of Total				0.0%	0.3%	0.0%	0.0%
One Mile							
Number of Permits				15	78	0	66
% Residential				0.0%	78.2%	NA	100.0%
% Other				100.0%	21.8%	NA	0.0%
% of Total				0.2%	0.7%	0.0%	0.6%
Two Mile							
Number of Permits				29	385	30	205
% Residential				0.0%	88.8%	100.0%	77.6%
% Other				100.0%	11.2%	0.0%	22.4%
% of Total				0.3%	3.7%	0.3%	2.0%
All Permit Data							
Number of Permits	9553	7509	6185	9888	10409	10860	10465
% Residential	69.7%	64.2%	66.6%	68.6%	65.9%	69.4%	70.5%
% Other	30.3%	35.8%	33.4%	31.4%	34.1%	30.6%	29.5%
% of Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Value of Permits	$750,421,273	$854,939,237	$399,387,195	$414,897,083	$432,584,009	$617,865,903	$784,296,771
% Residential	59.6%	36.3%	36.9%	30.5%	59.0%	55.8%	60.8%
% Other	40.4%	63.7%	63.1%	69.5%	41.0%	44.2%	39.2%
% of Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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BIOGRAPHICAL SKETCH

Benjamin Lytle was born in Melbourne, FL in 1988. He graduated from the University at Buffalo in 2011 with a Bachelor of Arts in environmental design with a minor in architecture. In 2012, he entered the University of Florida's Graduate School to study urban and regional planning. His interests are focused on transportation planning and the interactions between transportation and land use. He is currently employed by AECOM in Orlando, FL as a planner.