Impacts of CT*fastrak* on Real Estate and Urban Economic Development: Phase 2

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16. Abstract: CT***fastrak***, a bus rapid transit service connecting four municipalities (Hartford, West Hartford, Newington, and New Britain) in Central Connecticut (CT), opened for service in March 2015. This new service may be encouraging transit-oriented development (TOD) along the busway and these potential impacts of CT***fastrak*** are expected to affect property values; however, the impacts are unknown. Phase 1 of this study set the baseline of conditions leading up to the start of service. This report considers Phase 2 for the first 5 years of service (March 2015-March 2020). This Phase 2 analysis includes considering descriptive statistics for many variables across various ranges of distance from the stations in 2015 and 2020, as well as a comprehensive set of over 500 before/after maps superimposed on aerial photography (including property sales values; assessed values; property tax revenues; vacancies; vacant/undeveloped parcels; number of units of rentals, residential single family, and commercial; locations of environmental remediation; number of "assisted units"; travel costs; and planned/proposed development). A visualization tool was developed to ease the presentation of comparing each of the two sets of maps for Phase 1 and Phase 2. Finally, a statistical analysis is conducted to assess the correlation between distance to the nearest station and sales price, covering the period of 2015-2020. The statistical analysis finds that after controlling for other covariates, proximity to the nearest station is significantly correlated with sales price for each of the 3 classes studied, residential, condominiums, and commercial properties. A recommendation is to consider updating the analysis in a Phase 3, which would cover the period of post-March 2020 (i.e., the timeframe covering the Covid-19 pandemic).

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METRIC CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
		LENGTH		
in	inches	25.4	Millimeters	mm
ft	feet	0.305	Meters	m
yd	yards	0.914	Meters	m
mi	miles	1.61	Kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	Hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	Milliliters	mL
gal	gallons	3.785	Liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	Grams	g
lb	pounds	0.454	Kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
		ILLUMINATION		
fc	foot-candles	10.76	Lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	Newtons	N
lbf/in^2	poundforce per square inch	6.89	Kilopascals	kPa

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Executive Summary

The key benefits of this Phase 2 proposed project are that an extensive geocoded, longitudinal database on property values near CT***fastrak*** stations supplement the data obtained in Phase 1, which has allowed for the analysis of real estate impacts in this Phase 2. For Phase 2, in addition to the statistical analysis comparing the impacts of proximity to CT***fastrak*** stations on property values, a set of aerial photographs are developed that cover the first five years of service, March 2015 - March 2020. These photographs provide extensive, detailed visual evidence of how the CT***fastrak*** has led to land use changes near stations. The data visualization tool facilitates comparing the Phase 1 and Phase 2 landscapes for many variables, with the use of a set of before versus after "story maps." The information collected in Phase 1 and Phase 2 will be extremely useful to policymakers and researchers at the federal, state, and local levels. The information gathered in Phase 1 on the way the landscape looked before the start of service can be extremely powerful when compared against the changes that have occurred during the first 5 years of service. Thus, a thorough update of the data in Phase 2, as well as statistical analysis and visual comparison of the before vs. after, has been invaluable.

Each of the statistical analyses - one for proximity to CT***fastrak*** and another for proximity to environmental remediation sites - demonstrates how CT***fastrak*** has translated into additional value near each station. This includes separate estimates for residential, condo, and commercial properties.

When comparing the time periods of Phase 2 with Phase 1, some key highlights of the overall findings of this Phase 2 study include:

- Average residential assessed values fell in some municipalities and rose in others, with some heterogeneity across various distance ranges from the nearest stations.
- There is mixed evidence on average sales price changes in the neighborhoods across stations. This could be partly due to different size structures selling at different times and in various locations, and it motivates the desire to examine square footage as an additional metric.
- There is a great deal of variation in the average square footage of residential properties near the stations. Most neighborhoods within ¼ mile of stations had residential average square footage that rose. This implies that any new construction or renovations are accompanied with larger residential properties, on average.
- Similarly, the variation in commercial property average square footage is substantial. Within ¼ mile of most stations, the average commercial square footage rose. These differences may be due to new property construction of different sizes than existing sites, which raise the overall average square footage of the properties within this radius. The changes are more mixed for other radii from the stations. Given this broad variation in the direction of the changes between Phases 1 and 2 for the various stations and radii, it is difficult to try and attribute these average changes to the presence of CT***fastrak***.

- The number of “assisted units” housing rose in Hartford and Newington, which implies CT***fastrak*** may have been associated with a greater amount of social “equity” in those municipalities. On the other hand, the number of “assisted units” fell in New Britain and followed a mostly flat trend in West Hartford, which may be a sign of gentrification that is occurring there.
- Decreases in the number of commercial properties within ¼ mile of some stations were likely due to redevelopment that was occurring in the West Hartford neighborhoods near those stations.
- The number of residential and commercial vacancies in each census tract near the stations fell between the two time periods, but changes in the number of vacant or undeveloped parcels was mixed in neighborhoods near the stations. While the former is evidence of possible gentrification, the latter implies that gentrification could be occurring in some areas but not in others.
- The statistical analysis offers strong evidence of correlation between proximity to CT***fastrak*** stations and property sales prices over the period 2015-2020 for all 3 property classes, residential, condos, and commercial.
- Similarly, the statistical analysis also provides support for the correlation between distance to the nearest environmental remediation site and properties that sold between 2015 - 2020. This implies remediation that occurred for the purpose of facilitating development near CT***fastrak*** may have been worthwhile.
- If one commuter from each household in the cities/towns with CT***fastrak*** stations took the bus instead of driving in a hypothetical commute, total annual cost savings are estimated to be $143 million if everyone were commuting to the XL Center in Hartford, or $161 million if everyone were commuting to the UCONN-Hartford campus.

A series of recommendations include the following:

- A follow-up, Phase 3, should be conducted once several more years of data (past March 2020) have become available to consider how changes in ridership associated with the onset of the Covid-19 pandemic have indirectly impacted property values.
- Future phases of this project should incorporate new maps and figures into the visualization tool dashboard.
- Finally, policymakers should rely heavily on the details of this study when considering the possibility of the future expansion of the CT***fastrak*** route system.

There are clear benefits of CT***fastrak*** at the micro-level. The products of this study have offered evidence of where these benefits may be occurring. While one might expect spatial variation to lead to a range of effects, both within Connecticut and across cities in the U.S. and the world, the findings of this study are generally consistent with the broad variation found in the literature review.

CHAPTER 1 Background

1.1 Introduction

CT***fastrak*** has been operating bus rapid transit (BRT) service in four Connecticut municipalities since March 2015. Among all the BRTs in the U.S., there are only a handful that have a dedicated pathway and CT***fastrak*** is among this uniquely small number. This dedicated pathway enhances travel time reliability due to there being no traffic congestion, among other benefits. In conjunction with the construction and operation of CT***fastrak***, the Connecticut Department of Transportation (CTDOT) and local municipalities have been seeking to encourage Transit-Oriented Development (TOD) along the busway, including retail shops, restaurants, office space, and housing.

Ridership on CT***fastrak*** has been steadily increasing since the commencement of service, although the lockdowns associated with the start of the Covid-19 pandemic in March 2020 (before masking was required) led some commuters to hesitate to ride transit. In the first five years of service through March 2020, there is anecdotal evidence of TOD occurring near several of the stations; however, a formal analysis will help verify these observations. The new service has given many residents and businesses faster and more reliable travel times to and from the urban core in several of Connecticut's moderate to large-sized cities. It has also enabled some New Britain area residents without automobiles to easily commute to the state's capital city. Well-designed mass transit routes have the potential to improve the lives of residents by reducing the financial, temporal, and psychological costs of commuting to work, shopping, and recreation. All these potential impacts of CT***fastrak*** can impact property values. Therefore, one way to measure the impact of CT***fastrak*** is by examining how property values have changed after versus before the commencement of service.

Phase 1 of this study set the baseline for the current Phase 2. In both phases, data was collected from the four municipalities where the service operates, and over 500 GIS maps (in each phase), many of which superimposed on aerial photography, were developed to demonstrate how the landscape looked as of the service commencement in 2015 and then in 2020. In Phase 1, it was indicated that Phase 2 would cover the period between opening in March 2015 and the 5-year anniversary of CT***fastrak*** service, up to March 2020. While the Covid-19 pandemic, which began mid-March 2020, has an expected impact on ridership and impact of transit on real estate values, the purpose of this Phase 2 was to compare the first 5 years of service with the time period leading up to the opening in March 2015. The Covid-19 pandemic impacts can be explored thoroughly in a future Phase 3.

Another primary objective of Phase 1 was to collect data that would be necessary for a statistical analysis and visual analysis comparing the real estate landscape pre-2015 with 2020. The objectives of Phase 2 are to update the data collected in Phase 1, create new maps superimposed on new aerial photographs for all of the different categories that were completed in Phase 1, develop a visualization tool facilitating comparisons of the maps for the two phases, and conduct rigorous statistical analyses to determine how CT***fastrak*** has impacted real estate markets in these municipalities. Placing all the data from both phases into a query-able geospatial database will enable national, state, and local policymakers and researchers to easily download data and use it to inform decision-making. The information collected in Phase 1 was extremely useful upon completion of Phase 2. The information gathered in Phase 1 on how the landscape looked before the start of service can be very powerful when compared against the changes that have occurred during the first five years of service. Thus, a thorough update of the data in Phase 2, as well as statistical analysis and visual comparison of the before vs. after, will be invaluable.

While there have been other studies of rapid transit impacts on real estate – which will be summarized in greater detail in the literature review below – none of these studies focused on a before vs. after assessment of a specific BRT project in Connecticut. This was the case even though many of the other studies focused on some pieces of these topics. CT***fastrak*** is also unique because much of the 9.4-mile busway was constructed in former or existing rail rights of way, which minimized the construction disruption to existing businesses and residential properties. This was not the case in other cities (such as in the Vancouver, B.C., Canada area), where construction was much more disruptive. This uniqueness of CT***fastrak*** was part of the motivation for this study of real estate impacts, which began after collection of the necessary data that occurred during Phase 1 of the project.

1.2 Review of Existing Bus Rapid Transit (BRT) Literature

The purpose of this section is to review the literature that focuses on the impact of BRT on property values and economic development. An extensive literature review was performed during Phase 1 and is presented in the final report for Phase 1 Cohen & Danko (2017). Parts of the Phase 1 review are included below in a somewhat condensed form, with an updated discussion added that includes more recent literature, mostly published from 2015 to 2020, the time during which Phase 2 considers. The literature review draws upon sources that are primarily related to Bus Rapid Transit (BRT); however, some references pertain to other forms of rapid transit (e.g., light rail) and general body of transportation and economics literature. It should be noted that the literature review excludes any discussion or analysis of the effects incurred from restrictions imposed by the Coronavirus (COVID-19), post-March 2020 because the 5-year anniversary of service on CT***fastrak*** was March 15, 2020, and Phase 2 is intended to cover the 5-year period following the start of service.

This section is further divided into two sub-sections. The first focuses on the findings from studies of factors directly or primarily related to property values and economic development, such as the effects of BRT on property and land values, local tax revenue, other nearby properties (i.e., residential, commercial, and rental properties as well as affordable housing), plans or proposals for new real estate development, vacancies, and square footage. The second subsection focuses on factors that become capitalized into property values, such as changes in travel costs, changes in modal choice, environmental remediation, noise effects, and urban design and placemaking. In general, this breakdown loosely corresponds to the various tasks for this Phase 2 project.

● Factors Directly or Primarily Related to Property Values and Economic Development

The general relationship between BRT and factors directly or primarily related to property values and economic development is rooted to some extent by individuals, especially urban millennials, who prefer to walk or take public transportation to work, shop, and for leisure activities (Bartholomew & Ewing, 2011; Gose, 2017). In theory, demand for housing should increase close to public transit, such as the Hartford-New Britain BRT, which provides easy access to desirable destinations. It then follows that the increase in demand should raise property values near these BRT stations. In conjunction with increasing demand, it is expected that there would also be positive relationships with other economic development factors, including increases in the amount of local tax revenue, residential housing, commercial properties, rental properties, affordable housing, structural square footage, and plans or proposals for new real estate development. At the same time, the number of vacancies and quantity of adjacent vacant properties would be expected to decrease. The remainder of this subsection summarizes the findings from the literature on these relationships, which help to guide empirical analysis of benefits associated with improved accessibility in Connecticut provided by CT***fastrak*** BRT stations.

○ **Property and Land Values (Assessed and Sales Values)**

The literature review performed for Phase 1 of the CT***fastrak*** shows that established BRT operations in two major metropolitan areas in North America, Pittsburgh, and Quebec City, Canada, had positive effects on property values (Dubé, Des Rosiers, Thériault, & Dib, 2011; Perk and Catala, 2009). For example, Dubé *et al.* (2011), finds that the BRT service in Quebec City generates an increase in house prices ranging from 2.9 percent to 6.9 percent, for those properties located close to the service corridor where the population is quite dense, and the service was offered initially. Perk and Catala (2009) finds that for service on Pittsburgh's East Busway, a property 100 feet away from a station is valued at approximately $9,745 more than a property 1000 feet away. Similar positive findings are also reported in studies in Seoul, South Korea; Bogotá and Barranquilla, Colombia; and Beijing, China (Cervero & Kang, 2011; Deng *et al.*, 2016). However, it is reported that the mere announcement of future BRT systems did not provide immediate economic impacts in Ecatepec, Mexico or in Beijing, China (Flores-Dewey, 2010; Zhang & Wang, 2013).

Three other studies are noted in the CT***fastrak*** Phase 1 literature summary that address property values adjacent to the TransMilenio BRT system in Bogotá, Colombia (Perdomo-Calvo *et al.*, 2007; Estupiñán and Rodriguez, 2008; Perdomo, 2011). However, it is reported by Cain *et al.* (2007) that due to the differences of various factors (e.g., urban demographics, demand for transit, fare box recovery rates, private vs. government BRT operation, labor costs), caution should be taken in comparing BRT effects on the economy in other parts of the world with the United States. For example, Cain *et al*. (2007) relates that in Bogotá, Colombia the population is approximately eight million people, and the majority of residents do not own cars. Also, lower socioeconomic groups live in the periphery of Bogotá and there is high-density development focused within the Central Business District (CBD). Cain *et al*. (2007) further notes that population densities reported in persons per acre in major metropolitan areas of Atlanta, Houston, Portland, Oregon, Chicago, Los Angeles, San Francisco, and Washington D.C. are significantly lower than in forty-four metropolitan areas of Europe, Asia, Africa, and Latin America. Only New York City would be considered comparable in size to several European cities.

One study by Perk *et al*. (2012) examines the impact of BRT station access on the sale prices of condominiums located along the Washington Street Corridor of the Silver Line BRT system in Boston, Massachusetts, which officially started service in 2002. A key finding is that for condominium sales that occurred in 2007 and 2009, the premium is approximately 7.6 percent. For condominium sales in 2000 and 2001, prior to the opening of the Silver Line, no sales premium is found for proximity to the corridor. The paper concludes that there exists a sale price premium for walking access to a Silver Line BRT station (Perk *et al*., 2012). The same paper also reports that a separate analysis of land use changes along the Washington Street corridor reveals an increase in the number of parcels that converted to condominium classification over the period from 2003 to 2009.

Ulloa (2015) studies the RTC Rapid BRT service in Reno, Nevada. The new service was announced in October 2004 and started operation in October 2009. The study considers whether proximity to a BRT station influences residential housing values. Results indicate that property prices in an area between 0.4 and 0.8 miles (network distance) away from a BRT station are roughly $5,000 higher during the economic crisis and initial recovery of the real estate market that occurred between 2009 and 2013.

A review of other studies that focus on regular and rapid heavy- and light-rail transit systems (i.e., not specific to BRT) shows that considerable variability exists in the estimated change in property and land values (Atkinson-Palombo, 2009; Babalik-Sutcliffe, 2002; Bartholomew & Ewing, 2011; Baum-Snow & Kahn, 2000; Bowes & Ihlanfeldt, 2001; Brinckerhoff, 2001; Cervero & Duncan, 2002; Hess & Almeida, 2007; Kahn, 2007; Atkinson-Palombo, 2009; Goetz *et al.*, 2010; Mohammad *et al.*, 2013 Smith & Gihring, 2006; Vessali, 1996). Areas identified that likely contribute to these variable findings include geographic location, type of land use, type of transit service, age and maturity of the transit system, distance from/to a transit station, and accessibility (Ryan, 1999; Debrezion *et al.*, 2007; Mohammad *et al.*, 2013). In addition, Landis *et al.* (1994) finds that the following variables affect property and land values: the quality of the service (reliability, frequency, speed, etc.), size of the market, quantity of parking for suburban commuters, and the degree to which the service reduces freeway congestion. Locations where additional value is created can also be influenced by several other factors, such as the scope of the transit system, real estate market conditions, traffic congestion and other neighborhood qualities, location of the properties, and travel times to various landmarks in the city (Cohen &

Brown, 2017; Fogarty *et al.*, 2008). There is evidence that being "too close" to a station does not increase value and can, in fact, decrease a property's value. This is commonly found within an approximate 0.25-mile zone of heavy rail, light rail, and subways in studies by Bowes and Inlanfeldt (2001), Brandt and Maennig (2011), Chen *et al.* (1997), and in a study of BRT by Perk and Catalá (2009).

It should also be noted that with systems such as CT***fastrak***, where some BRT vehicles are not operated exclusively via a dedicated guideway but are able to travel away from their normal route to provide additional service at defined junctions. CT***fastrak*** is a fixed and open-system busway with some buses dedicated to the fixed guideway and others that join/leave along the route. It is likely that the busway itself may influence a larger area of a city than would a completely closed linear system.[1] These direct feeder line services play an important role in an open-system type BRT. Zhang (2018) finds that within the Brisbane Australia busway network, feeder line stops are important for increasing network accessibility for Brisbane's BRT. Additionally, Zhang (2018) states that estimating open-system BRT impact only for properties located around BRT's main corridor could lead to biased results and that feeder line stops should be considered when examining BRT property value impacts[1]. As a note of reference, the overall bus mode share in Australia's major cities equates to about 5 percent of all trips, while the mode share of the private car is around 84 percent (Cosgrove, 2011). This is somewhat less than, but similar to, the greater Hartford area. Commuters in Brisbane and Hartford are currently much less dependent on public transit than, for instance, Bogotá, Colombia.

○ **Local Property Tax Revenue**

As a consequence of rising demand and an increased assessed value of housing and commercial properties near transit stations, several studies show that many communities have experienced increases in local property tax revenue (Cervero & Kang, 2009; Dubé *et al.*, 2011; Fogarty *et al.*, 2008; Perk & Catala, 2009; Dubé *et al.*, 2011; Noland *et al.*, 2012; Panero *et al.*, 2012; Mohammed *et al.*, 2013; Mathur 2015). This is true in communities where stations are located near the property that provides tax income for local governments but not near where adjacent properties are not taxable, such as parks and places of religious worship. The added tax revenue can be a major selling point for local governments that are considering investments in BRT services.

Some BRT systems, similar to other forms of transit and rapid transit, are funded via Tax Increment Financing (TIF) (Rayle, 2015). TIF is an approach to financing a new project where future gains in property tax generated from that development are leveraged to finance it. Property tax revenue generated from the growth in property values above the base property values is diverted to finance the TIF development programs in lieu of being distributed to local governments. This revenue stream is referred to as the "tax increment" (Greenbaum & Landers, 2014). The Connecticut General Statutes allow Connecticut municipalities to use TIF. These Statutes were further updated in 2015 by Connecticut Public Act 15-57 to be more

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[1] It should be noted that the Phase 2 data collection is being performed to mirror the Phase 1 data collected previously; thus, accounting for the effect of side routes or feeder lines is not performed.

flexible and to better meet the needs of a municipality. TIF can be used if *"properties within the area meet any one of three conditions: they are blighted; they require rehabilitation, redevelopment, or conservation; or they are suitable for industrial, commercial, residential, mixed-use, retail, downtown, or TOD* [Transit Oriented Development]" (Cohen *et al*., 2019). With TIF, the local communities or state takes on the financial risk and must be able to ensure, or guarantee, that the estimated gains in tax revenue associated with the project materialize in a timely way to justify the request for TIF (Rayle, 2015). According to Greenbaum & Landers (2014), the majority of U.S. studies reviewed do find evidence of positive associations between TIF districts and growth in property values. However, a potential caveat would be that even where a TIF district leads to higher property values, in some cases, the increased property value is not enough to generate sufficient tax revenue. For example, to fully pay off bonds that may have been used to finance the new development. This situation has been encountered in the state of California, and after using TIF in redevelopment efforts for over sixty years, California is re-evaluating its use of TIF (Greenbaum & Landers, 2014). In order to justify the request for TIF, organizations need to be able to ensure that the estimated gains in tax revenue associated with the project materialize in a timely manner.

Another reason why tax revenue is a popular subject is that local communities hope to capitalize on property tax revenue resulting from the BRT to help fund public programs (Panero *et al.*, 2012). Many of these programs are intended to revitalize communities where BRT systems are built by improving the quality of life for existing residents and/or aiding other areas in the municipality that do not directly benefit from the increased access or increased property values and development related to the BRT system. Page (2018) notes that BRT operations with substantial TOD investments operate in Pittsburgh, Cleveland, Las Vegas, Los Angeles, Eugene, Oregon, United States, as well as in Ottawa and Ontario, Canada.

Many communities gauge an increase in tax revenue as a measure of success for TOD (Fogarty *et al.* 2008; Perk & Catala, 2009). There are numerous studies that look at property tax revenue related to BRT and other transit improvements relative to TOD (Cervero and Kang, 2009; Dubé *et al.*, 2011; Mather, 2015; Mohammad *et al.*, 2013; Noland *et al.*, 2012). Almost all of these studies note that new transit stations have resulted in an increase in tax revenue. Page (2018) reports that value creation is a key element of value capture. Citing examples of 21 BRT, streetcar, and Light Rail Transit (LRT) systems, Page (2018) notes that TOD thrives when public policy supports it, and the corridor is positioned for value creation. Rayle (2015) concludes, however, that governmental emphasis on tax revenue gains may result in public officials, consciously or unconsciously, targeting their TOD marketing at higher-income residents, potentially displacing lower-income residents as rents, property values, and taxes rise. This is also noted in a study by Bates *et al.* (2017) where they find that there is the potential for TOD to spur gentrification and displacement near the newly planned Powell-Division BRT in Portland, Oregon (opening in 2022) if affordable housing is lost.

Mohammad *et al.* (2013) finds that some cities charge higher tax rates in BRT catchment areas to capitalize on the rising demand for these properties. The authors caution that because of this, researchers could mistakenly measure tax revenue gains related to BRT that are not directly attributable to changing economic activities around BRT stations. For this reason, a careful statistical analysis that controls for other factors is warranted.

○ **Residential, Commercial, and Rental Properties, Including Affordable Housing**

All properties having easy access to BRT stations, including residential, commercial, rentals and affordable housing (at least with proper government intervention) would be expected to increase in value. However, the literature suggests that multi-family and commercial properties (i.e., including vacant properties that are converted into these types of uses) tend to experience the highest premiums and often dominate new development or redevelopment in transit catchment areas (Hamidi *et al.*, 2016; Gose, 2017). In fact, despite the fact that many studies focus on the impact of transit on single-family housing, these uses are generally viewed as the least favorable near transit stations because they achieve the lowest premiums (i.e., not as many new homes get built as a result), and the residents who live in these homes typically depend on private automobiles even when public transportation options are available (Billings, 2011).

A meta-analysis by Hamidi *et al.* (2016) of the value of transit to single-family homes in the United States and Canada finds that the average single-family home premium is lower than for other types of properties (e.g., multi-family, rental, and commercial). Additionally, it reported to be significantly lower than the premium reported in a previous meta-analysis in 2007 which used pre-2003 data. Using forty-five single-family studies, Hamidi et al. (2016) found a 2.3 percent premium; whereas they report an older study found a 4.5 percent premium.

The owners of multi-family units, other rental housing, and commercial properties can capitalize on the changes in their property values more quickly. The attractiveness of being located within walking distance of a station is potentially stronger for renters and business owners than for single-family homeowners. The homeowners simply pay more taxes while having to put up with a less peaceful environment due to additional pedestrian traffic, increased vehicle noise, and people getting on and off buses during all hours of the day. All of the above suggests that the number of non-single-family properties near BRT stations might be expected to increase faster than single-family homes.

Researchers have identified other factors besides property classes that impact the demand for properties with transit access. One factor is regional compactness. The Hamidi *et al.* (2016) meta-analysis finds that the highest transit premiums occur in compact regions having transit accessibility, as opposed to sprawling urban regions. A second factor is the walkability of the station's environment. Duncan (2011) finds that the pedestrian environment helps to explain whether communities view proximity to the transit station as an amenity or a disamenity. The author notes that the prices of rental units in a "good"[2] pedestrian environment sharply decline with station distance, whereas the prices of rental units in a bad pedestrian environment slightly increase with station distance. Hence, there may be more development of rental units in more positive pedestrian environments and less in negative pedestrian environments since

[2] Duncan (2012) describes "pedestrian-oriented" with "good" pedestrian access to transit stations. Pedestrian environment is not described on a scale that is directly quantifiable. The density of street intersections is used as a variable for connectivity and ease of access by foot. Also, steepness of terrain surrounding stations is used.

the individuals who value a more typical residential neighborhood place less value on transit access and likely have a greater sensitivity to (real or perceived) effects of station proximity, such as traffic levels, noise, strangers, and crime. A third factor playing a role in the change in the quantity and type of properties near transit stations is rent control or the presence of affordable housing (Bocarejo *et al.*, 2013; Mathur, 2015). Although public officials tend to focus on TOD, encouraging mixed-use development, there is concern over the affordability of housing in transit catchment areas for lower-income and middle-class households (Bocarejo *et al.*, 2013; McKenzie, 2015; Renne *et al.*, 2016). Some find that there are barriers, such as the high cost of land near transit stations, making it difficult to develop and maintain affordable housing within transit-rich neighborhoods (Zuk and Carlton, 2015). Kahn (2007) finds that some public officials are approving plans to remove older (affordable) single-family homes in current or planned transit catchment areas for luxury condominiums and townhouse units to capitalize, wholly or in part, on potential tax revenue gains.

Some researchers point out examples where governments have successfully intervened in TOD to ensure affordable housing is built and maintained near transit stations, such as in New Jersey (Noland *et al.*, 2012). One approach used to ensure the presence of affordable housing in transit catchment areas is selling development rights (Renne *et al.*, 2016). This strategy was applied in Palm Beach County, Florida; Seattle, Washington; and New York City, New York.

BRT stations are cited by Page (2018) as increasing the value of apartments by 3.0 percent and the value of office rent by 9 to 30 percent for BRT operations in Cleveland, Pittsburgh, Las Vegas, and Eugene and housing by 2.9 to 6.9 percent in Quebec, Canada. Interestingly, the CT***fastrak*** Hartford-New Britain Line and Grand Rapids (Michigan) Silver Line are both cited by Page (2018) as two BRT operations worthy of further evaluation.

One of the most cited BRTs in the U.S. is the Healthline in Cleveland, Ohio. According to an article in Planetizen in November 2018, "*the Regional Transit Authority estimates that the $200 million invested in its HealthLine has spurred about $9.5 billion in development … a remarkable return of $190 per dollar"* (Brasuell, 2018). Although in an earlier analysis by the Institute for Transportation & Development Policy (ITDP) Hook *et al.* (2013) states that Cleveland managed to leverage $114.54 dollars of new transit-oriented investment for every dollar it invested into the BRT system. Both estimates are positive news for the Cleveland BRT. Hook et al. (2013) also compares the Healthline BRT with MAX light rail transit in Portland, Oregon, and conclude that Cleveland's BRT leverages approximately thirty-one times more TOD investment per dollar spent on transit than Portland's MAX Blue Line LRT. The study concludes that in corridors with emerging land development potential and moderate government support, BRT is two to three times as cost-effective as LRT at leveraging TOD investments. When government TOD support is strong, as in Cleveland and Portland, the BRT is as much as thirty times more cost-effective than the LRT. Also, from the results of comparing 21 corridors in North America, Hook *et al.* (2013) concludes overall that BRT systems cost less than half as much as LRT systems to develop for equivalent corridors.

Although employment is not an area specified for analysis in this CT***fastrak*** study, Nelson *et al.* (2013) present an interesting study of economic development outcomes in terms of change in employment (jobs growth) as a result of the Eugene Oregon Emerald Express (EmX) BRT. The authors evaluate the EmX BRT system's influence on jobs between 2004 and 2010 (three years before and after 2007, the year EmX began operation) within three zones: areas within 0.25 miles of a station; between 0.25 and 0.50 miles of a station; and for the remainder of the metropolitan area in Lane County, Oregon. Overall, for the metropolitan area outside the 0.50-mile zone surrounding BRT stations, jobs fell by about 5 percent. Jobs stayed about the same between 0.25 and 0.50 miles of station areas and increased by about 10 percent within 0.25 miles of stations. In summary, where the Eugene-Springfield, Oregon metropolitan area lost jobs between 2004 and 2010, jobs were added within 0.25 miles of the BRT stations (Nelson *et al.*, 2013). A similar study of 11 BRT systems operating since 2008 in the U.S., 2016) finds that jobs for five economic groups, manufacturing, industrial, office, health care, and arts-entertainment-recreation, commonly appear to be more attract to BRT station areas.

○ **Square Footage**

As the value of properties near BRT stations rise, so does the value of the square footage of each livable unit of the properties. There is an incentive for owners of commercial buildings to expand the square footage of their existing properties or for developers to build new commercial properties (especially office space) to capitalize on new foot traffic as their market area grows (Gose, 2017). Owners of rental units can charge more rent when they expand the size of units, earn more rent from building more units, or do a combination of the two.

Although it seems that the change in square footage is an important factor in studies examining the impact of BRT on property values and economic development, it is often only used as a control (Bocarejo *et al.*, 2013; Calvo, 2017; Cervero & Kang, 2011; Debrezion *et al.*, 2007; Landis *et al.*, 1994; Muñoz-Raskin, 2010; Perk & Catala, 2009; Rodriguez & Targa, 2004; Ryan, 1999; Smith & Gihring, 2006; Zhang & Wang, 2013). In Bocarejo *et al.* (2013), the authors examine the change in the built area (i.e., as measured in square meters) as a consequence of a BRT system but not the change in the living area of these properties.

○ **Current Plans or Proposals for New Real Estate Development**

In recent years, the demand for residential and commercial properties near transit stations has been expanding due to the proliferation of young workers who opted, or even preferred, to use public over private transportation to get to work, shopping centers, or recreational sites (Gose, 2017). It is not known for certain whether this trend will return once the influence of COVID-19 is lessened. However, any rise in demand increases property values and rents in nearby neighborhoods (as noted previously) and decreases vacancies (as discussed later), especially for locations within walking distance of BRT stations. Consequently, the priorities and plans of real estate developers shift away from suburban office parks and gravitate toward TOD areas. Government investment in transit infrastructure is therefore seen as a major stimulus for the development of surrounding real estate.

Findings reported in studies by New Jersey Transit (New Jersey Transit, 1994; New Jersey Transit, 2005) indicate there is a general perception that new stations will attract new and more intensive development, particularly in the areas closest to the stations. However, this can also be a negative concern for existing residents who worry this increase in development will induce many undesirable changes, such as more traffic, more people, and inappropriate developments. The above-cited New Jersey Transit studies state that successful planning tactics for preventing these fears from becoming a reality include: ensuring that new stations and new development help to establish and celebrate the local community identity; employing a rational basis for defining where growth and change should and should not occur, and promoting convenient retail that serves not only transit riders but also the community at large. Walkers and bicyclists must be able to experience a sense of security. The successful developments must strengthen connections between the community and the stations, thus heightening shared responsibility for the interaction between transit owners/operators and the community.

Bocarejo *et al.* (2013) studied the Bogotá, Colombia BRT network, called TransMilenio. Their review of the literature examines the impact of BRT systems on development patterns and shows that there was no specific policy that produced specific developments in areas close to the BRT system and that changes were produced by the market. Rodriguez *et al.* (2016) studied the land development impacts of BRT in Bogotá, Colombia and Quito, Ecuador. They found that the largest impact on development in both cities tended to concentrate near end-of-line terminals and stops built in the early 2000s. The authors conclude that land development near BRT depends on several institutional factors, including the behavior of developers, market conditions, land availability, and land regulations.

○ **Vacancies**

Due to increased demand for residential properties within walking distance from transit stations, investments in transit are expected to reduce residential and commercial vacancies (Hamidi *et al.*, 2016). This increase in demand also spurs investment in areas that developers would not have otherwise acquired, such as older-abandoned industrial sites close to transit stations (Panero *et al.*, 2012). For example, Cervero and Dai (2014) find that the availability of cheap vacant parcels help explain high levels of construction near peripheral BRT feeder lines in previously undeveloped areas of Bogotá, Colombia.

BRT stations can revitalize vacant areas, such as older factory buildings and foreclosed industrial sites, as well as places with lower occupancy rates and areas that are struggling to find a competitive advantage. Transit stations generally spur lower vacancy rates and high absorption rates of buildings that were partly vacant (Ryan, 1999; Smith and Gihring, 2006). For example, Jones Lang LaSalle (JLL), a global property company, states that office buildings with transit access have approximately 3.7 percent lower vacancy rates than office buildings without transit access JLL (2017). Due to this increasing interest in vacant land near transit stations, vacant properties are often cited as one of the property types attaining the highest premiums because of transit access (Hamidi *et al.*, 2016).

● **Factors That Play a Role in BRT Becoming Capitalized into Real Estate Values and Urban Economic Development**

This subsection summarizes the literature focusing on factors that become capitalized into property values, such as travel costs, modal choice, environmental remediation, noise effects, and urban design/placemaking. Although only two of the factors, travel costs and environmental remediation, are directly examined as a part of the research for the CT***fastrak*** Phases 1 and 2, the other factors (modal choice, emissions, noise, and urban design/placemaking) are included in this literature review because researchers have noted that they affect the impact of BRT. Consequently, consideration of these studies may help contextualize any findings and/or explain variations in the data described or analyzed during Phase 2 research.

○ **Changes in Travel Costs**

New transit options often reduce the cost of travel and these savings become capitalized into the value of the real estate (Fogarty *et al.*, 2008; Hamidi *et al.*, 2016; Stokenberga, 2014; Zhang and Wang, 2013). The logic of this argument is generally based on location theory (Alonso, 1964; Muth, 1969). A fundamental premise of location theory is that highly accessible places provide travel cost savings, which in turn causes properties in such areas to be more highly valued than areas with less accessibility. In principle, the value of a property increases until the travel cost savings become fully capitalized into the price of the property (Duncan, 2011). Thus, the theory implies that any changes in the accessibility of an area, such as the installation of a new BRT station, would trigger this capitalization process for nearby properties that achieve transit cost savings. One should expect that the greatest reductions in travel costs and increases in property values generally are associated with high-density neighborhoods with new transportation options providing a high level of transit connectivity that previously did not exist (McKenzie, 2015).

For property values to universally rise (i.e., not depend on local circumstances, such as where each homeowner or renter works), homeowners and renters must realize transportation cost savings to major points of interest (Gose, 2017). Common examples of these points of interest include major employers, government services, shopping centers, and recreational sites. Many TOD studies have also emphasized the need to add new transit stations to decrease transportation costs to the city center(s), especially in areas plagued with traffic congestion and urban decline (Bartholomew & Ewing, 2011; Kahn, 2007).

Despite the perceived benefit of BRT as a method of reducing travel costs, there are some mixed reviews of its effectiveness. For example, Muñoz-Raskin (2010) finds that some lower-income households often fail to achieve travel time savings because they cannot afford to relocate to or even remain in areas near BRT stations. Other researchers find that TOD areas (including TOD related to BRT) are generally more expensive places to buy and rent housing but contend that the increase in housing prices or rents and the reduction in transportation costs cancel each other out and thus do not cause the displacement of current residents (Renne *et al.*, 2016). In fact, Rayle (2015) argues that the critics who discuss issues of displacement primarily focus on the noticeable rise in property values but tend to overlook the associated travel time savings that are associated with these higher housing costs.

Determining the value of travel time savings (VTTS) can be a very complex process, as reported by Litman (2020). Different individuals do not value travel time equally for all trips or modes. Many factors, such as the travelers' wages and the alternative modes being considered, can influence the realization of travel time savings. A transit improvement that increases travel speeds and/or reduces travel time can persuade commuters to accept longer distance commutes. This is especially true for highway improvements. In that situation, according to Litman (2020), the actual benefits are increased mobility and improved location options rather than travel time savings. U.S. DOT (2016) notes that in some situations, such as commuting to work under tenuous or uncomfortable conditions, travel time is conceived as having a negative demand (i.e., a consumer is willing to pay to have less of it). That concept is what can make BRT an attractive alternative. While on a bus, the rider can choose to perform other productive or leisure activities.

○ **Changes in Modal Choice**

Variability and uncertainty of travel can lead to a choice of travel mode(s) where insuring against delay may mean choosing a more reliable route, which could even imply a preferred choice of a mode with a slower expected speed and/or a higher monetary cost (U.S. DOT, 2016). During the last 50 years, especially since the 1990s, there has been concern about the shrinking modal share of public transit and the increasing social costs of private automobile traffic (Cervero & Kang, 2011; Dubé *et al.*, 2011). BRT, however, is one of the less expensive options for providing rapid transit services, and BRT is globally considered one of the more popular means of increasing the modal share of public transportation (ITDP, 2020). As a result, BRT systems have been increasing substantially throughout the world over the past 20 years. In 2020, the Hartford-New Britain CT***fastrak*** was one of approximately 80 BRT lines in North America, including 56 in the United States and sixteen in Canada (BRT+CoE, 2020). Vergel-Tovar & Welch (2019) reports that more than 200 cities in the world have or are implementing BRT systems.

Several studies highlight the ability of BRT to encourage multimodal transportation and to reduce the share of private automobiles and paratransit around the world (Rodriguez *et al.*, 2016; Hensher *et al.*, 2014; Muñoz-Raskin, 2010). Bartels *et al.* (2016) report that BRT is effective at spurring a modal shift for multiple communities: those residing in both higher and lower/middle-income suburbs, including individuals who previously rarely used public transportation. Delsaut & Rabuel (2016) and Satiennam *et al.* (2016) argue that the ability of BRT to alter these individuals' mode choice depends on whether the BRT stations are within walking distance of the users' residences and whether the BRT service offers travel time savings. Thus, spatially examining the interplay of proximity to stations, reduction of travel costs, and property values is crucial to understanding the potential usage and impact of a BRT system on modal choice in nearby communities (Hamidi *et al.*, 2016).

○ **Environmental Remediation**

According to the U.S. Environmental Protection Agency (EPA), the term "brownfield site" generally means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant (EPA, 2021). Cleaning up (environmental remediation) and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands. Environmental remediation can be both a cause and an effect in the implementation of BRT systems. In Connecticut, some environmental remediation and construction of the CT***fastrak*** BRT stations, along with dedicated infrastructure construction, occurred around the same time. Additionally, other nearby sites have continued to be remediated during the five years since the opening of CT***fastrak***.

Multiple studies have discussed the potential of BRT and other rapid transit systems to help revitalize vacant and formerly noxious areas. Panero *et al.* (2012) mention that BRT is widely viewed as an effective way of renewing interest in otherwise ignored vacant factory buildings and foreclosed industrial sites. Fogarty *et al.* (2008) also note the increased interest in investing in not only these properties but the entire economically disadvantaged neighborhoods where these sites are located.

Gose (2017) shares the results of interviews with developers indicating the crucial role that new transit stations play in their investment decisions. The article contains multiple quotes from developers who state that they would not have otherwise been interested in former industrial buildings and neighborhoods had the transit infrastructure not existed. The author provides case studies of this trend from across the United States, including sites in Boston, Washington, D.C., Chicago, and Bellevue.

- **Changes in Emissions**

Improvements in air quality via emissions reductions due to BRT remain a high priority for many public officials and their community members (Lindau *et al.*, 2014; Perdomo-Calvo *et al.*, 2007). Emissions of carbon dioxide (CO2), carbon monoxide (CO), particulate matter (PM), nitrous oxides (NOX), and volatile organic compounds (VOC) are of concern and are monitored and regulated by the EPA. With the increasing certainty of global warming also comes a need to manage carbon (greenhouse gas) emissions. A growing body of literature indicates that BRT is considered a catalyst for decreasing these forms of air pollution (Cervero & Kang, 2009; Estupinan & Rodriguez, 2008; Fogarty *et al.*, 2008; Hidalgo & Gutierrez, 2013; Rodriguez and Mojica, 2008; Siedler, 2014; Rodriguez *et al.*, 2016).

Increased usage of BRT and other public transit usually results in fewer vehicles on the road, as well as decreases in congestion, energy usage, and emissions. (Panero *et al.*, 2012; Flores-Dewey, 2010) Researchers also cite the requirement of hybrid or low-emission buses as a major factor in achieving these emission goals. (Cass & Faulconbridge, 2016; Dubé *et al.*, 2011; Paget-Seekins, 2015; Panero *et al.*, 2012; Rayle, 2015) On the other hand, Duncan (2011) notes that some individuals are still debating how effective BRT and TOD are as means of reducing emissions, energy consumption, and congestion. Bocarejo *et al.* (2013) argue that lower property value premiums near some BRT stations in Colombia can be attributed to the noise and negative emission effects of diesel buses.

Gallivan *et al.* (2015) discuss the impact of transit on greenhouse gas emissions and energy use from the perspective of land use changes. The authors note that transit ridership, as a means of transporting people on buses/trains who would otherwise travel by private automobile, has reduced vehicle-miles travelled (VMT), transportation fuel use, and transportation greenhouse gas emissions by a significant amount even though only 4 percent of passenger trips in U.S.

metropolitan areas are currently made by public transit. More specifically, Gallivan *et al.* (2015) highlight the fact that the addition of a new transit station to a neighborhood without previous transit access generally increases activity density (i.e., a combination of population and employment density) by 9 percent and decreases VMT transportation fuel use and transportation greenhouse emissions by 2 percent within a 1-mile radius of the new station.

○ Noise Effects

The literature contains a mixture of claims and findings regarding the noise effects of BRT. Some individuals argue that BRT helps reduce noise effects by encouraging modal shifts away from private transportation (Estupinan & Rodriguez, 2008; Rodriguez & Mojica, 2008; Panero *et al*., 2012). Others argue that BRT generates unwanted noise, especially in areas located closer to stations, for example, within a 5-minute walk from stations (Delsaut & Rabuel, 2016; Duncan, 2011; Noland *et al.*, 2012; Perdomo-Calvo *et al.*, 2007; Perk and Catala, 2009; Rodriguez and Mojica, 2009). But noise, whether its effect is positive, negative, or insignificant, and other aspects of the station environment are potentially important factors when examining the impact of BRT or other transit stations on property values and economic development (Currie, 2006). Some have used noise and other aspects of the station environment to determine which communities are more sensitive to real or perceived disamenities of station proximity (Duncan, 2011; Muñoz-Raskin, 2010).

○ Urban Design and Placemaking

The environment immediately surrounding a transit station is generally a byproduct of urban design and placemaking, where placemaking involves the planning, design, management, and programming of public spaces that promote human health, happiness, and well-being (PPS, 2009). While the present research does not incorporate the urban design and placemaking strategies implemented at each of the CT***fastrak*** stations, this section is included to recognize the potential importance and utility of these subjects to help contextualize findings from subsequent phases of this research. The information on the crucial role of urban design and placemaking, as it pertains to transit, is derived from two major reports completed by New Jersey Transit (New Jersey Transit, 1994; New Jersey Transit, 2005).

These New Jersey Transit reports find that transit stations and nearby public areas have great potential for positively transforming the local communities that may or may not be assessed in quantitative impact analyses of real estate. The authors note that there are multiple ways for transit investments to improve the quality of life of commuters and the community at large. Transit stations can build a sense of community by functioning as a venue for a wide range of community activities and events. They also can bring people together by serving as the focus of communal life and a center of civic pride. They provide a visible point of identity for the neighborhoods, districts and/or municipalities that they serve. These sites provide a sense of orientation, a feeling of safety and security, and an attractive and well-maintained environment. With the proper planning, these sites can be incorporated into vibrant pedestrian and bicycling-friendly streetscapes where there is a demand for certain amenities such as bike paths and storage locations.

Renne *et al.* (2016) explore the affordability of some transit station environments throughout the United States. The authors specifically compared housing and transportation costs in approximately 4,400 fixed-route transit stations, which included many BRT systems. They classified each station area as TOD, transit-adjacent development, or a hybrid of these two. Based on this classification system, the authors found that TODs are expensive places to buy and rent housing but more affordable than hybrid areas and transit-adjacent development because the lower cost of transportation offsets housing costs.

1.3 Problem Statement

The costs of a bus and other types of rapid transit are generally well understood; however, the potential benefits are often more challenging to quantify because they typically depend on local conditions. Therefore, the primary focus of Phase 1 of the study was to collect much of the baseline data needed for this Phase 2 data analysis on the potential to create value for property owners, businesses, residents, and towns in the areas surrounding the stations. In addition to the direct property value effects, TOD can lead to additional local property tax revenues due to the property value increases, which in turn can induce further public spending and another round of property value increases. Since it takes substantial time for these impacts to develop, an understanding of the determinants of the property value changes is part of this Phase 2 study. There are other related benefits, such as environmental remediation nearby the stations, and data were gathered in Phase 1 so that this issue can be studied in statistical analysis in this Phase 2.

In Phase 2, the Phase 1 data is updated, and a set of detailed analyses of CT***fastrak*** impacts on property values is conducted. These analyses are described in more detail below, which include a combination of descriptive statistics, figures/charts, written descriptions and comparisons of the two phases' data, and a visualization tool that is available separately. A set of before vs. after maps are developed in the visualization dashboard to compare the landscape in 2015 to that of 2020.

CHAPTER 2 Research Approach

This chapter focuses on an exposition of the staging of the study, which includes Phase 1 and Phase 2 and description of the long-term objectives of this Phase 2.

2.1 Staging of the Study

The two stages of this study - Phase 1 and Phase 2 - are described as follows:

Phase 1. The research for Phase 1 of this project, which was completed in October 2017, collected data for the following period:

Phase 1: **Pre-2015 (baseline conditions)**: The time period leading up to the start of CT***fastrak*** service.

-Over 500 GIS maps, many of which were superimposed on aerial photography, were developed, and placed in a geospatial database for later use in Phase 2.

Phase 2. Phase 2 of this project is a follow-up to update the data as described below, and then perform statistical analyses to examine the relationships between CT***fastrak*** and various real estate variables. Phase 2 covers the following period:

Phase 2: **2015 – 2020:** The period between the start of service on CT***fastrak*** (March 2015) and the 5-year anniversary of the service (March 2020).

-The Phase 2 project also includes a set of comprehensive statistical analyses.

-The raw data that were collected and all GIS maps superimposed on aerial photography are compiled and will be made publicly available in a geospatial database at the end of Phase 2. Many of the maps will be made available via a visualization tool that facilitates the comparison of Phase 1 and Phase 2 changes in the landscape.

2.2 Objectives of Phase 2

The long-term objective in Phase 2 is to examine the question: How has CT***fastrak*** become capitalized into property values?

These crucial steps to meeting the long-term objective are addressed in Phase 2:

1. <u>Determine what data is currently available</u> for collection in Phase 2.

   This task found that many of the same data sources were available as in Phase 1. Specifically, updated information from assessors' offices was a primary source for many variables. Other data, such as information on vacancies, number of assisted units, planned and proposed developments, were similar in Phase 2 as in Phase 1. For some items, such as environmental remediation, some of the sources are no longer available, therefore some results are not directly comparable between the two phases. But this is only an issue for a small number of variables, such as the environmental remediation data and for some of the travel cost data. However, a comparison of the travel costs in 2015 versus 2020 is not a primary focus of this analysis.

2. Examine the conditions between the time of the commencement of CT***fastrak*** service in March 2015 and March 2020. Also, this objective will necessitate a thorough update of the literature review of BRT studies.

   The literature review has been updated in Chapter 1 above.

3. Collect updated data necessary to examine how property value changes are correlated with proximity to the CT***fastrak*** stations.

   This data has been collected and used in the statistical analysis in this report.

4. Collect the updated data needed to examine how property value changes are correlated with changes in travel costs and updated data needed to determine how sale price and/or property value changes are correlated with travel time changes.

   This data has been computed, and the visual representations are displayed in a number of maps for the individual stations (see the data visualization for more details). It is possible to infer how property values are correlated with travel time costs with the story maps in the visualization.

5. Gather updated data that will be useful in "controlling" general price movements. In this Phase 2, this will enable distinguishing between changes in property values due to CT***fastrak*** versus other unrelated factors, such as general inflation and/or general fluctuations in real estate prices in the Metro-Hartford area and in Connecticut.

   This issue was explored and determined that adjusting for inflation would not significantly alter the numbers in the data. This is because, on average, there was approximately a 1.8% annual increase in overall housing prices between 2015 and 2020 in the Metro-Hartford area. More details are explained in Section 3.3 below.

6. Obtain updated assessed residential property values for the subsequent years after what had been collected in Phase 1.

   This data has been obtained and analyzed thoroughly below.

7. Determine the current levels of local property tax revenues that accrue to the municipalities where the CT***fastrak*** stations are located.

   The analysis below has considered how average changes in local property tax revenues vary with distance to the various CT***fastrak*** stations.

8. Address the questions: What is the number of dwelling units within a range of reasonable distances from the stations at the time of the announcement and at the start of CT***fastrak*** service? What share of these are rental properties, and what share are considered "affordable housing"? How have these changed between 2015 and 2020?

   Detailed tables of numbers of dwelling units and rental properties, along with a written analysis of how the landscape changed over the first five years of CT***fastrak*** service, are presented below. Analysis of "affordable housing" (a.k.a. "assisted units") is presented as well, at the lowest level of aggregation available (i.e., the municipal level).

9. Collect updated information on total building square footage within a given radius of the bus stations and use this updated information to examine how these have changed since Phase 1.

   The square footage data is presented and broken out by commercial and residential uses for various distances to the individual stations.

10. Investigate what are the current plans/proposals for new real estate development. How has the number of plans near each station changed in 2020 compared with 2015?

    Careful consideration of these plans is presented in this report, along with maps of the locations of planned and proposed developments in the data visualization tool.

11. Collect the updated data, beyond what was gathered in Phase 1, needed for this Phase 2 analysis on how the cleanup of the land where a former police station and welding facility are located has affected nearby property values. Then perform a statistical analysis to determine the impacts of the cleanup on property values.

    The data is collected and used in the statistical analysis below to demonstrate the correlation between proximity to remediated sites and property values.

12. Examine the role of vacancies. Collect data to determine the vacancy rates in the Census tracts near the CT***fastrak*** stations. How have these vacancy rates changed between 2015 and 2020?

    Interestingly, both residential and commercial property vacancies fell in the census tracts near every station between 2015 and 2020. This is evidence that could support the hypothesis that CT***fastrak*** is correlated with gentrification.

13. Aerial Photography and/or remote sensing: obtain an updated snapshot of land use in the neighborhoods near the stations from the most recent time period available.

    In addition to the aerial photography map of all four municipalities presented in Figure 12 of this report, there are aerial photographs of each station and the surrounding area, in the visualization tool.

14. Geospatial database. To the extent possible, data is compiled in a parcel-level geospatial database and merged with the data collected in Phase 1. This geospatial database is set up in a manner that will facilitate easy tracking of changes in parcels between Phase 1 and Phase 2 (use, change in use, building type and square footage, sales, sale prices, assessed values, etc.), and it is possible to query the database to obtain desired information. CTI at UCONN has the production environment to host this geospatial database, so it could be hosted there, if necessary.

    The visualization tool is currently available at https://gis.cti.uconn.edu/portal/apps/MapSeries/index.html?appid=4f407577fd134d598dc45957f12cb44c. In addition, a GIS geospatial database is available that contains the raw data, along with a set of Excel pivot tables that were used to develop the figures/charts in this report. The pivot tables can be used to develop additional figures/charts if so desired.

15. Data analyses. The techniques of regression analysis are used to determine the relationships between property values as the dependent variable (sales prices, from #3 above, and/or separately, assessed values, from #6 above), and the independent variables, which include some combination of change in travel costs/time (from #4 above), changes in neighborhood vacancy rates (from #12 above), distance from the stations (near vs. far, from #3 above), before vs. after CT***fastrak*** started operating.

    The specification that the data best supports dictated which independent variables were ultimately included in the results tables for this data analysis. Two separate sets of regressions are presented for each property class, residential, condominium, and commercial. Since transaction prices are the best metric of market value, the results focus on sales prices as the dependent variable, rather than using assessed value changes as the dependent variable. While initially, the plan was that the sales price data would be adjusted using the inflation factor from Task 5 above, to control for general price changes, it was subsequently determined that there was less than an annual average of 1.8% change in house prices between 2015 and 2020 (see Section 3.3 below for more details). Therefore, the deflator adjustment was not necessary to pursue.

    In addition, based on Task 11, an analysis of how proximity to environmental remediation sites impacts property values was conducted. Also, a spatial correlation approach was applied to the data to estimate how the accrued real estate wealth in some properties may vary depending on property locations.

CHAPTER 3 Data and Methodology

3.1 Geographic Extent of Subject Sites in Current Studies of the Impacts of BRT Service on Real Estate and Urban Economic Development

As outlined by Cohen and Danko (2017), previous studies have focused on BRT systems in North America, Asia, and South America, including several cities in Columbia[3]; Seoul, South Korea; Beijing, China; Québec City, Canada; Pittsburgh; and broad analyses of the United States (Bocarejo *et al.*, 2013; Calvo, 2017; Cervero & Kang, 2011; Deng *et al.*, 2016; Dubé *et al.*, 2011; Estupiñán & Rodriguez, 2008; Flores-Dewey, 2010; Jun, 2012; Muñoz-Raskin, 2010; Perdomo-Calvo, 2007; Perdomo, 2011; Perk & Catala, 2009; Renne *et al.*, 2016; Rodriguez and Mojica, 2009; Rodriguez *et al.*, 2016; Zhang and Wang, 2013).

3.2 Data Sources Used in This Study of the Impact of BRT Service on Property Values

There are some existing studies of the impacts of CT***fastrak*** on real estate values. Although their focus is somewhat broader in terms of geographic coverage within Connecticut, one aspect of Zhang *et al.* (2021) is that they consider how properties in Hartford that sold in the 12-month period of December 2017 - November 2018 are impacted by the presence of CT***fastrak*** . While their statistical techniques are sophisticated, they find a negative impact of transit on property values in the city center of Hartford, with positive impacts on the outskirts of the city. This seems counter-intuitive, and it may be at least in part a result of their short sample period of residential sales, which they obtained from a commercial source (Redfin®).

In the present study, a long range of data has been obtained and will be analyzed in the statistical analysis section of this report. A variety of data has been collected mainly from governmental sources. As noted in the acknowledgments, data sources for this study include municipal assessor offices, municipal economic development agencies, municipal planning departments, Capitol Region Council of Governments (CRCOG), Connecticut Department of Transportation (CTDOT), United States Department of Transportation (USDOT), United States Census Bureau, Federal Housing Finance Authority (FHFA), Connecticut Office of Policy and Management (OPM), United States Environmental Protection Agency (EPA) Region 1, Connecticut Department of Economic and Community Development (DECD), Connecticut Department of Energy and Environmental Protection (DEEP), and the United States Postal Service (USPS). Annual estimates were generated based on an approach suggested by numerous assessors in the Central Connecticut area. The following paragraphs present a brief description of the data and any calculations that were made to derive the data are outlined if any alterations were made to the original sources.

[3] One of the most researched BRT systems is the TransMilenio in Bogotá, Columbia, which is one of the largest BRT systems in the world.

Simultaneously, tables are presented here as well as the figures located in the visualization and the geospatial database, to illustrate the data that have been collected for Hartford, West Hartford, Newington, and New Britain. These figures and tables are also used to illustrate how these characteristics are analyzed over time in this (and possibly a subsequent) phase of this project.[4] Local changes as much as possible are focused on in this report because the areas closest to the stations are expected to be affected more than those located further from the stations. However, in some circumstances such as changes in affordable housing, only municipal data is available. In the present study, affordable housing changes is one measure of the "equity" effects associated with BRT.[5] This contrasts with one other recent study of CT***fastrak*** and the equity among residents from the BRT system. Specifically, Bertolaccini (2018) relies on a derived measure of equity based on transit demand and supply together with a Gini coefficient. Such an approach seems like an innovative way to examine transit equity but may not be as defensible as a direct measure, such as changes in affordable housing availability, due to the somewhat arbitrary nature of their derived estimates.

The vacancies data in the present study are at the census tract level, therefore, the most disaggregated level of presentation is at the tract level for these vacancies' variables. Otherwise, for brevity, an extensive set of figures on the characteristics of the communities near each CT***fastrak*** station is presented in the visualization and database. Providing a full set of local maps and figures here, covering all 11 CT***fastrak*** stations, is impractical due to the size limitations of this report.

The locations of the CT***fastrak*** stations were obtained from the CT DOT staff involved in maintaining the CT***fastrak*** website. Measures of proximity to these stations were based on the aforementioned latitude and longitude of these stations and the use of GIS tools. The locations of the stations extend southwesterly from the center of Hartford through the southeast corner of West Hartford and the northwest corner of Newington into the center of New Britain. Assessed property values and property tax revenues are obtained from data provided by the municipal assessors' offices. Estimated local property tax revenue is calculated using the assessment data and the mill rates from the assessor's office. The number of single-family properties (Tables 2 and 3), number of multifamily properties (Tables 4 and 5), number of rental properties (i.e., apartments, boarding houses and condominiums; Tables 6 and 7), number of commercial properties (Tables 8 and 9), and number of affordable housing properties (or equivalently, assisted units; Table 35) are created from data provided by the municipal

[4] Before moving to the maps and tables of the results for Phase 2, a clarification should be made regarding underlying data. Property counts in maps and their corresponding tables might not match in all instances, the reason is due to map elements (such as the legend) covering properties that are included in table calculations; and in some instances, the properties are close together so they may appear as one property but in fact there are multiple properties at that location. Also, some revisions to the geocoding were done after the maps were developed, so that, for instance, some property locations were moved from the center of the street to the side of the same street in the Phase 2 versus Phase 1 geocoding process. All these issues might result in the appearance of a different location of the properties, in a small number of instances, in comparison with the numbers in some of the descriptive statistics tables.

[5] Consequently, for these variables that are at the municipal level, only the figures and tables that focus on the entire aforementioned four municipalities are shown.

assessors' offices, CHFA, and CRCOG. As previously mentioned, only municipal-level information about affordable housing could be acquired. Although the number of assisted units is rising between 2009 and 2015 in all four towns, Hartford and New Britain have added more assisted units than West Hartford and Newington.

Quarterly vacancy rate information was acquired and geocoded at the Census tract level, from 2009, 2015, and 2020 (Tables 36-39). The data is from the USPS vacancy database, which is also associated with the United States Department of Housing and Urban Development. Additionally, lists of vacant or undeveloped land parcels were obtained from the municipal assessors' offices (Tables 40 and 41).

3.3 Deflators

Properties in small local areas, such as near a CT***fastrak*** station, may appreciate due to anticipation and implementation of BRT service. But it may be the case that all properties have changed for other reasons during the same timeframe in the municipality or in the metropolitan area. Adjusting real estate prices by deflators is one way to adjust for these types of metro-wide price changes. Analysis of the Greater Hartford area indicates no significant changes in the housing sales price index from FHFA[6] during the period of Phase 2 of this study (March 2015 - March 2020). Therefore, there is little to no value added to this analysis anticipated by deflating the property prices in this study, and it is not pursued in the tables and maps below.

3.4 Mill Rates

In Connecticut, properties are generally assessed at 70 percent of their market values. Then a mill rate (i.e., the tax rate per $1,000 of assessed value) is applied to this assessed value, in order to obtain the property tax bill for each property. The mill rate used by each municipality in 2019[7] is listed in Table 1 below.

[6] Specifically, the FHFA house price index (non-seasonally adjusted) for the "Hartford-East Hartford-Middletown, CT" metropolitan statistical area in 2015 Q1 was 145.39, and it was 158.52 in 2020 Q1, which is an average of less than 1.8% increase in each year (year over year) during the first five years of CT***fastrak*** service (https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_PO_metro.txt, accessed on 5/26/2022). In contrast, the index for the most recent data available, for 2021 Q4, is 201.71, which implies a 27.25% increase in less than one year. Clearly, the vast majority of house price growth in this city occurred after 2021 Q1.

[7] Sources: https://portal.ct.gov/OPM/IGPP-MAIN/Publications/Mill-Rates and https://www.hartfordct.gov/Government/Departments/Tax (Accessed 4/23/2021).

Table 1. Mill Rates in the 4 Towns Served by CTfastrak

Town	FY2019/GL2017
Hartford	74.29*
West Hartford	41***
Newington	38.50
New Britain	50.50**

*Hartford has three special services districts with additional mill rates: Columbia Street & Park Terrace Special Services District (2.40), Hartford Business Improvement District (1.3115), and Park Street Special Services (3.50). Due to challenges with identifying the locations of properties in these districts, the tax revenue estimates tables and any corresponding maps below do not reflect these additional mill rates.

**New Britain Downtown has an additional mill rate (3.80). The maps and tables for tax revenues in New Britain include this additional mill rate, where appropriate.

***West Hartford has 800 Mountain Road Tax District that carries a different mill rate (27.774). Due to challenges with identifying the locations of properties in this district, the tax revenue tables, and maps below do not include this alternative mill rate.

While the mill rates vary by town in each year, the towns often adjust the mill rates after revaluations of properties are completed so that they can achieve a target level of property tax revenues. With this caveat in mind, the tables below demonstrate how tax revenues have changed in the two time periods (before versus after the first few years of operation of CT***fastrak***).

The change in the number of single-family homes is fairly stable between the two phases, except for Newington Junction Station and East Main Street Station, which experience modest increases between the two time periods shown in Tables 2 and 3.

Table 2. Number of Single-Family Homes-2012 or 2016 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	48	111	604	5541
Parkville Station Hartford	22	160	1468	8170
Kane Street Station Hartford	10	437	2206	9399
Flatbush Station West Hartford	92	393	2890	10516
Elmwood Station West Hartford	9	323	2644	11591
Newington Junction Station Newington	86	639	3209	8160
Cedar Street Station Newington	N/A	75	1186	9373
East Street Station New Britain	50	378	2184	8338
East Main Street station – Northbound New Britain	72	360	1814	7490
East Main Street station – Southbound New Britain	66	307	1719	7497
New Britain Station New Britain	N/A	54	983	7888

Note: In some instances, 2012 Phase 1 estimates were the only ones available and were used here.

Table 3. Number of Single-Family Homes- 2020 (Sources: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station-Hartford	48	112	605	5516
Parkville Station-Hartford	22	159	1466	8142
Kane Street Station-Hartford	10	436	2200	9378
Flatbush Station-West Hartford	92	392	2887	10496
Elmwood Station-West Hartford	9	320	2643	11589
Newington Junction Station-Newington	86	646	3212	8164
Cedar Street Station-Newington	0	74	1194	9398
East Street Station-New Britain	50	379	2206	8371
East Main Street Station- New Britain	79	372	1869	7659
New Britain Station-New Britain	0	55	992	7930

The numbers of multi-family homes within ½ mile from each of the stations remained somewhat stable between the two phases of this study (2012/2016 and 2020), as demonstrated in Tables 4 and 5 below.

Table 4. Number of Multi-Family Homes, 2012 or 2016 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	32	215	1501	5536
Parkville Station Hartford	140	510	1771	5509
Kane Street Station Hartford	40	242	1567	4986
Flatbush Station West Hartford	39	119	634	4252
Elmwood Station West Hartford	5	87	374	2181
Newington Junction Station Newington	10	28	96	421
Cedar Street Station Newington	N/A	1	41	1616
East Street Station New Britain	4	45	469	2837
East Main Street station – Northbound New Britain	222	747	1799	4435
East Main Street station – Southbound New Britain	234	739	1861	4529
New Britain Station New Britain	1	261	2582	4809

Note: In some instances, 2012 Phase 1 estimates were the only ones available and were used here.

Table 5. Number of Multi-Family Homes, 2020 (sources: municipal assessor offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station-Hartford	32	215	1517	5558
Parkville Station-Hartford	140	513	1783	5534
Kane Street Station-Hartford	40	241	1573	5010
Flatbush Station-West Hartford	40	119	632	4269
Elmwood Station-West Hartford	5	87	375	2179
Newington Junction Station-Newington	10	24	92	419
Cedar Street Station-Newington	N/A	1	38	1595
East Street Station-New Britain	4	44	453	2819
East Main Street Station-New Britain	223	744	1847	4508
New Britain Station-New Britain	1	260	2580	4792

Sigourney Street Station experienced a notable increase in the number of rental properties, within all radii shown in the tables below (Tables 6 and 7).

Table 6. Number of Rental Properties (Apartments, Boarding Houses and Condominiums) in 2012 or 2016 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	180	1150	2825	6962
Parkville Station Hartford	96	309	2495	7396
Kane Street Station Hartford	5	157	1307	7283
Flatbush Station West Hartford	N/A	79	785	4015
Elmwood Station West Hartford	2	125	318	1989
Newington Junction Station Newington	55	301	706	1343
Cedar Street Station Newington	N/A	24	265	1593
East Street Station New Britain	105	108	240	1609
East Main Street station – Northbound New Britain	N/A	44	338	1527
East Main Street station – Southbound New Britain	1	47	359	1502
New Britain Station New Britain	38	143	570	1381

Note: In some instances, 2012 Phase 1 estimates were the only ones available and were used here.

Table 7. Number of Rental Properties (Apartments, Boarding Houses and Condominiums) in 2020 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station-Hartford	451	1936	5018	10148
Parkville Station-Hartford	97	454	3275	10423
Kane Street Station-Hartford	5	168	1514	10276
Flatbush Station-West Hartford	N/A	87	734	5127
Elmwood Station-West Hartford	N/A	126	324	1935
Newington Junction Station-Newington	55	299	676	1350
Cedar Street Station-Newington	N/A	24	259	1600
East Street Station-New Britain	106	108	240	1627
East Main Street Station-New Britain	N/A	45	367	1501
New Britain Station-New Britain	38	152	580	1395

Parkville Station saw a modest increase in the number of commercial properties within ¼ mile from the station between the two phases under consideration in this study. However, Flatbush Station and Elmwood Station experienced decreases in the number of commercial properties within ¼ miles of the stations. This is likely due to redevelopment that was occurring in the West Hartford neighborhoods near those stations.

Table 8. Number of Commercial Properties in 2012 or 2016 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	35	110	597	1531
Parkville Station Hartford	44	122	495	1791
Kane Street Station Hartford	18	141	398	1829
Flatbush Station West Hartford	62	162	474	1506
Elmwood Station West Hartford	91	348	621	1075
Newington Junction Station Newington	29	68	238	898
Cedar Street Station Newington	17	49	123	559
East Street Station New Britain	20	34	155	696
East Main Street station – Northbound New Britain	27	60	325	839
East Main Street station – Southbound New Britain	37	61	356	831
New Britain Station New Britain	51	176	400	785

Note: In some instances, 2012 Phase 1 estimates were the only ones available and were used here.

Table 9. Number of Commercial Properties in 2020 (Source: Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station-Hartford	37	131	691	1643
Parkville Station-Hartford	53	147	546	1836
Kane Street Station-Hartford	18	149	380	1785
Flatbush Station-West Hartford	49	131	394	1376
Elmwood Station-West Hartford	69	279	515	944
Newington Junction Station-Newington	29	66	227	817
Cedar Street Station-Newington	17	50	121	644
East Street Station-New Britain	24	42	164	807
East Main Street Station-New Britain	44	77	452	1070
New Britain Station-New Britain	63	257	540	987

3.5 Assessed Values

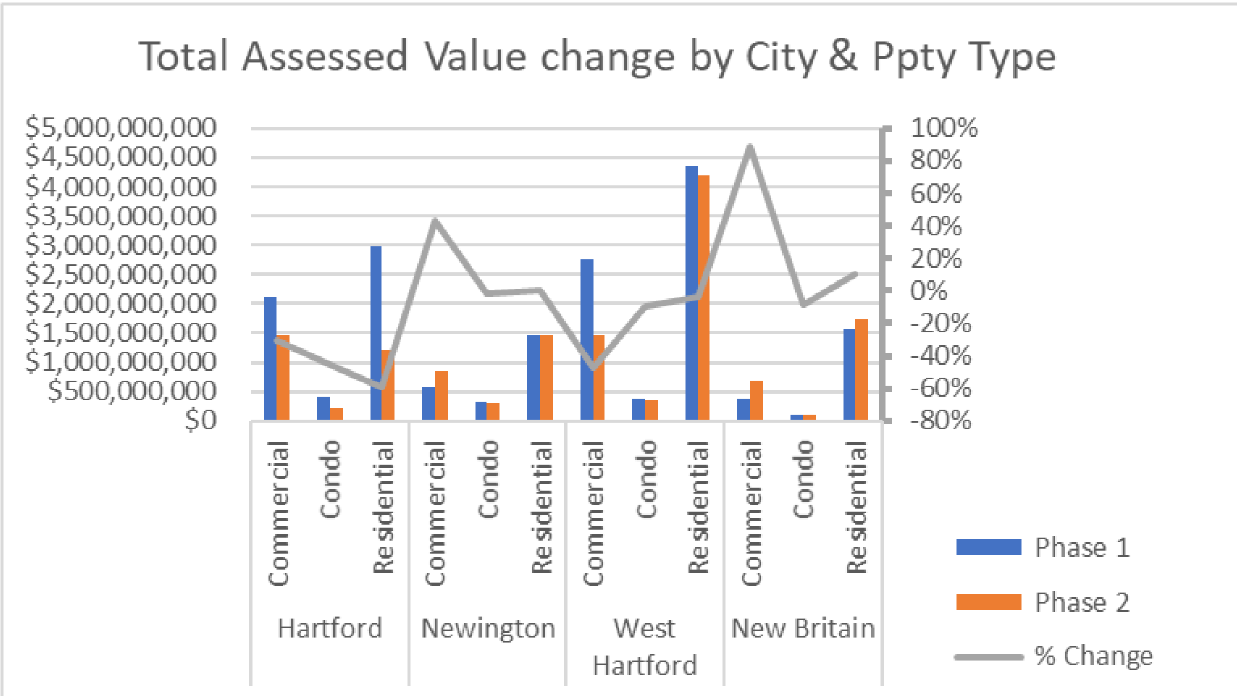

Figure 1. Total Assessed Values by Municipality and Property Type, Phases 1 and 2

Figure 1 above shows the total assessed values by municipality and property type, for Phase 1 and Phase 2. Residential assessments rose in New Britain but fell or remained steady in all other three municipalities. Condominium assessments either fell slightly or remained steady in all 4 municipalities. It is notable that commercial assessments rose in total by 40% and 80%, for Newington and New Britain, respectively, but fell in total by 30% and 40% for Hartford and West Hartford, respectively, between Phases 1 and 2.

Residential Assessed Values

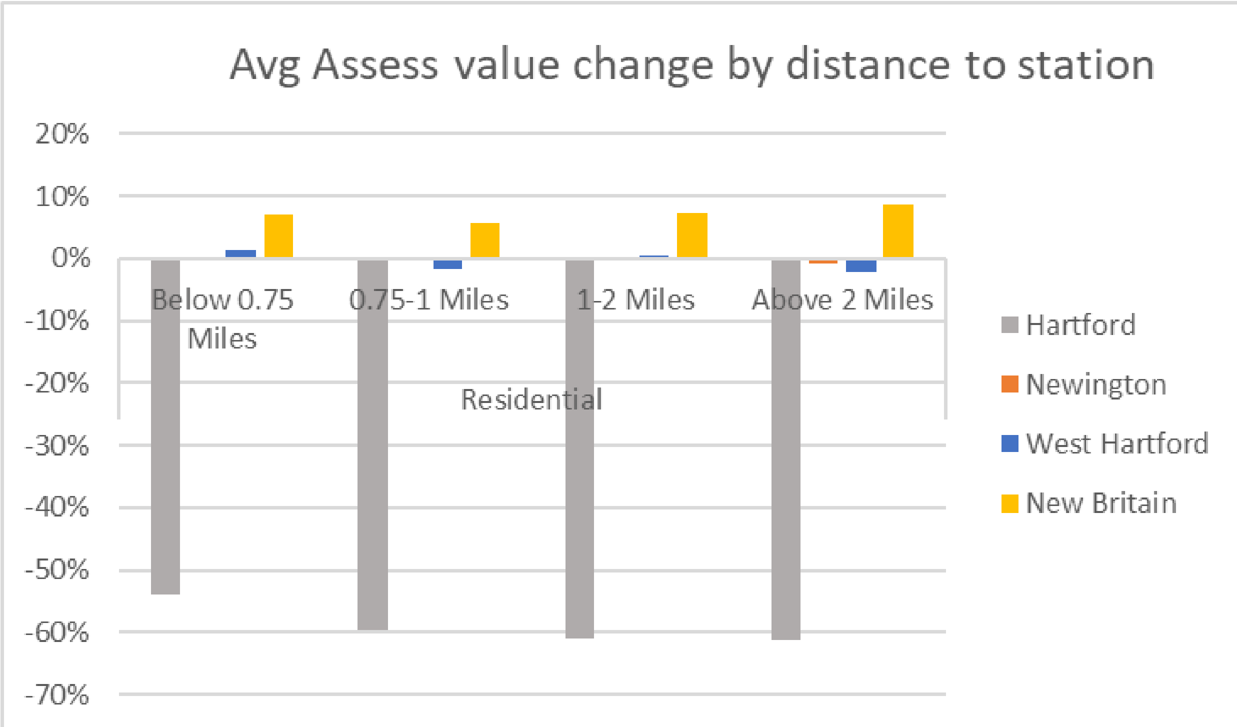

Figure 2. Average Residential Assessed Value Changes by Distance to Station, Phases 1 and 2

Figure 2 above shows average assessed value changes by distance to the nearest station, for residential properties in all 4 municipalities. It is particularly noteworthy that the Hartford residential assessments dropped by about 50% for those properties within 0.75 miles of a station and become more negative successively as the distance to the nearest station rises.

The following tables show the descriptive statistics for the assessed values of residential properties, by distance radius from each station, for 2015 (Phase 1, Table 10) and 2020 (Phase 2, Table 11).

Table 10. Descriptive Statistics of Assessed Values of Residential Properties (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	120	482	1,208	2,809	12,802
	Avg.	272,143	313,668	330,632	269,476	220,246
	Med.	179,800	172,350	178,350	174,800	168,500
	S.D.	456,781	770,373	1,075,211	754,338	444,077
	Min	1,100	1,100	1,100	1,100	560
	Max	4,342,700	9,159,100	27,177,000	27,177,000	27,177,000
Parkville Station Hartford	**n =**	192	808	2,083	3,894	15,294
	Avg.	182,941	204,824	220,289	215,975	210,207
	Med.	167,850	166,100	167,200	169,520	167,700
	S.D.	92,275	475,452	678,195	545,826	401,295
	Min	76,800	2,700	1,200	560	560
	Max	859,900	11,205,500	27,177,000	27,177,000	27,177,000
Kane Street Station Hartford	**n =**	56	754	2,271	4,117	15,734
	Avg.	155,666	148,391	159,969	172,820	199,423
	Med.	153,850	131,500	137,000	142,900	163,590
	S.D.	43,297	128,696	256,169	478,802	357,450
	Min	21,900	560	560	560	190
	Max	284,100	2,055,300	11,205,500	27,177,000	27,177,000
Flatbush Station West Hartford	**n =**	137	539	1,573	3,645	15,747
	Avg.	143,982	136,596	131,635	138,999	179,539
	Med.	115,920	121,310	122,850	128,500	154,470
	S.D.	113,719	111,733	83,680	114,893	277,038
	Min	560	560	560	560	190
	Max	979,650	2,055,300	2,055,300	4,434,850	27,177,000
Elmwood Station West Hartford	**n =**	24	432	1,561	3,102	14,190
	Avg.	186,667	133,917	132,530	136,863	156,918
	Med.	134,190	127,960	130,760	130,900	142,575
	S.D.	134,979	49,088	37,622	93,197	88,855
	Min	19,670	3,220	190	190	190
	Max	554,820	554,820	554,820	3,491,770	4,434,850
Newington Junction Station Newington	**n =**	109	1,310	1,741	3,370	8,834
	Avg.	145,053	142,994	139,534	140,568	151,359
	Med.	134,390	133,665	130,740	133,560	137,575
	S.D.	157,641	143,668	118,518	87,610	267,384
	Min	370	140,840	370	190	190
	Max	1,706,450	42,472	3,491,770	3,491,770	20,865,530
Cedar Street Station Newington	**n =**	-	1,310	584	1,261	11,260
	Avg.	N/A	257,720	156,416	146,106	133,367
	Med.	N/A	79	130,990	123,180	122,130
	S.D.	N/A	143,668	269,760	265,333	266,253
	Min	N/A	140,840	370	370	370
	Max	N/A	42,472	6,049,190	6,144,600	20,865,530
East Street Station New Britain	**n =**	59	432	1,219	2,706	11,452
	Avg.	265,141	130,523	116,079	119,619	129,055
	Med.	90,440	94,045	98,140	102,865	111,090
	S.D.	813,284	320,012	194,404	238,586	271,358
	Min	45,360	38,780	370	370	370
	Max	6,049,190	6,049,190	6,049,190	10,273,970	20,865,530
East Main Street Station – Northbound New Britain	**n =**	295	1,113	2,174	3,707	12,207
	Avg.	95,555	100,093	108,543	115,943	122,529
	Med.	93,520	95,830	94,150	97,160	106,260
	S.D.	23,671	54,036	255,339	240,518	169,619
	Min	25,130	25,130	370	370	130

	Max	231,630	1,690,220	10,273,970	10,273,970	10,273,970
East Main Street Station – Southbound New Britain	**n =**	302	1,055	2,144	3,659	12,306
	Avg.	95,726	102,644	110,945	115,657	121,296
	Med.	92,400	96,600	94,255	96,530	105,700
	S.D.	26,230	68,854	276,665	242,377	163,860
	Min	25,130	25,130	370	370	130
	Max	280,490	1,690,220	10,273,970	10,273,970	10,273,970
New Britain Station New Britain	**n =**	1	346	1,547	3,666	12,940
	Avg.	210,700	157,519	127,792	118,796	114,544
	Med.	210,700	96,425	100,310	99,015	99,925
	S.D.	-	367,667	225,955	235,977	173,190
	Min	210,700	18,900	18,900	18,900	370
	Max	210,700	4,840,570	4,840,570	10,273,970	10,273,970

Table 11. Descriptive Statistics of Assessed Values of Residential Properties (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	116	460	1,146	2,716	12,502
	Avg.	140,046	157,450	176,297	128,523	126,597
	Med.	64,488	60,638	62,773	61,530	66,115
	S.D.	305,515	484,628	750,465	518,779	272,622
	Min	8,960	1,960	1,960	1,680	1,680
	Max	3,039,890	6,411,370	19,024,040	19,024,040	19,024,040
Parkville Station Hartford	**n =**	185	786	2,026	3,780	14,947
	Avg.	70,273	89,565	107,336	114,025	129,533
	Med.	58,520	57,803	58,870	63,875	73,290
	S.D.	44,608	319,363	478,494	379,356	248,069
	Min	26,880	1,890	1,890	1,890	1,680
	Max	300,300	7,175,000	19,024,040	19,024,040	19,024,040
Kane Street Station Hartford	**n =**	56	734	2,223	4,043	15,408
	Avg.	62,293	66,991	86,838	105,717	128,621
	Med.	53,830	47,915	58,520	70,140	83,020
	S.D.	36,495	81,405	169,534	336,470	238,886
	Min	15,330	2,870	1,890	1,890	1,680
	Max	198,870	1,132,320	7,175,000	19,024,040	19,024,040
Flatbush Station West Hartford	**n =**	132	521	1,537	3,587	15,487
	Avg.	129,084	121,024	97,795	92,456	126,964
	Med.	115,290	115,080	105,840	85,750	111,650
	S.D.	38,820	63,293	57,561	67,940	200,248
	Min	68,460	5,950	5,950	2,240	1,890
	Max	300,020	1,120,000	1,120,000	1,715,000	19,024,040
Elmwood Station West Hartford	**n =**	15	408	1,533	3,057	14,039
	Avg.	148,512	133,514	109,347	115,299	127,608
	Med.	133,560	128,485	116,480	120,680	127,610
	S.D.	57,193	34,276	44,162	81,692	82,566
	Min	52,640	52,640	2,240	2,240	1,960
	Max	263,130	269,220	269,220	3,491,770	3,491,770
Newington Junction Station Newington	**n =**	107	687	1,732	3,352	8,766
	Avg.	148,277	145,014	141,142	142,011	143,595
	Med.	134,710	134,290	131,495	134,470	134,725
	S.D.	157,861	144,289	116,794	86,269	292,161
	Min	3,680	3,680	3,680	3,680	2,240
	Max	1,706,450	3,491,770	3,491,770	3,491,770	22,750,000
Cedar Street Station Newington	**n =**	-	79	588	1,278	11,352
	Avg.	N/A	145,823	162,323	150,321	137,918

	Med.	N/A	140,900	133,070	126,900	125,175
	S.D.	N/A	40,670	283,815	270,687	300,467
	Min	N/A	34,120	2,630	2,630	2,100
	Max	N/A	257,720	6,349,210	6,349,210	22,750,000
East Street Station New Britain	**n =**	60	442	1,237	2,745	11,621
	Avg.	296,135	137,064	121,398	125,361	135,094
	Med.	98,035	99,820	103,320	108,360	117,630
	S.D.	856,803	338,055	206,289	298,418	308,146
	Min	54,460	3,710	3,710	2,100	2,030
	Max	6,349,210	6,349,210	6,349,210	13,770,731	22,750,000
East Main Street Station (Southbound) New Britain	**n =**	304	1,084	2,197	3,752	12,547
	Avg.	100,927	114,599	120,628	122,819	127,796
	Med.	97,405	101,815	98,560	101,010	111,510
	S.D.	29,248	156,565	353,596	299,627	209,609
	Min	15,890	2,870	2,730	2,100	2,030
	Max	330,960	3,292,730	13,770,731	13,770,731	13,770,731
East Main Street Station (Northbound) New Britain	**n =**	300	1,135	2,223	3,792	12,449
	Avg.	100,371	107,070	117,974	123,020	128,987
	Med.	97,930	101,080	98,490	101,850	112,070
	S.D.	26,082	95,931	334,293	297,767	214,251
	Min	15,890	2,870	2,730	2,100	2,030
	Max	251,580	2,929,780	13,770,731	13,770,731	13,770,731
New Britain Station New Britain	**n =**	1	366	1,612	3,789	13,243
	Avg.	239,120	183,686	139,529	128,253	121,917
	Med.	239,120	100,625	104,055	103,880	105,980
	S.D.	-	445,943	305,909	311,295	224,658
	Min	239,120	2,730	2,730	2,100	2,030
	Max	239,120	5,242,160	7,450,870	13,770,731	13,770,731

Condos Assessed Values

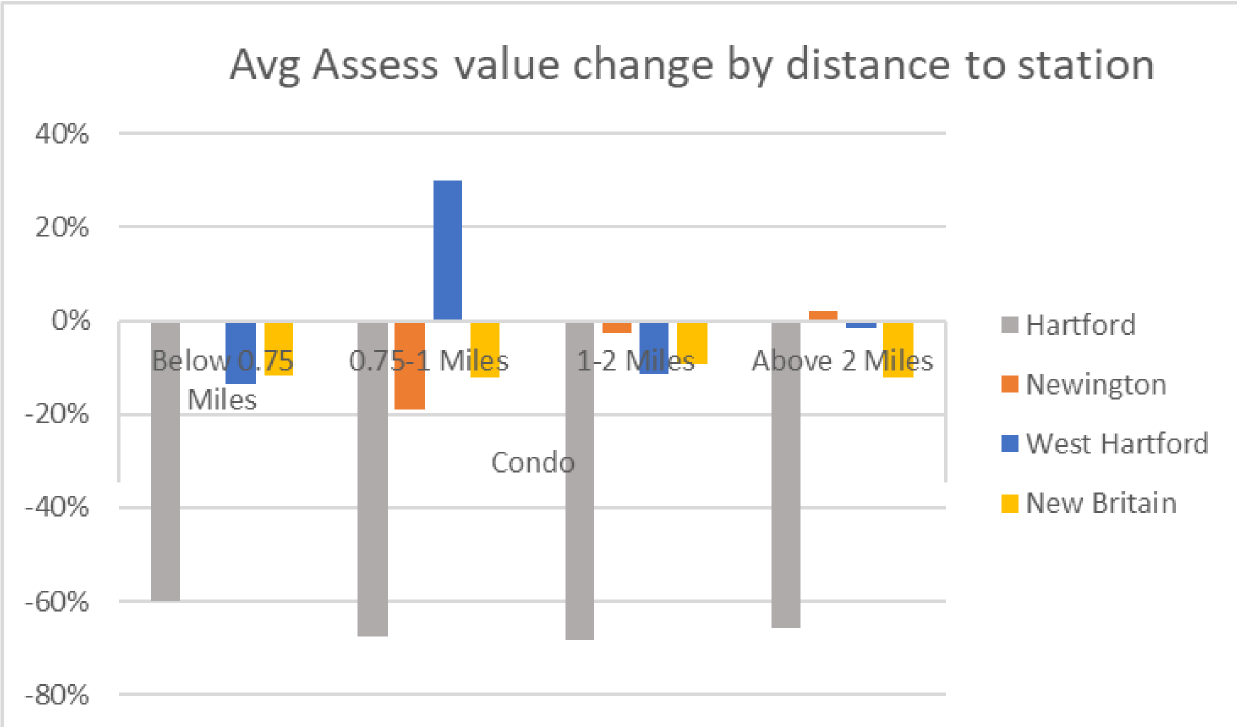

Figure 3. Average Condominium Assessed Value Changes by Distance to Station, Phases 1 and 2

Figure 3 above shows the change in assessed values of condominiums, in each of the 4 municipalities, by radius from the nearest station. Hartford experienced a 60% drop in average assessed value for the condominiums closest to CT***fastrak*** stations, and even larger drops for condos further away. West Hartford condominiums assessed values fell by about 15% for condos closest to a station, while a nearly 30% increase in condo assessed values for properties between 0.75 and 1 mile. New Britain condominiums' average assessed values fell by about 12% for condos within 0.75 miles and for condos within 0.75-1 mile, and those above 2 miles; while condos in New Britain that were between 1 and 2 miles from the nearest station fell by slightly less than 10% on average.

The following tables show the descriptive statistics for the assessed values of condominium properties, by distance radius from each station, for 2015 (Phase 1, Table 12) and 2020 (Phase 2, Table 13).

Table 12. Descriptive Statistics of Assessed Values of Condominiums (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	150	1,020	1,923	2,258	5,634
	Avg.	49,496	37,516	51,899	72,611	78,593
	Med.	30,000	34,400	40,300	40,300	41,600
	S.D.	34,002	18,430	64,282	370,394	289,588
	Min	20,500	4,600	4,600	4,600	3,990
	Max	153,800	153,800	1,740,417	16,304,300	16,304,300
Parkville Station Hartford	**n =**	69	202	698	1,957	6,171
	Avg.	138,540	72,901	47,587	50,933	92,695
	Med.	82,853	44,400	34,400	38,700	44,900
	S.D.	264,803	162,441	89,679	65,456	446,505
	Min	34,300	8,400	5,900	3,990	2,450
	Max	1,740,417	1,740,417	1,740,417	1,740,417	22,959,930
Kane Street Station Hartford	**n =**	-	100	615	1,045	6,235
	Avg.	N/A	26,703	50,256	55,643	90,224
	Med.	N/A	24,300	41,510	36,600	47,300
	S.D.	N/A	23,939	96,092	302,517	418,427
	Min	N/A	4,900	4,900	4,900	2,450
	Max	N/A	214,900	1,740,417	9,213,750	22,959,930
Flatbush Station West Hartford	**n =**	-	69	299	734	3,301
	Avg.	N/A	358,541	122,075	93,649	97,347
	Med.	N/A	24,900	40,810	41,580	49,580
	S.D.	N/A	1,720,748	832,861	533,898	485,835
	Min	N/A	15,100	4,900	4,900	2,450
	Max	N/A	10,920,490	10,920,490	10,920,490	22,959,930
Elmwood Station West Hartford	**n =**	-	118	288	294	1,800
	Avg.	N/A	185,136	219,341	216,680	95,606
	Med.	N/A	175,210	120,330	119,945	56,980
	S.D.	N/A	57,889	841,804	833,351	345,284
	Min	N/A	78,960	27,200	27,200	3,710
	Max	N/A	333,550	10,920,490	10,920,490	10,920,490
Newington Junction Station Newington	**n =**	52	297	505	692	1,297
	Avg.	57,322	105,098	95,930	124,270	134,091
	Med.	52,520	95,990	93,280	95,990	95,990
	S.D.	28,478	36,257	46,950	77,333	403,368
	Min	44,820	44,820	44,820	44,820	3,710
	Max	247,140	247,140	372,070	1,173,720	10,920,490
Cedar Street Station Newington	**n =**	-	24	100	254	1,524
	Avg.	N/A	50,447	53,815	153,627	99,359
	Med.	N/A	50,330	54,950	194,555	83,545
	S.D.	N/A	412	3,658	81,961	63,158
	Min	N/A	50,050	50,050	50,050	10,150
	Max	N/A	50,890	68,670	255,940	1,173,720
East Street Station New Britain	**n =**	100	100	100	222	1,511
	Avg.	53,815	53,815	53,815	61,290	94,176
	Med.	54,950	54,950	54,950	54,950	81,480
	S.D.	3,658	3,658	3,658	21,755	63,892
	Min	50,050	50,050	50,050	15,260	10,150
	Max	68,670	68,670	68,670	100,110	1,173,720
East Main Street Station – Northbound New Britain	**n =**	-	40	138	294	1,409
	Avg.	N/A	42,737	69,204	56,541	61,166
	Med.	N/A	53,340	63,690	53,340	56,910
	S.D.	N/A	18,329	26,813	28,324	26,611
	Min	N/A	15,260	10,150	5,110	5,110

	Max	N/A	62,160	101,850	169,610	248,930
East Main Street Station – Southbound New Britain	**n =**	-	40	120	311	1,385
	Avg.	N/A	42,737	66,242	56,780	59,963
	Med.	N/A	53,340	62,420	56,070	55,160
	S.D.	N/A	18,329	27,078	27,612	25,194
	Min	N/A	15,260	10,150	5,110	5,110
	Max	N/A	62,160	101,850	169,610	248,930
New Britain Station New Britain	**n =**	38	119	321	497	1,252
	Avg.	17,809	42,066	40,590	47,519	54,967
	Med.	15,715	28,910	33,460	43,890	53,655
	S.D.	9,274	29,934	21,279	23,163	21,341
	Min	12,250	5,110	5,110	5,110	5,110
	Max	55,930	169,610	169,610	169,610	169,610

Table 13. Descriptive statistics of assessed values of condominiums (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	422	1,806	3,601	4,415	8,853
	Avg.	19,672	20,692	20,693	25,210	31,423
	Med.	14,875	13,230	14,210	14,350	15,050
	S.D.	12,115	50,570	44,134	169,236	139,206
	Min	7,140	1,610	1,610	1,610	1,155
	Max	80,780	490,000	981,890	10,220,000	10,220,000
Parkville Station Hartford	**n =**	68	340	1,282	2,742	9,192
	Avg.	64,598	24,957	17,048	22,957	38,744
	Med.	35,525	15,155	14,000	14,735	15,715
	S.D.	158,197	73,786	38,558	35,575	141,673
	Min	24,010	2,940	2,065	1,610	1,155
	Max	981,890	981,890	981,890	981,890	10,220,000
Kane Street Station Hartford	**n =**	-	100	698	1,258	9,247
	Avg.	N/A	10,887	36,252	26,364	40,909
	Med.	N/A	9,205	26,495	14,648	16,380
	S.D.	N/A	3,799	57,582	45,437	129,474
	Min	N/A	5,285	5,285	2,065	1,155
	Max	N/A	20,020	981,890	981,890	10,220,000
Flatbush Station West Hartford	**n =**	-	77	241	688	4,473
	Avg.	N/A	17,962	52,775	62,217	54,580
	Med.	N/A	8,785	51,800	41,580	18,340
	S.D.	N/A	35,999	40,835	64,023	75,195
	Min	N/A	5,285	5,285	5,285	1,610
	Max	N/A	170,450	170,450	330,540	1,120,840
Elmwood Station West Hartford	**n =**	-	126	307	313	1,785
	Avg.	N/A	189,933	152,212	151,000	80,189
	Med.	N/A	177,940	123,550	123,340	56,980
	S.D.	N/A	59,850	77,782	77,576	69,353
	Min	N/A	78,960	9,520	9,520	5,285
	Max	N/A	333,550	333,550	333,550	333,550
Newington Junction Station Newington	**n =**	52	295	493	675	1,322
	Avg.	57,322	105,052	91,644	119,854	114,889
	Med.	52,520	95,990	93,280	95,990	95,990
	S.D.	28,478	36,465	37,753	63,638	67,425
	Min	44,820	44,820	44,820	44,820	4,200
	Max	247,140	247,140	247,140	261,840	333,550
Cedar Street Station Newington	**n =**	-	24	100	254	1,536
	Avg.	N/A	46,842	39,610	148,364	92,397

	Med.	N/A	46,725	35,105	194,600	75,390
	S.D.	N/A	377	7,092	89,172	56,229
	Min	N/A	46,480	31,430	31,430	2,590
	Max	N/A	47,250	47,250	261,840	315,520
East Street Station New Britain	**n =**	100	100	100	222	1,528
	Avg.	39,610	39,610	39,610	54,791	87,668
	Med.	35,105	35,105	35,105	47,250	71,680
	S.D.	7,092	7,092	7,092	25,133	57,692
	Min	31,430	31,430	31,430	2,590	2,590
	Max	47,250	47,250	47,250	103,710	315,520
East Main Street Station (Southbound) New Britain	**n =**	-	40	124	295	1,327
	Avg.	N/A	42,394	63,768	56,374	54,010
	Med.	N/A	51,380	61,730	51,380	49,420
	S.D.	N/A	16,117	28,966	24,032	24,185
	Min	N/A	2,590	2,590	2,590	2,590
	Max	N/A	59,220	103,710	103,710	126,210
East Main Street Station (Northbound) New Britain	**n =**	-	40	142	280	1,351
	Avg.	N/A	42,394	66,960	56,250	55,366
	Med.	N/A	51,380	62,420	51,380	49,420
	S.D.	N/A	16,117	28,724	24,615	26,017
	Min	N/A	2,590	2,590	2,590	2,590
	Max	N/A	59,220	103,710	103,710	143,070
New Britain Station New Britain	**n =**	35	103	301	478	1,233
	Avg.	41,472	40,304	37,510	43,246	50,037
	Med.	43,260	42,280	37,800	42,245	48,020
	S.D.	3,984	17,594	15,732	17,943	20,725
	Min	34,090	2,940	2,940	2,590	2,590
	Max	50,820	85,890	98,630	98,630	114,590

Commercial Assessed Values

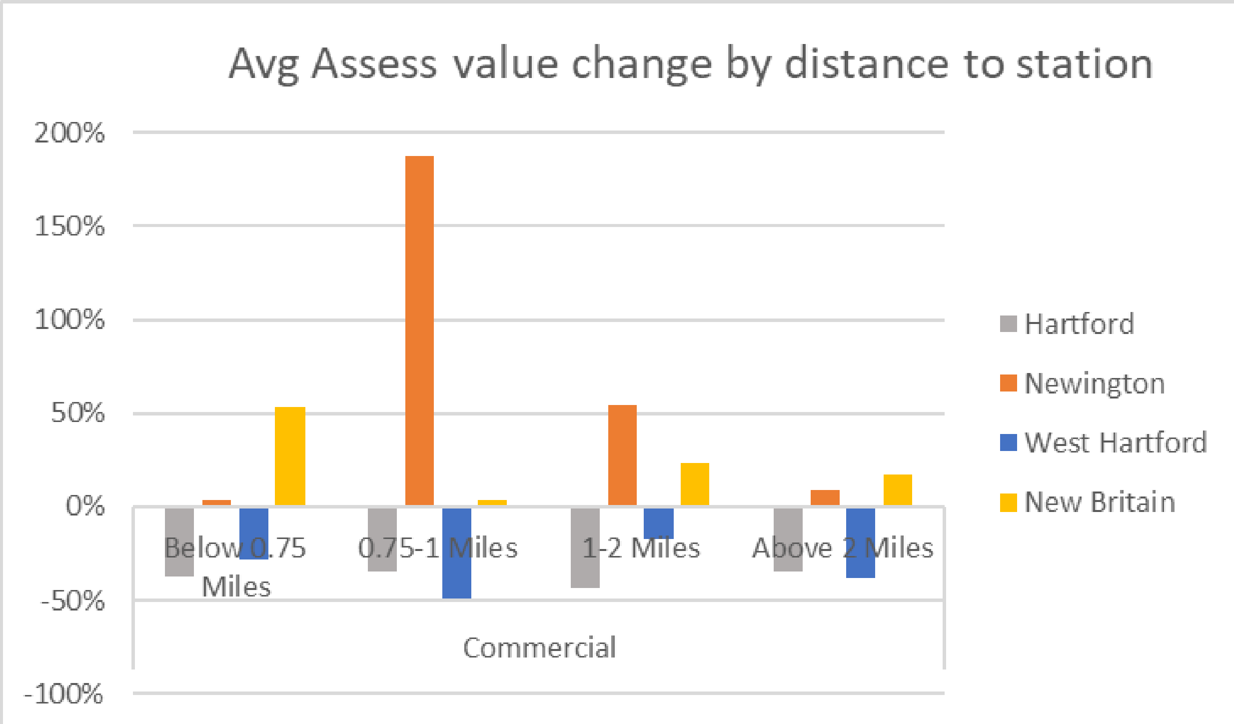

Figure 4. Average Commercial Assessed Value Changes by Distance to Station, Phases 1 and 2

Exploring deeper into the commercial property assessments in the four towns, by property location, Figure 4 shows that New Britain saw a greater than 50% increase in average assessed values for properties within 0.75 miles of the nearest CT***fastrak*** station. The average assessed value of commercial properties in Newington, within 0.75 and 1 mile from the nearest station, experienced nearly 200% increase in assessed values in the two periods.

The following tables show the descriptive statistics for the assessed values of commercial properties, by distance radius from each station, for 2015 (Phase 1, Table 14) and 2020 (Phase 2, Table 15).

Table 14. Descriptive Statistics of Assessed Values of Commercial Properties (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	35	110	286	597	1531
	Avg.	464180	1694964	1366029	1310801.56	1378584.42
	Med.	114400	261050	249550	241700	272000
	S.D.	1456842	9455721	8338510	7650785.54	6525846.47
	Min	25800	8100	1700	1700	1600
	Max	8737600	98039800	99250600	108126400	108126400
Parkville Station Hartford	**n =**	44	122	261	495	1791
	Avg.	456443.2	505377	766081.5	902393.3	1443912.32
	Med.	216350	183700	231100	275800	285500
	S.D.	679933.8	1092823	1964047	4679289	6407407.07
	Min	23900	16100	13100	1700	500
	Max	3398900	8733500	17141600	98039800	108126400
Kane Street Station Hartford	**n =**	18	141	255	398	1829
	Avg.	1015722	882024.5	916000.7	908325.5	1181578
	Med.	309100	238500	275800	268865	310590
	S.D.	2054470	2444069	2410677	2686159	4483283
	Min	16100	16100	10290	1200	500
	Max	8733500	17141600	20238100	25711700	99250600
Flatbush Station West Hartford	**n =**	62	162	336	474	1505
	Avg.	989412.3	1044208	904054.3	945288.2	1160734
	Med.	310905	277785	253015	288960	334180
	S.D.	2824279	3425410	2818905	2546075	3379816
	Min	1200	1200	500	500	130
	Max	20238100	25711700	25711700	25711700	45327900
Elmwood Station West Hartford	**n =**	91	348	500	621	1074
	Avg.	864947.7	616606.9	743988.2	816826.1	988436
	Med.	342580	266910	279220	275870	277430
	S.D.	1345165	1073333	1338715	2056666	2871706
	Min	35630	8190	500	130	130
	Max	6423550	6423550	9658040	25711700	42378420
Newington Junction Station Newington	**n =**	29	68	137	238	897
	Avg.	255859.7	342058.5	637209.4	708632.4	1099154
	Med.	181290	243405	250810	260330	288120
	S.D.	223982.2	394298.3	1445692	1421198	3784197
	Min	8850	130	130	130	130
	Max	875660	2841300	9658040	9658040	57586270
Cedar Street Station Newington	**n =**	17	49	67	123	556
	Avg.	1118031	790473.7	748621.6	553252	854270.8
	Med.	315000	315000	315000	196000	181295
	S.D.	2387581	1504573	1342562	1094210	4369222
	Min	350	350	350	350	130
	Max	9450000	9450000	9450000	9450000	57586270
East Street Station New Britain	**n =**	20	34	75	154	693
	Avg.	296696.5	315372.9	423187.2	418568	497510.7
	Med.	177695	193620	175980	171010	193200
	S.D.	287593.3	300608.1	1118544	965786.7	1007878
	Min	65900	350	350	350	350
	Max	1028370	1028370	9450000	9450000	10888850
East Main Street Station – Northbound New Britain	**n =**	27	60	189	324	837
	Avg.	290155.2	319244.3	309549.7	417109.1	435938.5
	Med.	162680	166600	135870	175385	187670
	S.D.	554364	657584.6	559249.1	809627.2	865667.7
	Min	33320	33320	420	420	350

	Max	3003000	4334260	4334260	8840440	9450000
East Main Street Station – Southbound New Britain	**n =**	37	61	194	355	829
	Avg.	263472.4	287562.3	368795.8	423790.3	436925.5
	Med.	141260	144130	140000	186340	185710
	S.D.	482706.3	566142.2	850580.6	793686.5	900703.9
	Min	33320	33320	420	420	350
	Max	3003000	3499860	8840440	8840440	9450000
New Britain Station New Britain	**n =**	51	176	302	400	784
	Avg.	905003.9	495163.3	477518.7	429002.3	435684.1
	Med.	416010	208530	191625	184590	185780
	S.D.	1513334	952007.2	1019126	918790	883113.1
	Min	68740	17780	17780	17780	370
	Max	8840440	8840440	9394280	9394280	9394280

Table 15. Descriptive statistics of assessed values of commercial properties (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	36	129	340	678	1,598
	Avg.	836,687	1,177,291	861,544	822,365	808,152
	Med.	88,830	199,220	179,305	172,830	189,840
	S.D.	3,259,173	6,301,170	5,166,941	4,781,901	4,097,825
	Min	18,060	5,670	5,670	3,710	2,310
	Max	18,920,790	68,627,790	68,627,790	72,425,499	72,425,499
Parkville Station Hartford	**n =**	52	141	296	536	1,779
	Avg.	336,630	338,153	503,225	575,521	864,711
	Med.	150,640	138,320	166,250	186,375	199,500
	S.D.	507,707	693,003	1,685,140	3,237,900	4,182,300
	Min	16,730	11,270	9,170	5,670	2,310
	Max	2,644,740	5,635,000	18,920,790	68,627,790	72,425,499
Kane Street Station Hartford	**n =**	18	146	248	368	1,737
	Avg.	679,113	495,836	574,492	513,484	731,380
	Med.	216,370	168,805	184,065	200,235	224,000
	S.D.	1,337,475	1,575,528	1,594,551	1,383,901	3,093,572
	Min	11,270	11,060	8,890	8,890	3,010
	Max	5,635,000	17,141,600	17,141,600	17,141,600	68,627,790
Flatbush Station West Hartford	**n =**	48	126	273	387	1,347
	Avg.	861,474	583,174	567,481	608,158	753,413
	Med.	310,905	215,040	201,180	219,170	243,530
	S.D.	1,897,437	1,362,767	1,497,445	1,437,955	2,507,306
	Min	9,030	3,010	3,010	3,010	3,010
	Max	11,060,000	11,060,000	17,141,600	17,141,600	43,320,130
Elmwood Station West Hartford	**n =**	69	278	398	506	905
	Avg.	662,641	502,968	541,474	554,123	718,649
	Med.	281,890	235,340	240,870	240,870	235,830
	S.D.	1,146,656	937,172	1,067,536	1,121,443	2,409,289
	Min	19,670	3,220	3,010	3,010	3,010
	Max	6,423,550	6,423,550	9,658,040	11,060,000	42,378,420
Newington Junction Station Newington	**n =**	29	64	119	202	775
	Avg.	273,169	358,304	610,310	633,869	1,123,492
	Med.	192,500	241,655	259,880	256,990	269,850
	S.D.	237,361	402,244	1,305,431	1,226,397	4,259,573
	Min	47,250	7,000	3,360	3,360	3,010
	Max	1,067,500	2,841,300	9,658,040	9,658,040	59,539,430
Cedar Street Station Newington	**n =**	16	49	70	120	590
	Avg.	1,179,611	827,319	786,238	1,148,823	942,184

	Med.	336,210	403,430	398,590	248,430	212,625
	S.D.	2,449,035	1,504,709	1,325,400	5,502,817	4,420,116
	Min	49,000	5,510	5,510	5,510	2,520
	Max	9,450,000	9,450,000	9,450,000	59,539,430	59,539,430
East Street Station New Britain	**n =**	24	41	81	158	751
	Avg.	240,801	314,955	434,576	425,018	701,059
	Med.	169,925	186,130	181,580	186,795	211,190
	S.D.	247,541	351,616	1,089,426	911,901	2,628,421
	Min	23,660	6,160	6,160	6,160	2,240
	Max	995,750	1,706,810	9,450,000	9,450,000	59,539,430
East Main Street Station (Southbound) New Britain	**n =**	44	77	216	412	967
	Avg.	253,208	242,186	358,689	482,308	605,582
	Med.	158,060	146,580	143,330	171,850	177,800
	S.D.	461,782	475,301	846,384	1,356,926	4,700,304
	Min	13,230	13,230	2,590	2,240	2,240
	Max	3,044,790	3,044,790	10,150,000	18,653,670	142,092,790
East Main Street Station (Northbound) New Britain	**n =**	33	73	204	374	972
	Avg.	280,776	235,669	312,307	489,065	594,972
	Med.	167,860	151,200	145,740	164,990	179,235
	S.D.	521,869	400,417	506,786	1,414,444	4,675,690
	Min	13,230	13,230	2,590	2,240	2,240
	Max	3,044,790	3,044,790	3,328,150	18,653,670	142,092,790
New Britain Station New Britain	**n =**	60	231	393	509	933
	Avg.	1,422,665	595,974	859,997	719,629	667,605
	Med.	373,240	173,530	168,490	167,860	174,790
	S.D.	3,150,588	1,745,087	7,294,255	6,414,262	5,221,805
	Min	2,940	2,240	2,240	2,240	2,240
	Max	18,653,670	18,653,670	142,092,790	142,092,790	142,092,790

3.6 Property Tax Revenues

Residential Property Tax Revenues

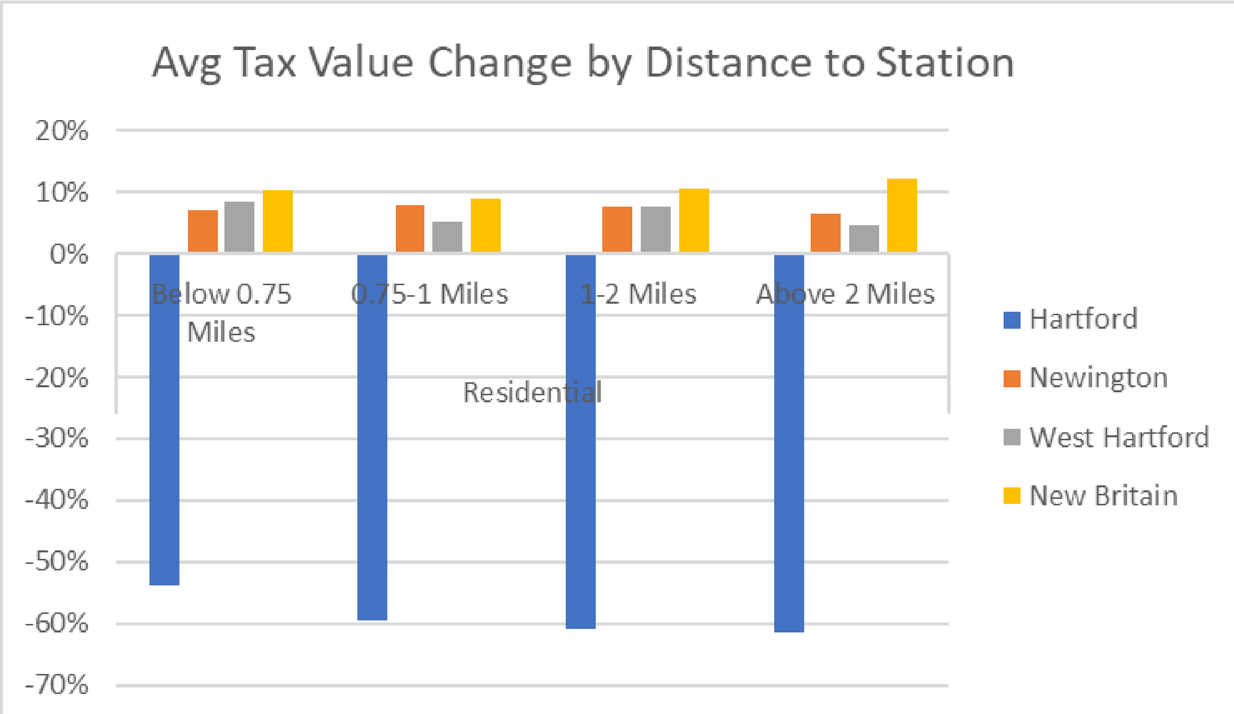

Figure 5. Average Residential Property Tax Value Change, 2015-2020, by Distance to Station

Figure 5 shows the change in average residential property tax value, by distance to the nearest station, between 2015 and 2020. Hartford experienced more than a 50% decline in tax revenues for properties within all radii from the nearest station. On the contrary, Newington, West Hartford, and New Britain all experienced increases in their tax revenues for properties within all radii, and there does not appear to be a notable difference between the tax revenue increases across various distance bands from the nearest station.

Tables 16 and 17 below present a set of detailed descriptive statistics for residential property tax revenues in 2015 and 2020, respectively.

Table 16. Descriptive Statistics of Estimated Residential Property Tax Revenue (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	120	482	1,208	2,809	12,802
	Avg.	20,218	23,302	24,563	20,019	14,212
	Med.	13,357	12,804	13,250	12,986	10,980
	S.D.	33,934	57,231	79,877	56,040	32,888
	Min	82	82	82	82	21
	Max	322,619	680,430	2,018,979	2,018,979	2,018,979
Parkville Station Hartford	**n =**	192	808	2,083	3,894	15,294
	Avg.	13,591	15,216	16,051	14,915	12,993
	Med.	12,470	12,340	12,042	11,151	10,304
	S.D.	6,855	35,321	50,410	40,500	29,694
	Min	5,705	201	89	21	21
	Max	63,882	832,457	2,018,979	2,018,979	2,018,979
Kane Street Station Hartford	**n =**	56	754	2,271	4,117	15,734
	Avg.	11,564	10,480	10,537	10,801	11,989
	Med.	11,430	9,535	9,383	9,011	9,815
	S.D.	3,217	9,688	19,135	35,688	26,461
	Min	1,627	21	21	21	7
	Max	21,106	152,688	832,457	2,018,979	2,018,979
Flatbush Station West Hartford	**n =**	137	539	1,573	3,645	15,747
	Avg.	5,516	6,069	6,947	7,921	10,061
	Med.	4,441	4,677	5,339	6,972	8,952
	S.D.	4,357	7,681	6,202	7,462	20,352
	Min	21	21	21	21	7
	Max	37,530	152,688	152,688	208,993	2,018,979
Elmwood Station West Hartford	**n =**	24	432	1,563	3,102	14,190
	Avg.	7,151	5,130	6,382	6,432	7,658
	Med.	5,141	4,902	5,192	5,162	6,374
	S.D.	5,171	1,881	3,091	5,717	5,332
	Min	754	123	7	7	7
	Max	21,255	21,255	21,255	208,993	208,993
Newington Junction Station Newington	**n =**	109	690	1,742	3,370	8,834
	Avg.	5,193	5,178	5,111	5,174	6,232
	Med.	4,811	4,871	4,827	4,940	5,256
	S.D.	5,644	5,172	4,244	3,147	12,606
	Min	13	13	13	7	7
	Max	61,091	125,005	125,005	125,005	1,022,411
Cedar Street Station Newington	**n =**	-	79	584	1,261	11,260
	Avg.	N/A	5,487	6,399	6,059	5,463
	Med.	N/A	5,270	5,142	5,046	4,891
	S.D.	N/A	1,529	13,135	11,242	12,624
	Min	N/A	47	13	13	13
	Max	N/A	9,553	296,410	296,410	1,022,411
East Street Station New Britain	**n =**	59	432	1,219	2,706	11,452
	Avg.	12,992	6,191	5,255	5,320	5,563
	Med.	4,432	4,562	4,562	4,727	4,881
	S.D.	39,851	15,607	9,456	11,635	12,975
	Min	2,223	1,900	13	13	13
	Max	296,410	296,410	296,410	503,425	1,022,411
East Main Street Station (Southbound) New Britain	**n =**	302	1,055	2,145	3,659	12,306
	Avg.	4,691	5,030	5,412	5,414	5,466
	Med.	4,528	4,733	4,589	4,593	4,936
	S.D.	1,285	3,374	13,553	11,863	7,847
	Min	1,231	1,231	13	13	5

	Max	13,744	82,821	503,425	503,425	503,425
East Main Street Station (Northbound) New Britain	**n =**	295	1,113	2,174	3,707	12,207
	Avg.	4,682	4,905	5,248	5,375	5,496
	Med.	4,582	4,696	4,557	4,610	4,943
	S.D.	1,160	2,648	12,512	11,765	8,009
	Min	1,231	1,231	13	13	5
	Max	11,350	82,821	503,425	503,425	503,425
New Britain Station New Britain	**n =**	1	346	1,547	3,666	12,940
	Avg.	10,324	7,720	6,262	5,821	5,426
	Med.	10,324	4,725	4,915	4,852	4,816
	S.D.	-	18,015	11,072	11,563	8,451
	Min	10,324	926	926	926	13
	Max	10,324	237,188	237,188	503,425	503,425

Table 17. Descriptive Statistics of Estimated Residential Property Tax Revenue (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	116	460	1,146	2,716	12,502
	Avg.	10,404	11,697	13,097	9,548	7,445
	Med.	4,791	4,505	4,663	4,571	4,740
	S.D.	22,697	36,003	55,752	38,540	19,555
	Min	666	146	146	125	125
	Max	225,833	476,301	1,413,296	1,413,296	1,413,296
Parkville Station Hartford	**n =**	185	786	2,026	3,780	14,947
	Avg.	5,221	6,654	7,685	7,457	7,214
	Med.	4,347	4,294	4,364	4,653	4,948
	S.D.	3,314	23,726	35,513	28,057	17,702
	Min	1,997	140	140	140	125
	Max	22,309	533,031	1,413,296	1,413,296	1,413,296
Kane Street Station Hartford	**n =**	56	734	2,223	4,043	15,408
	Avg.	4,628	4,481	5,218	5,968	6,956
	Med.	3,999	3,525	4,137	4,635	5,008
	S.D.	2,711	5,784	12,303	24,798	17,079
	Min	1,139	213	140	140	125
	Max	14,774	84,120	533,031	1,413,296	1,413,296
Flatbush Station West Hartford	**n =**	132	521	1,537	3,587	15,487
	Avg.	5,292	5,286	4,669	4,703	6,402
	Med.	4,727	4,736	4,449	4,342	5,139
	S.D.	1,592	4,138	3,067	4,033	14,025
	Min	2,807	300	300	166	104
	Max	12,301	83,205	83,205	127,407	1,413,296
Elmwood Station West Hartford	**n =**	15	408	1,533	3,057	14,039
	Avg.	6,089	5,474	4,909	5,115	5,754
	Med.	5,476	5,268	4,833	4,982	5,229
	S.D.	2,345	1,405	1,399	3,654	3,511
	Min	2,158	2,158	166	166	104
	Max	10,788	11,038	13,880	134,433	134,433
Newington Junction Station Newington	**n =**	107	687	1,732	3,352	8,766
	Avg.	5,709	5,645	5,552	5,610	5,953
	Med.	5,186	5,253	5,216	5,341	5,387
	S.D.	6,078	5,553	4,498	3,331	14,132
	Min	142	142	142	142	101
	Max	65,698	134,433	134,433	134,433	1,148,875
Cedar Street Station Newington	**n =**	-	79	588	1,278	11,352
	Avg.	N/A	5,945	7,021	6,585	5,992

	Med.	N/A	5,730	5,597	5,503	5,331
	S.D.	N/A	1,603	14,259	12,114	14,843
	Min	N/A	1,314	101	101	101
	Max	N/A	10,785	320,635	320,635	1,148,875
East Street Station New Britain	**n =**	60	442	1,237	2,745	11,621
	Avg.	14,955	6,743	5,738	5,838	6,135
	Med.	4,951	5,007	5,002	5,168	5,338
	S.D.	43,269	17,011	10,363	15,033	15,314
	Min	2,750	187	187	106	101
	Max	320,635	320,635	320,635	695,422	1,148,875
East Main Street Station (Southbound) New Britain	**n =**	304	1,084	2,197	3,752	12,547
	Avg.	5,097	5,787	6,070	5,976	6,024
	Med.	4,919	5,142	4,960	4,974	5,373
	S.D.	1,477	7,907	17,857	15,124	10,464
	Min	802	145	138	106	103
	Max	16,713	166,283	695,422	695,422	695,422
East Main Street Station (Northbound) New Britain	**n =**	300	1,135	2,223	3,792	12,449
	Avg.	5,069	5,407	5,894	5,938	6,057
	Med.	4,945	5,105	4,938	4,995	5,380
	S.D.	1,317	4,844	16,883	15,027	10,612
	Min	802	145	138	106	103
	Max	12,705	147,954	695,422	695,422	695,422
New Britain Station New Britain	**n =**	1	366	1,612	3,789	13,243
	Avg.	12,076	9,279	7,047	6,477	5,990
	Med.	12,076	5,096	5,257	5,246	5,278
	S.D.	-	22,520	15,448	15,720	11,324
	Min	12,076	138	138	106	103
	Max	12,076	264,729	376,269	695,422	695,422

Commercial Property Tax Revenues

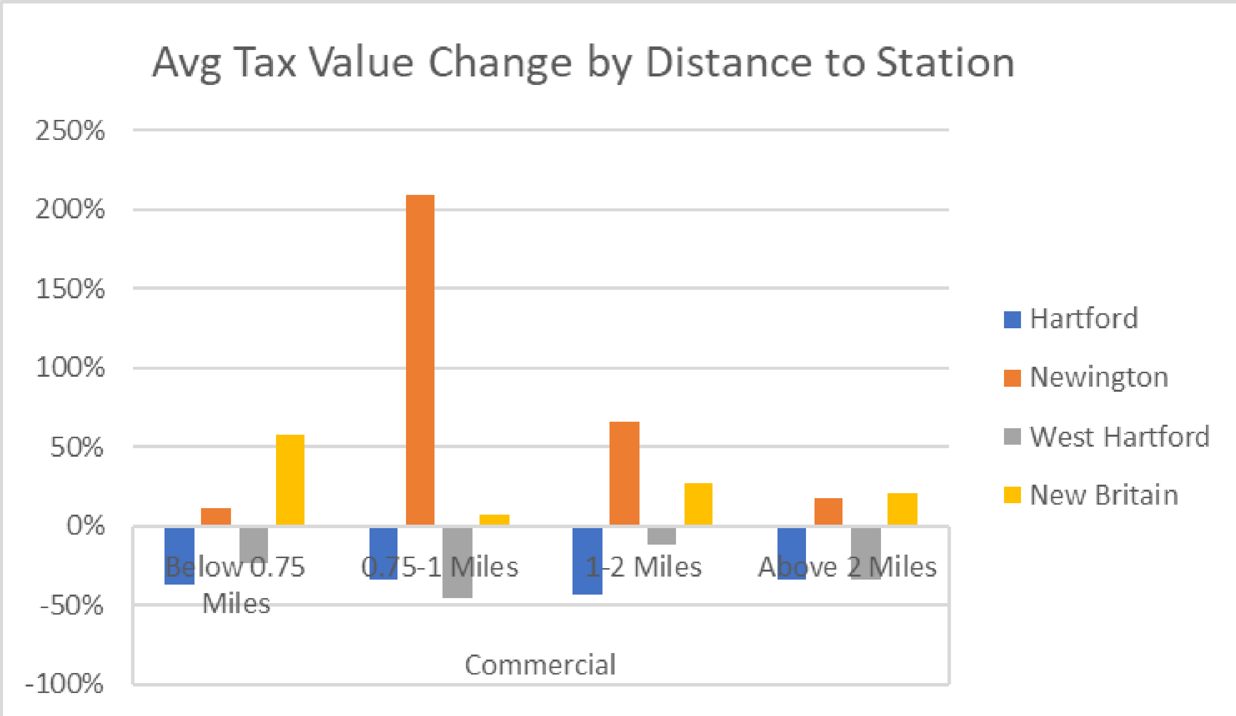

Figure 6. Average Commercial Property Tax Value Change, 2015-2020, by Distance to Station

Figure 6 presents the change in average commercial tax revenues by distance to the nearest station in each of the four municipalities. Newington and New Britain experienced notable increases in average property tax revenues for properties within 0.75 -1 miles and 0 -0.75 miles, Descriptive statistics for the estimated average commercial property tax revenues, in all 4 municipalities in 2015 and 2020, are presented below for various radii, in Tables 18 and 19 respectively. West Hartford and Hartford average commercial property tax revenues fell across all radii from the nearest stations in those municipalities.

Below are descriptive statistics tables (Table 18 and 19) for various radii to the nearest station, for commercial property tax revenues in 2015 and 2020.

Table 18. Descriptive Statistics of Estimated Commercial Property Tax Revenue (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	35	110	286	597	1,531
	Avg.	34,484	125,919	101,482	97,379	93,075
	Med.	8,499	19,393	18,539	17,956	17,146
	S.D.	108,229	702,466	619,468	568,377	478,712
	Min	1,917	602	126	126	119
	Max	649,116	7,283,377	7,373,327	8,032,710	8,032,710
Parkville Station Hartford	**n =**	44	122	261	495	1,791
	Avg.	33,909	37,544	45,388	55,742	88,698
	Med.	16,073	13,647	16,173	16,626	16,886
	S.D.	50,512	81,186	94,736	336,964	449,676
	Min	1,776	1,196	973	126	37
	Max	252,504	648,812	656,695	7,283,377	8,032,710
Kane Street Station Hartford	**n =**	18	141	255	398	1,829
	Avg.	75,458	51,253	52,030	47,199	61,477
	Med.	22,963	16,619	15,705	13,906	16,953
	S.D.	152,627	121,618	141,161	134,446	285,185
	Min	1,196	1,196	394	89	37
	Max	648,812	762,617	1,503,488	1,503,488	7,373,327
Flatbush Station West Hartford	**n =**	62	162	336	474	1,505
	Avg.	57,668	50,782	41,238	43,563	51,379
	Med.	12,595	11,231	10,544	12,309	15,928
	S.D.	207,632	177,693	136,764	125,337	156,397
	Min	89	89	37	37	5
	Max	1,503,488	1,503,488	1,503,488	1,503,488	3,367,410
Elmwood Station West Hartford	**n =**	91	348	500	621	1,074
	Avg.	33,136	23,622	28,992	33,279	41,935
	Med.	13,124	10,225	11,043	10,679	11,706
	S.D.	51,533	41,119	51,314	95,319	122,106
	Min	1,365	314	37	5	5
	Max	246,086	246,086	370,000	1,503,488	1,623,517
Newington Junction Station Newington	**n =**	29	68	137	238	897
	Avg.	9,160	12,373	23,579	26,394	42,434
	Med.	6,490	8,980	9,386	9,613	10,935
	S.D.	8,019	14,115	54,235	53,358	145,895
	Min	317	5	5	5	5
	Max	31,349	101,719	370,000	370,000	2,206,130
Cedar Street Station Newington	**n =**	17	49	67	123	556
	Avg.	40,025	28,547	27,433	20,598	33,269
	Med.	11,277	11,837	11,837	8,395	7,969
	S.D.	85,475	53,771	47,979	39,216	167,977
	Min	13	13	13	13	5
	Max	338,310	338,310	338,310	338,310	2,206,130
East Street Station New Britain	**n =**	20	34	75	154	693
	Avg.	14,495	14,115	17,026	16,634	21,784
	Med.	8,707	9,081	7,999	7,385	8,846
	S.D.	14,130	13,101	40,763	37,355	45,010
	Min	2,359	13	13	13	13
	Max	50,390	50,390	338,310	338,310	533,554
East Main Street Station (Southbound) New Britain	**n =**	37	61	194	355	829
	Avg.	12,910	14,091	18,221	21,057	20,399
	Med.	6,922	7,062	6,716	9,114	8,903
	S.D.	23,653	27,741	44,449	41,221	42,609
	Min	1,633	1,633	15	15	13

	Max	147,147	171,493	470,311	470,311	470,311
East Main Street Station (Northbound) New Britain	**n =**	27	60	189	324	837
	Avg.	14,218	15,946	14,957	20,617	20,173
	Med.	7,971	8,163	6,606	8,594	9,001
	S.D.	27,164	34,134	28,262	42,123	40,648
	Min	1,633	1,633	15	15	13
	Max	147,147	230,583	230,583	470,311	470,311
New Britain Station New Britain	**n =**	51	176	302	400	784
	Avg.	47,805	25,411	24,067	21,526	21,210
	Med.	22,132	10,441	9,407	9,074	9,014
	S.D.	80,317	49,940	51,769	46,582	43,987
	Min	3,657	871	871	871	13
	Max	470,311	470,311	470,311	470,311	470,311

Table 19. Descriptive Statistics of Estimated Commercial Property Tax Revenue (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	36	129	340	678	1,598
	Avg.	62,157	87,461	64,004	61,094	56,970
	Med.	6,599	14,800	13,321	12,840	12,840
	S.D.	242,124	468,114	383,852	355,247	301,657
	Min	1,342	421	421	276	172
	Max	1,405,625	5,098,359	5,098,359	5,380,490	5,380,490
Parkville Station Hartford	**n =**	52	141	296	536	1,779
	Avg.	25,008	25,121	33,134	38,536	56,126
	Med.	11,191	10,276	12,145	12,665	12,793
	S.D.	37,718	51,483	102,903	234,309	292,404
	Min	1,243	837	681	421	123
	Max	196,478	418,624	1,405,625	5,098,359	5,380,490
Kane Street Station Hartford	**n =**	18	146	248	368	1,737
	Avg.	50,451	31,387	35,082	29,916	41,429
	Med.	16,074	12,325	11,927	11,077	12,938
	S.D.	99,361	78,636	90,229	77,011	196,667
	Min	837	822	364	364	123
	Max	418,624	702,806	821,647	821,647	5,098,359
Flatbush Station West Hartford	**n =**	48	126	273	387	1,347
	Avg.	49,699	31,527	27,821	30,230	36,525
	Med.	13,479	10,272	8,986	10,651	12,595
	S.D.	135,942	93,266	79,851	77,127	118,797
	Min	494	123	123	123	123
	Max	821,647	821,647	821,647	821,647	1,846,107
Elmwood Station West Hartford	**n =**	69	278	398	506	905
	Avg.	27,168	20,622	22,537	24,011	32,414
	Med.	11,557	9,649	10,038	10,008	10,651
	S.D.	47,013	38,424	43,741	56,190	103,470
	Min	806	132	123	123	123
	Max	263,366	263,366	395,980	821,647	1,737,515
Newington Junction Station Newington	**n =**	29	64	119	202	775
	Avg.	10,517	13,894	24,017	25,057	45,761
	Med.	7,411	9,304	10,118	10,081	11,276
	S.D.	9,138	15,481	51,904	48,639	170,367
	Min	1,819	270	129	129	123
	Max	41,099	109,390	395,980	395,980	2,292,268
Cedar Street Station Newington	**n =**	16	49	70	120	590
	Avg.	45,415	32,503	31,104	45,663	38,710

	Med.	12,944	15,941	15,737	10,516	9,425
	S.D.	94,288	58,172	51,132	212,206	175,948
	Min	1,887	212	212	212	121
	Max	363,825	363,825	363,825	2,292,268	2,292,268
East Street Station New Britain	**n =**	24	41	81	158	751
	Avg.	12,128	14,829	18,670	17,721	31,703
	Med.	8,581	8,790	8,431	8,517	9,751
	S.D.	12,526	16,734	42,907	35,687	109,790
	Min	1,195	311	311	311	113
	Max	50,285	86,194	363,825	363,825	2,292,268
East Main Street Station (Southbound) New Britain	**n =**	44	77	216	412	967
	Avg.	12,787	12,230	18,136	24,836	29,727
	Med.	7,982	7,402	6,987	8,767	8,809
	S.D.	23,320	24,003	45,098	73,035	237,510
	Min	668	668	121	113	110
	Max	153,762	153,762	551,145	1,012,894	7,175,686
East Main Street Station (Northbound) New Britain	**n =**	33	73	204	374	972
	Avg.	14,179	11,901	15,476	25,118	29,076
	Med.	8,477	7,636	7,165	8,300	8,830
	S.D.	26,354	20,221	25,748	76,179	236,250
	Min	668	668	121	113	110
	Max	153,762	153,762	168,072	1,012,894	7,175,686
New Britain Station New Britain	**n =**	60	231	393	509	933
	Avg.	76,727	31,533	44,274	36,993	33,737
	Med.	20,267	8,830	8,512	8,509	8,774
	S.D.	170,985	94,425	369,244	324,711	264,218
	Min	148	113	113	113	110
	Max	1,012,894	1,012,894	7,175,686	7,175,686	7,175,686

3.7 Sales Values

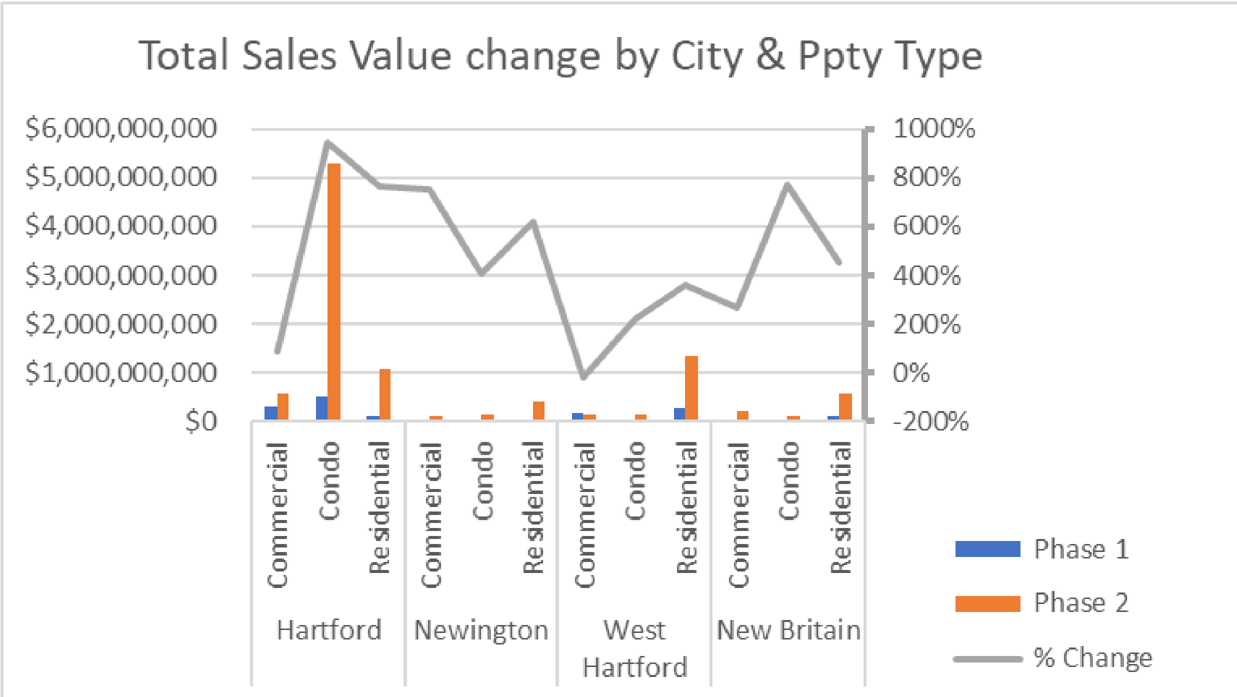

Figure 7. Total Sales Value Change by City and Property Type, Phase 1 and Phase 2

Figure 7 above demonstrates how the total sales value (in dollars) changed in each of the 4 municipalities, by property type. While the total sales (in dollars) of commercial properties in Hartford rose by less than 50%, there was more than a 900% increase in the sales in Phase 2 compared with Phase 1. Newington experienced a nearly 800% increase in commercial property sales, while condos sales value increased by 400% and residential sales values increased by over 600%. West Hartford saw a slight decline in the sales values of commercial property sold but had a 200% increase in condominium sales values and nearly 400% increase in the sales value of residential properties.

While a priori it might not seem clear as to whether price increases or the volume of properties being sold are driving the increases in the total sales, some reflection might help address this. In section 3.3 of this report, and in footnote 3 in that section, it is explained that there was an approximately 1.8% average annual rate of increases in prices of residential properties in the Hartford metro area between 2015-2020. This implies that much of the residential sales increase can be attributed to the volume of sales rather than sales prices. It appears as if residential properties in these four municipalities are selling more often, or with a higher volume of sales, during this time period.

Residential Sales Values

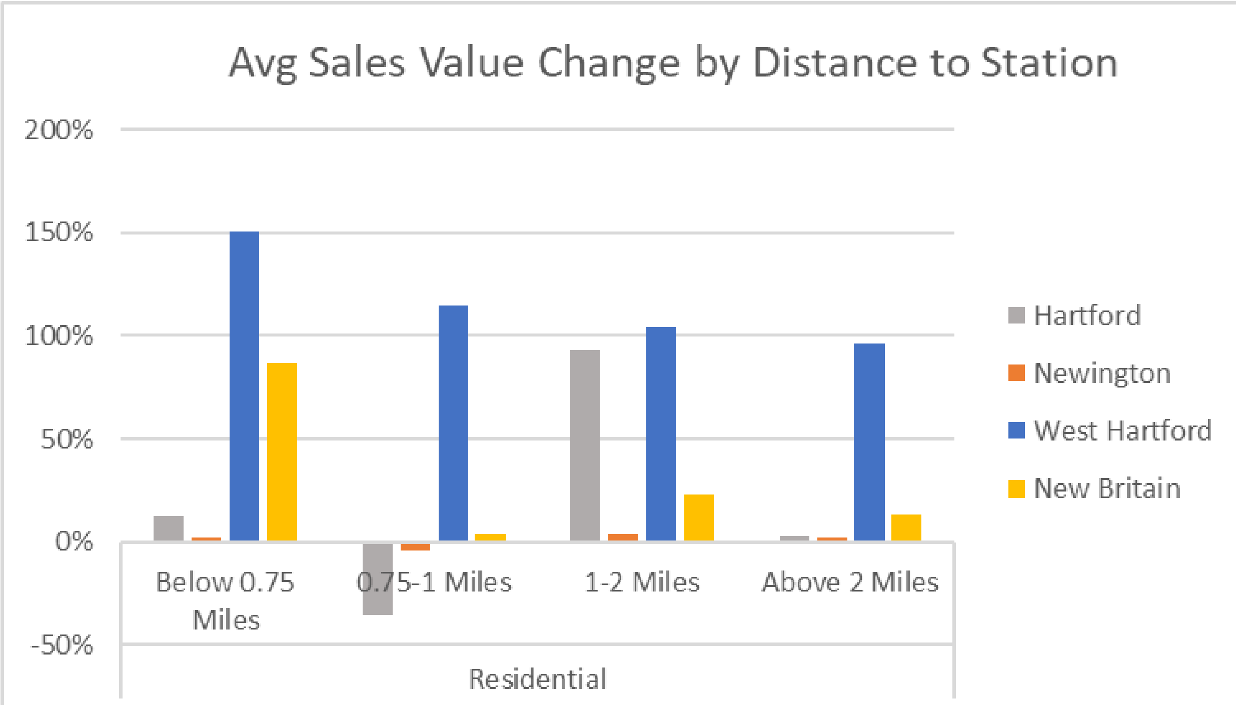

Figure 8. Change in Residential Average Sales Value, by Distance to Nearest Station, Phases 1 and 2

Figure 8 above shows the average sales value change between the two periods, for each municipality, by distance to the station. For West Hartford and New Britain, properties within 0.75 miles of the nearest station have the largest increase, implying a strong correlation between sales volume and proximity to a station. More Hartford residential properties sell for those located within 0.75 miles from the station, and there is almost a 100% increase in sales for properties within 1 and 2 miles of the nearest station. There is little change in property sales values for those in all distance bands near Newington stations.

Tables 20 and 21 below show the descriptive statistics of the sales values of residential properties in 2015 and 2020, respectively, for each of the individual stations.

Table 20. Descriptive Statistics of Sales Value of Residential Properties (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	2	29	68	131	610
	Avg.	178,150	520,240	442,443	351,776	230,689
	Med.	178,150	135,000	138,000	121,000	157,200
	S.D.	29,345	2,122,592	1,485,964	1,224,909	587,781
	Min	157,400	2,000	8,000	2,000	2,000
	Max	198,900	11,550,000	11,550,000	11,550,000	11,550,000
Parkville Station Hartford	**n =**	8	33	89	163	715
	Avg.	109,538	346,374	290,140	271,717	235,756
	Med.	95,150	130,000	138,555	145,000	170,000
	S.D.	76,032	785,611	1,213,783	963,834	549,884
	Min	30,000	8,000	2,000	2,000	2,000
	Max	254,000	4,531,503	11,550,000	11,550,000	11,550,000
Kane Street Station Hartford	**n =**	-	23	79	178	717
	Avg.	N/A	120,244	299,441	226,622	237,512
	Med.	N/A	77,000	147,000	155,000	175,000
	S.D.	N/A	130,699	1,286,052	858,540	545,896
	Min	N/A	22,250	2,000	2,000	2,000
	Max	N/A	620,000	11,550,000	11,550,000	11,550,000
Flatbush Station West Hartford	**n =**	3	61	64	154	703
	Avg.	132,000	108,787	150,389	169,447	217,893
	Med.	144,000	99,900	155,000	154,500	179,000
	S.D.	35,553	59,400	54,868	230,564	454,515
	Min	92,000	23,100	41,250	2,300	2,000
	Max	160,000	335,000	370,000	2,900,000	11,550,000
Elmwood Station West Hartford	**n =**	1	61	68	149	599
	Avg.	180,000	106,410	171,196	194,637	206,597
	Med.	180,000	96,475	165,000	172,000	189,000
	S.D.	-	58,498	71,407	231,975	160,923
	Min	180,000	23,100	44,500	44,500	2,300
	Max	180,000	335,000	380,000	2,900,000	2,900,000
Newington Junction Station Newington	**n =**	2	13	69	132	340
	Avg.	257,500	128,488	204,523	200,118	214,825
	Med.	257,500	128,000	203,000	194,450	202,500
	S.D.	38,891	44,703	46,275	47,689	166,244
	Min	230,000	69,000	105,000	65,833	44,500
	Max	285,000	188,000	345,000	345,000	2,900,000
Cedar Street Station Newington	**n =**	-	2	16	49	445
	Avg.	N/A	244,950	178,567	159,354	159,853
	Med.	N/A	244,950	176,250	155,000	155,500
	S.D.	N/A	21,284	64,975	62,090	84,853
	Min	N/A	229,900	72,000	28,000	4,000
	Max	N/A	260,000	329,100	329,100	965,000
East Street Station New Britain	**n =**	1	22	63	124	487
	Avg.	160,000	216,914	125,998	136,626	142,912
	Med.	160,000	217,250	129,000	139,441	135,000
	S.D.	-	47,492	55,373	65,583	87,521
	Min	160,000	125,000	7,435	7,435	4,000
	Max	160,000	299,900	253,000	385,000	965,000
East Main Street Station – Northbound New Britain	**n =**	18	20	129	200	568
	Avg.	111,314	192,875	112,105	119,559	150,064
	Med.	118,750	176,500	97,200	96,188	130,000
	S.D.	56,937	77,551	75,986	110,951	176,598
	Min	30,000	65,833	9,000	7,435	4,000

	Max	213,850	320,000	500,000	1,270,000	2,800,000
East Main Street Station – Southbound New Britain	**n =**	18	21	128	206	580
	Avg.	93,482	167,039	112,177	119,188	151,151
	Med.	86,000	172,000	91,250	95,450	130,000
	S.D.	53,658	43,252	80,674	110,635	179,385
	Min	30,000	55,707	9,000	7,435	4,000
	Max	213,850	235,000	500,000	1,270,000	2,800,000
New Britain Station New Britain	**n =**	-	22	102	228	644
	Avg.	N/A	89,286	121,833	145,062	141,848
	Med.	N/A	82,750	87,250	96,188	124,000
	S.D.	N/A	59,220	106,121	200,497	170,246
	Min	N/A	2,300	22,250	11,000	4,000
	Max	N/A	200,000	620,000	1,525,000	2,800,000

Table 21. Descriptive Statistics of Sales Value of Residential Properties (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	16	130	301	603	2,568
	Avg.	1,007,188	982,954	733,576	558,181	444,727
	Med.	209,450	199,250	195,000	189,000	210,000
	S.D.	1,388,667	1,730,169	1,536,478	1,618,427	1,239,652
	Min	22,500	7,000	5,000	2,000	180
	Max	3,275,000	5,902,476	9,675,000	27,750,000	27,750,000
Parkville Station Hartford	**n =**	44	174	414	751	3,062
	Avg.	180,343	288,101	355,160	408,916	407,550
	Med.	173,000	180,000	179,500	190,000	215,000
	S.D.	142,259	413,594	618,294	854,610	1,125,738
	Min	30,000	2,000	2,000	2,000	180
	Max	763,500	3,197,000	3,500,000	5,902,476	27,750,000
Kane Street Station Hartford	**n =**	12	118	373	744	3,060
	Avg.	375,433	238,491	210,062	239,737	334,029
	Med.	198,500	139,950	168,750	190,000	215,000
	S.D.	499,429	423,578	264,122	310,763	843,994
	Min	60,700	2,300	2,000	2,000	2,000
	Max	1,430,000	3,625,000	3,625,000	3,625,000	27,750,000
Flatbush Station West Hartford	**n =**	16	82	236	621	2,973
	Avg.	203,922	243,634	192,065	189,916	266,455
	Med.	197,450	194,500	175,000	174,000	217,000
	S.D.	63,421	385,913	234,764	190,905	358,183
	Min	110,000	55,707	11,000	2,300	2,000
	Max	350,000	3,625,000	3,625,000	3,625,000	8,500,000
Elmwood Station West Hartford	**n =**	4	64	248	535	2,621
	Avg.	238,750	209,548	191,783	210,757	227,741
	Med.	212,500	211,500	196,400	199,900	212,500
	S.D.	80,247	59,599	62,161	363,974	209,411
	Min	180,000	68,500	11,000	11,000	2,000
	Max	350,000	350,000	351,000	8,500,000	8,500,000
Newington Junction Station Newington	**n =**	17	132	349	661	1,719
	Avg.	185,585	259,387	225,499	221,489	216,087
	Med.	190,000	205,000	204,500	210,000	210,000
	S.D.	58,363	724,658	447,607	326,787	214,034
	Min	102,000	50,000	45,500	45,500	11,000
	Max	285,000	8,500,000	8,500,000	8,500,000	8,500,000
Cedar Street Station	**n =**	-	14	128	258	2,377
	Avg.	N/A	585,064	315,607	248,032	202,769

Newington	Med.	N/A	229,950	190,000	182,000	179,000
	S.D.	N/A	1,369,547	784,909	558,591	499,142
	Min	N/A	100,000	10,000	10,000	4,000
	Max	N/A	5,340,000	5,340,000	5,340,000	21,250,000
East Street Station New Britain	**n =**	9	71	241	568	2,475
	Avg.	1,294,115	431,218	260,991	247,472	201,546
	Med.	147,500	152,000	153,500	159,950	165,500
	S.D.	2,293,881	1,159,713	700,888	996,096	513,950
	Min	102,500	10,000	9,000	9,000	4,000
	Max	5,340,000	5,340,000	5,340,000	21,250,000	21,250,000
East Main Street Station (Southbound) New Britain	**n =**	83	267	528	871	2,671
	Avg.	130,890	145,870	188,596	194,697	201,219
	Med.	120,000	141,000	145,000	145,000	163,000
	S.D.	60,008	78,875	921,784	759,637	506,302
	Min	12,500	12,500	9,000	9,000	4,000
	Max	261,700	585,818	21,250,000	21,250,000	21,250,000
East Main Street Station (Northbound) New Britain	**n =**	83	279	519	863	2,651
	Avg.	138,511	145,372	188,820	195,545	206,448
	Med.	130,000	145,000	145,000	145,000	164,900
	S.D.	59,594	72,801	929,469	762,976	536,164
	Min	12,500	12,500	9,000	9,000	4,000
	Max	261,700	585,818	21,250,000	21,250,000	21,250,000
New Britain Station New Britain	**n =**	-	110	407	909	2,837
	Avg.	N/A	192,831	186,747	202,413	190,892
	Med.	N/A	150,000	152,000	150,000	156,000
	S.D.	N/A	157,701	209,384	724,941	482,928
	Min	N/A	20,000	12,500	7,500	4,000
	Max	N/A	770,000	3,550,000	21,250,000	21,250,000

Condominium Sales Values

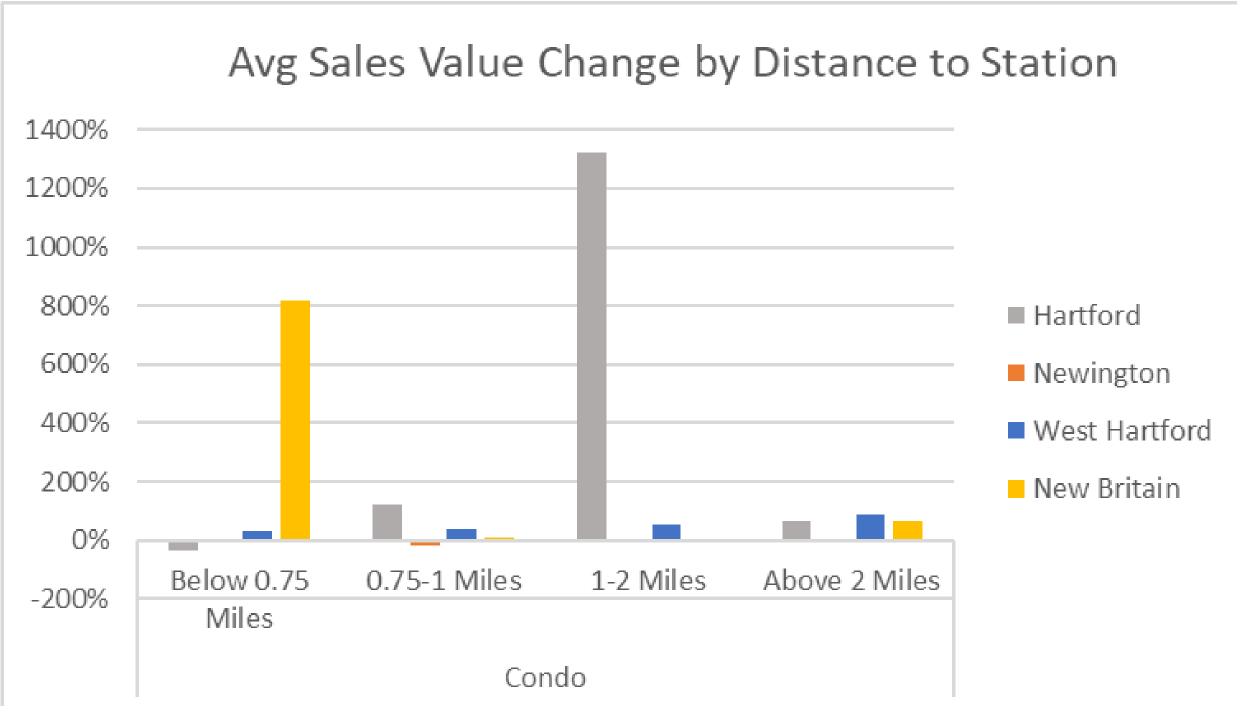

Figure 9. Change in Condominium Average Sales Value, by Distance to Nearest Station, Phases 1 and 2

Figure 9 above shows the changes in average condominium sales value by municipality and distance to the nearest station, between Phase 1 and 2. New Britain condominiums within 0.75 miles of the nearest station experienced a dramatic increase in sales value in the two periods. Similarly, condominiums in Hartford within 1-2 miles from the nearest station experienced a large increase in average sales value. Hartford condominiums within 0.75 miles from a CT***fastrak*** station fell slightly in value between the two phases. West Hartford condominium average sales values rose for all 4 distance bands in Figure 9, ranging from approximately 20% for below 0.75 miles, to over 100% for above 2 miles. Newington condominium's average sales value fell slightly in the 0.75-1 miles range. For municipalities with stations' radii other than those mentioned above, the average sales value increased modestly between Phases 1 and 2.

Tables 22 and 23 below show detailed descriptive statistics for condominium average sales prices in Phases 1 and 2, respectively.

Table 22. Descriptive Statistics of Sales Value of Condominiums (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	5	38	200	218	342
	Avg.	38,520	130,791	2,471,352	2,283,538	1,502,923
	Med.	28,200	38,000	3,950,000	3,950,000	212,500
	S.D.	25,583	142,395	1,856,685	1,885,742	1,828,288
	Min	20,000	15,573	8,750	8,750	3,500
	Max	82,900	325,000	3,950,000	3,950,000	3,950,000
Parkville Station Hartford	**n =**	-	9	15	82	379
	Avg.	N/A	210,000	141,740	88,722	1,388,176
	Med.	N/A	210,000	210,000	60,500	210,000
	S.D.	N/A	-	86,632	89,525	1,772,887
	Min	N/A	210,000	30,100	15,000	3,500
	Max	N/A	210,000	210,000	450,000	3,950,000
Kane Street Station Hartford	**n =**	-	4	38	43	423
	Avg.	N/A	45,725	119,277	110,105	1,275,404
	Med.	N/A	29,950	89,000	70,000	250,000
	S.D.	N/A	36,565	80,341	79,640	1,710,397
	Min	N/A	23,000	23,000	23,000	3,500
	Max	N/A	100,000	257,900	257,900	3,950,000
Flatbush Station West Hartford	**n =**	-	7	18	65	169
	Avg.	N/A	157,907	118,242	191,928	210,022
	Med.	N/A	254,550	100,000	238,250	190,000
	S.D.	N/A	121,922	83,528	107,858	171,390
	Min	N/A	23,000	23,000	23,000	10,000
	Max	N/A	257,900	257,900	385,000	1,200,000
Elmwood Station West Hartford	**n =**	-	38	46	46	115
	Avg.	N/A	278,432	289,489	289,489	190,400
	Med.	N/A	277,950	282,762	282,762	171,500
	S.D.	N/A	68,683	82,972	82,972	117,549
	Min	N/A	60,000	60,000	60,000	23,000
	Max	N/A	475,000	508,000	508,000	508,000
Newington Junction Station Newington	**n =**	2	11	23	36	103
	Avg.	103,500	125,586	116,942	167,769	209,212
	Med.	103,500	131,000	110,000	126,500	206,550
	S.D.	9,192	34,965	57,524	102,967	112,478
	Min	97,000	45,151	27,218	27,218	27,218
	Max	110,000	171,500	319,000	376,000	508,000
Cedar Street Station Newington	**n =**	-	-	6	16	120
	Avg.	N/A	N/A	88,667	227,531	139,051
	Med.	N/A	N/A	94,000	283,250	112,000
	S.D.	N/A	N/A	23,619	115,210	89,169
	Min	N/A	N/A	60,000	60,000	27,218
	Max	N/A	N/A	112,000	376,000	405,266
East Street Station New Britain	**n =**	6	6	6	16	113
	Avg.	88,667	88,667	88,667	82,919	128,770
	Med.	94,000	94,000	94,000	93,000	112,000
	S.D.	23,619	23,619	23,619	40,250	85,052
	Min	60,000	60,000	60,000	32,000	31,000
	Max	112,000	112,000	112,000	145,000	405,266
East Main Street Station – Northbound New Britain	**n =**	-	4	15	25	118
	Avg.	N/A	45,000	71,113	72,271	71,876
	Med.	N/A	45,000	45,000	45,000	60,000
	S.D.	N/A	-	42,306	49,645	41,972
	Min	N/A	45,000	32,000	31,000	2,000

	Max	N/A	45,000	145,000	188,000	195,000
East Main Street Station – Southbound New Britain	**n =**	-	4	13	25	116
	Avg.	N/A	45,000	63,592	72,271	69,796
	Med.	N/A	45,000	45,000	45,000	59,950
	S.D.	N/A	-	39,042	49,645	39,177
	Min	N/A	45,000	32,000	31,000	2,000
	Max	N/A	45,000	144,000	188,000	188,000
New Britain Station New Britain	**n =**	-	20	43	62	107
	Avg.	N/A	59,170	58,400	58,862	64,248
	Med.	N/A	53,950	54,000	54,000	55,900
	S.D.	N/A	46,902	36,186	35,463	34,968
	Min	N/A	21,500	20,000	20,000	20,000
	Max	N/A	188,000	188,000	188,000	188,000

Table 23. Descriptive Statistics of Sales Value of Condominiums (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	211	573	1,335	1,548	2,876
	Avg.	1,055,377	1,515,715	2,040,123	1,992,556	1,842,903
	Med.	950,000	1,450,000	2,135,000	1,975,000	1,275,000
	S.D.	554,638	974,284	1,376,637	1,442,081	1,878,371
	Min	20,000	16,500	8,750	8,750	3,500
	Max	1,975,000	3,107,547	4,325,000	18,480,000	18,480,000
Parkville Station Hartford	**n =**	-	103	464	849	2,934
	Avg.	N/A	2,207,286	1,793,828	1,290,521	1,801,392
	Med.	N/A	3,490,000	1,975,000	950,000	1,255,000
	S.D.	N/A	1,471,696	996,167	1,056,937	1,878,926
	Min	N/A	22,000	22,000	13,000	3,500
	Max	N/A	3,490,000	3,490,000	3,490,000	18,480,000
Kane Street Station Hartford	**n =**	-	27	211	299	3,006
	Avg.	N/A	127,022	1,368,463	1,369,979	1,668,189
	Med.	N/A	32,500	675,000	800,000	1,210,000
	S.D.	N/A	147,951	1,433,513	1,283,208	1,521,787
	Min	N/A	13,000	13,000	13,000	3,500
	Max	N/A	350,000	3,490,000	3,490,000	18,480,000
Flatbush Station West Hartford	**n =**	-	23	55	157	1,353
	Avg.	N/A	71,828	100,675	177,178	1,102,465
	Med.	N/A	28,000	70,000	196,500	950,000
	S.D.	N/A	87,246	75,003	111,916	1,101,383
	Min	N/A	13,000	13,000	13,000	13,000
	Max	N/A	257,900	257,900	512,000	4,550,000
Elmwood Station West Hartford	**n =**	-	77	135	137	488
	Avg.	N/A	283,238	263,314	261,951	215,932
	Med.	N/A	275,000	258,000	257,900	155,000
	S.D.	N/A	61,764	98,304	98,223	209,293
	Min	N/A	180,000	40,000	40,000	13,000
	Max	N/A	512,000	512,000	512,000	950,000
Newington Junction Station Newington	**n =**	9	77	156	224	434
	Avg.	91,578	134,987	113,195	160,057	184,843
	Med.	94,000	130,000	108,000	120,500	153,750
	S.D.	15,147	47,993	45,662	92,258	102,898
	Min	65,000	45,000	27,218	27,218	27,218
	Max	110,000	277,500	277,500	376,000	512,000
Cedar Street Station Newington	**n =**	-	23	56	112	465
	Avg.	N/A	1,664,435	1,461,404	882,293	304,982

	Med.	N/A	2,355,000	2,355,000	310,000	124,900
	S.D.	N/A	1,067,548	1,121,059	980,551	582,061
	Min	N/A	60,000	33,100	33,100	17,340
	Max	N/A	2,355,000	2,355,000	2,355,000	2,355,000
East Street Station New Britain	**n =**	56	56	56	81	456
	Avg.	1,461,404	1,461,404	1,461,404	1,039,440	303,446
	Med.	2,355,000	2,355,000	2,355,000	135,000	123,500
	S.D.	1,121,059	1,121,059	1,121,059	1,126,253	588,719
	Min	33,100	33,100	33,100	17,340	15,000
	Max	2,355,000	2,355,000	2,355,000	2,355,000	2,355,000
East Main Street Station (Southbound) New Britain	**n =**	-	10	26	85	357
	Avg.	N/A	52,924	86,144	79,108	307,688
	Med.	N/A	50,000	77,450	66,900	80,000
	S.D.	N/A	20,884	41,606	34,369	667,936
	Min	N/A	17,340	17,340	17,340	15,000
	Max	N/A	79,900	144,000	150,000	2,355,000
East Main Street Station (Northbound) New Britain	**n =**	-	10	30	77	366
	Avg.	N/A	52,924	92,458	77,126	304,549
	Med.	N/A	50,000	92,000	63,900	82,500
	S.D.	N/A	20,884	42,770	35,241	659,955
	Min	N/A	17,340	17,340	17,340	15,000
	Max	N/A	79,900	150,000	150,000	2,355,000
New Britain Station New Britain	**n =**	32	52	97	133	321
	Avg.	71,853	66,237	73,380	72,572	327,960
	Med.	62,900	62,900	62,900	62,900	72,000
	S.D.	27,014	26,315	44,737	41,318	701,542
	Min	35,000	27,000	27,000	17,340	15,000
	Max	140,000	140,000	250,000	250,000	2,355,000

Commercial Sales Values

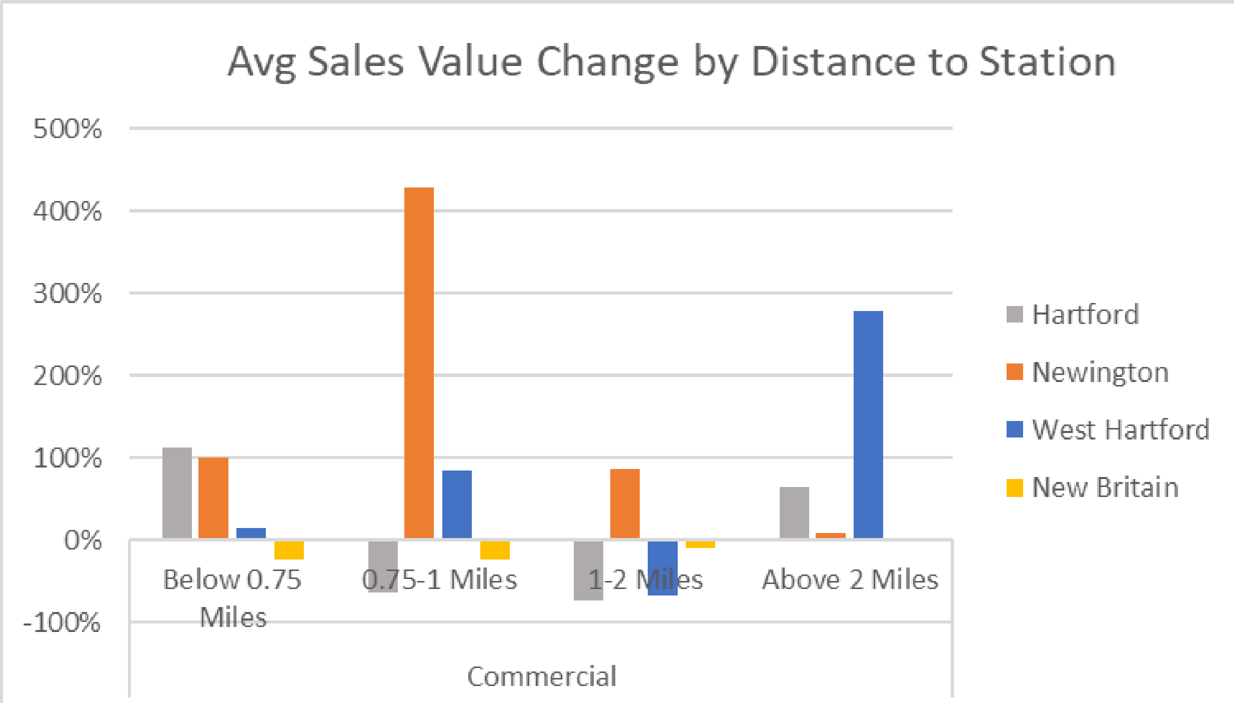

Figure 10. Change in Commercial Average Sales Value, by Distance to Nearest Station, Phases 1 and 2

Figure 10 above shows the changes in commercial properties' sales values for various distances to the nearest stations. Hartford, Newington, and West Hartford all experienced higher sales values in total, for properties within 0.75 miles of the nearest stations. Slightly further out, between 0.75 miles and 1 mile, Newington saw more than a 400% increase in the value of commercial property sales between the two time periods. Consistently, New Britain experienced either a negative or no notable change in average sales value of commercial properties across all 4 distance bins.

The two tables below, Tables 24 and 25, break out the descriptive statistics for each station in 2015 and 2020, respectively, in terms of the sales values of commercial properties nearby.

Table 24. Descriptive Statistics of Sales Value of Commercial Properties (2015)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	-	4	14	37	74
	Avg.	N/A	1,745,000	757,143	4,913,261	4,200,393
	Med.	N/A	1,199,248	150,500	240,000	235,000
	S.D.	N/A	1,977,778	1,296,438	50,000	16,057,674
	Min	N/A	50,000	25,000	2,500	2,500
	Max	N/A	4,531,503	4,531,503	113,250,000	113,250,000
Parkville Station Hartford	**n =**	4	10	14	27	64
	Avg.	233,750	125,565	538,546	676,522	4,747,247
	Med.	190,000	56,573	122,000	119,500	372,500
	S.D.	231,782	167,624	1,052,225	50,000	17,211,303
	Min	5,000	2,500	2,500	2,500	2,500
	Max	550,000	550,000	3,000,000	4,531,503	113,250,000
Kane Street Station Hartford	**n =**	2	10	18	22	66
	Avg.	95,000	109,065	559,203	506,050	3,606,165
	Med.	95,000	56,573	165,000	165,000	601,979
	S.D.	77,782	163,169	929,875	50,000	6,225,869
	Min	40,000	2,500	2,500	2,500	2,500
	Max	150,000	550,000	3,000,000	3,000,000	20,750,000
Flatbush Station West Hartford	**n =**	5	7	7	11	50
	Avg.	556,000	415,571	415,571	447,364	3,520,473
	Med.	390,000	390,000	390,000	390,000	425,000
	S.D.	310,023	348,755	348,755	150,000	6,260,983
	Min	225,000	54,000	54,000	40,000	2,500
	Max	887,500	887,500	887,500	911,000	17,600,000
Elmwood Station West Hartford	**n =**	2	3	11	18	29
	Avg.	911,000	625,333	4,942,324	3,250,864	2,051,638
	Med.	911,000	911,000	911,000	660,000	300,000
	S.D.	-	494,789	6,236,580	225,000	4,385,477
	Min	911,000	54,000	34,560	34,560	2,500
	Max	911,000	911,000	12,800,000	12,800,000	12,800,000
Newington Junction Station Newington	**n =**	1	2	2	3	26
	Avg.	146,796	408,398	408,398	452,265	3,109,321
	Med.	146,796	408,398	408,398	540,000	637,500
	S.D.	-	369,961	369,961	670,000	4,894,055
	Min	146,796	146,796	146,796	146,796	34,560
	Max	146,796	670,000	670,000	670,000	12,800,000
Cedar Street Station Newington	**n =**	-	1	2	3	16
	Avg.	N/A	2,590,000	1,565,000	1,115,000	1,527,853
	Med.	N/A	2,590,000	1,565,000	540,000	267,500
	S.D.	N/A	-	1,449,569	2,590,000	3,195,007
	Min	N/A	2,590,000	540,000	215,000	70,000
	Max	N/A	2,590,000	2,590,000	2,590,000	12,000,000
East Street Station New Britain	**n =**	-	-	2	3	26
	Avg.	N/A	N/A	1,402,500	1,118,333	1,478,368
	Med.	N/A	N/A	1,402,500	550,000	267,500
	S.D.	N/A	N/A	1,679,379	2,590,000	2,739,871
	Min	N/A	N/A	215,000	215,000	6,750
	Max	N/A	N/A	2,590,000	2,590,000	12,000,000
East Main Street Station – Northbound New Britain	**n =**	2	6	9	16	38
	Avg.	171,925	168,377	1,235,580	971,411	1,059,929
	Med.	171,925	180,000	213,850	260,705	260,705
	S.D.	59,291	61,510	2,099,720	236,409	1,987,221
	Min	130,000	70,000	70,000	6,750	6,750

	Max	213,850	236,409	5,400,000	5,400,000	8,945,009
East Main Street Station – Southbound New Britain	**n =**	3	6	10	16	38
	Avg.	137,950	168,377	1,146,522	971,411	1,059,929
	Med.	130,000	180,000	225,130	260,705	260,705
	S.D.	72,254	61,510	1,999,567	236,409	1,987,221
	Min	70,000	70,000	70,000	6,750	6,750
	Max	213,850	236,409	5,400,000	5,400,000	8,945,009
New Britain Station New Britain	**n =**	2	8	18	24	38
	Avg.	4,912,479	2,749,590	1,328,443	1,108,804	1,042,560
	Med.	4,912,479	1,435,000	225,130	206,925	233,205
	S.D.	689,459	3,231,599	2,452,852	236,409	2,001,062
	Min	4,424,958	6,750	6,750	6,750	6,750
	Max	5,400,000	8,945,009	8,945,009	8,945,009	8,945,009

Table 25. Descriptive statistics of sales value of commercial properties (2020)

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	3	13	35	87	224
	Avg.	51,000	2,481,381	1,608,477	3,826,588	2,676,722
	Med.	39,000	437,500	437,500	500,000	421,750
	S.D.	20,785	2,975,742	2,536,864	13,239,357	9,946,291
	Min	39,000	39,000	25,000	2,500	2,500
	Max	75,000	6,900,000	9,675,000	113,250,000	113,250,000
Parkville Station Hartford	**n =**	10	19	41	71	215
	Avg.	1,996,280	2,212,647	1,892,030	2,056,152	2,802,322
	Med.	152,050	350,000	520,000	515,000	450,000
	S.D.	3,293,204	3,207,789	2,448,523	3,286,618	10,134,835
	Min	5,000	2,500	2,500	2,500	2,500
	Max	8,000,000	8,000,000	8,000,000	20,850,000	113,250,000
Kane Street Station Hartford	**n =**	3	23	40	55	186
	Avg.	563,109	3,341,506	2,728,684	2,143,726	1,462,709
	Med.	550,000	725,000	938,414	550,000	437,500
	S.D.	419,817	4,942,788	3,905,500	3,472,200	2,692,134
	Min	150,000	2,500	2,500	2,500	2,500
	Max	989,327	20,850,000	20,850,000	20,850,000	20,850,000
Flatbush Station West Hartford	**n =**	2	12	22	32	141
	Avg.	638,750	1,708,625	2,111,700	1,751,278	1,359,081
	Med.	638,750	445,000	450,000	637,500	426,000
	S.D.	351,786	2,300,539	4,542,273	3,798,594	2,543,872
	Min	390,000	295,000	295,000	150,000	2,500
	Max	887,500	6,900,000	20,850,000	20,850,000	20,850,000
Elmwood Station West Hartford	**n =**	6	22	32	45	98
	Avg.	957,667	1,581,902	1,179,249	964,088	1,976,975
	Med.	830,500	725,000	462,500	400,000	550,000
	S.D.	594,322	2,183,501	1,899,357	1,636,383	3,620,804
	Min	250,000	250,000	34,560	34,560	2,500
	Max	1,750,000	7,325,000	7,325,000	7,325,000	22,414,743
Newington Junction Station Newington	**n =**	4	7	18	26	81
	Avg.	96,949	402,685	2,856,086	3,283,822	1,848,772
	Med.	100,523	162,750	635,000	660,000	500,000
	S.D.	68,214	390,719	5,461,172	5,259,898	3,711,701
	Min	24,000	24,000	24,000	24,000	24,000
	Max	162,750	885,000	22,414,743	22,414,743	22,414,743
Cedar Street Station Newington	**n =**	-	7	11	16	83
	Avg.	N/A	1,187,143	934,545	2,020,302	1,447,468

	Med.	N/A	850,000	850,000	695,000	300,000
	S.D.	N/A	884,057	789,944	3,510,162	3,581,098
	Min	N/A	170,000	55,000	55,000	24,000
	Max	N/A	2,590,000	2,590,000	12,189,834	22,414,743
East Street Station New Britain	**n =**	1	2	5	12	118
	Avg.	525,000	347,500	736,000	704,583	1,120,849
	Med.	525,000	347,500	215,000	282,500	292,500
	S.D.	-	251,023	1,046,753	845,355	2,861,144
	Min	525,000	170,000	170,000	75,000	6,750
	Max	525,000	525,000	2,590,000	2,590,000	22,414,743
East Main Street Station (Southbound) New Britain	**n =**	13	23	44	82	167
	Avg.	277,219	246,254	456,051	462,908	1,011,589
	Med.	185,000	175,000	193,000	188,000	214,000
	S.D.	241,462	198,958	863,667	833,432	2,749,109
	Min	70,000	50,000	24,000	6,750	2,000
	Max	775,000	775,000	5,400,000	5,400,000	23,048,760
East Main Street Station (Northbound) New Britain	**n =**	11	22	39	76	164
	Avg.	308,986	271,084	479,842	422,874	844,272
	Med.	186,000	185,500	186,000	185,500	214,000
	S.D.	250,076	206,028	914,631	737,278	2,109,076
	Min	130,000	70,000	24,000	6,750	2,000
	Max	775,000	775,000	5,400,000	5,400,000	19,250,014
New Britain Station New Britain	**n =**	16	55	92	112	161
	Avg.	1,280,931	682,235	1,052,259	931,898	1,061,003
	Med.	450,000	175,000	187,000	194,000	214,000
	S.D.	1,627,456	1,511,138	2,693,058	2,457,564	2,835,111
	Min	25,000	6,750	6,750	6,750	6,750
	Max	5,400,000	8,945,009	19,250,014	19,250,014	23,048,760

Square Footage

Square footage fell, on average, for residential properties within ¼ mile of Kane Street Station and Newington Junction Station, between Phases 1 and 2. All other stations saw a square footage increase, on average, for properties within ¼ mile of the nearest station between these two time periods. Tables 26 and 27 below present descriptive statistics for the square footage of residential properties in 2016 and 2020, respectively.

Table 26. Descriptive Statistics of Gross Living Area in 2016 of Residential Properties

CTfastrak Station		1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford - 2016	Avg.	2,132	3,527	5,191	4,062
	Med.	704	2,649	2,351	2,506
	S.D.	5,306	9,416	16,571	11,054
	Min	335	411	287	287
	Max	41,085	161,664	163,890	163,890
Parkville Station Hartford – 2016	Avg.	3,235	3,527	3,000	3,570
	Med.	3,225	2,649	1,824	2,041
	S.D.	1,351	9,416	6,546	10,230
	Min	616	411	309	287
	Max	9,576	161,664	161,664	163,890
Kane Street Station Hartford – 2016	Avg.	3,054	2,369	2,607	3,370
	Med.	2,871	1,935	1,542	1,716
	S.D.	1,364	1,990	5,900	10,192
	Min	1,212	616	360	287
	Max	7,053	21,600	360	163,890
Flatbush Station West Hartford – 2016	Avg.	621	555	619	659
	Med.	1,152	1,080	1,038	1,008
	S.D.	927	785	788	1,230
	Min	4	4	4	1
	Max	4,032	4,455	12,120	36,207
Elmwood Station West Hartford – 2016	Avg.	417	685	630	608
	Med.	195	975	1,058	1,056
	S.D.	764	816	690	825
	Min	24	12	4	1
	Max	3,420	3,420	4,032	21,756
Newington Junction Station Newington – 2015	Avg.	1,507	1,421	1,409	1,440
	Med.	1,300	1,281	1,307	1,328
	S.D.	604	453	417	440
	Min	720	720	672	558
	Max	3,514	3,514	4,532	4,599
Cedar Street Station Newington – 2015	Avg.	N/A	1,952	1,471	1,460
	Med.	N/A	1,952	1,322	1,346
	S.D.	N/A	101	528	454
	Min	N/A	1,880	894	558
	Max	N/A	2,023	4,954	5,193
East Street Station New Britain – 2012	Avg.	1,397	1,517	1,709	1,964
	Med.	1,268	1,352	1,499	1,581
	S.D.	635	605	759	1,101
	Min	418	418	418	418
	Max	6,240	6,240	8,280	10,712
East Main Street Station New Britain – 2012	Avg.	2,511	2,409	2,246	2,159
	Med.	2,460	2,268	1,946	1,832
	S.D.	1,070	1,168	1,215	1,133
	Min	825	676	540	418
	Max	7,734	8,964	10,712	10,712
New Britain Station New Britain – 2012	Avg.	5,927	3,052	2,704	2,072
	Med.	5,927	2,701	2,496	1,739
	S.D.	2,616	1,684	1,339	349
	Min	4,077	968	534	840
	Max	7,776	10,712	10,712	2,670

Note: Sample sizes for 2015 GLA and 2015 sample sizes for assessment data tables may differ slightly in some instances due to different GIS algorithm used in geocoding for properties during Phase 1 research versus geocoding for properties during Phase 2 research.

Table 27. Descriptive Statistics of Gross Living Area in 2020 of Residential Properties

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	109	438	1,093	2,621	12,225
	Avg.	5,503	6,463	6,539	5,074	3,517
	Med.	2,907	3,588	3,654	3,390	2,800
	S.D.	10,537	14,337	16,351	12,105	7,391
	Min	1,300	978	978	616	324
	Max	100,640	163,890	307,643	307,643	307,643
Parkville Station Hartford	**n =**	185	767	1,971	3,685	14,720
	Avg.	3,299	3,582	3,678	3,491	3,067
	Med.	3,160	3,013	2,884	2,738	2,340
	S.D.	1,567	7,223	8,724	7,506	6,573
	Min	616	616	616	575	480
	Max	10,206	161,664	307,643	307,643	307,643
Kane Street Station Hartford	**n =**	55	723	2,186	3,985	15,234
	Avg.	2,791	2,106	2,452	2,511	2,706
	Med.	2,506	1,470	1,764	1,766	1,984
	S.D.	1,451	2,399	4,126	6,161	5,445
	Min	900	616	480	480	480
	Max	7,053	39,614	161,664	307,643	307,643
Flatbush Station West Hartford	**n =**	132	516	1,519	3,557	15,320
	Avg.	1,784	1,745	1,568	1,677	2,268
	Med.	1,443	1,406	1,332	1,351	1,701
	S.D.	847	1,944	1,778	1,967	3,669
	Min	738	480	480	480	480
	Max	5,238	39,614	51,491	63,426	307,643
Elmwood Station West Hartford	**n =**	14	407	1,515	3,028	13,901
	Avg.	2,093	1,623	1,456	1,491	1,735
	Med.	1,619	1,464	1,312	1,323	1,460
	S.D.	1,035	635	524	1,408	1,258
	Min	1,040	598	598	598	480
	Max	4,292	4,292	5,152	51,491	63,426
Newington Junction Station Newington	**n =**	99	674	1,707	3,313	8,620
	Avg.	1,702	1,469	1,403	1,437	1,546
	Med.	1,374	1,323	1,306	1,324	1,352
	S.D.	942	653	520	487	2,821
	Min	720	720	672	672	558
	Max	7,604	11,812	11,812	11,812	177,480
Cedar Street Station Newington	**n =**	-	76	577	1,244	11,074
	Avg.	N/A	1,495	2,025	1,816	1,754
	Med.	N/A	1,323	1,352	1,403	1,419
	S.D.	N/A	624	7,922	5,460	3,458
	Min	N/A	1,008	418	418	418
	Max	N/A	5,712	180,467	180,467	180,467
East Street Station New Britain	**n =**	60	431	1,212	2,679	11,305
	Avg.	6,673	2,322	1,877	1,784	1,996
	Med.	1,274	1,346	1,392	1,456	1,500
	S.D.	24,210	9,424	5,708	3,925	3,846
	Min	418	418	418	418	418
	Max	180,467	180,467	180,467	180,467	180,467

East Main Street Station (Southbound) New Britain	**n =**	301	1,058	2,135	3,647	12,210
	Avg.	2,544	2,752	2,601	2,418	2,213
	Med.	2,486	2,340	2,166	1,792	1,694
	S.D.	1,131	3,798	4,427	3,940	3,588
	Min	768	687	540	534	418
	Max	9,591	76,284	103,227	103,227	193,402
East Main Street Station (Northbound) New Britain	**n =**	296	1,110	2,163	3,670	12,116
	Avg.	2,515	2,520	2,482	2,359	2,205
	Med.	2,464	2,277	2,054	1,749	1,684
	S.D.	1,073	2,562	3,843	3,886	3,598
	Min	768	676	540	540	418
	Max	7,734	66,960	103,227	103,227	193,402
New Britain Station New Britain	**n =**	1	352	1,556	3,679	12,905
	Avg.	7,776	4,879	3,810	3,113	2,210
	Med.	7,776	2,787	2,848	2,526	1,700
	S.D.	-	9,654	7,435	5,213	3,557
	Min	7,776	968	534	534	400
	Max	7,776	102,354	193,402	193,402	193,402

Tables 28 and 29 below present the descriptive statistics for square footage for commercial properties in 2016 and 2020, respectively, for various radii from the nearest station. Among the stations for which data were available in both 2016 and 2020, Kane Street Station is the only station for which the nearest commercial properties (within ¼ mile) had lower average square footage in 2020 compared with 2016. The average commercial square footage rose for properties within ¼ mile of all other stations for which nearby commercial property square footage was available. These differences may be due to new property construction of different sizes than existing sites, which raise (or lower, for those near Kane Street Station) the overall average square footage of the properties within this radius. The changes are more mixed for other radii from the stations. Given this broad variation in the direction of the changes between Phases 1 and 2 for the various stations and radii, it is difficult to try and attribute these average changes to the presence of CT***fastrak***.

Table 28. Descriptive Statistics of Gross Living Area in 2016 of Commercial Properties

CTfastrak Station		1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford - 2016	Avg.	N/A*	182,611	85,189	73,267
	Med.	N/A*	3,117	1,157	1,149
	S.D.	N/A*	627,403	345,136	292,027
	Min	N/A*	461	461	276
	Max	N/A*	2,416,538	2,416,538	2,416,538
Parkville Station Hartford – 2016	Avg.	3,212	12,834	3,095	73,326
	Med.	3,106	4,072	923	1,149
	S.D.	798	18,010	8,283	292,586
	Min	1,955	1,110	461	276
	Max	4,072	58,891	67,711	2,416,538
Kane Street Station Hartford – 2016	Avg.	29,101	15,171	13,605	48,174
	Med.	42,426	4,072	5,954	923
	S.D.	23,079	20,630	17,331	258,356
	Min	2,452	1,110	1,110	276
	Max	42,426	67,711	67,711	2,416,538
Flatbush Station West Hartford – 2016	Avg.	N/A**	N/A**	N/A**	N/A**
	Med.	N/A**	N/A**	N/A**	N/A**
	S.D.	N/A**	N/A**	N/A**	N/A**
	Min	N/A**	N/A**	N/A**	N/A**
	Max	N/A**	N/A**	N/A**	N/A**
Elmwood Station West Hartford – 2016	Avg.	N/A**	N/A**	N/A**	N/A**
	Med.	N/A**	N/A**	N/A**	N/A**
	S.D.	N/A**	N/A**	N/A**	N/A**
	Min	N/A**	N/A**	N/A**	N/A**
	Max	N/A**	N/A**	N/A**	N/A**
Newington Junction Station Newington – 2015	Avg.	2,878	7,249	9,226	13,311
	Med.	3,360	3,200	2,303	3,912
	S.D.	2,958	11,107	18,069	33,483
	Min	441	441	441	441
	Max	7,604	47,424	99,848	284,432
Cedar Street Station Newington – 2015	Avg.	16,332	21,245	24,093	11,081
	Med.	14,259	1,967	3,504	3,550
	S.D.	27,707	44,405	55,892	27,934
	Min	1,200	798	798	441
	Max	67,508	178,640	284,432	284,432
East Street Station New Britain – 2012	Avg.	4,015	4,699	4,166	6,447
	Med.	7,004	7,702	5,835	7680
	S.D.	17,555	17,135	15,276	22,349
	Min	694	694	660	380
	Max	180,467	180,467	180,467	513,123
East Main Street Station New Britain – 2012	Avg.	11,255	9,512	11,186	7,931
	Med.	6,905	6,126	7,950	7,367
	S.D.	16,545	20,721	30,354	27,761
	Min	649	338	338	338
	Max	71,999	136,824	513,123	513,123
New Britain Station New Britain – 2012	Avg.	20,873	13,729	9,559	8,536
	Med.	10,717	9,139	7,213	7,200
	S.D.	58,365	34,094	28,185	30,781
	Min	794	794	600	136
	Max	513,123	513,123	513,123	542,561

Notes: N/A* = No GLA (SF) data available for these properties; N/A** = No properties within this radius.

Sample sizes for 2015 GLA and 2015 sample sizes for assessment data tables may differ slightly in some instances due to a different GIS algorithm used in geocoding for properties during Phase 1 research versus geocoding for properties during Phase 2 research.

Table 29. Descriptive Statistics of Gross Living Area in 2020 of Commercial Properties

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	16	86	243	468	1,207
	Avg.	79,261	64,711	39,595	34,356	29,820
	Med.	2,656	8,885	6,721	6,809	5,978
	S.D.	198,736	276,383	203,330	158,095	129,956
	Min	468	468	468	120	120
	Max	730,458	2,416,538	2,416,538	2,416,538	2,416,538
Parkville Station Hartford	**n =**	45	119	230	429	1,367
	Avg.	18,307	15,846	16,372	19,376	27,597
	Med.	8,378	5,883	5,974	5,871	5,740
	S.D.	24,243	30,361	53,054	124,049	122,505
	Min	697	374	374	374	120
	Max	92,763	243,011	730,458	2,416,538	2,416,538
Kane Street Station Hartford	**n =**	14	121	211	308	1,383
	Avg.	21,619	13,273	13,781	12,753	17,923
	Med.	8,006	5,295	5,037	4,870	5,466
	S.D.	26,387	27,096	27,309	24,962	89,703
	Min	1,271	374	374	374	120
	Max	79,462	243,011	243,011	243,011	2,416,538
Flatbush Station West Hartford	**n =**	36	100	213	305	1,107
	Avg.	22,713	15,909	12,488	12,676	13,413
	Med.	6,037	5,574	5,045	5,150	5,322
	S.D.	36,999	28,106	23,300	24,525	33,656
	Min	510	510	300	300	300
	Max	178,466	178,466	178,466	204,524	730,458
Elmwood Station West Hartford	**n =**	56	230	322	402	741
	Avg.	10,334	9,479	11,264	12,234	12,825
	Med.	5,495	4,969	5,063	5,408	4,893
	S.D.	16,122	14,553	19,429	22,398	33,134
	Min	300	300	300	300	200
	Max	75,265	114,433	158,393	204,524	622,262
Newington Junction Station Newington	**n =**	18	46	99	170	597
	Avg.	8,031	13,717	18,747	16,570	17,185
	Med.	5,520	7,422	6,160	5,840	5,608
	S.D.	7,283	20,712	64,285	50,990	41,955
	Min	441	441	441	441	200
	Max	27,158	134,928	622,262	622,262	622,262
Cedar Street Station Newington	**n =**	9	27	45	78	432
	Avg.	21,700	37,318	29,114	25,388	15,377
	Med.	6,640	9,204	8,132	6,395	4,800
	S.D.	26,980	71,835	57,724	54,567	43,786
	Min	1,200	798	694	694	338
	Max	67,508	342,358	342,358	342,358	622,262
East Street Station New Britain	**n =**	18	27	51	97	581
	Avg.	8,622	9,323	15,479	15,604	17,080
	Med.	5,838	5,835	5,242	4,916	6,196
	S.D.	11,539	11,445	48,426	40,624	44,011
	Min	694	694	694	694	338
	Max	52,117	52,117	342,358	342,358	622,262

East Main Street Station (Southbound) New Britain	**n =**	39	64	170	342	797
	Avg.	10,358	10,139	13,906	16,156	14,640
	Med.	6,492	5,792	5,777	6,489	5,238
	S.D.	15,257	18,238	23,739	36,367	36,898
	Min	607	338	338	338	338
	Max	71,999	115,945	136,824	513,123	513,123
East Main Street Station (Northbound) New Britain	**n =**	29	62	162	305	799
	Avg.	11,660	10,649	13,427	16,324	14,679
	Med.	7,325	5,792	5,531	6,169	5,242
	S.D.	17,276	20,538	23,187	38,094	36,875
	Min	649	338	338	338	338
	Max	71,999	136,824	136,824	513,123	513,123
New Britain Station New Britain	**n =**	58	202	336	438	757
	Avg.	29,755	16,338	15,378	14,613	15,514
	Med.	10,885	6,247	5,947	5,342	5,280
	S.D.	69,823	41,441	38,553	37,527	41,548
	Min	1,270	397	397	397	136
	Max	513,123	513,123	513,123	513,123	542,561

3.8 Travel Time and Cost Comparison

A travel time and cost comparison for travel via CT***fastrak*** versus private automobile was performed for two urban Connecticut destinations: the XL Center, located at 1 Civic Center Plaza in Hartford, and the UCONN Hartford campus, located at 10 Prospect Street in Hartford.[8] One analysis includes round trip travel via automobile between home residences and a public parking area near each destination (assuming 20 work days each month), including the walk to the destination from the parking lot. The second analysis includes walking from home residences to the nearest CT***fastrak*** station, riding on the bus, and walking from the bus stop to the destination, in both directions for a round trip analysis. All the residences located within a three-quarter mile radius of each of the stations are included in the analyses. The result is reported as the difference in travel costs per average household person trip.

The following assumptions are made for the time and cost comparison:

1. All trips analyzed are defined as **personal travel**. Business travel is defined as travel while on the job, "on the clock," and it is not considered in this analysis for commuting to one of the two destinations. This is because, typically, workers are not paid for their commuting time, unless they can be productive while traveling (hence the U.S. DOT, 2016 guidance on surface factor adjustments for transit commuting, as described below).
2. All train travel is defined as **"local"** as opposed to "intercity." Intercity is typically defined as travel occurring between major metropolitan areas greater than 50 miles apart, e.g., Boston to New York City.

[8] Note that the procedures used here in Phase 2 are more justifiable than those used in Phase 1, and therefore they are not as easily comparable with the Phase 1 estimates. Moving forward (in future phases), the same methodology used here in Phase 2 will be applied again, which will facilitate comparisons across phases.

3. Costs associated with travel[9] are divided into two categories: **value of travel time**, and **travel expenses**. The value of travel time can be a complex issue, as drivers of various economic and cultural backgrounds might value the cost of travel time quite differently. The type of travel is also a factor. Whereas a drive to work under congested, and therefore stressful, conditions might garner a maximum cost to many commuters, a drive for the primary purpose of vacationing in a national park might be identified as a desirable expense or negative cost.
    i. The procedures used for calculating **travel time[10]** are based loosely on recommendations from the Office of the Secretary of the US DOT, updated through 2016, (U.S. DOT, 2016). The U.S. DOT method provides the value of travel time savings (VTTS) for an existing travel mode (road, transit, train, etc.), for evaluating reductions or increases in passenger travel time resulting from infrastructure upgrades or operational changes. Both travel time costs and travel expenses are summed to compare two modes for each trip, and the difference in total cost is thus developed. It is possible for travel time by CT***fastrak*** to be longer yet produce a net positive cost savings for household travel.
    ii. Median personal income for the recent 5-years (2015-2019) from the 2019 American Community Survey, at the census block group level, is used for determining the cost assignment per individual, expressed as travel time per minute. Data on the census block group was collected as it is the smallest unit where the personal income data are available.
4. The value of travel time during the commute is assigned to be 50% of annual household income per minute (U.S. DOT, 2016). The other components of travel, such as the walk from stations to and from destinations[11], and the drive from home to the destination parking garage, are considered at 100% of personal income per minute. This assumption is recommended by U.S. DOT (2016) because the bus allows for more productive use of personal time than driving a car.

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[9] The costs of greenhouse gas (GHG) emissions are ignored for both the driving and bus travel modes. If it were feasible to include GHG emissions costs, it is hypothesized that the total cost savings from using CT***fastrak*** opposed to personal automobiles would be higher.

[10] Travel time on CT***fastrak*** was collected from the Weekday Schedule https://www.cttransit.com/sites/default/files/schedules/F_101_Wkdysched_0.pdf. (Accessed 8/21/2021). The schedule on Pg. 4 was used (for routes from New Britain to Hartford). For each station, the route closest to 8:00 am at the station to the time given at Sigourney Street Station is used to determine travel time on the bus.

[11] An additional benefit to walking to/from the stations is the health benefits, which are difficult to quantify and not considered in this analysis.

5. **Travel expenses** include fixed and variable costs of vehicle ownership; parking fees[12]; and train fares.[13]
    i. The automobile ownership costs used are those listed by the American Automobile Association (AAA)[14]; $9,282 per year, as of Sept. 2019 (AAA, 2019). The AAA figure is calculated based on the cost of fuel, maintenance, repairs, insurance, license/registration/taxes, depreciation, and loan interest, and is determined as an average of nine types of vehicles ranging from small sedans to pickup trucks, including some hybrid and electric vehicles. For this analysis, the ownership value is converted to a per-travel-day value by dividing the annual ownership cost by 260 workdays (20 workdays per week for 52 weeks).
    ii. It is assumed for this analysis that people who live within walking distance[15] (1 mile) of a station would be able to eliminate ownership of their vehicles. While there may be multiple residents living at each household address, it is assumed that one vehicle is eliminated, and that one resident is taking the bus for their trip to Hartford. Therefore, the cost of auto ownership is applied only to the driving portion of the analysis for one vehicle per residential address.

For illustrative purposes, a sample calculation comparing travel by CT***fastrak*** and by automobile is provided below for one example case: 70 Grove Hill, New Britain, CT, to the XL Center in Hartford.

The travel times assigned to each one-way trip for this example are given in Table 30. The value of travel time is estimated at a certain percent of the hourly median household income for the municipalities in which the CT***fastrak*** is located. With an annual personal income of $34,555 for this census block group, this example has median personal income of ($34,555)/ ((260 days) X (8 hr./day) X (60 min/hr)) = $0.2769 per minute = the value of time travel. The total cost of

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[12] Since the two parking garages are adjacent to each of the two landmarks, the walking time from the garage to the landmark is assumed to be trivial. The monthly parking at XL Center Garage at 200 Church Street is $150/month (https://www.parkme.com/lot/91814/xl-center-hartford-ct accessed on 8/19/2021) and the daily average fee is divided by the 20 workdays per month. The monthly parking at UCONN-Hfd at the North Front Street Garage (LAZ Parking) is $206.32 per month (https://en.parkopedia.com/parking/garage/front_street_north_garage/06103/hartford/?arriving=202108200030&leaving=202108200230 accessed on 8/19/2021), and the daily average fee is divided by the 20 workdays per month.

[13] As of 2021, a 31-day pass on CT***fastrak*** was $63. Given the assumption that the pass would be used for 20 workdays per month, the average daily round trip fare was assumed to be $3.15.

[14] The AAA average car ownership cost estimate in 2019 is $9282, from https://media.acg.aaa.com/aaa-true-cost-annual-vehicle-ownership-rises-to-9282-1.htm#:~:text=Finance%20costs%20on%20new%20car%20purchases%20have%20jumped,vehicle%20ownership%20to%20%249%2C282%2C%20or%20%24773.50%20a%20month (accessed on 8/19/2021).

[15] The walking travel time from properties (within 1 mile) to the closest station is calculated with ArcGIS Pro **OD Cost Matrix** specifying walking time as mode of travel; Thiessen polygons used to determine which station is closest for each point.

each component of the trip, for this specific example, is given by multiplying each element of the travel time by the median travel cost per minute for residents in this census block group.

Table 30. Example of Daily Travel Times and Percent of Household Income Used for Cost Comparison Analysis, 70 Grove Hill, New Britain, CT to the XL Center in Hartford, CT

Travel Mode	*From/to*	*Travel Time one way (minutes)*	*Daily Cost (round trip travel)*
Personal Automobile	Home to XL Center Parking	22.8	$12.63
Parking			$7.50
Car Ownership			$35.70
Walking to station[16]	Residence to New Britain station	13.9	$7.70
CT***fastrak*** ride	New Britain station to Sigourney Station	10.5[17]	$5.81
CT***fastrak*** fare			$3.15
Walking to destination (from train station)	Sigourney station to XL Center	29	$16.06
Daily R.T. Cost Savings from using CT*fastrak*			**$23.11**

First, Table 30 above demonstrates that the majority of the savings from using CT***fastrak*** come from the expenses of owning and operating an automobile. The travel time on CT***fastrak*** is longer than the drive time, on average.[18] Similar results are apparent for the other residents in the 1-mile radius from each CT***fastrak*** station. Table 30 shows that the daily cost savings estimate for traveling by CT***fastrak*** instead of driving is $23.11 for this individual residence. Annually, this is $6,009 for this one resident. Adding up the annual cost savings for all residences within 1 mile of a CT***fastrak*** station, for all 10 stations, yields an annual cost savings of over $143 million. If instead all residents were to commute to UCONN-Hartford instead of to the XL Center, the cost savings estimate would be $161 million.

Note that these savings are only realized if one automobile is given up at each address and one resident switch to taking CT***fastrak*** to the XL Center, instead of driving. This estimate would be different if more than one car were given up, or if multiple residents from each address were commuting by CT***fastrak*** instead of driving. While this is clearly an exercise that relies on several assumptions, it is instructive in the sense that it demonstrates how CT***fastrak*** has the

[16] Since the departure schedule of CT***fastrak*** informs the exact times of arrival/departure of each bus, and there is no significant traffic on the route due to the dedicated pathways, the assumed wait time at the stations is negligible.

[17] This estimate is obtained after adjusting the travel time for surface factor per U.S. DOT (2016)

[18] This is due to walking as the mode used for first/last mile in this research. However, using other modes, such as bike or scooter, for these legs of the trip would potentially reduce travel times. It is important to stress that while the travel time between modes may not always result in time savings, the value of travel time between modes likely does results in cost savings.

potential to save society millions of dollars annually if it were to become fully utilized by a broad swath of the population.

Below are the descriptive statistics tables for the value of travel time savings in neighborhoods near each of the CT***fastrak*** stations. Table 31 is the descriptive statistics table for travel from each house in the four towns to the XL Center in downtown Hartford, and Table 32 is the descriptive statistics table for travel from each house in the four towns to UCONN's Hartford campus. Separate radius band travel time savings averages are outlined for each station. First, it is noteworthy that as the size of the radius increases, the travel time savings falls. This is intuitive because residents who live closer to a station can walk to the station more quickly, thus saving more time. Second, for residents closest to a station, the Parkville and Kane Street stations in Hartford (which are the furthest Hartford stations from the XL Center and UCONN Hartford), tend to have high average travel cost savings. Similarly, the stations in New Britain (which are far from downtown Hartford) tend to have high average travel cost savings for those properties within ¼ mile of the station. The Newington stations tend to have among the lowest travel cost savings for those properties within ¼ mile of the station.

Table 31. Descriptive Statistics of Cost Savings (Dollars) Per Household Round Trip to Hartford XL Center

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	601	2533	5405	8383	12910
	Avg.	28.34	26.44	26.19	24.68	22.57
	Med.	28.63	27.84	28.31	28.46	26.80
	S.D.	1.42	4.27	5.36	9.96	12.11
	Min	18.79	-1.31	-21.38	-28.12	-38.64
	Max	31.79	32.07	34.92	34.92	34.92
Parkville Station Hartford	**n =**	324	1345	3750	7271	14591
	Avg.	30.96	29.61	27.15	23.19	22.15
	Med.	30.68	30.69	29.31	27.72	26.10
	S.D.	1.37	3.55	6.29	11.74	11.61
	Min	28.83	13.82	-4.41	-38.14	-38.64
	Max	34.92	34.92	34.92	34.92	34.92
Kane Street Station Hartford	**n =**	88	1006	3144	5571	15219
	Avg.	31.67	27.74	25.38	22.35	21.69
	Med.	31.81	29.74	27.23	25.65	25.26
	S.D.	1.53	5.03	6.78	11.81	11.07
	Min	24.72	7.28	-4.45	-38.64	-38.64
	Max	34.51	34.51	34.92	34.92	34.92
Flatbush Station West Hartford	**n =**	156	650	1966	4514	12624
	Avg.	23.98	22.38	20.77	20.73	20.83
	Med.	22.62	21.99	20.95	20.95	23.04
	S.D.	3.47	6.01	5.91	6.08	10.23
	Min	8.34	7.28	7.28	6.07	-38.64
	Max	32.30	33.73	34.51	34.51	34.92
Elmwood Station West Hartford	**n =**	84	775	2116	3583	10339
	Avg.	26.71	23.59	20.57	18.77	18.48
	Med.	26.87	24.51	21.21	19.40	19.18
	S.D.	2.63	3.81	5.15	5.96	8.58
	Min	19.28	15.11	8.53	-1.63	-38.64
	Max	30.69	30.69	30.69	32.30	34.51
	n =	168	930	2098	3757	6716

Newington Junction Station Newington	Avg.	21.97	19.91	18.30	16.03	16.91
	Med.	21.33	20.17	18.61	16.56	16.97
	S.D.	2.34	2.83	3.42	6.04	6.14
	Min	17.86	10.61	9.17	-13.64	-13.64
	Max	27.50	27.50	28.34	29.88	39.46
Cedar Street Station Newington	**n =**	16	125	655	1450	6822
	Avg.	23.33	22.65	20.45	16.59	19.61
	Med.	22.37	20.88	19.26	16.84	19.52
	S.D.	5.10	6.26	6.89	9.35	9.71
	Min	17.67	11.97	2.09	-4.71	-13.64
	Max	32.17	39.46	39.46	39.46	39.46
East Street Station New Britain	**n =**	172	512	1238	2658	6968
	Avg.	28.67	27.74	21.29	18.95	22.92
	Med.	28.31	27.92	26.59	23.41	27.25
	S.D.	1.57	2.40	9.64	11.08	9.77
	Min	26.08	19.34	-5.62	-6.35	-6.35
	Max	33.92	39.46	39.46	39.46	39.46
East Main Street Station (Southbound) New Britain	**n =**	312	1027	2219	3944	7529
	Avg.	33.09	31.63	30.32	28.25	24.80
	Med.	33.19	31.93	30.23	29.51	28.02
	S.D.	0.89	1.61	2.76	5.44	8.82
	Min	31.13	27.65	18.08	3.98	-6.35
	Max	34.78	34.78	35.37	35.37	39.46
East Main Street Station (Northbound) New Britain	**n =**	289	1065	2242	3931	7580
	Avg.	33.12	31.64	30.01	27.72	24.76
	Med.	33.27	31.92	30.02	29.31	28.02
	S.D.	0.92	1.55	3.09	5.95	8.81
	Min	31.13	28.26	17.21	2.41	-6.35
	Max	34.78	34.78	35.37	35.37	39.46
New Britain Station New Britain	**n =**	95	670	2128	4287	6995
	Avg.	32.87	31.60	30.11	28.96	25.92
	Med.	32.89	32.44	31.26	29.32	28.30
	S.D.	0.75	2.95	3.39	3.70	7.75
	Min	30.39	23.41	21.05	15.83	-6.35
	Max	35.16	35.37	35.37	35.37	39.24

Table 32. Descriptive Statistics of Cost Savings (Dollars) Per Household Round Trip to UCONN-Hartford

CTfastrak Station		1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	**n =**	601	2533	5405	8383	12910
	Avg.	31.44	29.47	29.27	27.72	25.63
	Med.	31.79	30.97	31.16	31.34	29.81
	S.D.	1.48	4.24	5.26	9.84	11.93
	Min	22.18	2.33	-16.39	-24.65	-34.45
	Max	34.88	35.00	37.82	37.82	37.82
Parkville Station Hartford	**n =**	324	1345	3750	7271	14591
	Avg.	33.99	32.66	30.21	26.26	25.23
	Med.	33.63	33.69	32.27	30.63	29.21
	S.D.	1.36	3.47	6.16	11.50	11.44
	Min	31.90	16.85	-0.72	-33.95	-34.45
	Max	37.82	37.82	37.82	37.82	37.82
Kane Street Station Hartford	**n =**	88	1006	3144	5571	15219
	Avg.	34.70	30.81	28.48	25.46	24.78

	Med.	34.83	32.76	30.13	28.32	28.28
	S.D.	1.51	4.95	6.63	11.57	10.92
	Min	27.83	10.68	-0.77	-34.45	-34.45
	Max	37.53	37.53	37.82	37.82	37.82
Flatbush Station West Hartford	**n =**	156	650	1966	4514	12624
	Avg.	27.30	25.67	24.03	23.91	23.96
	Med.	26.02	25.35	24.14	24.13	25.99
	S.D.	3.38	5.86	5.78	5.94	10.00
	Min	11.62	10.68	10.68	9.50	-34.45
	Max	35.36	36.76	37.53	37.53	37.82
Elmwood Station West Hartford	**n =**	84	775	2116	3583	10339
	Avg.	29.94	26.84	23.85	22.08	21.56
	Med.	30.14	27.74	24.48	22.70	22.21
	S.D.	2.59	3.71	5.05	5.86	8.49
	Min	22.55	18.58	11.83	1.93	-34.45
	Max	33.84	33.84	33.84	35.36	37.53
Newington Junction Station Newington	**n =**	168	930	2098	3757	6716
	Avg.	25.23	22.93	21.20	18.93	19.85
	Med.	24.75	22.93	21.55	19.31	19.66
	S.D.	2.27	2.76	3.59	6.13	6.18
	Min	21.13	13.87	12.63	-10.15	-10.15
	Max	30.66	30.66	31.49	33.03	42.20
Cedar Street Station Newington	**n =**	16	125	655	1450	6822
	Avg.	24.93	24.23	21.95	18.35	21.69
	Med.	23.56	22.46	20.32	17.81	21.81
	S.D.	5.05	6.39	6.93	9.22	9.84
	Min	19.67	14.19	4.36	-3.59	-10.15
	Max	35.50	42.20	42.20	42.20	42.20
East Street Station New Britain	**n =**	172	512	1238	2658	6968
	Avg.	30.38	29.43	22.77	20.49	24.97
	Med.	30.00	29.61	28.29	24.87	29.44
	S.D.	1.63	2.54	9.91	11.32	10.14
	Min	27.77	21.49	-4.70	-5.43	-5.43
	Max	35.61	42.20	42.20	42.20	42.20
East Main Street Station (Southbound) New Britain	**n =**	312	1027	2219	3944	7529
	Avg.	35.41	33.84	32.52	30.38	27.09
	Med.	35.50	34.14	32.33	31.74	30.15
	S.D.	0.96	1.70	3.01	5.96	9.27
	Min	33.01	29.96	19.35	4.91	-5.43
	Max	37.23	37.23	38.36	38.36	42.20
East Main Street Station (Northbound) New Britain	**n =**	289	1065	2242	3931	7580
	Avg.	35.37	33.81	32.14	29.79	27.03
	Med.	35.50	34.08	32.13	31.48	30.09
	S.D.	1.04	1.69	3.39	6.49	9.26
	Min	32.94	30.43	18.49	3.33	-5.43
	Max	37.23	37.23	38.36	38.36	42.20
New Britain Station New Britain	**n =**	95	670	2128	4287	6995
	Avg.	36.00	34.62	33.06	31.81	28.26
	Med.	36.05	35.48	34.11	32.00	30.62
	S.D.	0.72	2.86	3.23	3.54	8.16
	Min	33.55	26.80	24.44	19.27	-5.43
	Max	38.14	38.36	38.36	38.36	41.98

3.9 Planned and Proposed Developments

Tables 33 and 34 show the number of planned and proposed developments, within various radii from each station, in 2016 and 2020, respectively. While there were small differences in the numbers of planned/proposed developments within ¼ miles of a station, many stations (including Sigourney Street, Parkville, Kane Street, and Flatbush) saw dramatic decreases in development plans within 2 miles of the stations. New Britain Station is an exception; there is roughly 50% increase in the number of planned/proposed developments within each of the radii shown in Tables 33 and 34 between 2016 and 2020, respectively.

Table 33. Planned and Proposed Developments as of 2016

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	3	9	31	71
Parkville Station Hartford	1	2	16	75
Kane Street Station Hartford	1	2	4	52
Flatbush Station West Hartford	1	2	6	23
Elmwood Station West Hartford	2	3	5	9
Newington Junction Station Newington	0	0	0	7
Cedar Street Station Newington	0	0	0	0
East Street Station New Britain	0	0	0	5
East Main Street station New Britain	0	0	9	12
New Britain Station New Britain	2	4	6	6

Table 34. Planned and Proposed Developments as of 2020 (Summary of Each Town's Numbers

CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	1	1	12	29
Parkville Station Hartford	1	3	11	26
Kane Street Station Hartford	2	3	4	18
Flatbush Avenue Station West Hartford	0	0	3	13
Elmwood Station West Hartford	0	1	1	7
Newington Junction Station Newington	0	0	3	12
Cedar Street Station Newington	0	5	6	11
East Street Station New Britain	0	0	4	16
East Main Street station New Britain	0	0	6	12
New Britain Station New Britain	4	7	9	9

3.10 Numbers of Assisted Housing Units

Table 35. Number of Assisted Units by Municipality, 2009-2020

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hartford	17,785	18,859	18,432	19,245	19,588	19,634	20,850	19,839	19,875	20,039	20,382	20,659
West Hartford	1,800	1,850	2,069	2,075	2,136	2,056	1,981	1,928	1,991	1,968	2,091	2,119
Newington	918	906	912	933	956	1,111	1,124	1,058	1,078	1,116	1,155	1,168
New Britain	5,610	5,485	6,189	6,345	6,467	6,597	6,281	5,689	5,763	5,672	5,731	5,763

Source: Connecticut Housing Finance Authority (CHFA), https://portal.ct.gov/DOH/DOH/Programs/Affordable-Housing-Appeals-Listing. (Accessed 5/30/2022).

While some of the descriptive analysis above on property sales prices and assessed values are indicators of the economic aspects of the five years of service, another important issue is that of equity. With gentrification comes the displacement of some residents and their need for affordable housing increases. Table 35 above presents data on the total number of “assisted units” for each of the four municipalities in each year of Phase 1 and Phase 2. While it would have been ideal to have information of the exact locations of these units, unfortunately the municipal level is the most disaggregated level for which such data are available. There appears to be an upward trend in numbers of assisted units in Hartford and Newington in most years of Phase 2 relative to years in Phase 1. However, West Hartford and New Britain tend to have fewer assisted units in most years of Phase 2 relative to the individual years of Phase 1. These numbers are indicative of a possible gentrification effect arising due to the transit-oriented development associated with CT***fastrak***’s service in these towns.

3.11 Vacancies

Residential Vacancies

The two tables below show how residential vacancies have changed in the census tracts near each station, for the period during Phase 1 (Table 36) and Phase 2 (Table 37). While Sigourney Street Station, the two Newington Stations, and New Britain all saw nearby residential vacancies fall during Phase 1, the census tracts near the remaining stations had an increase in vacancies during Phase 1. In contrast, all census tracts near stations had lower vacancies during Phase 2. This indicates a strong negative correlation between residential vacancies and the opening of service in 2015. Maps of the residential vacancies in each tract, as well as the changes in vacancies during each phase, are included for each station in the database and the visualization tool.

Table 36. Change in the Number of Residential Vacancies of the Census Tract Where Each CTfastrak Station is Located Between 2009 and 2015 (Sources: HUD and USPS)

CTfastrak Station	2009	2015	Difference (2015 minus 2009)
Sigourney Street Station Hartford	316	189	-127
Parkville Station Hartford	25	90	65
Kane Street Station Hartford	25	90	65
Flatbush Station West Hartford	7	20	13
Elmwood Station West Hartford	7	20	13
Newington Junction Station Newington	45	23	-22
Cedar Street Station Newington	45	23	-22
East Street Station New Britain	63	80	17
East Main Street station- Northbound New Britain	9	80	17
East Main Street station- Southbound New Britain	76	115	39
New Britain Station New Britain	150	139	-11

Table 37. Change in the Number of Residential Vacancies of the Census Tract Where Each CTfastrak Station is Located Between 2015 and 2020 (Source: HUD and USPS)

CTfastrak Station	2015	2020	Difference (2020 minus 2015)
Sigourney Street Station Hartford	189	150	-39
Parkville Station Hartford	90	45	-45
Kane Street Station Hartford	90	45	-45
Flatbush Station West Hartford	20	10	-10
Elmwood Station West Hartford	20	10	-10
Newington Junction Station Newington	23	10	-13
Cedar Street Station Newington	23	10	-13
East Street Station New Britain	80	37	-43
East Main Street station- Northbound New Britain	80	37	-43
East Main Street station- Southbound New Britain	115	88	-27
New Britain Station New Britain	139	121	-18

Commercial Vacancies

The two tables below show how commercial vacancies have changed in the census tracts near each station, for the period during Phase 1 (Table 38) and Phase 2 (Table 39). It is of interest that in Phase 1, for all stations, commercial vacancies either rose, or declined by a very small amount. In Phase 2, commercial vacancies decreased in the census tracts near all the CT***fastrak*** stations. This indicates a strong negative correlation between commercial vacancies and the opening of service in 2015. Maps of the residential vacancies in each tract, as well as the changes in vacancies during each phase, are included for each station in the database and visualization tool.

Table 38. Change in the Number of Commercial Vacancies of the Census Tract Where Each CTfastrak Station is Located between 2009 and 2015 (Sources: HUD and USPS)

CTfastrak Station	2009	2015	Difference (2015 minus 2009)
Sigourney Street Station Hartford	45	73	28
Parkville Station Hartford	35	45	10
Kane Street Station Hartford	35	45	10
Flatbush Station West Hartford	101	105	4
Elmwood Station West Hartford	101	105	4
Newington Junction Station Newington	24	23	-1
Cedar Street Station Newington	24	23	-1
East Street Station New Britain	9	13	4
East Main Street station- Northbound New Britain	9	13	4
East Main Street station- Southbound New Britain	10	11	1
New Britain Station New Britain	107	126	19

Table 39. Change in the Number of Commercial Vacancies of the Census Tract Where Each CTfastrak Station is Located Between 2015 and 2020 (Sources: HUD and USPS)

CTfastrak Station	2015	2020	Difference (2020 minus 2015)
Sigourney Street Station Hartford	73	59	-14
Parkville Station Hartford	45	39	-6
Kane Street Station Hartford	45	39	-6
Flatbush Station West Hartford	105	83	-22
Elmwood Station West Hartford	105	83	-22
Newington Junction Station Newington	23	20	-3
Cedar Street Station Newington	23	20	-3
East Street Station New Britain	13	9	-4
East Main Street station - Northbound New Britain	13	9	-4
East Main Street station - Southbound New Britain	11	11	0
New Britain Station New Britain	126	121	-5

Vacant or Undeveloped Parcels

Tables 40 and 41 below show the number of vacant or undeveloped parcels within given radii from each of the stations. There appears to be a substantial degree of variation in the relationship between vacant/undeveloped parcels and proximity to CT***fastrak*** stations. For instance, the number of vacant/undeveloped parcels within ½ mile of Parkville Station and Kane Street Station decreased over time, while Sigourney Street Station saw an increase. Most notably is the decrease in vacant/undeveloped parcels within a 2-mile radius of several stations. For Sigourney Street Station and Parkville Station there was a nearly 10 percent decrease in the number of vacant/undeveloped parcels between the two phases. However, within 2 miles of the East Street Station in New Britain, the number of vacant/undeveloped parcels nearly doubled over the timeframe of the two phases. This leads to the conclusion that the correlation of vacant parcels with the presence of nearby CT***fastrak*** stations is highly variable, and no clear trend is apparent.

Table 40. Number of Vacant or Undeveloped Parcels in Phase 1 (Sources: CRCOG and Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	10	29	74	161	535
Parkville Station Hartford	7	42	90	144	514
Kane Street Station Hartford	6	36	81	119	394
Flatbush Station West Hartford	9	30	65	100	368
Elmwood Station West Hartford	11	24	60	87	367
Newington Junction Station Newington	15	37	81	138	314
Cedar Street Station Newington	1	5	19	37	400
East Street Station New Britain	N/A	9	27	67	353
East Main Street station New Britain (Southbound)	3	16	40	96	312
East Main Street station New Britain (Northbound)	4	18	41	95	315
New Britain Station New Britain	1	10	37	82	276

Table 41. Number of Vacant or Undeveloped Parcels in Phase 2 (Sources: CRCOG and Municipal Assessor Offices)

CTfastrak Station	1/4 mile radius	1/2 mile radius	3/4 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	10	32	77	149	490
Parkville Station Hartford	5	37	94	148	470
Kane Street Station Hartford	5	33	73	111	386
Flatbush Station West Hartford	12	35	82	115	377
Elmwood Station West Hartford	14	50	98	143	387
Newington Junction Station Newington	24	47	99	140	449
Cedar Street Station Newington	10	31	47	92	620
East Street Station New Britain	8	31	77	163	632
East Main Street station New Britain (Southbound)	8	40	133	230	666
East Main Street station New Britain (Northbound)	8	38	129	247	667
New Britain Station New Britain	3	58	127	199	606

3.12 Environmental Remediation Sites

Table 42 below shows the number of remediated brownfields during Phase 1 (2010 -2014) and in Phase 2 (2015 -2019). In virtually all radius bins for every station, there was a marked increase in the amount of remediation during Phase 2 compared with Phase 1. This might imply that land near the stations became more desirable to potential owners after the start of service, so owners were more willing to undertake remediation to enable occupancy of land that prior to 2015 was less desirable. The relationship between sales prices and proximity to remediated brownfields is explored further, in the statistical analysis section below.

Table 42. Number of Remediated Brownfields and "Sites" Between 2010-2019 (Sources: CT DEEP, EPA and CRCOG)

	2010-2014- "brownfields"				2015-2019- "CT DEEP CMS sites"			
CTfastrak Station	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius	1/4 mile radius	1/2 mile radius	1 mile radius	2 mile radius
Sigourney Street Station Hartford	0	0	1	11	2	3	6	23
Parkville Station Hartford	0	0	0	4	0	0	3	18
Kane Street Station Hartford	0	0	0	3	0	0	1	11
Flatbush Station West Hartford	0	0	0	0	1	1	3	4
Elmwood Station West Hartford	0	0	0	0	1	2	3	3
Newington Junction Station Newington	0	0	0	0	0	0	0	3
Cedar Street Station Newington	0	0	0	1	1	2	2	3
East Street Station New Britain	0	0	0	1	1	2	2	11
East Main Street station New Britain	0	2	2	4	1	1	9	12
New Britain Station New Britain	0	1	1	2	3	8	10	11

The remediated brownfields data from Phase 1 were collected from a combination of US EPA Region 1's brownfield program and some data from CT DEEP, and from the Capitol Region Council of Governments (CRCOG). Based on information obtained via communications between the research team and CT DEEP, CRCOG makes loans for assessment and redevelopment of brownfields in all four municipalities, using funds from an EPA grant. EPA has a tracking system called ACRES that grant recipients use to report their progress on assessing and cleaning up sites. EPA's ACRES system is not open to the public, but its data feeds into EPA's Cleanups in My Community database, which is available at https://www.epa.gov/cleanups/cleanups-my-community. That database includes data from all of EPA's cleanup programs, including Superfund, brownfields and the Resource Conservation and Recovery Act (RCRA). CT DEEP also has a state brownfield grant and loan program that funds the assessment and remediation of brownfields.

According to correspondence with officials at CT DEEP, it does not track cleanups of brownfields separately from cleanups of sites under other programs such as the property transfer and voluntary remediation programs. The majority of cleanups are done under oversight by licensed environmental professionals (LEPs). The LEP submits a verification report and a form when remediation is complete. A much smaller number of sites are cleaned up under direct CT DEEP supervision. For those “DEEP lead” sites, the LEP submits a remedial action report once cleanup is done. The CT DEEP Remediation Division’s case management system (CMS) tracks cleanups that have been completed under any of these programs. The case management system includes sites where CT DEEP received verifications or issued an approval of the final remedial action report. The Phase 2 brownfield redevelopment data listed in the table above is obtained from the CT DEEP CMS database. Because of the differences in how the data were collected and classified in Phases 1 and 2, the number of remediated sites in the two phases are not directly comparable. Furthermore, the CMS database is updated over time so that it is not now possible to go back to earlier versions of the CMS database to obtain comparable data for Phase 1. Moving forward, in any future phases of this research, the CMS database will be obtained at the date of the future phases for comparability with this Phase 2.

Based on the CMS data, there are a total of 78 remediated sites in the four towns between 2015 -2020, although in the table above, the sum of the totals within 2 miles radius of all stations are 99 remediated sites. This can be attributed to the fact that there is some overlap between the 2-mile radii for some stations (i.e., some stations are closer than 2 miles away from each other). As an example of how the figure below corresponds to the table above, there are eight sites within ½ mile of the New Britain Station, while it appears from the figure that there are only three. This is because some of the sites are so close to each other that they essentially appear on top of each other in the figure, so it is difficult to discern the precise numbers of sites from looking at the figures.

The statistical analysis in the sections below relies on the CMS data for remediated sites.

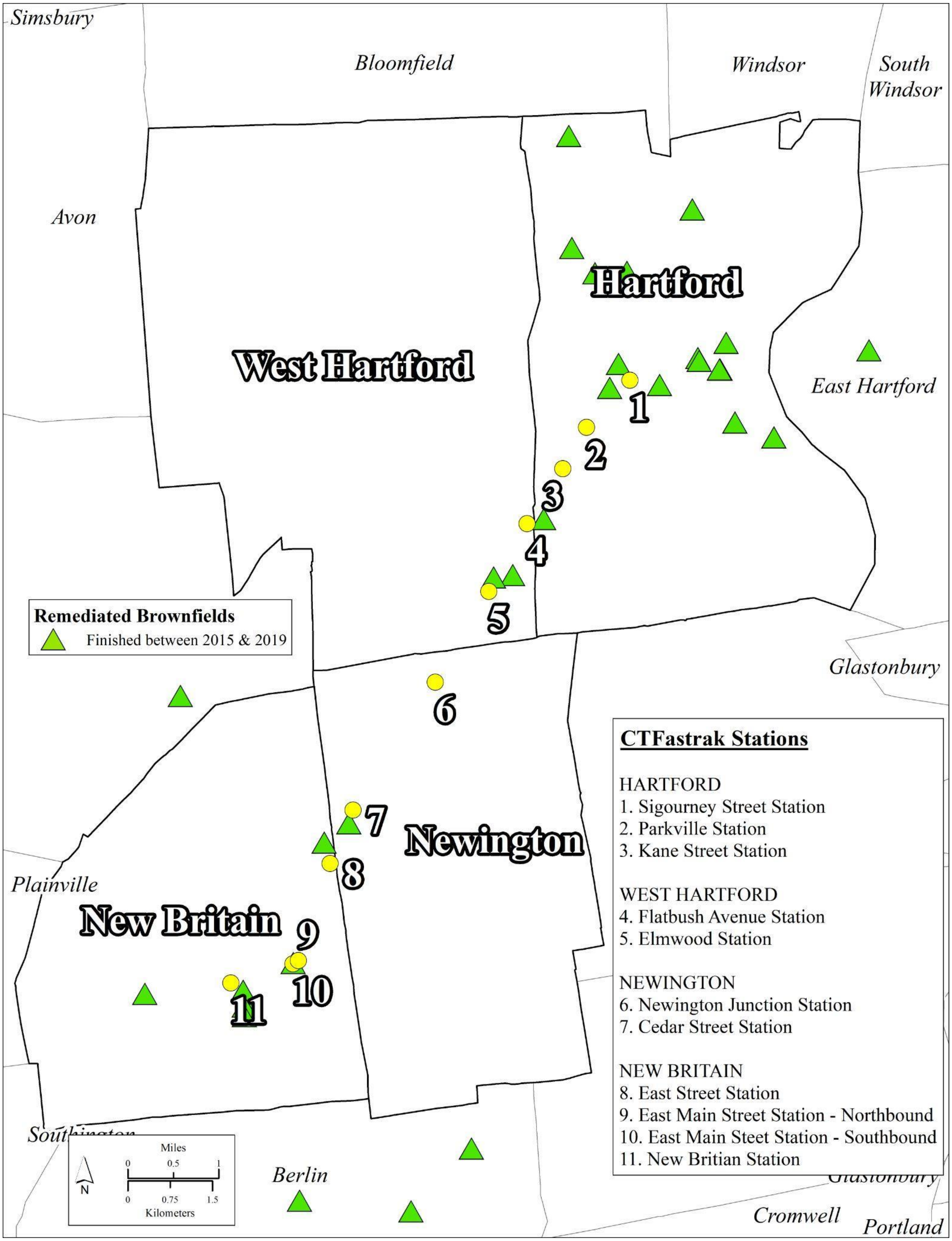

Figure 11. Locations of Environmental Remediation Sites, 2015-2019

3.13 Aerial Photography

The map below in Figure 12 shows aerial photography for all 4 municipalities in which there is a CT***fastrak*** station. Similar aerial photos for the areas surrounding each station are contained in the geospatial database and in the visualization tool. A comparable map comprised of all four towns, for the period of Phase 1 (i.e., pre-2015), is available in the Phase 1 report and in the database and visualization tool.

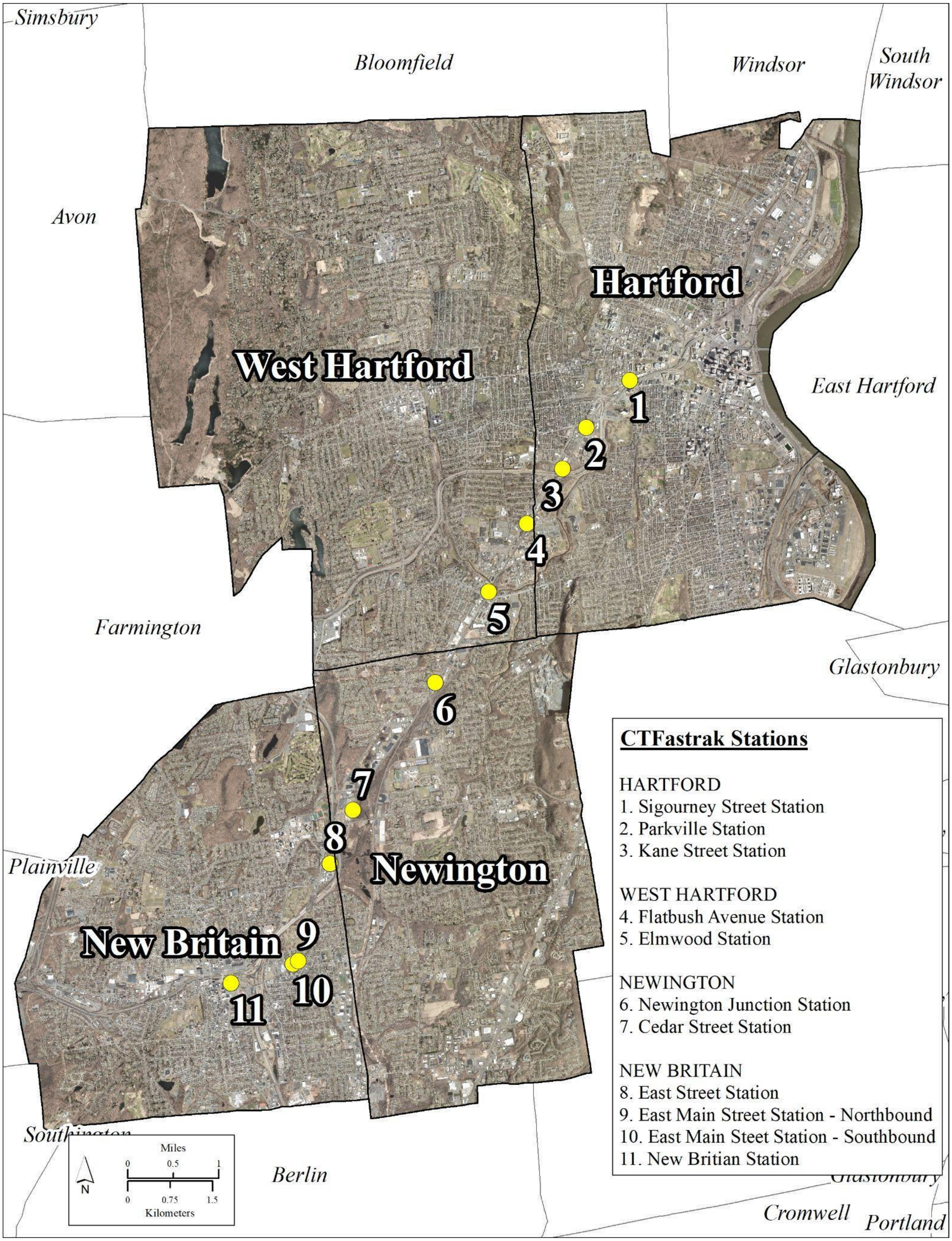

Figure 12. Map of 2019 Aerial Photography for all CTfastrak stations.

3.14 Techniques Used to Study the Impact of BRT Service on Property Values

3.14.1 Statistical Analyses

We present two separate sets of statistical analyses in this section – one based on graphical depictions via scatterplots and trendlines of two-way correlations between key variables of interest – and a second using regression analysis to control for multiple covariates.

Figure 13 shows a scatter plot for the sales prices of residential properties against the value of travel time savings (VTTS) between driving, versus walking to the nearest station, then taking CT***fastrak*** to Sigourney Street station, and then walking to UCONN-Hartford. The trend line indicates that there is a positive correlation in Figure 13, that is, households with greater travel time savings tend to be correlated with higher valued homes. This positive correlation is also seen in Figure 14 with the VTTS between driving, versus walking to the nearest station, then taking CT***fastrak*** to Sigourney Street station, and then walking to the XL Center in Hartford.

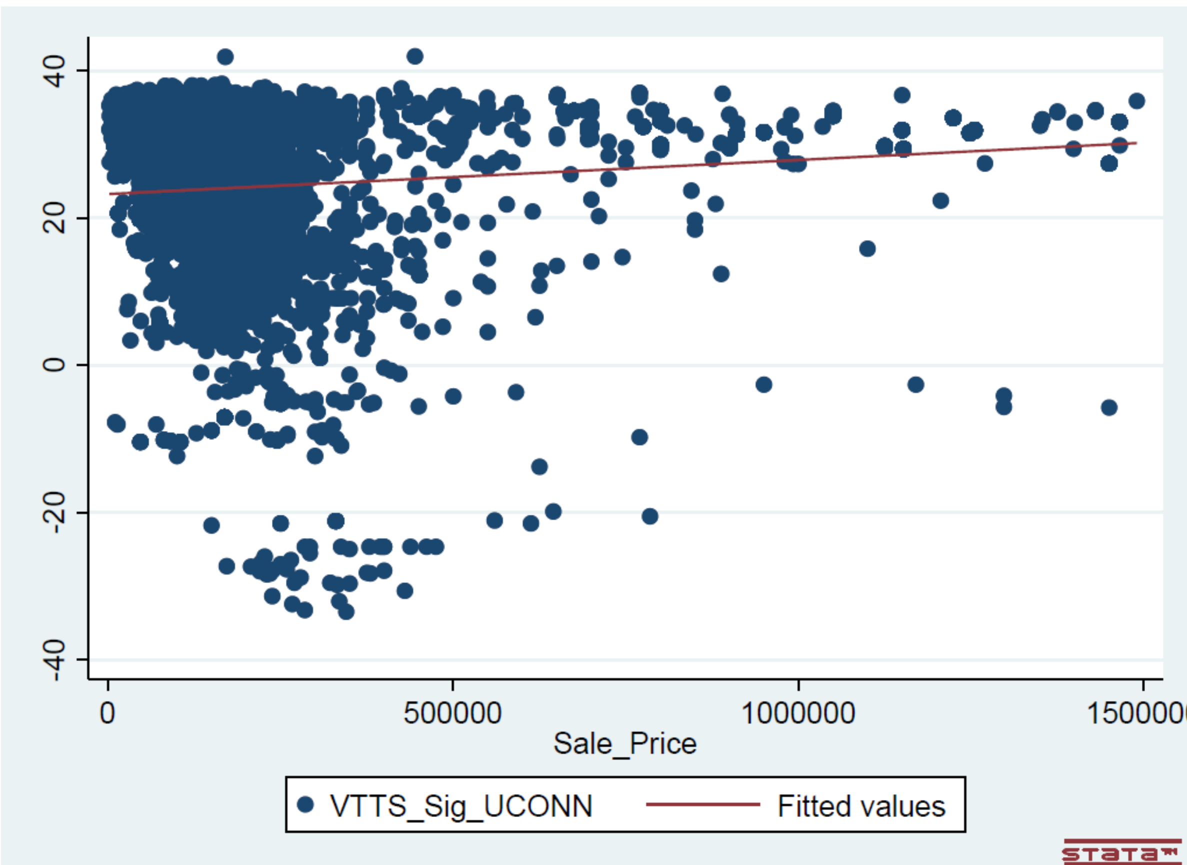

Figure 13. VTTS (in dollars per round trip) of Traveling From Each Property Sold In 2015-2020 to UCONN in Hartford, By Taking CTfastrak Instead of Driving; against the sale prices (in dollars) of the corresponding houses, for properties within 1.5 miles from the nearest station. (Sources: 2019 AAA car ownership data; 2021 CTtransit bus fares; 2021 N. Front Street Garage and XL Center Garage parking costs; municipal assessors' sale prices; 2019 Census block group income from American Community Survey; authors' calculations; and Stata ™ software).

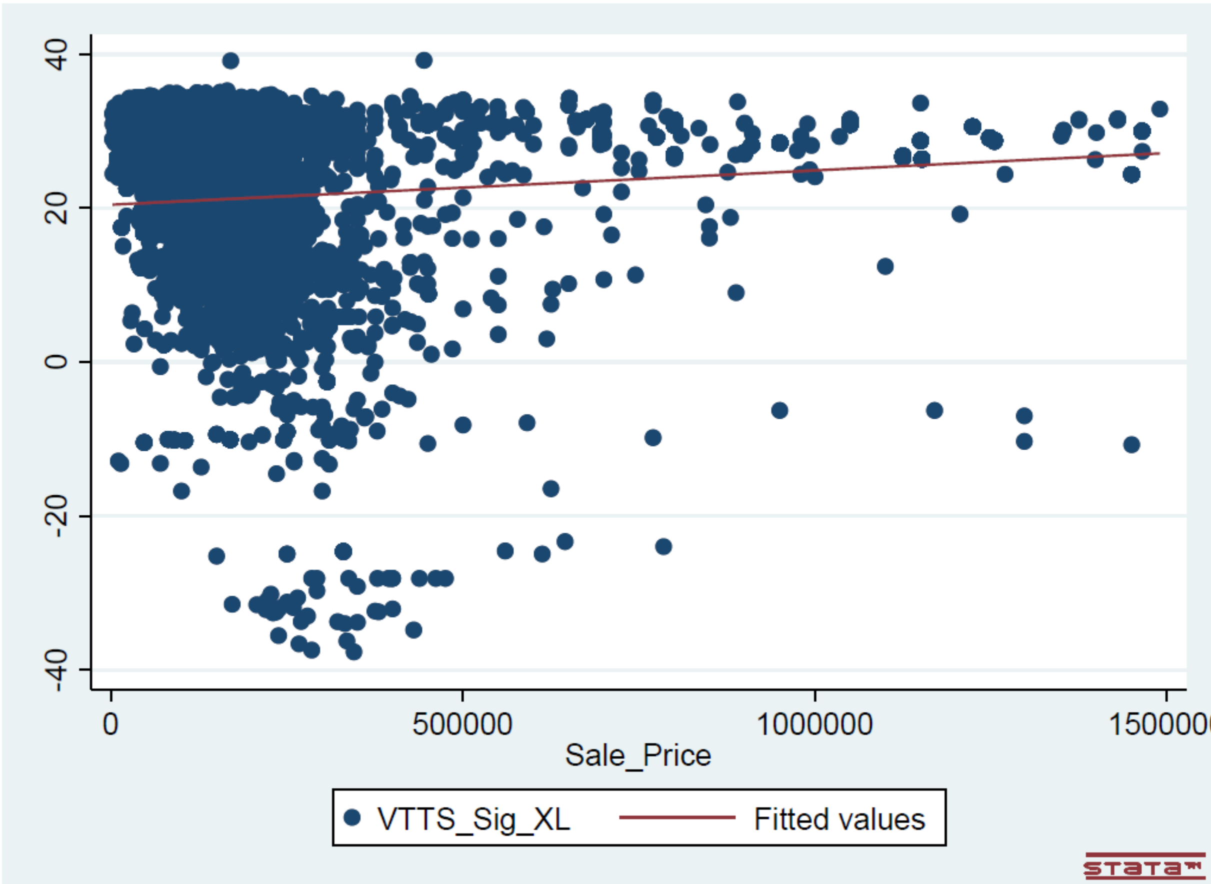

Figure 14, VTTS (In Dollars Per Round Trip) of Traveling From Each Property Sold In 2015-2020 to XL Center in Hartford, by Taking CTfastrak Instead of Driving; against the sale prices (in dollars) of the corresponding houses, for properties within 1.5 miles from the nearest station. (Sources: 2019 AAA car ownership data; 2021 CTtransit bus fares; 2021 N. Front Street Garage and XL Center Garage parking costs; municipal assessors' sale prices; 2019 Census block group income from American Community Survey; authors' calculations; and Stata ™ software).

Figures 15 and 16 compare the VTTS for the endpoints of the UCONN-Hartford campus and the XL Center, respectively, with the distance from the nearest CTfastrak station. In both cases, there is a negative correlation between VTTS and distance from the station. In other words, households that are further from a CTfastrak station experience lower VTTS from taking CTfastrak versus driving. In other words, the VTTS benefits of riding CTfastrak are higher for households that have shorter travel distances between their homes and the closest station.

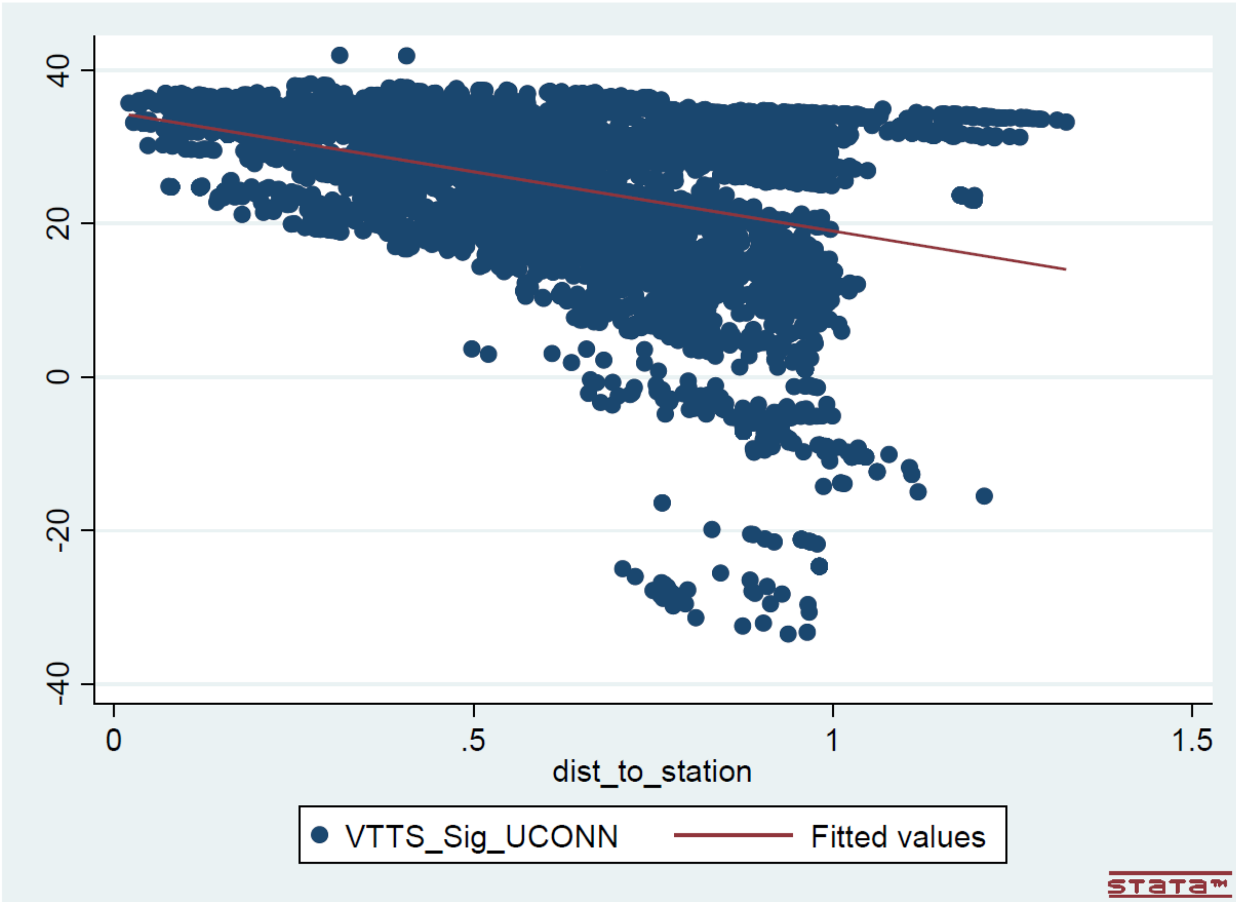

Figure 15. VTTS (In Dollars Per Round Trip) of Traveling From Each Property Sold In 2015-2020 to the UCONN Hartford Campus, by Taking CTfastrak Instead of Driving; against the distance (in miles) to nearest station, for properties within 1.5 miles from the nearest station. (Sources: 2019 AAA car ownership data; 2021 CTtransit bus fares; 2021 N. Front Street Garage and XL Center Garage parking costs; municipal assessors' sale prices; 2019 Census block group income from American Community Survey; authors' calculations; and Stata ™ software).

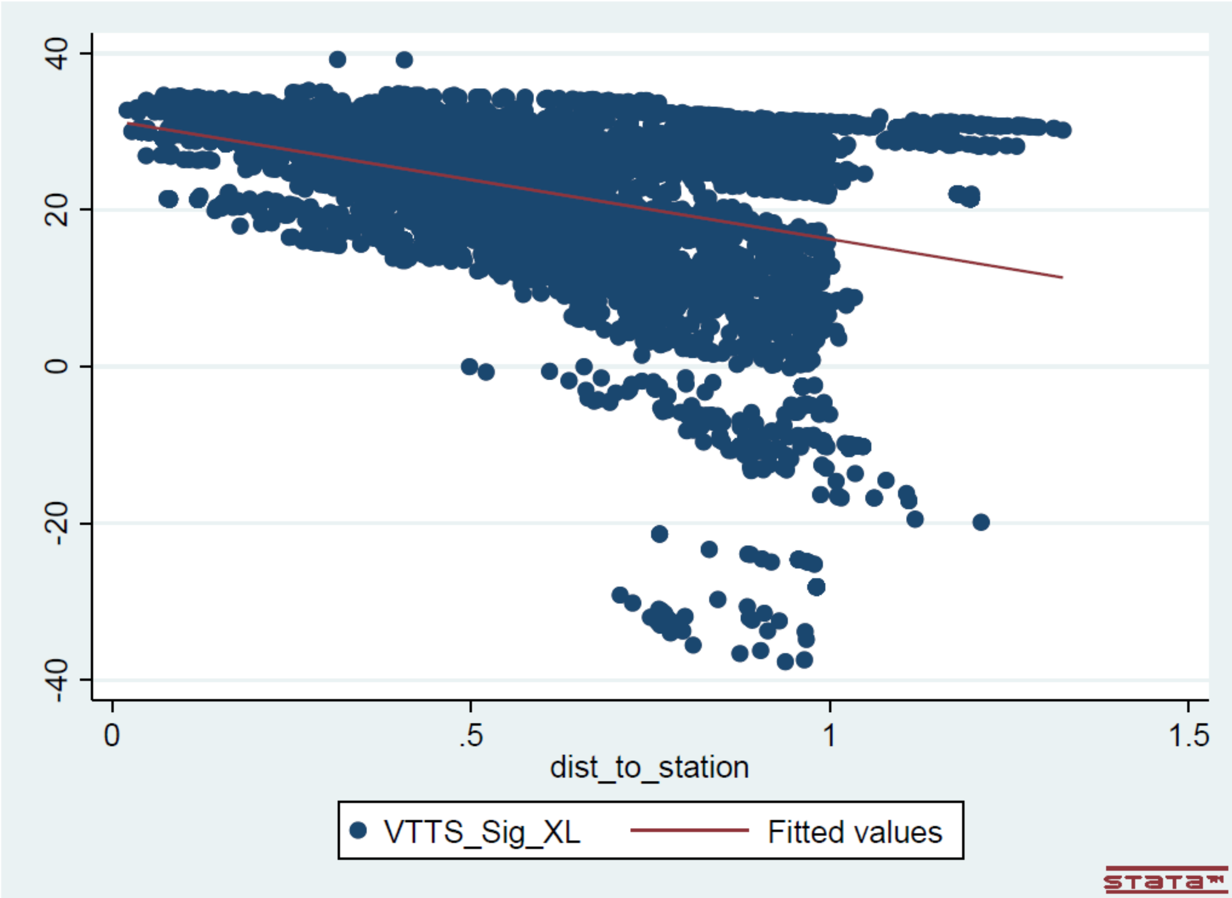

Figure 16. VTTS (in Dollars Per Round Trip) of Traveling From Each Property Sold In 2015-2020 to XL Center in Hartford, by Taking CTfastrak Instead of Driving; against the distance (in miles) to nearest station, for properties within 1.5 miles from the nearest station. (Sources: 2019 AAA car ownership data; 2021 CTtransit bus fares; 2021 N. Front Street Garage and XL Center Garage parking costs; municipal assessors' sale prices; 2019 Census block group income from American Community Survey; authors' calculations; and Stata ™ software).

The above scatter plots and trend lines focus on two-way correlations, but an alternative statistical approach can control for multiple other variables that are changing in addition to the variables of interest. This approach, regression analysis, is one method to test the hypothesis that property prices are positively impacted by proximity to CTfastrak. It is also a useful tool to test the hypothesis that proximity to a remediated "site" has a positive, or perhaps negative, impact on property values. One attractive feature of regression analysis is that it controls for other covariates that might also impact the price of properties, when estimating how proximity to transit impacts prices. In this section, regression results for two separate sets of analyses are presented. One of these sets is for how proximity to CTfastrak impacts sales prices, and the other is for how proximity to remediated "sites" impacts sales prices, for properties that sold in prior to the first full year of service (in 2015, i.e., the "pre" period) and those sold in 2019 (the "post" period).

This approach is called difference-in-differences (diff-in-diff). A diff-in-diff approach can strengthen the conclusions from the empirical analysis because it is an identification strategy in a controlled quasi-experimental context. For instance, properties close to CT***fastrak*** that sold after service was fully operational should lead to higher prices. This gives credence to the identification strategy and strengthens confidence in findings that property values are impacted by proximity to the nearest CT***fastrak*** station.

This approach can be implemented by looking at properties "near" CT***fastrak*** stations and other properties that are "far" – some of which sold before the first full year of service (e.g., in 2015) and others that sold after (e.g., in 2019). For the Brownfields analysis, one would consider properties "near" the Brownfields, after the first full year of service, versus "far" from the Brownfields. One useful approach for such analyses is diff-in-diff, as in Wooldridge (2013). In this analysis, "near" is defined as properties within 0.5 miles of the nearest station.

The diff-in-diff regression model includes a dummy variable equal to 1 for near CT***fastrak***, and 0 otherwise, where "near" is defined as within 0.5 miles, and another dummy variable equal to 1 after CT***fastrak***'s first full year of service and at the end of the study period (i.e., 2019). First, if one were to estimate this regression model for the final period in the study that was also after the first full year of service of CT***fastrak*** (i.e., for 2019), one might still see some effect of the near dummy on property price, which may be due to a number of unrelated factors, such as other co-varying factors that affected all property values before service. Second, there may be similar co-varying factors affecting all properties, including those that are not "near" the stations, for properties that sold after the first full year of service. In order to purge these common effects, one can examine the "differences" jointly in both time and geographic space, which would leave the researcher with the pure effects due to the last year of service in the study and in proximity to the stations. This can be done by multiplying the two dummy variables together, and the regression parameter estimate for this interaction term – called a "treatment effect" - reveals how the average property price changed after vs. before the first full year of service, for properties that are near relative to far from the stations. As mentioned above, "near" is defined here as properties within 0.5 miles of a CT***fastrak*** station, while "far" is defined as properties at least a mile from the nearest CT***fastrak*** station. Note the maximum distance in the dataset between a CT***fastrak*** station and a property is approximately 5.5 miles. Separate regressions are estimated for residential, condominiums, and commercial properties.

Ideally, one might want to include both covariates, proximity to remediated brownfield "sites" and proximity to CT***fastrak***, in one regression analysis. However, when these two covariates are highly correlated with each other, this causes problems with the hypothesis testing that could lead one to conclude that the covariates have no statistically significant effect on prices when in reality they may have a significant effect. This problem is called multicollinearity. One way to explore whether multicollinearity is a concern would be to examine the simple correlation between proximity to the nearest remediated "site" and proximity to CT***fastrak***. In the context of the current dataset, this simple correlation is 0.71. This implies that approximately 71% of the variation in CT***fastrak*** proximity also is correlated with the "site" remediation proximity. In other words, when CT***fastrak*** proximity increases by 10% we would expect "site" remediation proximity to also increase by approximately 7.1%. One solution when multicollinearity is present is to perform separate sets of regressions, one including a regressor for CT***fastrak*** proximity, and a separate regression that includes proximity to the nearest remediated "site". This is the approach followed in the analysis below.[19]

Table 43. Statistical Analysis Results for Distance to Nearest Station: Property Sales, 2015 (Before CTfastrak) Versus 2019 (After CTfastrak)

	(1) Log(price)	(2) Log(price)	(3) Log(price)
Total Finished Area	0.0000541***	0.0000618***	0.00000757***
	(4.80)	(4.13)	(5.03)
Year=2019	0.109***	0.578***	-0.0412
	(5.25)	(6.42)	(-0.17)
Station Distance<0.5 miles	-0.331***	0.186	-0.459
	(-3.94)	(1.53)	(-1.18)
Year=2019 and Distance<0.5 miles	0.313***	0.148	0.955**
	(3.00)	(0.93)	(2.13)
Latitude	-2.009***	-9.895***	-1.095
	(-4.23)	(-4.70)	(-0.20)
Longitude	-4.011***	-15.25***	5.514
	(-5.39)	(-5.96)	(0.53)
Constant	-195.3***	-684.3***	460.1
	(-3.33)	(-3.32)	(0.65)
N	2568	1283	105
R^2	0.444	0.397	0.458
adj. R^2	0.443	0.393	0.413
AIC	3967.5	4082.1	326.1
BIC	4020.1	4128.5	350.0

t statistics in parentheses; dependent variable is Log(price) in all regressions.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Log of sale price is dependent variable in all 3 regressions. Indicators for each city are included.
Distance to nearest station is measured in miles.
Column (1): Residential Properties (excluding condos); Column (2): Condos; Column (3): Commercial Properties

[19] While there are additional variables included in the GIS maps of this report, it was not possible to conduct a statistical analysis that included all of them at the same time. First, the VTTS data was only computed for residential properties within 1-mile of the nearest station, while the statistical analysis focused on all properties in each municipality. Including a VTTS variable would result in many missing values in the regression due to the smaller radius of houses in that data. In addition, the VTTS data is correlated with the distance to the station variable, which would lead to multicollinearity (and statistically insignificant parameter estimates) if both VTTS and distance to the station were included in the regressions. Third, including a variable for property taxes in the regression would lead to a reverse causality problem that would render the regression coefficient estimates inaccurate. For instance, higher valued houses would be expected to have higher property taxes, and in addition, properties with higher taxes (and the associated public services) would be expected to sell for more. To avoid these potential estimation problems, the property tax variable was not included in the statistical analysis.

Table 44. Statistical Analysis Results for Distance to Nearest Remediated Brownfield: Property Sales (2015 and 2019)

	(1) Log(price)	(2) Log(price)	(3) Log(price)
Total Finished Area	0.0000551***	0.0000572***	0.00000773***
	(4.68)	(4.23)	(5.07)
Year = 2019	0.105***	0.250***	0.293
	(5.54)	(3.06)	(1.15)
Distance to remediated site < 0.5	-0.382***	-1.150***	0.0247
	(-4.45)	(-7.39)	(0.09)
Year = 2019 & Distance to remediated site < 0.5	0.274***	1.165***	-0.407
	(2.61)	(6.76)	(-0.97)
Latitude	-1.187***	-7.829***	-2.546
	(-2.65)	(-3.85)	(-0.45)
Longitude	-3.617***	-17.61***	9.959
	(-4.75)	(-6.16)	(1.03)
Constant	-200.9***	-941.9***	844.1
	(-3.39)	(-4.12)	(1.24)
N	2568	1283	105
R^2	0.448	0.431	0.451
adj. R^2	0.446	0.427	0.405
AIC	3950.8	4008.2	327.5
BIC	4003.5	4054.6	351.4

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Log of sale price is dependent variable in all 3 regressions. Indicators for each city are included.
Distance to nearest remediated “site” is in miles.
Eq (1): Residential Properties (excluding condos); Eq (2): Condos; Eq (3): Commercial Properties

3.14.2 Discussion of Statistical Analysis Results

For CT***fastrak*** proximity (Table 43), there is a positive and significant "treatment effect" (i.e., coefficient on the interaction between distance < 0.5 miles and year = 2019) for single-family residential properties (excluding condominiums), with a magnitude of approximately 0.313. This implies that for properties within 0.5 miles and sold in 2019, the property value is approximately 31.3% higher compared with properties further away and/or sold before 2019. In other words, CT***fastrak*** is an amenity benefit. The corresponding effect for condominiums, however, is negligible (i.e., it is positive but statistically insignificant). Commercial properties have a large "treatment effect" of 0.955. In other words, commercial properties that sold in 2019 within 0.5 miles of a station sold for 95.5% more than all other commercial properties that were in the data sample.

Brownfields' redevelopment proximity impacts on sales prices of residential properties (excluding condominiums), in Table 44, are similar to those of the proximity to CT***fastrak***. There is a positive statistically significant relationship between single-family properties sold in 2019 within 0.5 miles of a brownfield, with magnitude of 0.274. In other words, these "treated" properties sold for 27.4% more than all other properties in the sample, where here, "treated" is those properties within 0.5 miles of a brownfield that sold in 2019. Condominium sales prices are approximately 116.5% more for those units sold in 2019 within 0.5 miles from a remediated brownfield. Also, there is no significant correlation between commercial property prices and proximity to remediated brownfields sold in 2019. The latter result is not completely surprising given that many brownfield sites have been polluted from industrial discharge, so commercial property owners may not view proximity to a remediated brownfield as an amenity. In fact, remediated brownfield proximity may be less desirable for commercial entities because it would likely be more difficult for them to pollute further. While the coefficient on the commercial property "treatment effect" in Table 44 is negative, it is statistically insignificant, implying it is very small.

3.14.3 Spatial Analysis

We include regressors for the location of the properties. This approach is a common form of spatial analysis in the economic geography and real estate literature, as in Ross *et al.* (2011). In all cases, we find that the latitude and longitude are both statistically significantly correlated with sales prices, implying in another dimension that location is important when considering property sales prices. We also see that including indicator control variables for the city where the property is located (i.e., "fixed effects" for the city) are statistically significant in most of the regressions. Both including latitude and longitude coordinates as regressors, as well as including fixed effects for the municipality where sales occurred, are approaches to addressing spatial variation in the data. Results of the regressions are in the tables above. In the residential and condos specifications presented in Table 43, latitude and longitude are significantly correlated with sales prices.

3.15 Geospatial Database

The maps developed as a part of this project have been compiled and synthesized, and incorporated into a visualization tool that enables easy comparison between areas surrounding each of the stations for Phases 1 and 2. The tool utilizes "story maps" that essentially allow the user to slide across the screen so that the same geographic area can be viewed over time, with the changes in the landscape appearing as the user slides over the map. At this point, a beta version has been developed and additional content is being added. This tool will become "live" to the public when CT DOT approves of its release, and it can be accessed here: https://gis.cti.uconn.edu/portal/apps/MapSeries/index.html?appid=4f407577fd134d598dc45957f12cb44c. Given the software underlying the dashboard, it is designed to work best on a PC or Windows device (opposed to iPhone or Mac). An example of the dashboard for this beta-version of the tool can be seen in Figure 17.

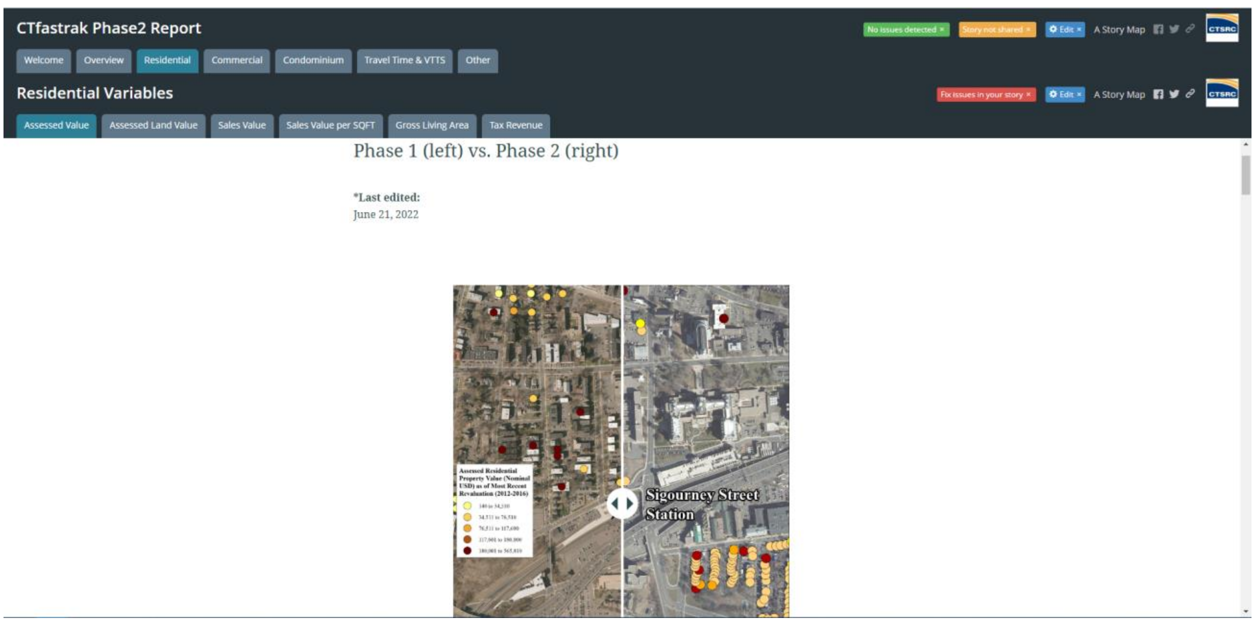

Figure 17. Screenshot of Visualization Tool Dashboard

In addition to this visualization tool, there are two other "products" that are related to the research done for this project. First, there is a geospatial database containing the maps and underlying data files, which can be accessed and manipulated using GIS software such as ArcGIS. Second, there is a set of Excel pivot tables that have been used to develop many of the figures and charts presented in this report. In the pivot tables, the user can select various filters and generate a wide range of figures/charts based on their interests. The pivot tables in these spreadsheets will be made publicly available upon the approval of CTDOT.

CHAPTER 4 Next Steps

4.1 Phase 2 Conclusions and Recommendations

This study has considered a broad range of metrics to assess how the first five years of service of CT***fastrak*** are correlated with changes observed in the residential, commercial, and condominium property markets in the Greater Hartford area. Some key insights and conclusions include the following:

- Average residential assessed values fell throughout Hartford; rose throughout New Britain; and rose slightly in West Hartford for homes within 0 - 0.75 miles from the nearest station but fell modestly between 0.75 and 1 mile from stations.
- There is mixed evidence on average sales price changes in the neighborhoods across stations. This could be partly due to different size structures selling at different times and in various locations, and it motivates the desire to examine square footage as an additional metric.
- There is a great deal of variation in the average square footage of residential properties near the stations. With the exception of Kane Street Station and Newington Junction Station, which experienced a decrease in average residential square footage for properties within ¼ mile, residential average square footage rose for properties within ¼ miles of all other stations. This implies that any new construction or renovations are accompanied by larger residential properties, on average.
- Similarly, the variation in commercial property average square footage is substantial. Other than Kane Street Station, the average commercial square footage rose for properties within ¼ mile of all other stations for which nearby commercial property square footage was available. These differences may be due to new property construction of different sizes than existing sites, which raise (or lower for those near Kane Street Station) the overall average square footage of the properties within this radius. The changes are more mixed for other radii from the stations. Given this broad variation in the direction of the changes between Phases 1 and 2 for the various stations and radii, it is difficult to try and attribute these average changes to the presence of CT***fastrak***.
- The number of "assisted units "of housing rose in Hartford and Newington, which implies CT***fastrak*** may have been associated with a greater amount of social "equity" in those municipalities. On the other hand, the number of "assisted units" fell in New Britain and followed a mostly flat trend in West Hartford, which may be a sign of gentrification that is occurring there.
- The possibility of gentrification occurring in parts of West Hartford is also borne out by the finding that Flatbush Station and Elmwood Station experienced decreases in the number of commercial properties within ¼ miles of the stations. These decreases were

likely due to redevelopment that was occurring in the West Hartford neighborhoods near those stations.

- The number of residential and commercial vacancies in each census tract near the stations fell between the two time periods, but changes in the number of vacant or undeveloped parcels were mixed in neighborhoods near the stations. While the former is evidence of possible gentrification, the latter implies that gentrification could be occurring in some areas but not in others.
- The statistical analysis offers strong evidence of a correlation between proximity to CT***fastrak*** stations and property sales prices for all three property classes, residential, condominiums, and commercial).
- The statistical analysis also provides support for the correlation between distance to the nearest environmental remediation site and properties that sold after the first full year of service, for residential houses and condos. This implies remediation that occurred for the purpose of facilitating development near CT***fastrak*** may have been worthwhile.
- If one commuter from each household in the cities/towns with CT***fastrak*** stations took the bus instead of driving in a hypothetical commute to the XL Center in Hartford, total annual cost savings are estimated to be $143 million.
- If one commuter from each household in the cities/towns with CT***fastrak*** stations took the bus instead of driving in a hypothetical commute to the UCONN-Hartford campus, total annual cost savings are estimated to be $161 million.

A series of recommendations include the following:

- A follow-up, Phase 3 should be conducted once several more years of data (past March 2020) have become available to consider how changes in ridership associated with the onset of the Covid-19 pandemic have indirectly impacted property values. Statistical analysis is particularly relevant here because while some people may have preferred to avoid transit at the outset of the pandemic, property values rose dramatically overall. Therefore, a statistical analysis will be crucial to control for other factors influencing real estate prices, in order to isolate the effects on property values of changes in preferences due to the pandemic.
- Future phases of this project should incorporate new maps and figures into the visualization tool dashboard. This dashboard has the potential to offer great insights into how the landscape is changing over time due to CT***fastrak.***
- Finally, policymakers should rely heavily on the details of this study when considering the possibility of the future expansion of the CT***fastrak*** route system.

The products of this study have offered evidence of the potential benefits CT***fastrak*** has on real estate markets in general, and that these benefits vary at the micro-level. These findings are consistent with the broad variation found in the literature, although one might expect spatial variation to lead to a range of effects, both within Connecticut and across cities in the U.S. and the world.

4.2 Proposed Work Plan for Phase 3

The following is a proposed work plan structure for Phase 3 of this project.

The long-term objective in Phase 3 is to examine the question: How has CT***fastrak*** become capitalized into property values? An updated study and analysis are warranted due to the changes in the real estate markets and transit ridership due to the Covid-19 pandemic.

The crucial steps to meeting this long-term objective will be addressed now in Phase 3:

1. Determine what data is currently available for collection in Phase 3.
2. Examine the conditions after the time of the commencement of the Covid-19 pandemic and the end of Phase 2 in March 2020, up to March 2023. Also, this objective will necessitate a thorough update of the literature review of BRT studies.
3. Collect updated data necessary to examine how property value changes are correlated with proximity to the CT***fastrak*** stations.
4. Collect the updated data needed to examine how property value changes are correlated with changes in travel costs, and updated data needed to determine how sale price and/or property value changes are correlated with travel time changes.
5. Gather updated data that will be useful in determining whether "controlling" for general price movements is warranted. In Phase 3, this will enable distinguishing between changes in property values due to CT***fastrak*** versus other unrelated factors, such as general inflation and/or general fluctuations in real estate prices in the Metro-Hartford area and in Connecticut.
6. Obtain updated assessed residential property values for the subsequent years after what had been collected in Phase 2.
7. Determine the current levels of local property tax revenues that accrue to the municipalities where the CT***fastrak*** stations are located.
8. Address the questions: What is the number of dwelling units within a range of reasonable distances from the stations at the time of the announcement and at the start of CT***fastrak*** service? What share of these are rental properties and what share is considered "affordable housing"? How have these changed between 2020 and 2023?
9. Collect updated information on total/average building square footage within a given radius of the bus stations and use this updated information to examine how these have changed since Phase 2.
10. Investigate what are the current plans/proposals for new real estate development. How has the number of plans near each station changed in 2023 compared with 2020?
11. Collect the updated data, beyond what was gathered in Phase 2, needed for this Phase 3 analysis on how the cleanup of the land where a former police station and

welding facility are located has affected nearby property values. Then perform a statistical analysis to determine the impacts of the cleanup on property values.

12. Examine the role of vacancies. Collect data to determine the vacancy rates in the Census tracts near the CT***fastrak*** stations. How have these vacancy rates changed between 2020 and 2023?
13. Aerial Photography and/or remote sensing: obtain an updated snapshot of land use in the neighborhoods near the stations from the most recent time period available.
14. Geospatial database. To the extent possible, data will be compiled in a parcel-level geospatial database (in GIS format) and merged with the data collected in the visualization tool developed in Phase 2. This visualization tool will be set up in a manner that will facilitate easy tracking of changes in parcels between Phases 1, 2, and 3 (e.g., change in use, building type, sale prices, assessed values, vacancies, etc.), and it will be possible to query the database to obtain desired information. CTI at UCONN has the production environment to host this geospatial database, so it could be hosted there if that is mutually agreeable.
15. Data analyses. The techniques of regression analysis will be used to determine the relationships between property values as the dependent variable (sales prices, from #3 above, and separately, assessed values, from #6 above), and the independent variables, which will include some combination of change in travel costs/time (from #4 above), changes in neighborhood vacancy rates (from #12 above), distance from the stations (near vs. far, from #3 above), in the period of 2015 – 2023. In addition, from #11 above, an analysis of how proximity to brownfields that were cleaned up, impacts property values will be conducted.

Estimated project work performance time period for Phase 3: **18 months.**

Estimated project cost for Phase 3: **$292,000.**

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