

The Economic and Fiscal Impacts of Development Near DART Light-Rail Stations

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Dallas Area Rapid Transit
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Prepared by
Michael C. Carroll, Ph.D.
Vicki Oppenheim
Dennis Lyons
Valerie Wells

Property Value Verification
by



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Executive Summary

The purpose of this document is to identify and calculate economic impacts of real estate development projects within a quarter mile radius of DART light-rail stations in time period 2016-2018. The values of all projects included in the analysis were determined through a combination of steps including the use of their estimated values as published in the sources analyzed, cross-checking the properties with the Dallas and Collin County Appraisal Districts where possible, and augmenting all information with a review by analysts at Cushman & Wakefield. IMPLAN software was used to create an economic input-output model to measure the direct, indirect, and induced impacts of the development projects on the Dallas-Ft. Worth region.

Selected Highlights 2016-2018

- A total of 81 development projects were completed within ¼ mile of DART stations with a total property value of \$5.138 billion.
- Commercial development accounted for \$2.123 billion; Residential accounted for \$2.068 billion; and Mixed (Residential/Commercial) accounted for \$947 million.
- The total economic impact of the projects created \$10.27 billion for the DFW economy. The projects created 61,017 construction jobs.
- The projects generated \$286.4 million in state and local tax revenue.
- Projects within ¼ mile of the Downtown Dallas to Bishop Arts streetcar route saw \$200.7 million in development with a corresponding economic impact of \$454.7 million.
- The streetcar projects created 2,701 jobs over the period and generated \$12.6 million in state and local taxes.
- Properties surrounding DART stations rent for substantially more than surrounding projects. Residential properties have a 17.9% rent premium and commercial and office space have premiums of 23% and 5.8% respectively.

Introduction

In 2017, the Economics Research Group (ERG) examined the economic impacts associated with construction near DART rail stations. This study is a follow-up to that analysis and examines the impacts of projects that are located near DART stations in 2016-2018. As with the previous study, construction activity is only considered if it took place within a quarter mile of a DART station – a distance researchers agree yields a positive association with increased development.^{1 2}
³ Further, this study does not include downtown stations. While our focus is only on projects within a quarter mile of a DART station, it is likely that the effects of station proximity spread beyond this arbitrary impact zone.

Methodology and Data

The underlying data used for the calculation of impacts – the real estate development projects – were gathered through an ongoing review of publicly announced projects in publications such as the *Dallas Morning News*, *Dallas Business Journal*, and assorted community newspapers and online resources. ERG also used satellite image comparisons (Google Earth) to determine development projects that occurred in the 2016-2018 timeframe. A total of 81 projects, were identified then organized by type and status of completion. First, details of the projects were examined which helped assign them to one of six IMPLAN industry categories. The next step was to establish their stage of completion. The values of all projects included in the database were determined through a combination of steps including the use of their estimated values as published in the sources analyzed, cross-checking the properties with the Dallas and Collin County Appraisal Districts where possible, and augmenting all information with a review for accuracy by commercial real estate analysts. Further, Cushman & Wakefield verified the property values.

In order to understand how the effects of development projects constructed within a quarter mile of DART stations ripple throughout the economy of the Dallas-Ft. Worth region, IMPLAN

¹ Bollinger, C. & Ihlanfeldt, K. (1997). The impact of rapid rail transit on economic development: The case of Atlanta's MARTA. *Journal of Urban Economics*, 42, 179-204.

² Cervero, R. & Landis, J. (1997). Twenty years of the Bay Area Rapid Transit System: Land Use and Development Impacts. *Transportation Research A*, 31(4), 309-333.

³ Weinberger, R. (2000). *Commercial Rents and Transportation Improvements: The Case of Santa Clara County's Light Rail*. Cambridge, MA. Lincoln Institute for Land Policy.

was used to create economic models based on the development spending data provided. IMPLAN is an industry standard tool used to calculate the direct, indirect, and induced impacts of spending and employment. To better understand this process, a brief description at how impacts are calculated for the development of a property is helpful. “Direct” effects are the result of the money initially spent in the region by real estate developers, builders, and construction companies for the completion of a project. This includes money spent to pay employee salaries, purchase supplies, and other operating expenses. “Indirect” effects are the result of business-to-business transactions. When suppliers to the companies driving the development (e.g. an accounting firm) purchase services or supplies they create the indirect effect. When the employees of the real estate developers, builders, construction companies and their suppliers spend their income, this causes the “induced” effect. When added together, the sum of all the activity from direct, indirect, and induced impacts is greater than the combined spending of the developer – this is referred to as the “multiplier effect.” For more detail concerning how the economic impacts were calculated in this study, please see Appendix A.

Results:

What follows are descriptions of the economic and fiscal impacts for the development projects located within ¼ of DART stations. Downtown locations were not included because of overlapping ¼ radii. It should also be noted that the economic impacts for projects not yet in the construction phase are offered as economic scenarios of what *may* happen if the projects in question come to fruition. It is reasonable to assume that some of the projects planned or proposed may never make it to the construction phase. It is also important to keep in mind that while dollar values are associated with projects as they are announced, once reaching the construction phase projects may be expanded or contracted in scale and material costs may have fluctuated from initial projections. These uncertainties can result in direct spending on a project that is higher or lower than previous expectations.

Projects:

Construction activity and planned construction activity within a quarter mile of DART rail stations in 2016-2018 resulted in significant economic activity for the Dallas-Ft. Worth region. The projects either in the construction phase, completed, or planned in this time frame resulted in

over \$5.14 billion in direct spending. This yields a total economic impact of \$10.27 billion for the DFW region. Direct construction employment was 29,985 jobs with at total employment creation (direct, indirect, and induced) of 69,078 DFW jobs. The construction jobs generated \$3.9 billion in labor income and \$286 million in state and local taxes.

Table 1. Projects: Completed Under Construction, or Planned 2016 - 2018	
Description	Impact
Direct Economic Impact	\$5,138,550,728
Total Output or Economic Impact	\$10,274,683,354
Direct Labor Income	\$2,199,859,446
Total Labor Income	\$3,975,645,642
Direct Employment (Jobs)	29,985
Total Employment (Jobs)	61,018
State and Local Taxes*	\$286,412,540
* Includes state and local sales (excluding DART) and use taxes, property taxes, and license and permit fees. Source: IMPLAN	

Table 1.1 Projects: Completed Under Construction, or Planned 2016 - 2018	
Description	Value
Completed	\$992,661,800
Under Construction	\$3,817,757,361
Pre-Construction/planned	\$328,131,567
Total	\$5,138,550,728

The vast majority (94%) of the projects near the stations are currently under construction or have been completed.

Dallas Streetcar

The Dallas Streetcar is operated by DART for the City of Dallas. The Streetcar is a 2.4-mile streetcar track that provides access for riders in Oak Cliff to rail connections at Union Station in Dallas. The inclusion of the streetcar development is new to the ERG analysis. It included in this report to provide baseline in the economic development activity that occurs near the streetcar locations.

There were 11 development projects within the ¼ mile buffer area of the streetcar. With a value of \$200.7 million. Residential projects accounted for \$133.7 million, residential/commercial provided \$63.3 million and commercial projects added \$3.7 million.

The total economic impact of the development was \$200.7 million creating 2,701 jobs in DFW. The development generated \$175 million in labor income and 12.6 million in state and local taxes.

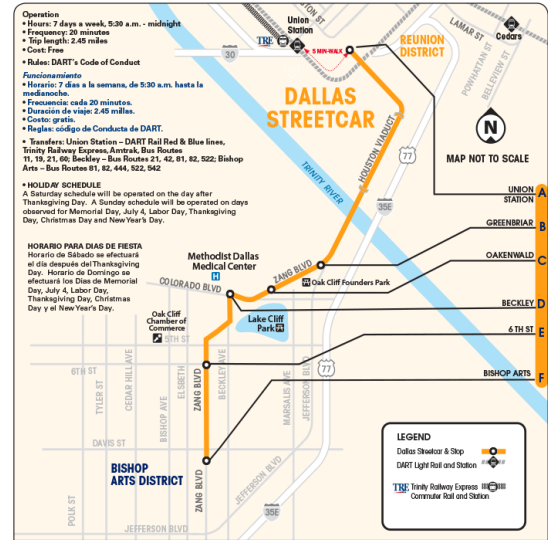


Table 2. Streetcar Projects 2016 - 2018	
Description	Impact
Direct Economic Impact	\$200.17M
Total Output or Economic Impact	\$454.7M
Direct Labor Income	\$97.4M
Total Labor Income	\$175.09M
Direct Employment (Jobs)	1,327
Total Employment (Jobs)	2,701
State and Local Taxes*	\$12.6M
* Includes state and local sales (excluding DART) and use taxes, property taxes, and license and permit fees. Source: IMPLAN	

Table 2.1 Projects: Completed Under Construction, or Planned 2016 - 2018	
Description	Value
Completed	\$169,269,090
Under Construction	\$31,455,690
Pre-Construction/planned	N/A
Total	\$200,724,780

All of the projects near the street car are currently under construction or have been completed.

Rent Premiums

Rent premiums for properties near DART stations are significant. This can be seen in the table below. Both commercial/office and residential properties show rents are higher the closer the property is to a DART station. Residential properties have a 17.9% premium, commercial have a 23% premium, and office properties enjoy a 5.8% premium. All the results are statistically significant at the .95 level.

Table: 3 Rent Premium Summary			
	Rent per sq/ft 0 to ½ mile from station	Rent per sq/ft 1/2 to 1 mile from station	Premium
Residential	\$1.94	\$1.62	17.9%
Commercial	\$1.60	\$1.29	23%
Office	\$1.64	\$1.55	5.8%
Results are statistically significant at the .95 confidence level			

Methodology

For the surrounding area around each DART Station, properties were separated into two distributions:

- Properties within 0.5 mile of a DART station
- Properties within 0.5 mile to 1 mile of a DART station

Residential (Apartment)

Similar amenity apartment complexes were chosen for a comparison to limit any bias in the rental prices. Since we are trying to single out for the price effects of a DART station, all other factors should be as equal as possible. For example, if an apartment complex in one distribution contained a pool and gym, the apartment complex in the other distribution should also contain these amenities. The apartment rental prices obtained were for one bedroom units of similar square footage sizes. The prices were divided by the amount of square footage units to minimize any pricing bias in the size of the specific apartment units. At least one apartment complex was selected for each distribution per station to create an average rental price (per square foot) for that

specific distance range of a DART station. Several stations contained up to four apartment complexes within the specified distance range. A paired t-test was used to determine whether the apartment rent price (per square foot) differential was statistically significant between apartments within 0.5 mile of a DART station and apartments further away at 0.5 to 1 mile from a DART station. Fifteen stations were analyzed with a pairwise model and included a total of 68 apartment complexes.

Table 4: Residential Rents		
Residential Rent Premiums	<i>within 0.5 mi</i>	<i>0.5 to 1 miles</i>
Mean	1.942644346	1.621798217
Variance	0.252198832	0.079672783
Pearson Correlation		0.132809037
Hypothesized Mean Difference		0
t Stat		2.290901266
P(T<=t) one-tail		0.018999961
t Critical one-tail		1.761310136
P(T<=t) two-tail		0.037999921
t Critical two-tail		2.144786688

The P-value was statistically significant at 0.01899 at a 95% confidence level. Therefore, we determine that there is a significant price differential in apartments and their distance to a DART station. Furthermore, we can state that apartment complexes within 0.5 mile of a DART station have rental prices significantly higher than apartment complexes located between ½ to 1 mile of a DART station. Apartments within 0.5 mile of a DART station have an average apartment rental price of \$1.94 per square foot, while apartments between 0.5 and 1 mile of a DART station have an average apartment rental price of \$1.62 per square foot – which is \$0.32 lower.

Commercial and Office

A similar model was run comparing rent for commercial properties. Properties chosen included commercial and office properties. Properties with similar characteristics were compared. A paired t-test was used to determine whether the rent price (per square foot) differential was statistically significant between properties within 0.5 mile of a DART station and properties further away at 0.5 to 1 mile from a DART station. Thirteen stations were analyzed with a pairwise model and included a total of 47 commercial/office properties.

Table 5: Commercial/Office Rents		
<i>Commercial and Office Combined</i>	<i>within 0.5 mi</i>	<i>0.5 to 1 miles</i>
Mean	1.599699467	1.291406593
Variance	0.297504262	0.346407128
Pearson Correlation		
Hypothesized Mean Difference	0	
t Stat	2.293050597	
P(T<=t) one-tail	0.020353143	
t Critical one-tail	1.782287556	
P(T<=t) two-tail	0.040706286	
t Critical two-tail	2.17881283	

The P-value was statistically significant at 0.020353 at a 95% confidence level. Therefore, we determine that there is a significant price differential in properties and their distance to a DART station. Furthermore, we can state that properties within 0.5 mile of a DART station have rental prices significantly higher than complexes located between ½ to 1 mile of a DART station. Properties within 0.5 mile of a DART station have an average rental price of \$1.60 per square foot, while properties between 0.5 and 1 mile of a DART station have an average rental price of \$1.29 per square foot – which is \$0.31 lower for combined commercial/office.

Conclusion

The Dallas-Ft. Worth region’s economy showed considerable economic activity from 2016-2018, including strength in the construction sector. The substantial amount of development within a quarter mile of DART stations analyzed in our last report attests to the region’s economic health. The trend to develop properties near light rail stations is one that extends across the nation. Connectivity and multi-modal access are increasingly important in a Texas that is rapidly urbanizing – this is especially true in the Dallas Ft. Worth region. The 81 projects analyzed represent not only the region’s commitment to multi-modal transportation options and an urban landscape that reflects the importance of those options, but billions of dollars in economic activity and tens of thousands of jobs throughout the region. The streetcar analysis (11 projects) mirrored these results.

Appendix A: Detailed Methodology

To understand how money being spent developing properties within a quarter mile of a DART station ripples through a regional economy, the first step is to define the region in question. This study uses the Dallas-Ft. Worth region for analysis as its economy is strongly integrated. The U.S. Office of Management and Budget's (OMB) definition of the "Dallas-Ft. Worth-Arlington Metropolitan Statistical Area" is used and the counties included in the region include Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Somervell, Tarrant, and Wise. After deciding on a region for analysis, the values of the selected properties are placed into an Input/Output economic model that examines how the money being spent on property development ripples through a regional economy. Input/Output methodology allows for insight into forward and backward linkages that are present in any regional economy, highlighting how they add value to the initial dollar spent. The model – in this case facilitated by the IMPLAN software package – measures the total annual economic activity that results from inter- and intra-industry transactions.

The model first breaks the economy into 536 separate sectors with each sector representing an individual industry, then it uses a sectoring scheme developed by the IMPLAN Group. This scheme is closely related to the Bureau of Economic Analysis (BEA) REIS model and is a 536 X 536 (row x column) matrix showing all the economic activity between the individual sectors. The entries in the matrix are based on the dollar amount that each industry sells to (and purchases from) other industries in a regional economy. It measures the amount of final consumption by the residents of the region as well as how much each industry exports from the area. The model uses data collected at the county level, which are obtained from the IMPLAN Group and the BEA. County data are in turn aggregated or "rolled-up" to form service areas such as local regions, states or larger geographic regions such as the Midwest. Input/Output models are able to estimate economic impacts because the flow of goods and services within an economic region is relatively stable. Predictions can be made of an industry's total economic impact by examining the purchasing patterns of the individual sectors. The BEA collects extensive data on these regional trade flows and reports their findings annually.

After the region is selected and the data on spending are entered, how the spending flows through the region and impacts it can be calculated. The three levels of spending impacts analyzed are direct, indirect, and induced. The direct impact includes the purchases of resources (labor,

goods, and services) by real estate developers, builders, and construction companies for the completion of a project. The indirect impact occurs through industry-to-industry purchases made by regional suppliers. Finally, the induced impact reflects the change in household demand as the employees of real estate developers, builders, and construction companies and the employees of their suppliers earn dollars for consumer spending. Therefore, the total impact to the economy is the summation of the direct, indirect, and induced components. The indirect and the induced portions are commonly known as the multiplier and their impacts often referred to as the “multiplier effect.” It shows how the initial (direct) spending get multiplied through the economy. Calculating the multipliers based on the supplier relationships and employee consumption patterns are much more accurate than simple multiplier tables.

The effects that the three levels of impacts and related spending have on employment is also calculated in the IMPLAN economic model. Employment is the total number of full-time wage and salary employees, plus the number of self-employed workers in a particular industry. Part-time workers’ hours are aggregated into full-time equivalents (2,080 hours), and reported with the full-time workers. An IMPLAN economic model will draw from multiple sources of data to offer employment estimates. This is due to the differences in how employment data is gathered by varying government agencies. In general, due to nondisclosure rules, the employment figure reported by government agencies often underestimates true employment in a given county. In accordance with U.S. Code Title 13, Section 9, no datum is published that would disclose the operations of an individual employer or put an individual employer at an unfair disadvantage.

By carefully combining the employment figures reported by the U.S. Department of Labor, Bureau of Economic Analysis, U.S. Census, and the Internal Revenue Service, a fairly comprehensive employment figure can be reconstructed. The raw data are then “sectored” into the appropriate NAICS and, in turn, combined into the necessary industry vectors and IMPLAN matrices. The result of this process is a “Total Employment” impact figure that is a result of the three levels of economic impacts associated with the initial spending. An IMPLAN economic model also calculates employee compensation which includes all salaries, wages, and benefits paid to the industry’s employees resulting from the direct, indirect, and induced employment impacts. The figure includes the proprietors’ income of self-employed persons in the industry. The figures reported are gross amounts and taken from the IMPLAN data set.

Input/Output methodology and IMPLAN software allow one to leverage and integrate the enormous amount of data collected by government agencies. As such, a reliable model of how spending affects a regional economy can be developed. These models take into account not only how money is initially spent in the “direct” stage of an event, but also inter- and intra-industry transactions. These transactions establish forward and backward linkages in a regional economy during the “indirect” and “induced” stages. In addition to spending, these models also estimate the resulting change in employment. The end product is a comprehensive economic analysis of a given event and its effect on a region.