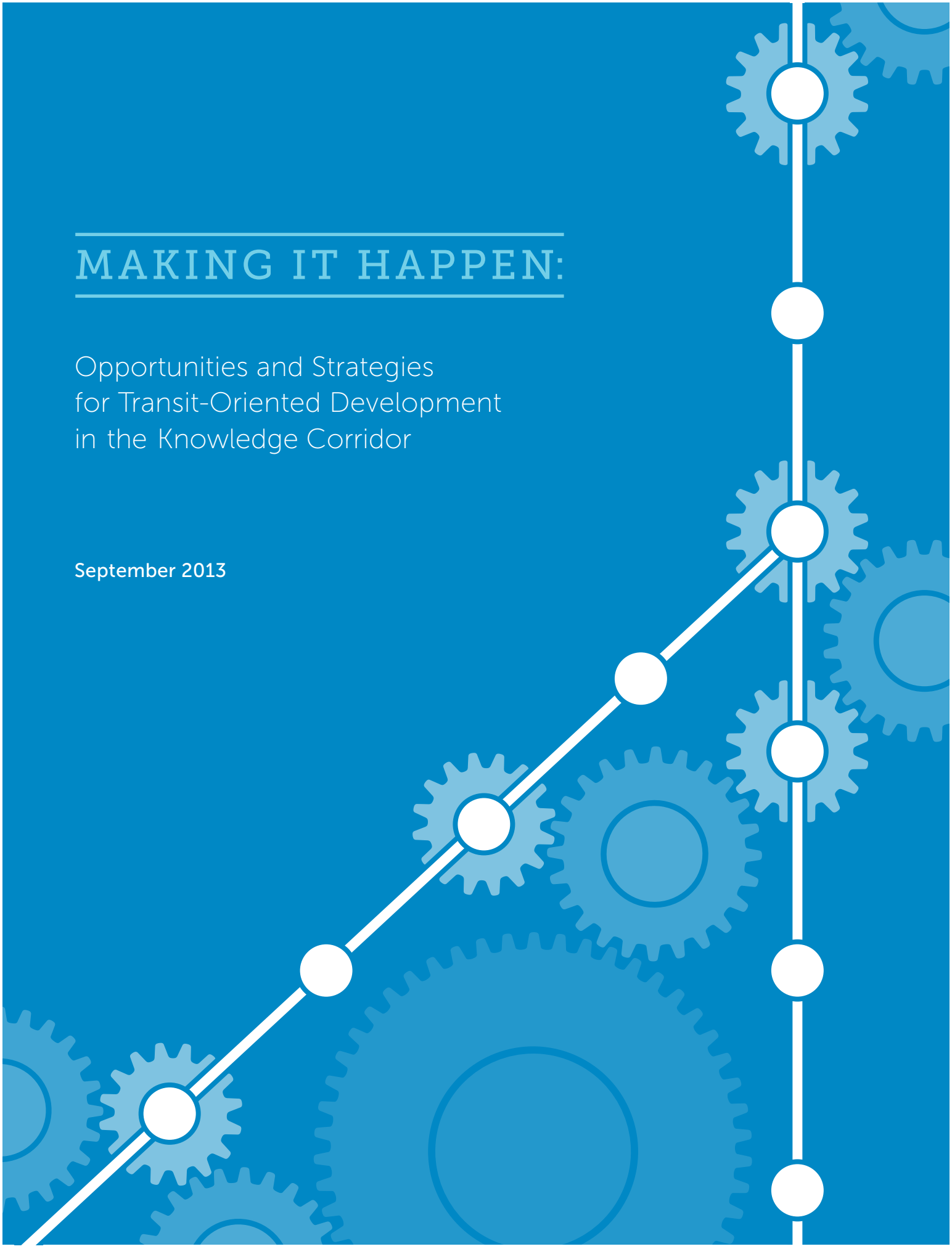
MAKING IT HAPPEN:

Opportunities and Strategies for Transit-Oriented Development in the Knowledge Corridor

September 2013



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The report was prepared for the Capitol Region Council of Governments, the Pioneer Valley Planning Commission, and the Sustainable Knowledge Corridor Consortium by Jonathan Rose Companies and the Center for Transit Oriented Development.

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MAKING IT HAPPEN:

Opportunities and Strategies for Transit-Oriented Development in the Knowledge Corridor

A Market Analysis for Transit-Oriented Development in the Region's Bus Rapid Transit and Rail Corridors

September 2013

prepared for
Capitol Region Council of Governments
Pioneer Valley Planning Commission

by
Jonathan Rose Companies
Center for Transit-Oriented Development

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Downtown, New Britain, CT



Executive Summary

Executive Summary

INTRODUCTION

The Knowledge Corridor is experiencing more than $1.5 billion in construction that is underway in three new transit and transportation investments:

In 2015—CT*fastrak*, a 9.4 mile new bus rapid transit (BRT) system, will provide frequent, fast, and reliable connections between important destinations in central Connecticut. **CT*fastrak*** will have 11 landscaped stations and will serve major employment destinations on a dedicated corridor and nearby destinations served by feeder routes extending from Hartford to New Britain.

In 2016—the NHHS rail service will provide 25 daily train trips each in north and south directions to connect major destinations in the Knowledge Corridor from downtown Springfield to downtown Hartford to New Haven. Much faster connections will be provided to the New York region and to the Northeast Corridor from Washington to Boston. A frequent bus shuttle will link the rail service with Bradley International Airport from the Windsor Locks rail station.

In 2014—the Vermonter Amtrak rail corridor connecting Washington D.C. to St. Albans, Vermont will have one to two trains per day. Service will be restored to its original alignment along the Connecticut River, and will add rail service to Northampton and Holyoke.

Figure 1: Summary of Knowledge Corridor Transit Investments

	CT*fastrak*	NHHS	Vermonter
Transit type	Bus Rapid Transit (BRT)	Rail	Rail
Frequency of service	High	Medium	Low
Projected ridership	High	Medium	Low
Corridor role	Connects destinations within the Central Connecticut region; reduces travel time	Connects employment centers within the region and outside the region; reduces travel time	Connects smaller towns in Massachusetts to the larger employment centers within the region; reduces travel time on Vermonter line
Estimated opening date	2015	2016	2014

KEY FINDINGS

The six key findings of the full report are:

- **Demographics are Promising for Transit Oriented Development (TOD).** A rising tide of aging Baby Boomers and young urban professionals in the Knowledge Corridor are promising for TOD. The report estimates that the region has the opportunity to build 9,000 to 12,000 more housing units near transit representing 15 to 20 percent of all new households to meet the growing demand for those attracted to a "walkable" urban lifestyle.

- **Corridor-Centered Growth is Needed**. To capitalize on the modest regional demand for TOD-supportive commercial space some growth can be directed into the NHHS Rail and CT***fastrak*** corridors. The region has existing strengths in TOD-supportive industries, including knowledge-based, health care services, educational services, and public administration, and a significant share of jobs in these sectors are already located in the transit corridors. Assuming modest job growth in the region, it is estimated that there will be demand to accommodate approximately 50,000 new TOD-supportive jobs during the next 25-year period. This corresponds to an increase of eleven percent in TOD-supportive jobs, and about seven percent in jobs overall.

- **TOD Supportive Industries Are Growing.** Health care, social assistance and educational services jobs are growing in the corridor, while the traditional bases such as finance, insurance and manufacturing are shedding jobs. The growing industries are also TOD-supportive and many of them are already located along the transit corridors. The growth of these industries is largely occurring within and relating to the region's anchor institutions, which include its universities, colleges and hospitals. It is expected that future expansion of commercial real estate will be connected to the growth of these institutions.

- **TOD Needs More than Transit.** Transit alone does not make a market for new development. In many station areas, current real estate values are insufficient to make new development feasible. The recent economic downturn has exacerbated negative impacts on real estate market dynamics, resulting in high office and retail commercial vacancy rates, minimum rental housing growth, and very low levels of new construction activity and development financing availability. However, there are promising signs that real estate market conditions are improving. Multifamily vacancy is down and rents are up, single-family values appear to be stabilizing and transaction volume is increasing, and commercial transaction volume is significantly up from 2011. If these trends continue as the national and statewide economies recover, market conditions may improve in the next few years to the point where new construction becomes more broadly financially feasible throughout the region.

- **Realizing the Potential for TOD in the Region will Require Proactive Efforts.** Municipal leaders, local planners, state governments, the metropolitan planning organizations, community members, institutional partners, and other stakeholders all have a part to play in making TOD happen. Regionally, new residential and commercial development has been occurring in suburban areas, while the urban areas on the transit corridors have experienced employment declines and, in some cases, population loss. Cooperation among various partners will be needed to help redirect regional growth to the transit corridors, and to plan for and implement TOD.

- **Active Leadership is Crucial for Success.** Connecticut and Massachusetts state governments can facilitate TOD in the Knowledge Corridor in a number of ways beyond the construction of the transit itself. The report identified two key strategies to support development near the new transit corridors:

    1. ***Leverage State Resources:*** Leverage existing state resources by directing them comprehensively to the station areas as priority locations.

    2. ***Partner with Anchor Institutions.*** Develop partnerships with regional anchor institutions to direct their future growth towards the station areas.

Within these two over-arching strategies, the following are specific strategies that the consultant team identified as most likely to lead to new TOD:

STATE INVESTMENT STRATEGIES

- **Direct state economic development resources to station area locations.** The New York Times estimates that governments spend nearly $80 billion each year in economic development incentives to private companies, ranging from tax credits to grants. But for nearly all of the states, the economic development incentives are "place-neutral," that is, the states do not necessarily target these investments in specific locations like existing job centers or locations near transit. Existing business incentive programs in Connecticut and Massachusetts have not reversed the trends towards government job dispersal. Many of the existing economic development grant and loan programs have been directed to companies in suburban locations disconnected to the new transit infrastructure. An alternative approach would be to award assistance to firms that locate in the new station areas. One such model exists in Illinois with the Business Location Efficiency Incentive Act, which considers location near mass transit and affordable workforce housing as a factor in awarding economic development awards.

- **Reinforce state government presence in new and existing buildings on the transit corridors.** The states have the most leverage and control over their own available resources. By prioritizing the station areas when making decisions related to these resources—such as leasing office space or building facilities near the station areas—the effects of the investment

Figure 2: Subsidized Businesses by Municipality in Massachusetts

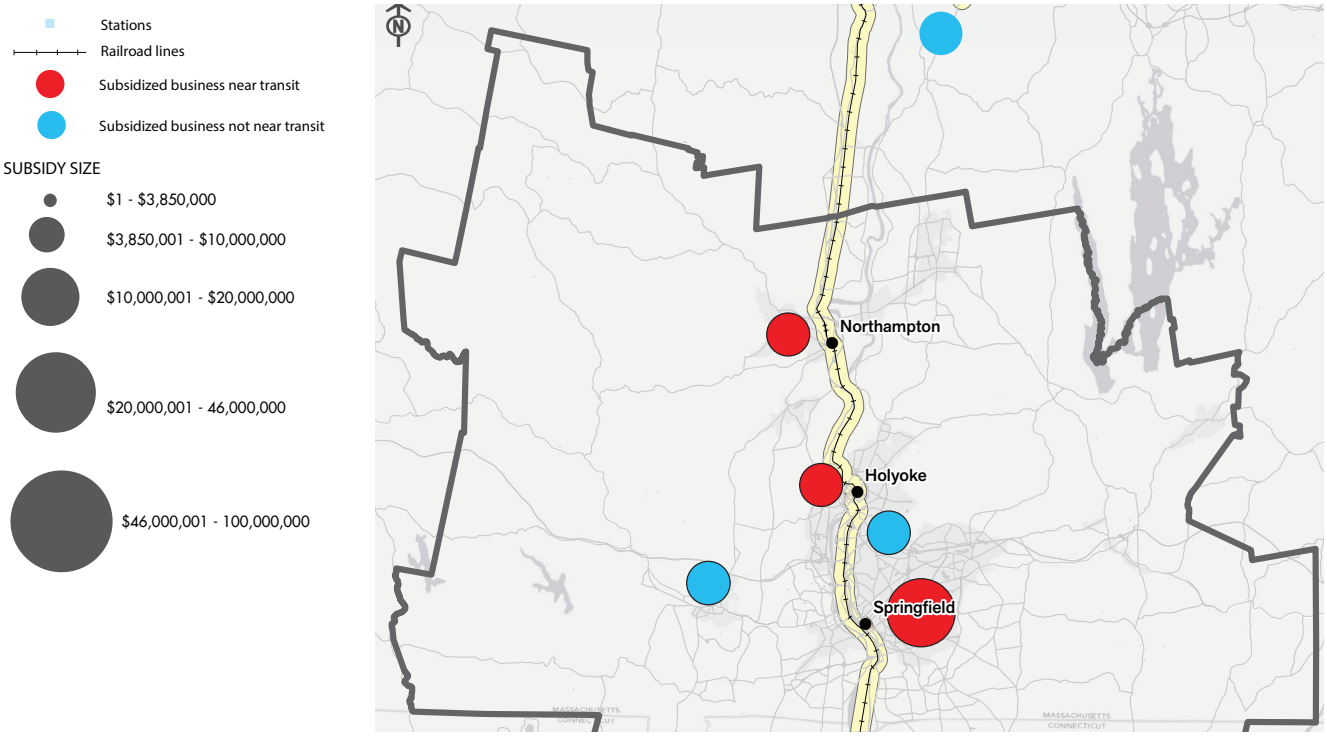
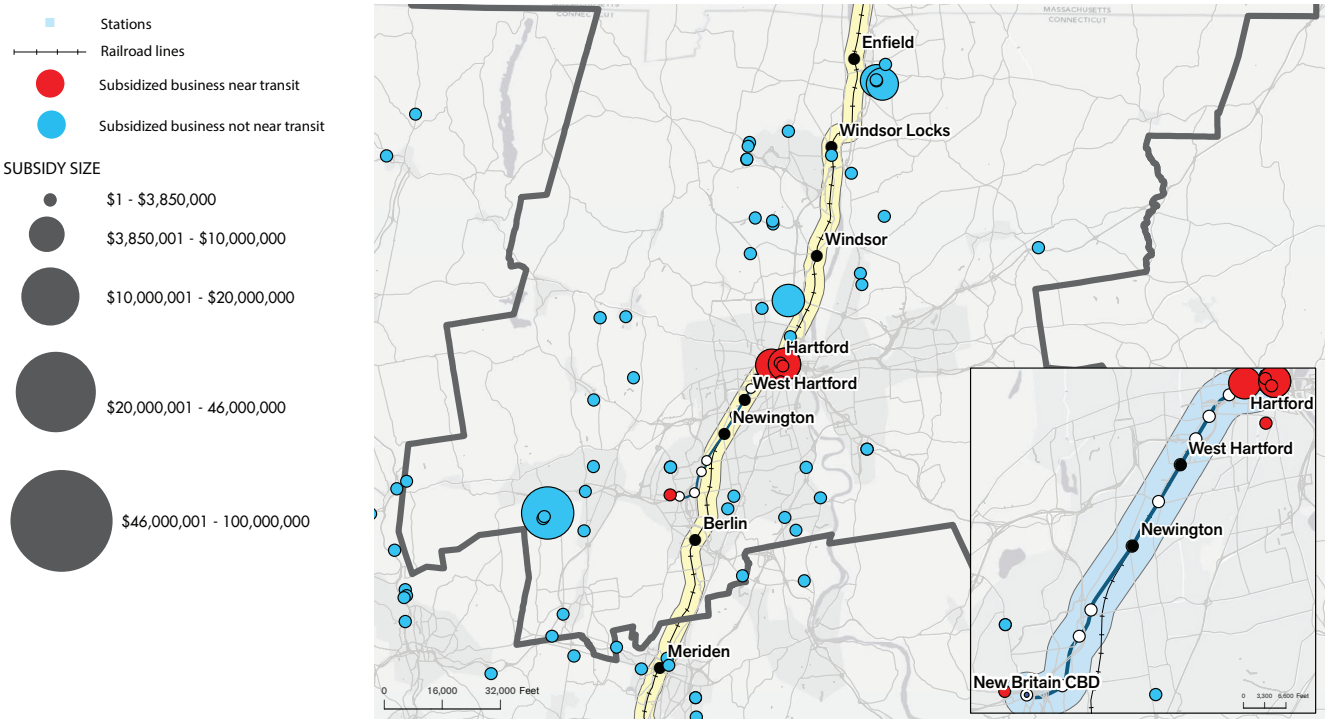


Figure 3: Subsidized Businesses by Address in Connecticut



in the transit by the states will be magnified. As the prospect for residential and commercial development is limited in terms of the private market, states can take the lead and begin to change the character of the station areas–making future, complementary development more likely. As new space and facilities are needed, the choice to locate just a small fraction of these employees in station areas would have a significant impact on these places, boosting the office market and spurring demand for ancillary services. Over time, the

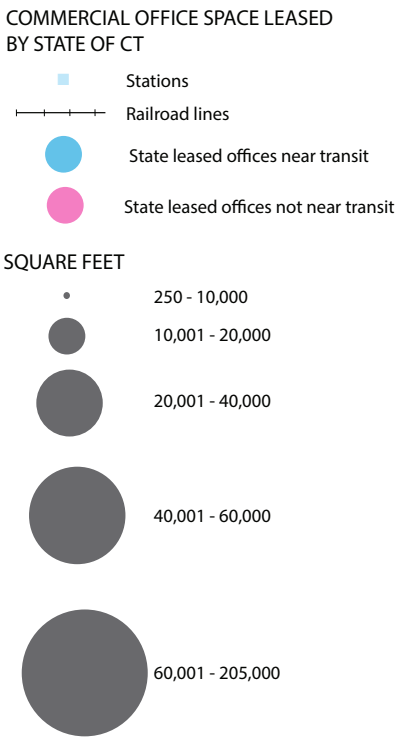
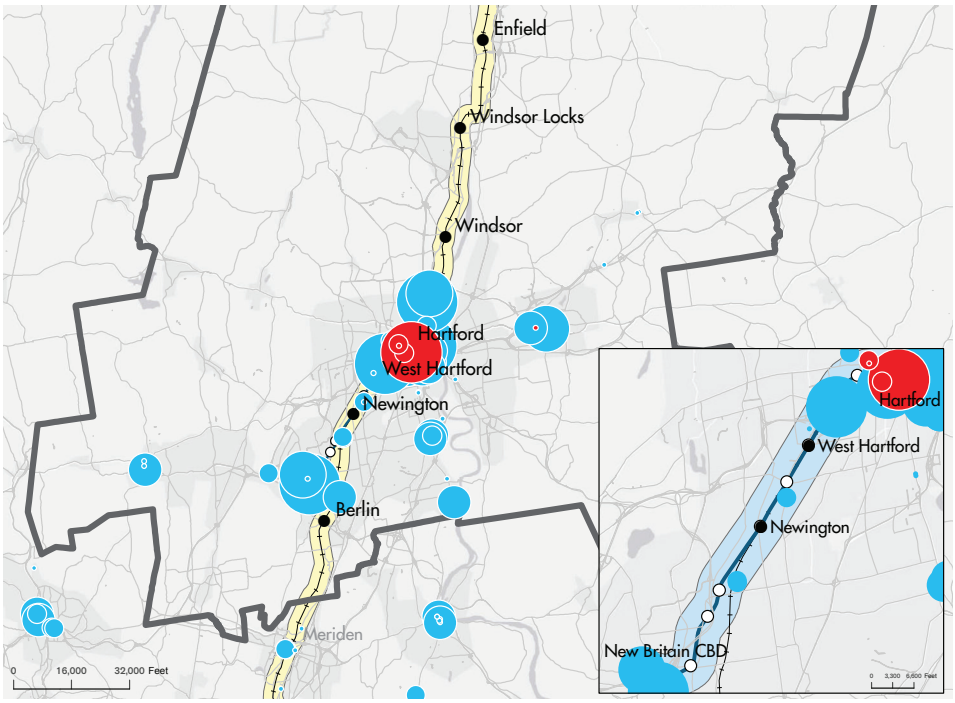


Figure 4: Commercial Office Space Leased by State of CT & Transit



presence of major employers in the station areas, including government offices, can also help to improve the potential for new housing and commercial development nearby. Some of these efforts are already underway in Connecticut, with the state consolidating state agency offices in the vacant buildings in downtown Hartford.

- **Prioritize station areas for other forms of state financial assistance.** Connecticut and Massachusetts are already supporting development through a variety of state financing mechanisms, including funds directed towards affordable housing, infrastructure, environmental clean-up, public magnet schools, and expansion of the states' university systems. Both states are already directing many of these funds to TOD locations, such as Massachusetts' Housing Development Incentive Program and Connecticut's CHAMP program, which could serve as models for aligning other forms of state financial assistance to TOD locations.

- **Provide technical assistance to municipalities along the transit corridors.** A key challenge in some station areas is zoning for higher density development and/or site assemblage and disposition for redevelopment. In many of the municipalities there is limited capacity within the municipal government for the more complex and intensive public processes required to accomplish these objectives. State governments can assist municipalities by providing direct technical assistance from its agencies' staffs, as is currently occurring in Meriden, Connecticut.

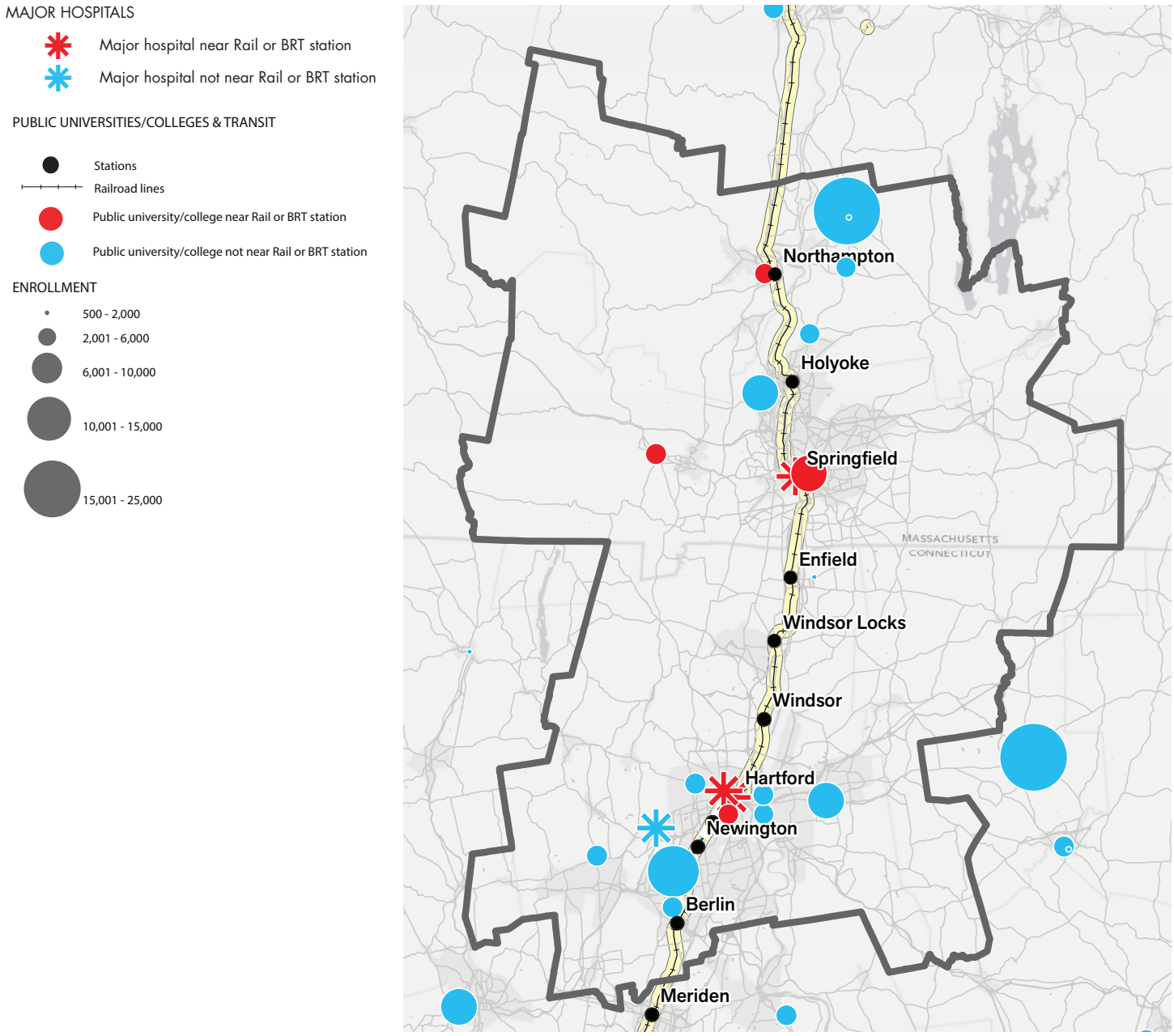
- **Direct Metropolitan Planning Organization (MPO) discretionary funds to station areas.** MPOs can also direct their discretionary infrastructure funds to station areas to prepare them for redevelopment, or to better connect them to the new transit corridors through enhanced pedestrian and bike infrastructure. Higher density development in infill locations often requires substantial investments in infrastructure—sidewalks, expanded roadways, upgraded utilities—that can impede development, especially when there are other sites in greenfield locations that do not pose this challenge. In many regions, regional planning organizations are directing their more flexible funding sources to making infrastructure improvements in transit locations. For example, the Atlanta Regional Commission's Livable Centers Initiative distributes federal transportation dollars as grants to local governments and neighborhood districts for planning activities, as well as for capital investments that support higher intensity housing, mixed-use development, and enhanced connectivity. Similar programs exist in the Minneapolis-St. Paul Twin Cities, San Francisco Bay Area, Portland, and other regions.

ANCHOR INSTITUTION STRATEGIES

- **Engage regional anchor institutions in a dialogue about how their future expansion can be transit-oriented.** Anchor institutions (hospitals, universities/colleges, and large employers) represent a significant source of employment and real estate activity in the region and are, in many cases, closely linked to the new transit service. Several of these institutions are located within walking distance of the planned transit stations and have a long legacy in the region. Opportunities exist in the Knowledge Corridor to leverage its anchor institutions by encouraging private development of student or employee housing in and around universities and hospitals, improving transit service to and from anchor institutions, or spurring development of research facilities linked to universities, as discussed in more detail in this report. The regional planning organizations can serve as leaders in this effort by setting up an outreach initiative with regional anchor institutions to discuss their expansion plans and investigate opportunities for alignment with the transit expansion.

- **Encourage and explore opportunities to relocate or expand components of state university systems to station areas.** As they expand out from their historic central campuses, the state university systems in Connecticut and Massachusetts offer a tremendous opportunity for supporting TOD in the Knowledge Corridor. Connecticut has already taken a step in this direction by announcing the relocation of UConn Hartford from its West Hartford campus to downtown Hartford. UMass Amherst is establishing a Springfield campus. In addition, there are other opportunities within the Knowledge Corridor, such as the planned East Campus of Central Connecticut State University between the East Street and Cedar Street CT***fastrak*** stations in Newington.

Figure 5: Anchor Institutions in the Knowledge Corridor

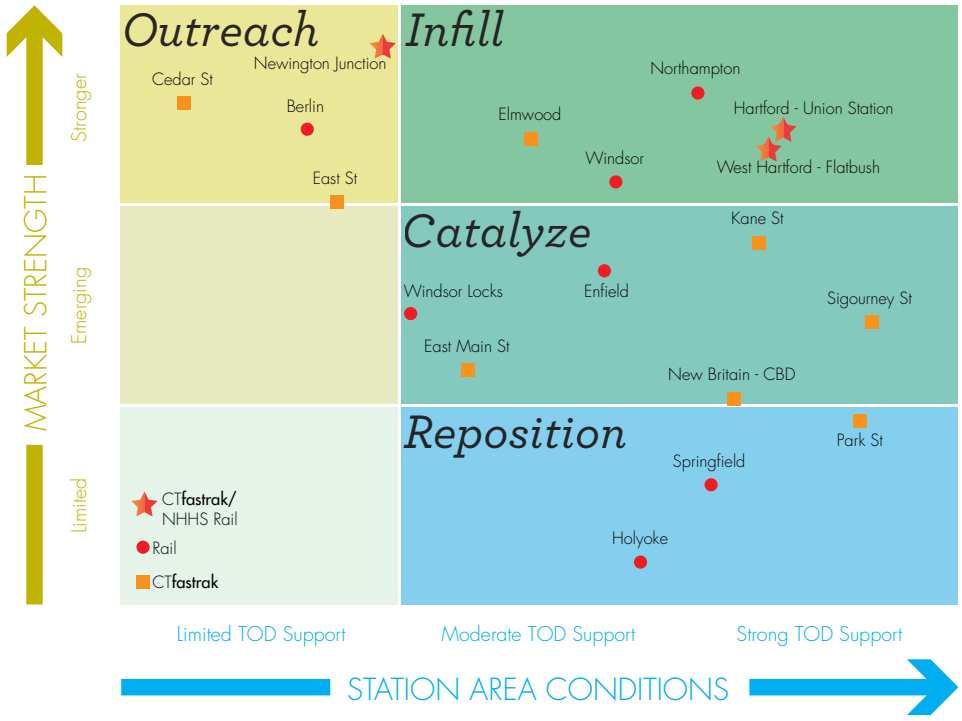


- **Convene a partnership between the region's research hospitals and its universities.** The region already contains excellent research hospitals and both states are supporting expansion of the biosciences industry from their university systems. The transit systems and station areas offer a great opportunity to support the creation of an innovation economy in the biosciences by connecting its research institutions. One example of such a partnership is Bay State Health's partnership with Tufts University in Boston. The state and regional planning organizations can play a role in bringing together the research institutions and supporting the creation of incubator and business start-up space at the station areas closest to these institutions.

TRANSIT-ORIENTED DEVELOPMENT TYPOLOGY AND OPPORTUNITIES AND STRATEGIES FOR MAKING TRANSIT-ORIENTED DEVELOPMENT HAPPEN

The market potential for TOD varies depending on the role of the station area within the corridors and greater region. The report studied existing urban form conditions and market characteristics of each station area to create a typology that describes the context for new development at each location. The typology serves two primary functions: 1) to quantitatively describe each station area in the region; and 2) to categorize similar station areas into "place types" that can inform recommendations on next steps to implement TOD. Using this framework, the consultant team classified the stations into four place types:

Figure 6: Station Area Typologies





Infill—These station areas have the strongest likelihood of new TOD in the near-term, due to their stronger market conditions and very supportive urban form. These station areas are generally built-up and are not likely to offer large tracts of land for redevelopment; rather, new TOD will largely consist of infill development building on the historical development patterns and filling out underutilized sites. The infill stations include Northampton, and station areas in and around Hartford, underscoring the fact that the near term TOD opportunities will likely be in places that have an existing base of residents and employees on which to build.



Outreach—These station areas also have relatively strong market demand for new development, but the station area urban form is less supportive of TOD. In these station areas, the prevailing existing development is suburban and automobile-oriented, which will inhibit pedestrian and bicycle connections to the stations from surrounding TODs. In many cases, changes to zoning regulations may be required to permit mixed-use and higher-density TOD, which the market is likely to support. Due to the existing character of these places, TOD in outreach stations is likely be lower in intensity, including products like attached townhouses, small-lot single-family houses, and potentially small scale apartment projects if regulations allow.



Catalyze—These station areas occupy a middle ground, where market conditions are not strong enough to support TOD in the near term but the urban environment is conducive to TOD. In these types of places, the implementation of TOD-supportive zoning regulations alone is not likely to be enough to spur private-sector development due to soft demand. The participation of public and/or anchor institutions can help to unlock the private market in these locations. Some examples include working with hospitals, universities, or government agencies to either expand or create a new presence in the area, thereby generating more activity, or creation of a tax-incentive zone to encourage larger businesses to locate in the station area.



Reposition—These station areas have a common legacy of historical buildings in an urban context, ranging from industrial mills in Holyoke and Park Street to downtown centers in Springfield and New Britain, which have experienced decades of slow decline. While existing development patterns are somewhat supportive of TOD, these locations will generally require significant repositioning to attract new development and regain vibrancy. A combination of policies will be necessary, including introducing new "demand drivers", offering significant incentives to developers, and making strategic infrastructure and "place-making" investments to attract private capital.

The results of the typology analysis are summarized in the report to assist planners, advocates, and community members better understand the types of development that are most likely to occur near a new rail or BRT station (residential, retail, office, etc.)–as well as the probable scale or density of future development–within the next three to five years. The recommendations are organized into six broad categories:

1. **Planning and Visioning**
2. **Zoning and Land Use Regulations**
3. **New Development**
4. **Neighborhood Revitalization**
5. **Local Transportation and Infrastructure**
6. **Economic Development**

The report details major strategies and tools, and identifies the lead implementers, existing programs and potential funding sources. It describes the applicability of each tool and strategy to the individual station area place types based on the typology framework. The recommendations are intended to provide a framework for decision-makers to craft implementation policies that are appropriate for the station area's context, rather than applying "one-size-fits-all" solutions for implementing TOD throughout the region.

Implementation of these strategies will require coordination between government and non-profit sector entities at multiple geographic scales, from municipal planning commissions to the state economic development departments. The strategies may require a phased approach over time, as economic conditions change and different needs arise.



Union Station, Hartford, CT

Introduction

Introduction

Cities and regions from coast to coast are pursuing transit-oriented development (TOD) strategies as a way to achieve many goals, including increased economic competitiveness through improved quality of life, reduced traffic congestion, lower transportation costs for households, improved air quality, reduced costs for providing city services, and growth management. The concept of TOD is becoming more popular as the number of regions planning light rail, bus rapid transit (BRT), and other fixed-guideway transit investments expands. Today, more than 40 regions across the country have a light rail or BRT line (compared to 28 in 2000) and there are 721 planned new transit corridors in 109 regions across the United States. At current federal funding levels, it would take 78 years to meet the full demand for new transit systems today.[1]

The central portion of the New England Knowledge Corridor—the focus of this study—is one of the areas that will soon benefit from over $1.5 billion in new bus rapid transit and rail investment. This bi-state region is comprised of the Hartford, Connecticut and Springfield Massachusetts metropolitan areas, which are linked by a shared economy, history and culture, and by economic and natural assets including Bradley International Airport, rail lines, Interstate 91, many colleges and universities, and the Connecticut River. Planning is underway throughout the region to help municipalities and a range of public and private stakeholders capitalize on these major transportation investments. This Market Analysis for Transit Oriented Development will inform that work, and identify opportunities and strategies to make transit-oriented development happen.

WHAT IS TRANSIT-ORIENTED DEVELOPMENT?

TOD, by definition, is the integration of transportation with surrounding land uses. This is accomplished through urban design, zoning, community development, and supportive infrastructure investments, which results in neighborhoods where residents and workers can often get around without a car. There is no one-size-fits-all TOD in terms of mix of land uses, density, or building types. TOD can include compact, single-family residential neighborhoods or major downtown areas with multi-story office buildings. Further, TOD does not necessarily require substantial new development. TOD can also include investments such as sidewalk and bike improvements, parks, affordable housing preservation, and commercial revitalization. Successful TOD is defined by shared traits like neighborhoods that foster transportation choices of all kinds and healthy communities with vibrant commercial districts serving the daily needs of the residents.

FIXED-GUIDEWAY TRANSIT

The entire non-automotive transportation network, including rail, busways, fixed-route buses, special services for the elderly and disability communities, sidewalks and bike lanes, is critical to providing transportation

1 Center for Transit-Oriented Development. *Transit-Oriented Development Typology Strategy for Allegheny County*. February, 2013. www.ctod.org/pittsburgh/.

choices and achieving vitality found in TOD. But TOD planning commonly focuses on the walkable areas surrounding rail or busway stations operating in their own dedicated right-of-way, referred to as a fixed guideway. Traditional TOD definitions focus on fixed-guideway stations because these major transit infrastructure investments are visible and permanent; they provide a greater level of certainty to investors, developers, and prospective families and businesses that the transit will always stay in one place, will always operate, and will always move people to destinations along the line. This sense of certainty reduces the level of risk for investors and attracts residents who want to live near transit but who otherwise may not have considered living in the surrounding neighborhood. Developers and businesses can also build fewer parking spaces, knowing that the transit provides permanent quality access to and from key destinations.

The TOD typology strategy contained in this report provides a framework for understanding what these transit-oriented investments might be, where they can leverage the greatest economic potential, and how they can be funded and implemented. It focuses on the region's fixed guideway network now under construction: the Hartford to New Britain bus rapid transit system known as CT***fastrak***, the New Haven-Hartford-Springfield (NHHS) Rail Project, and the Vermonter Realignment, which will extend Amtrak passenger rail service to Holyoke, Northampton and Greenfield Massachusetts. These investments are explained in greater detail at the end of this section.

STUDY PURPOSE, GOALS AND PRINCIPLES

The ***Market Analysis for Transit-Oriented Development in the Knowledge Corridor's Bus Rapid Transit and Rail Corridors*** is intended to help public and private parties capitalize on major federal and state infrastructure investment through identifying market-based TOD opportunities that exist around the planned NHHS and Vermonter Rail, and CT***fastrak*** BRT systems. The study will present these opportunities within a corridor context, while incorporating national, regional and local analysis of demographic, economic and real estate market conditions.

The goals of the project are to:

- Understand existing market conditions and how they may shape potential transit-oriented development.

- Create a development typologies framework defined by station area characteristics and market strength that can be used to inform redevelopment potential and strategies.

- Identify opportunities for catalytic sites that can change the economic dynamics of the region.

This project was funded by a U.S. Department of Housing and Urban Development (HUD) Sustainable Communities Regional Planning Grant awarded to the Capitol Region Council of Governments, the Pioneer Valley Planning Commission, and a partnership of public and private

organizations known as the Sustainable Knowledge Corridor Consortium. All of the tasks being carried out under this project, including the ***Market Analysis for Transit-Oriented Development in the Knowledge Corridor's Bus Rapid Transit and Rail Corridors***, address in a comprehensive way the six livability principles of the Partnership for Sustainable Communities, an interagency partnership of HUD, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency. These principles are:

- Provide more transportation choices.
- Promote equitable, affordable housing.
- Enhance economic competitiveness.
- Support existing communities.
- Coordinate policies and leverage investment.
- Value communities and neighborhoods.

In addition to the overall project goals and the livability principles discussed above, several additional principles have guided this analysis:

- **The market for TOD is regional**, and therefore competitive advantages and disadvantages of the station areas along corridor should be considered in light of their position in the regional market. This market analysis takes into consideration demand for office, housing and employment in the region and at the various station areas.
- **Not all station areas are alike**, and each varies in what are achievable land uses and development densities. The appropriate kind of development varies according to the station context and its role within the corridor, and the overall regional transportation system. This analysis evaluates the potential for phased development along the BRT and rail corridors, and provides insight as to what is possible now, what might be possible in the future, and how key public sector investments and policies can help to unlock the potential for development.
- **A framework for both private and public investment is desirable**. Delivering high-quality TOD will require coordinated efforts by the public sector, the private sector, community groups, and other parties. The implementation section of the plan provides a matrix of potential funding sources, and outlines a set of priorities, action steps and responsible parties that are directly related to specific outcomes.
- **Economic and market analyses are place-based** and guided by actual development, implementation, and finance experience to ensure that sound real estate principles drive proposed strategies and actions.

CIVIC ENGAGEMENT PROCESS

The primary objective of the civic engagement process was to provide insight, perspectives and information to support data driven analysis. The information gathered from the civic engagement process has helped to directly inform the ***Market Analysis for Transit-Oriented Development in the Knowledge Corridor's Bus Rapid Transit and Rail Corridors***. Another objective of the civic engagement process was to build awareness and consensus on the goals for the region, and for transit-oriented development in particular, as well as on the assets, opportunities, challenges, and strategies for achieving the goals.

The participants in the civic engagement process were organized into three categories. Because of the technical content of the ***Market Analysis for Transit-Oriented Development in the Knowledge Corridor's Bus Rapid Transit and Rail Corridors***, civic engagement focused on facilitating input from two primary sources: an Advisory Committee that met at benchmarks in the development of the final study, and interviews with industry experts to directly inform the study. The participants in civic engagement are described further below.

- **Advisory Committee:** A committee consisting of approximately 15 individuals in the Hartford-Springfield region recognized for their knowledge of economic conditions, real estate markets, public policy and government programs, for- and non- profit industries, and/or trends in higher education and industry growth.

- **Stakeholder Experts:** Individuals and/or institutions with specific expertise in market analysis and economic conditions in the region.

- **Community Members:** Those interested in providing input into and furthering a vision and set of goals for the future of the region as a livable, affordable, and economically sustainable region. Invited participants included, but were not necessarily limited to, residents, business owners, workers, non-profit organizations, anchor educational institutions, policy makers, public and elected officials.

Appendix B contains listings of Advisory Committee members, stakeholder interviews, and public meetings.

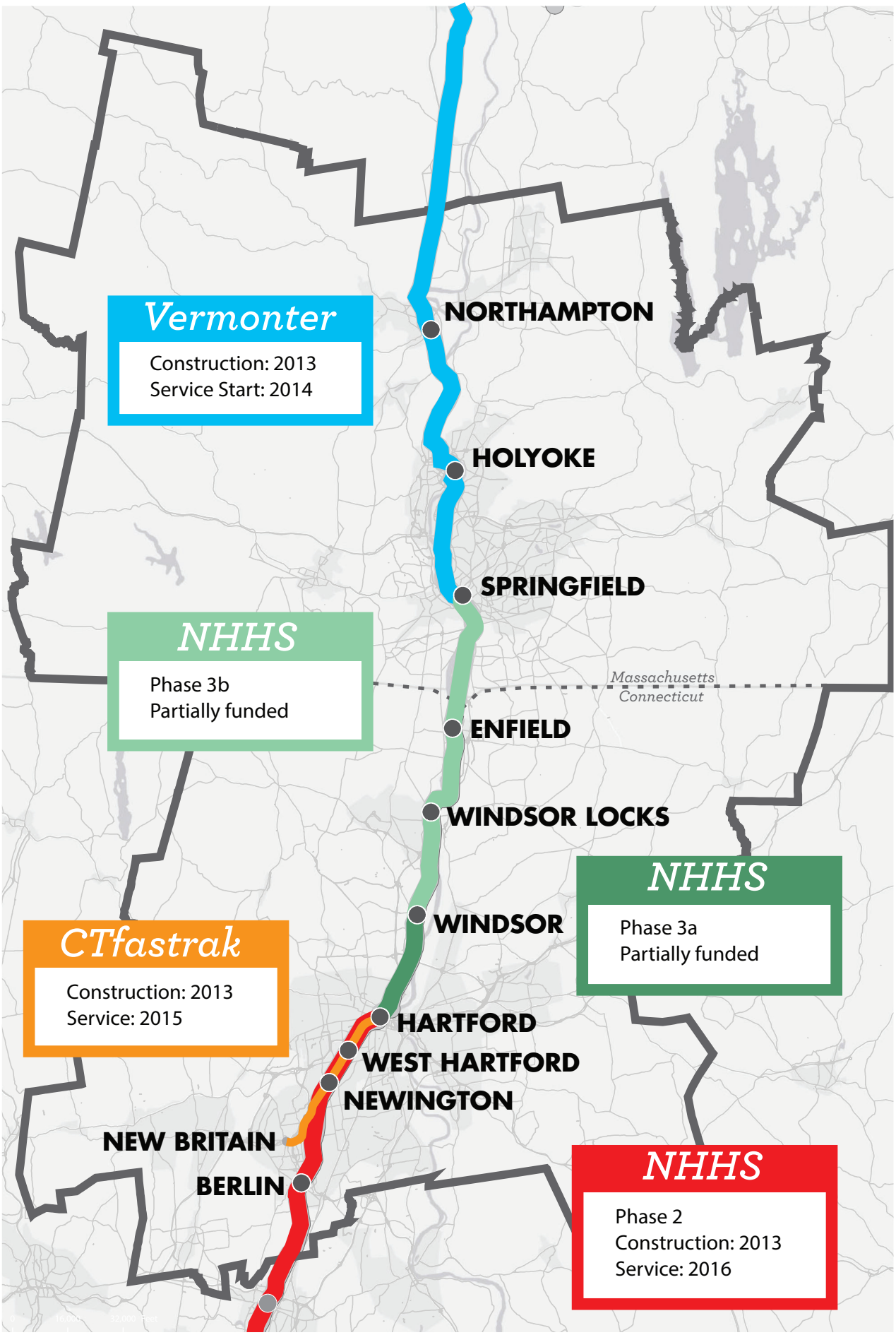
RAPID TRANSIT AND RAIL IMPROVEMENTS

This bi-state planning effort is timely, as the Knowledge Corridor has begun to receive more than $1.5 billion in new transit and rail investment that will extend over the next ten years for three projects: the CT***fastrak*** Bus Rapid Transit Project, the NHHS Rail Project, and the Vermonter Rail Realignment Project. These significant transportation investments offer a rare opportunity for the Knowledge Corridor to leverage other regional assets and further expand opportunity to all residents and workers of the region. A brief summary of these projects is provided below, and in Figure 7, Status of BRT and Rail Improvements.

CT*fastrak*

CT***fastrak*** is a new 9.4 mile bus rapid transit (BRT) system that will provide frequent, fast and reliable connections between important destinations in Central Connecticut. The dedicated bus-only roadway will run from Union

Figure 7: Status of BRT and Rail Improvments



Station in downtown Hartford to downtown New Britain, and is scheduled to begin operations in 2015. BRT and rail connections will be provided at three locations: Union Station in Hartford, Flatbush Avenue in West Hartford, and Newington Junction in Newington. CT***fastrak*** will have eleven landscaped stations and will serve major employment destinations on the dedicated corridor. Importantly, the transit network extends beyond the CT***fastrak*** roadway to cover many nearby destinations through feeder routes extending from Hartford to New Britain. Express buses and some local service will also have access to CT***fastrak***, further expanding the reach of the system and allowing these services to benefit from greater reliability and improved travel times. Projected ridership is an estimated 16,000 rides per day. Buses will run every 3 to 6 minutes during the peak morning and afternoon commutes.

A Hartford to New Britain busway was originally recommended in the Interstate 84 Hartford West Major Investment Study as the most cost-effective solution to congestion in the corridor. When built and operational, it will represent the first investment in rapid transit in the region, and will create the foundation for a sustainable transportation system. The Connecticut Department of Transportation will build and own CT***fastrak***.

NEW HAVEN-HARTFORD-SPRINGFIELD (NHHS) RAIL PROGRAM

The New Haven-Hartford-Springfield (NHHS) Rail Program will provide significant new regional passenger rail service options as a key component of a robust and vibrant multi-modal regional transportation system. When expanded service comes on line in 2016, the NHHS rail program will provide up to 25 daily train trips each in north and south directions to connect major destinations in the Knowledge Corridor from downtown Springfield to downtown Hartford and New Haven. Much faster connections will be provided to the New York region and to the Northeast Corridor from Washington to Boston. A frequent bus shuttle will link the rail service with Bradley International Airport from the Windsor Locks rail station.

The State of Connecticut, Amtrak, and the Federal Railroad Administration are presently working along the 62-mile route from New Haven to Springfield, to improve track, signaling, and station facilities. This will expand passenger rail operating capacity and increase connecting service to New York City. The NHHS project includes new stations in North Haven (outside of the study area for this report), Newington, West Hartford and Enfield. The project is proceeding in four stages, with funding currently in place for Phases 1 and 2. This will result in complete double tracking between Hartford and New Haven.

VERMONTER REALIGNMENT

The Vermonter Amtrak rail corridor connects Washington D.C. to St. Albans, Vermont. The plan is to restore Amtrak passenger rail service along a 61-mile segment between Springfield and Northfield, Massachusetts to its original alignment along the Connecticut River. This will reduce travel times and increase the number of passenger stations in Massachusetts from two to four, with service returning to Holyoke, Northampton, and Greenfield. It will also improve freight capacity along the corridor. Passenger service to these stations is set to begin in 2014.

1. Regional and Corridor Market Analysis

Regional and Corridor Analysis Summary of Findings

Overview of TOD Demand and Real Estate Economics

Demographics and Housing

Residential Real Estate Feasibility Analysis

Regional Economic and Commercial Real Estate Analysis

Regional and Corridor Analysis Summary of Findings

DEMOGRAPHIC TRENDS AND TOD HOUSING DEMAND

Young adults and Baby Boomers are likely to drive future demand for TOD housing in the transit corridors. Nationally, these demographic segments have a higher propensity to prefer a walkable, urban lifestyle in compact, transit-oriented communities. Baby Boomers and Echo Boomers together comprise over 50 percent of the region's population. In the Knowledge Corridor, these two cohorts have the potential to shift the demand away from single-family suburban homes towards compact housing types in transit districts, as many Baby Boomers downsize from single-family houses to condominiums and apartments and Echo Boomers enter the housing market, seeking rental apartments and starter homes.

The region's core cities have already successfully attracted the Echo Boomer population. The cities of Hartford and Springfield have a larger share of young adults than the region as a whole, showing that Echo Boomers are concentrated in the region's urban centers. The addition of transit and other TOD amenities will make the urban core even more attractive to young professionals and students.

There is a latent demand for smaller, compact housing units in the core of the region. Between 1990 and 2010, the number of single-person households increased by 45,000. However, the housing supply increases have primarily been in single-family developments which grew by 75,000 units, while the number of multifamily apartments only increased by 15,000 during the same period. New multifamily units built in the last decade were overwhelmingly in urban centers like Hartford and Manchester. The pattern is largely driven by zoning restrictions in other jurisdictions that prohibit the development of multifamily apartments, constraining the supply of these types of housing units in the region.

The housing market is recovering, indicating that there is potential for expansion in multifamily construction in the coming years. Rental market fundamentals are improving, with vacancy rates in decline and rents increasing throughout the region, which indicates increased demand for multifamily housing. The single-family housing market fundamentals are also improving, though the single-family housing market remains soft, and many of the new units are being developed in suburban areas away from the transit corridors.

There is potential demand for 9,000 to 12,000 new TOD housing units by 2035. Based on regional population and household projections developed by CRCOG and PVPC, it is estimated that the region has the opportunity to build 9,000 to 12,000 more housing units in transit locations. This corresponds to approximately 15 to 20 percent of future household growth.

In the short term, market-rate housing development is likely to be limited to a few station areas, though there is long-term potential capacity for new housing in many other station areas. A feasibility analysis comparing the costs of new construction to the sales and rental revenues achievable in the station areas found that in the short-term (0 to 5 years), owner-occupied housing development is feasible in downtown Hartford, Newington, Berlin, and Northampton. Rental housing development was found to be economically feasible in downtown Hartford, Windsor, Newington, and Berlin. However, over time, many more station areas in the region have the potential to attract TOD households as real estate market conditions improve.

REGIONAL ECONOMIC ANALYSIS AND COMMERCIAL REAL ESTATE DEMAND

Most of the region's existing jobs are in TOD supportive sectors, with a large share of them located along the transit corridors. 60 percent of the region's employment is in TOD supportive industries, including Finance/ Insurance, Health Services, and Educational Services. These industries already have a significant presence in the transit corridors, and could play an important role in fostering TOD in the Knowledge Corridor – just as they have in similar transit regions in the United States.

The region's future employment growth is likely to be driven by the Health and Educational Services sectors. Other traditional industries like Manufacturing and Insurance, while continuing to play an important role in the Knowledge Corridor's economy, are not forecast to grow. 28 percent of the region's employment in Health and Educational Services is already located on the transit corridors. The transit corridor contains many of the region's Anchor Institutions - major universities, colleges, hospitals, and large employers.

Although the current office market is weak, there are signs that it has stabilized and is starting to improve. Office vacancy rates in the region are high and rents have remained stable for several years, but there are promising signs that transactions are increasing, indicating increased investor interest in the region's office space. However, much of the new commercial development is likely to occur in outlying suburban areas as regional job growth continues to decentralize.

The region's anchor institutions and state governments offer the greatest opportunities for new commercial development and job growth in the transit corridor. The region's anchor institutions - its hospitals, colleges and universities - are expanding and driving job growth in the Health and Educational Services sectors. Many are located within station areas or will be connected via local spurs from the main transit corridors, which could lead to development of new institutional facilities or office space in the station areas. The state governments also have a large presence in the region, leasing hundreds of thousands of square feet of office space.

Overview of TOD Demand and Real Estate Economics

NATIONAL TOD DEMAND

In order to determine the TOD market potential in the Knowledge Corridor, it is important to first understand the national demand for development near transit. Since 2005, the Center for Transit-Oriented Development (CTOD) has conducted extensive research on TOD demand, reviewing national literature on housing preferences and analyzing the types of residents and businesses that are currently located near transit. This research has shed light on the types of households and industries that show a preference for TOD, which are highlighted below.

Housing

Trends in demographics, family types, and lifestyle preferences indicate an increasing demand for housing in compact, walkable neighborhoods near transit. Studies show that many households will consider living in a more compact housing unit if it is located in a pedestrian-oriented neighborhood with easy access to amenities, multiple transportation options, and faster commute times. A recent national survey found that 60 percent of respondents would choose a smaller home if it meant a commute time of 20 minutes or less, and two-thirds said that being within an easy walk of shops and services was an important factor in deciding where to live.[2]

There are two primary drivers of TOD demand in the coming decades: the 79 million Baby Boomers approaching retirement and the 85 million Echo Boomers entering the housing markets for the first time.

According to these studies, there are two primary drivers of TOD demand in the coming decades: the 79 million Baby Boomers approaching retirement and the 85 million Echo Boomers entering the housing markets for the first time. A recent report from Harvard University found that the aging Baby Boomer generation (born between 1946 and 1965) prioritizes public transportation, "walkability," and access to amenities. Baby Boomers are also more receptive to living in townhouses and condominiums with smaller yards than other households.[3] Indeed, households with a householder over age 65 already exhibit high demand for housing in a transit-oriented development relative to their share of all households. [4]

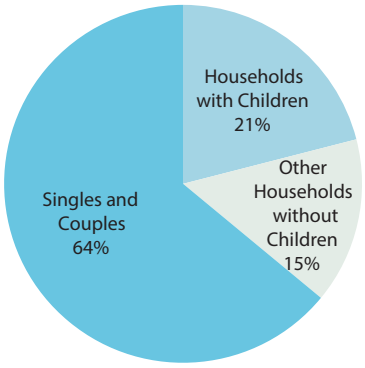
Meanwhile, the even larger Echo Boomer generation (born between 1981

2 Belden Russonello & Stewart LLC. (2011). The 2011 Community Preference Survey. Realtor, publication of the National Association of Realtors, March.

3 Belden, Russonello & Stewart LLC. (2011). The 2011 Community Preference Survey. Realtor, publication of the National Association of Realtors, March. Joint Center for Housing Studies. (2011). The state of the nation's housing. (Report.) Boston: Harvard Graduate School of Design and the Harvard Kennedy School.

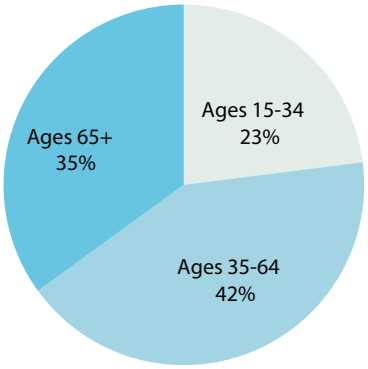
4 Center for Transit-Oriented Development. (2004). Hidden in Plain Sight: Capturing the Demand for Housing near Transit. (Report.) Oakland, CA.

Figure 8: Distribution of National Demand for TOD by Household Type, 2030



SOURCE: Center for Transit-Oriented Development, 2006

Figure 9: Distribution of National Demand for TOD by Age, 2030



SOURCE: Center for Transit-Oriented Development, 2006

and 2000) has also exhibited a preference for living in walkable mixed-use neighborhoods with short commutes.[5] This generation may be more likely to prefer neighborhoods that offer alternative transportation options as a lifestyle choice. According to the Department of Transportation, the share of automobile miles driven by young people between 21 to 30 years old dropped by seven points from 1995 to 2009[6]; the share of young people 19 and under with a driver's license decreased from 64 percent to 46 percent in the same period.[7]

These findings are supported by CTOD's own forecasts of national demand for TOD.[8] The methodology uses information about the current households living near transit, including household type and age, to project future demand. According to the analysis, smaller households without children and households over the age of 65 have a greater propensity to live near transit. Figures 8 and 9 show the breakdown of national TOD demand by age and household type. As shown in Figure 8, smaller households without children account for the largest share of future TOD demand. Figure 9 illustrates TOD demand by age group; it is important to note that while householders over the age of 65 are projected to comprise 28 percent of households nationally, they make up 35 percent of demand for TOD. Older households, therefore, also have a greater propensity to live near transit. An analysis of the demographic and household trends in the PVPC, CRCOG and CCRPA regions is presented in Appendix E of the report.

Industries

Just as households have different propensities to live near transit depending on demographic factors, the types of jobs that are likely to be in a TOD can also vary by industry. In 2010, CTOD studied the number and composition of existing jobs near transit for every transit region[9] in the country, and found that there are specific industries that are more likely to locate near transit (within a half mile of station areas) than other types of jobs.[10] These "TOD-supportive" industry groups include Knowledge-based, Educational and Health Services, and Government (see Figure 10).

Knowledge-based industries - include Information; Finance and Insurance; Real Estate; Professional, Scientific and Technical Services; and

5 Belden Russonello & Stewart LLC. (2011). The 2011 Community Preference Survey. Realtor, publication of the National Association of Realtors, March.

6 Federal Highway Administration, Department of Transportation. (2010). National Household Travel Survey. Washington, D.C.

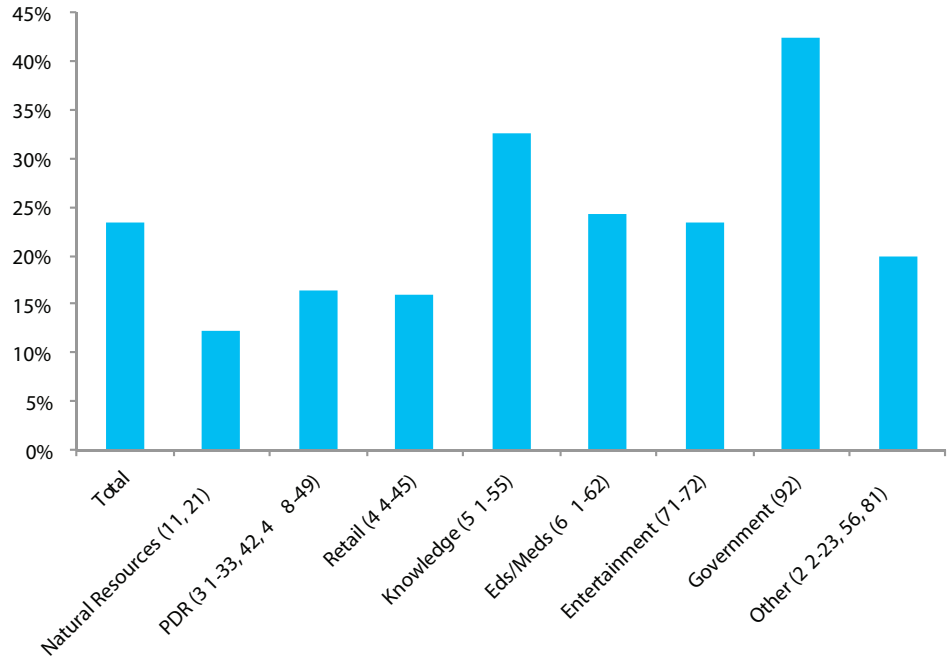
7 Federal Highway Administration, Department of Transportation. (2006 and 2009). Office of Highway Policy Information, Highway Statistics Series. Retrieved from http://www.fhwa.dot.gov/policyinformation/statistics.cfm.

8 For more about this methodology, please see: Center for Transit-Oriented Development (2004). Hidden in Plain Sight: Capturing the Demand for Housing near Transit. (Report.) Oakland, CA.

9 To conduct this analysis, CTOD used employment data from 2008 US Census Longitudinal Employment-Housing Dynamics (LEHD) for 34 regions with existing fixed-guideway transit (including commuter rail, light rail, trolley, streetcar, and bus rapid transit (BRT) corridors with dedicated lanes). The LEHD employment data excludes Massachusetts, Connecticut, and Washington, D.C., which did not participate in the Census survey.

10 Center for Transit-Oriented Development. (2011). Transit and Regional Economic Development. (Report.) Oakland, CA.

Figure 10: Share of Jobs in Transit Areas by Sector, 2008



Source: US Census LEHD 2008; Center for Transit-Oriented Development, 2010

Management of Companies and Enterprises.[11] In 2008, one third of Knowledge-based jobs were located in transit station areas compared to 23 percent for all jobs.[12] These industries benefit from agglomeration in many ways. First, they often draw from a shared pool of highly-skilled workers, and agglomeration allows them to have access to labor force while reducing the individual firm's recruitment and training costs.[13] In addition, agglomeration also allows industries to benefit from the "knowledge spillover" effects that occur when similar or complementary firms are geographically clustered.[14] Thus, agglomerations can generate increased innovation, especially in higher density urban contexts.[15]

Public Administration - Public Administration[16] jobs were shown to have the greatest concentration in transit areas nationally; in 2008, 42 percent of government jobs were located in transit areas. These jobs often are clustered in central business districts or downtowns, which are typically connected to transit.

Education and Health Services - In 2008, about 24 percent of jobs in Education and Health Services[17] were in transit areas. Universities and colleges can serve as institutional anchors in transit locations, and students can contribute significantly to ridership during off-peak hours.

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11 Includes NAICS codes 51, 52, 53, 54, and 55.
12 Ibid.
13 Marshall, A. (1920). Principles of Economics. London, UK: MacMillan & Co.
14 Romer, P. (1986). Increasing Returns and Long-Run Growth. Journal of Political Economy, 103.
15 Carlino, G., Chatterjee, S. & Hunt, R. (2006). Urban Density and the Rate of Invention. (Working paper.) Federal Reserve Bank of Philadelphia.
16 Includes NAICS code 92
17 Includes NAICS codes 61 and 62



Blue Back Square, West Hartford, CT

REAL ESTATE ECONOMICS

Transit has been shown to have a positive impact on real estate economics, as the value increases for properties located near stations. Multiple studies have confirmed that properties located in proximity to a transit station obtained higher values than comparable properties without transit access,[18] although the range of the premium varied widely from place to place.[19] From a developer's perspective, transit can enhance development opportunities in the following ways:

- Attract households and businesses – The availability of transit can be an amenity to households and employers, thereby helping to attract potential buyers or tenants into a new project.

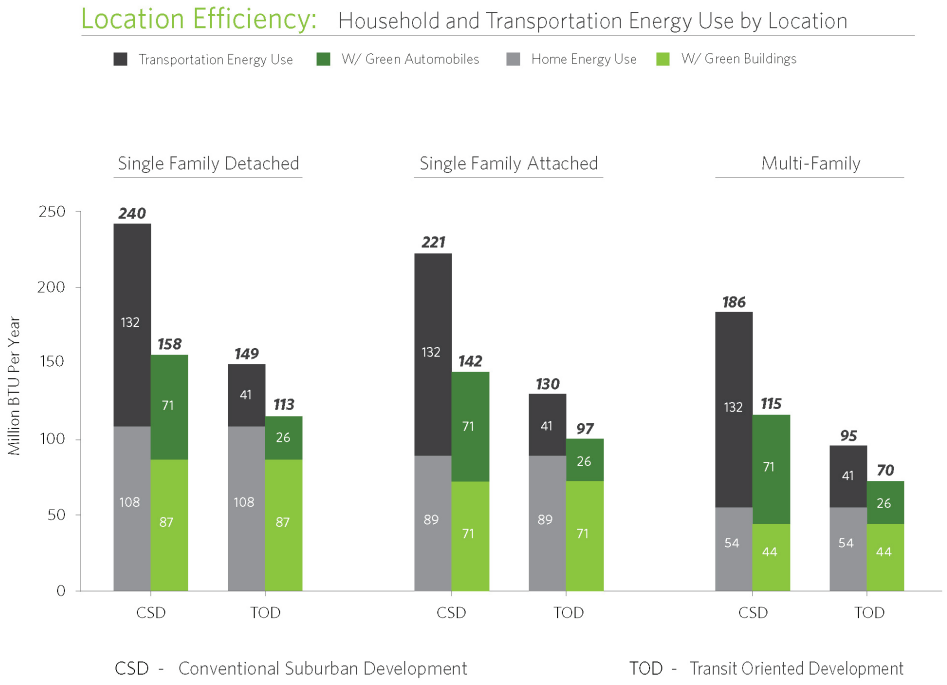
- Improve project performance – Often, local regulations have lower parking requirements and allow for higher density development in transit areas, thereby improving the economics of the project.

Although transit brings the potential to increase real estate values in the long term, in the short term the first developments around transit often require government support, either through financing or infrastructure, to create a market for higher density development.

18 Fogarty, N. (2008). Capturing the Value of Transit. (White paper.) Oakland, CA: Center for Transit-Oriented Development.

19 Fogarty, N. (2008). Capturing the Value of Transit. (White paper.) Oakland, CA: Center for Transit-Oriented Development.

Figure 11: Location Efficiency by Housing Type



SOURCE: Jonathan Rose Companies (2010). Location efficiency and housing type - boiling it down to BTUs. (White paper.) New York, NY: Jonathan Rose Companies

Transit also greatly benefits low- and moderate-income households, particularly those that live close enough to use the transit as their primary means of transportation. A Jonathan Rose Companies study on Location Efficiency found that a home's location relative to transportation choices as well as its housing type has a large impact on energy consumption. People who live in a more compact, transit-accessible area have more housing and transportation choices compared to those who live in spread-out developments where few or no transportation options exist besides driving. Choosing to live in an area with transportation options not only reduces energy consumption, it also can result in significant savings on home energy and transportation costs. For lower-income families, these savings can allow for more spending on other everyday necessities. As Figure 11 indicates, living in a TOD offers even more energy savings than would be experience in a high performing, green, conventional suburban development.

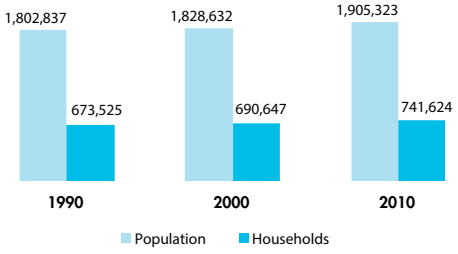
Demographics and Housing

Similar to national trends, the Knowledge Corridor exhibits changing demographics favorable to increasing demand for TOD. The study team analyzed long-term historical trends, particularly for household types and age cohorts that have demonstrated a higher propensity to live near transit—Echo Boomer (also known as Generation Y) and Baby Boomer households—as well as smaller households. The demographic data is supplemented with housing market information to shed light on the future development potential in station areas.

DEMOGRAPHIC TRENDS

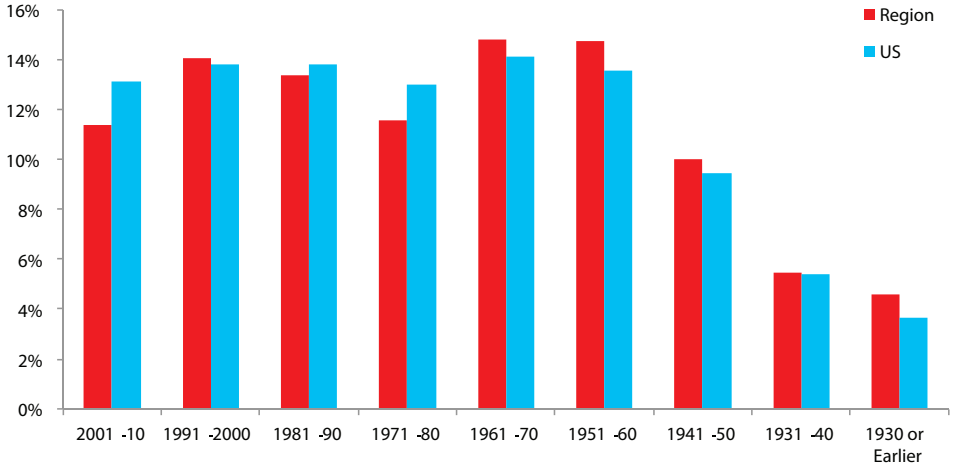
For the past two decades, the region experienced slow population growth. The region's population has grown by slightly more than 100,000 in the past twenty years, at an average annual rate of 0.3 percent, well below the United States growth rate. Household growth has been slightly faster, increasing at a rate of 0.5 percent annually, indicating that many of the new households in the region are small.

Figure 12: Population and Households in Region



NOTE: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
SOURCE: US Census, 1990, 2000, 2010.

Figure 13: Population by Year of Birth in Region and U.S., 2010



NOTE: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
SOURCE: US Census, 2010.

The region has a relatively lower share of young working-age adults compared to the U.S. The region's share of young people aged 25 to 39 is lower than the United States. The high ratio of "dependents" (seniors and children) to working age adults could be a concern for the region's future economic development if it leads to workforce shortages.[20]

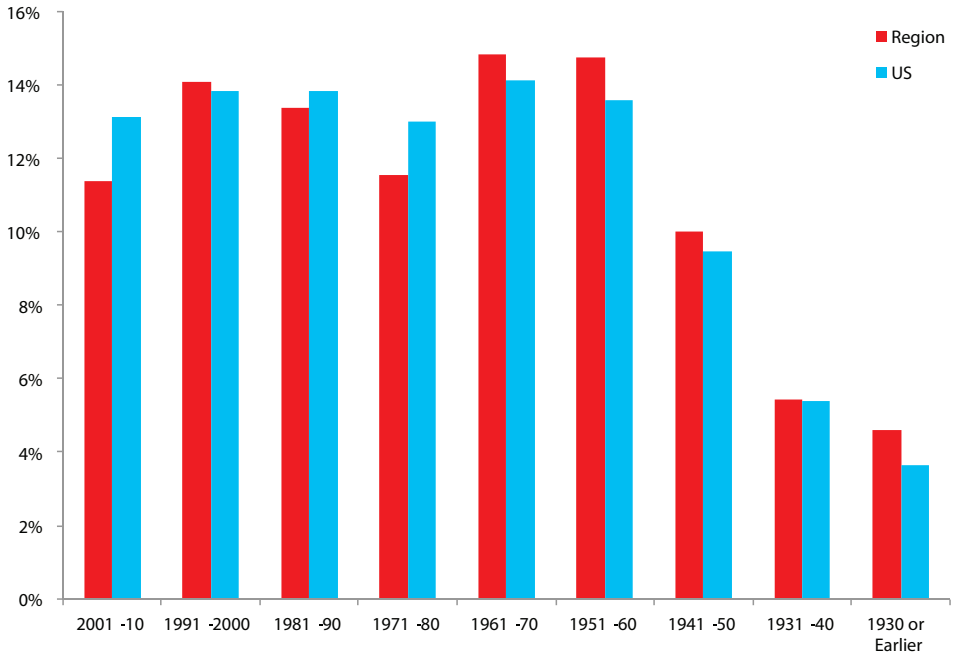
20 Connecticut Center of Economic Analysis. (2012). Recovery Stirring? But Will Connecticut be Too Old to Compete? The Connecticut Economic Outlook, May.

The region has a significant aging population. Compared to the nation, the region has a larger share of the senior[21] and Baby Boomer[22] population. Given the higher likelihood of Baby Boomers choosing a compact, walkable lifestyle, the large number of households in this demographic could help to support TOD demand in the region in future years.

The young adult population has not moved away from the region in the last decade. The concern about a decline in the young population in the region is mostly a function of the demographic composition of the population, which

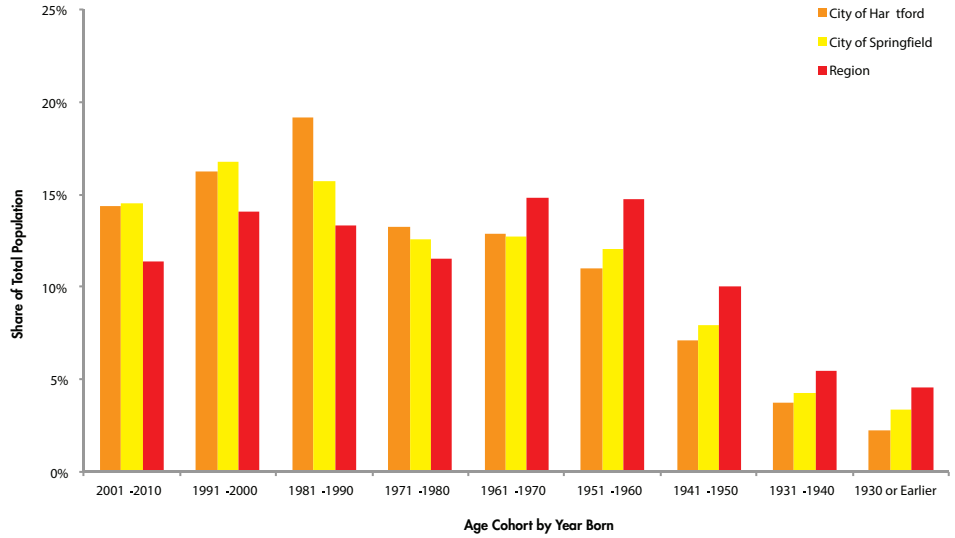
21 Born prior to 1946.
22 Born roughly between 1946 and 1965.

Figure 14: Population Change by Year of Birth, 2000-2010



Note: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
Source: US Census, 2010.

Figure 15: Population by Age in Core Cities.



Note: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
Source: US Census, 2010.

contains fewer people born between 1971 and 1990 (Generations X and Echo Boomers) than the United States as a whole. Still there is no strong evidence that there has been a significant net out-migration of young professionals away from the region. From 2000 to 2010, the population of people born between 1981 and 1990 remained stable, with a slight decline in the population of people born between 1971 and 1980. Most of the population declines were in fact in older demographic groups, likely a combination of deaths and out-migration.

The large cities are attracting a significant share of the region's young adults. When examined at the city scale, the cities of Hartford and Springfield have a significantly larger share of young adults and children than the region as a whole. This indicates that the young workforce aged between 20 and 39 (adults born between 1971 and 1990) is much more concentrated in the region's job centers.

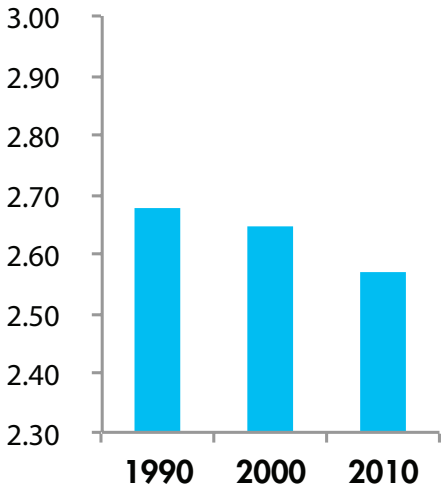
The number of young adults in Hartford has increased in the last 10 years, fueling much of the growth in that city. Over the past ten years – for the first time in four decades – the population of the city of Hartford experienced growth. Most of that growth was driven by students and working adults between the ages of 20 and 34.[23]

HOUSING DYNAMICS

Overall, housing has lagged behind the demographic shifts in household size, formation, and composition. Household size in the region is shrinking, consistent with national trends. The average number of persons per household has dropped from almost 2.68 in 1990 to 2.56 in 2010.

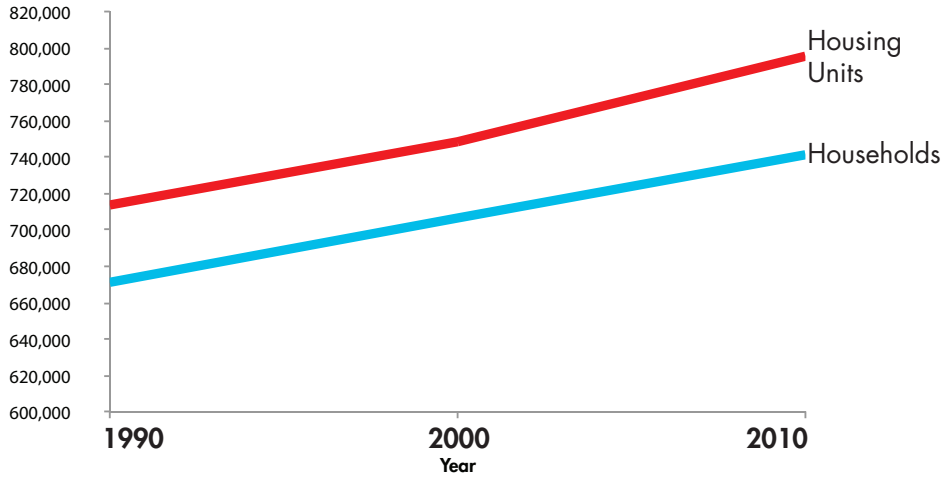
Housing unit development has outpaced household formation. From 1990 to 2010, the number of housing units in the region generally exceeded the number of households.

Figure 16: Trends in Average Household Size



Note: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
Source: US Census, 1990, 2000, 2010.

Figure 17: Trends in Housing Units and Households in Region, 1990-2010

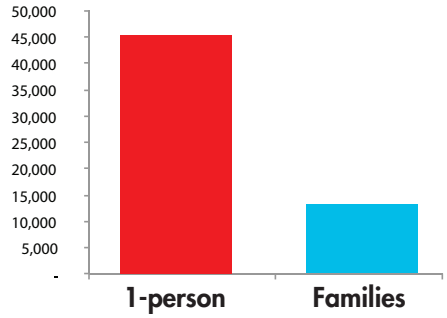


Note: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
Source: US Census, 1990, 2000, 2010.

23 Flaherty, P. (2011). Young People Aren't Fleeing and the Cities Aren't Dying. The Connecticut Economic Digest, Vol. 16, No. 10.

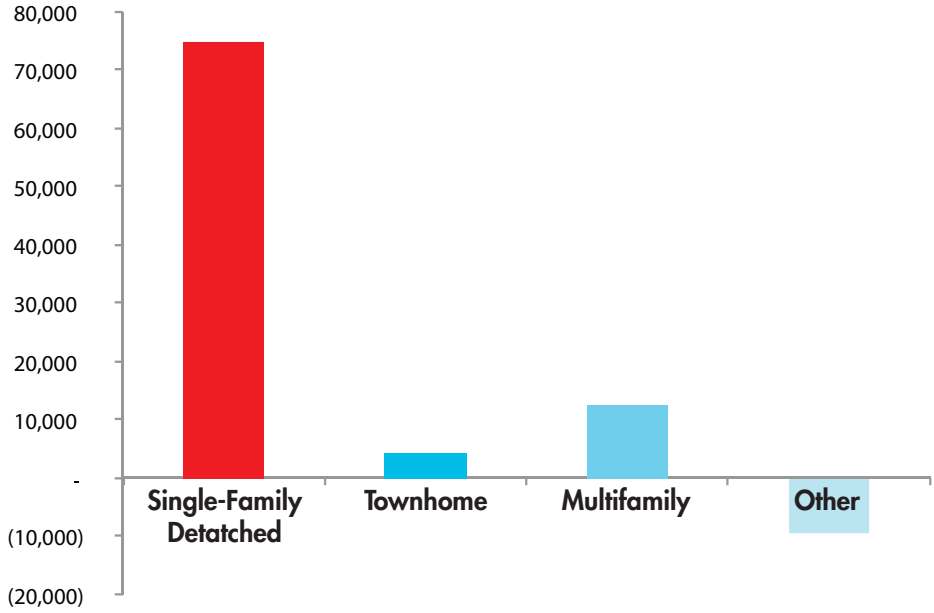
Most of the new household growth in the region has been driven by one-person households. From 1990 to 2010, two thirds of the net household growth in the region was from one-person households. The number of new one-person households grew by 45,000, more than three times the growth in family households during that same period.

Figure 18: Net New Households in Region by Type, 1990-2010



NOTE: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
SOURCE: US Census, 1990, 2000, 2010.

Figure 19: Net New Housing Units by Type in the Region, 1990-2010



NOTE: Region is defined as the US Census Metropolitan Statistical Areas encompassing Hartford and Springfield.
SOURCE: US Census, 1990, 2000, 2010

The demographic shifts that have occurred in the region are not reflected in the new construction of housing units, which are still predominantly single-family units in suburban locations. From 1990 to 2010, the increase in housing stock in the region was almost entirely driven by the addition of new single-family detached units, with only slight increases in multi-family and townhouse units.

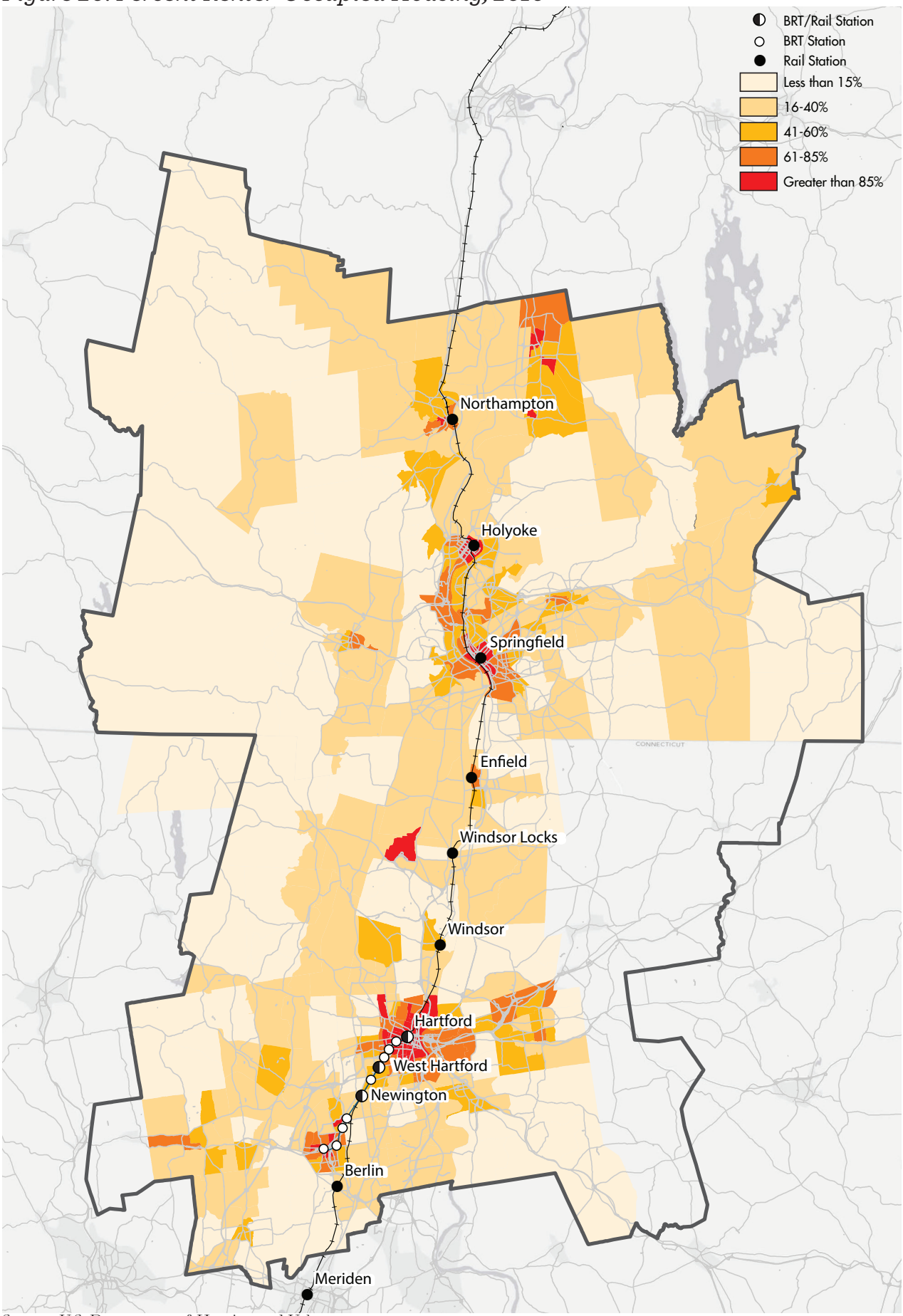
REAL ESTATE MARKET CONDITIONS

These trends in demographic change impact the type of housing in demand and the amount and location of new construction that can be expected in the region. The study team analyzed the existing conditions of the two key residential real estate market segments - multi-family rental and single-family owner-occupied - based on standard real estate metrics, including rent/value levels, vacancy, days on the market, and number of transactions to understand the existing state of these markets and to analyze the impacts these demographic shifts may have on these market segments.

MULTIFAMILY (RENTAL)

The multifamily rental market encompasses any building in which the primary occupants are renters and where there are more than one housing unit in one building. Traditionally, this encompasses a range of building types, from two-family homes up to 100+ unit apartment complexes.

Figure 20: Percent Renter-Occupied Housing, 2010



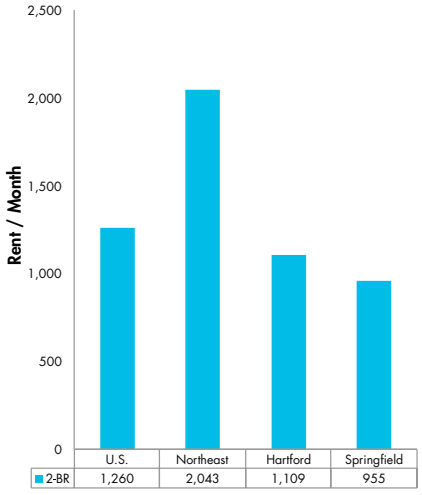
Source: U.S. Department of Housing and Urban Development. State of the Cities Data Systems Building Permits Database. 2000 - 2011.

In the Hartford/Springfield region, multifamily housing is concentrated around areas of high population density, especially in the urban centers. Large concentrations of renter-occupied housing are found in Hartford, Springfield, Manchester, New Britain, Holyoke, and Northampton.

The percentage of renter-occupied housing is particularly high relative to regional averages in the *CTfastraks* and NHHS Rail station areas. In these areas, an average of 78 percent and 75 percent of units are renter-occupied, respectively, compared to 41 percent for the region as a whole. Many of the station areas almost entirely consist of renter-occupied households, including stations in Enfield, Hartford, New Britain, Springfield, Holyoke and Northampton.

Multifamily housing in the region is also generally more than 30 years old and little new product has been added in the past decade. In both regions, less than 20 percent of multifamily housing was built since 1990. Older multifamily units are often functionally obsolescent and not appealing to modern consumer tastes, which limits their appeal to consumers deciding between renting and owning.

Figure 21: Hartford/Springfield Asking Rents to National/Regional Average



Source: U.S. REIS Service, LLC. Hartford Market Report. First Quarter, 2012; REIS Service, LLC. Springfield Market Report. First Quarter, 2012.

Figure 22: Year Built and Unit Size

Year Built	Hartford	Springfield
Before 1970	36%	32%
1970-1979	31%	56%
1980-1989	16%	10%
1990-1999	7%	2%
2000-2009	9%	0%
After 2009	1%	0%

Unit Size	Hartford
Studio	4%
1 BR	43%
2 BR	51%
3 BR +	3%

The rental market is geared primarily to single-person households, couples, and/or families with one child. The vast majority of multifamily units are either 1- or 2-bedroom, which indicates that larger families look to the homeownership market for housing options.

Multifamily rents in the Hartford/Springfield regions are relatively affordable and below Northeast region and U.S. averages. The average rents in the Hartford and Springfield regions for all unit types were below the national average and well below the Northeast region average.

The rental market in both regions appears to be unable to appeal to higher-income households. There exists a significant mismatch between the regions' average rents and average incomes when compared to national averages. Of 280 Metropolitan Statistical Areas (MSAs) nationally, the Hartford MSA ranks 6th and Springfield 98th in median income, but both regions have average rents substantially below the U.S. national average. This mismatch indicates that, while both regions rank highly in terms of income compared to other regions, higher income is not translating into high rent levels, either because the renting population is relatively lower income or because the regional population has lower demand for renting as compared to homeownership. The large supply of older rental housing may

also discourage households with sufficient income to afford homeownership from renting, due to the relative obsolescence of the regional rental unit supply.

Rent amounts in the region vary considerably by location and by age of structure, with the highest rents in newer buildings in downtown Hartford and suburban locations. The following map shows contract rents mapped by census tract and highlights a trend of higher rent amounts in the urban fringe and lower rent amounts in the urban core, with the exception of downtown Hartford, where some of the region's highest rents are located. Lower rent amounts are present at many of the CT***fastrak*** station areas, particularly in Hartford locations outside of downtown and in New Britain, as well as in the Windsor Locks, Springfield and Holyoke station areas. Downtown Hartford, Windsor, Newington, and Enfield contained relatively higher rent levels. Additionally, rent levels are highest in newer structures and lowest in older structures, with complexes built within the past 20 years having the highest rent levels.

Figure 23: Year Built and Average Rent

Year Built	Hartford	Springfield
Before 1970	$905	$838
1970-1979	$948	$962
1980-1989	$1,039	$844
1990-1999	$1,146	$1,289
2000-2009	$1,490	N/A
After 2009	$1,514	N/A

Source: U.S. REIS Service, LLC. Hartford Market Report. First Quarter, 2012; REIS Service, LLC. Springfield Market Report. First Quarter, 2012.

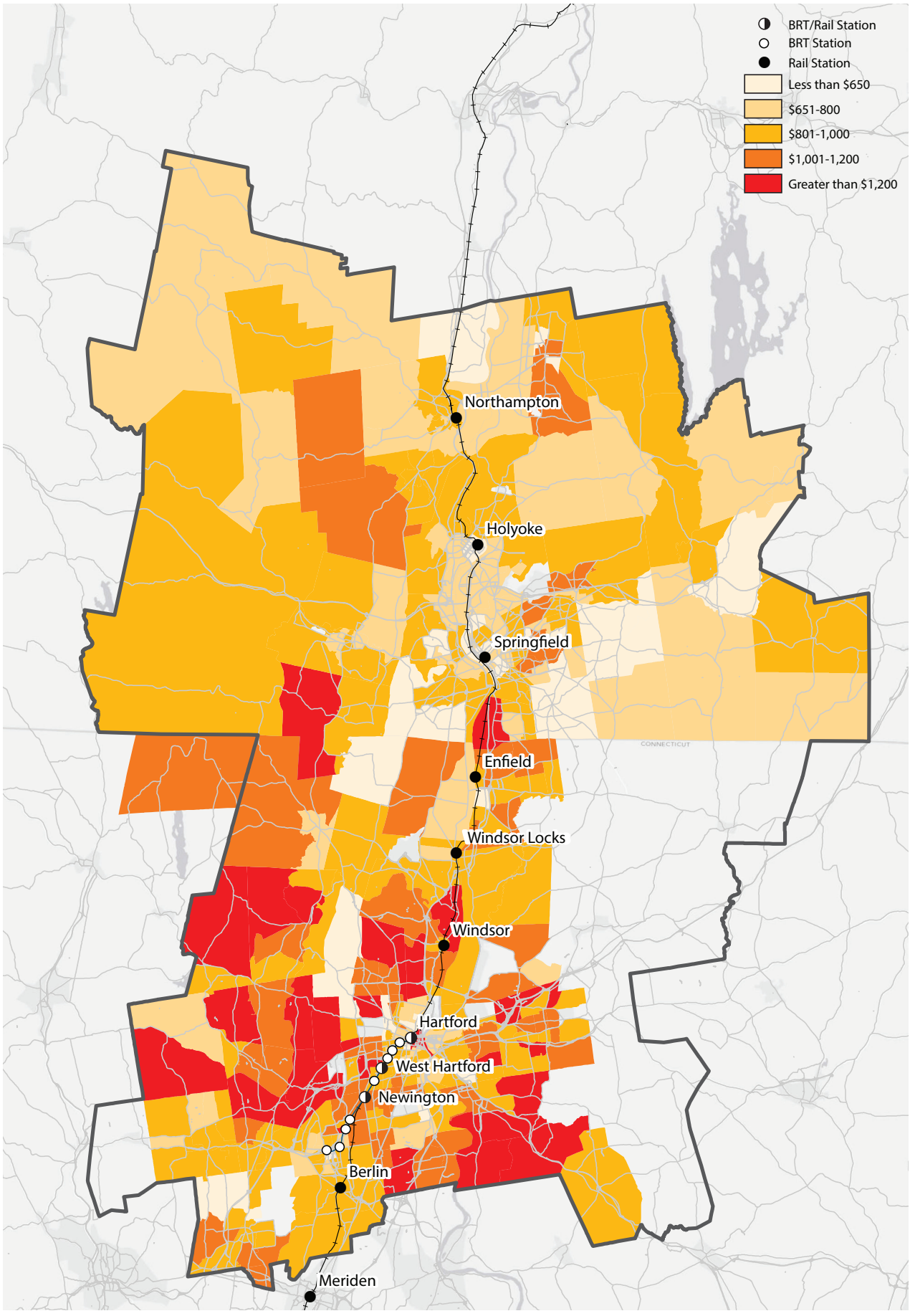
However, the multifamily rental market conditions are improving and appear poised for stronger performance in coming years. The multifamily rental sector in the Hartford and Springfield regions appears to be reaching a transition point where vacancy is reaching historical lows and rents are starting to increase. Compared to the region and the nation, the one year vacancy and rent growth rates are among the highest.

Multifamily housing is becoming a larger part of the region's new housing construction. While permit activity is down in the region in all sectors due to the impact of the Great Recession (the economic downturn that began in 2008) on the national real estate market, the multifamily sector constitutes a growing percentage of the total number of new units produced in the region. From 2000 to 2010, multifamily buildings with more than 5 units constituted 14 percent of all units constructed in the Hartford and Springfield regions, but constituted only an average of 11 percent of all units in 2000-2006 and 18 percent from 2007-2011.[24]

Multifamily housing construction is occurring in many locations not connected to transit. Over the past 10 years, new multifamily housing construction has been highly concentrated in just a few municipalities, most

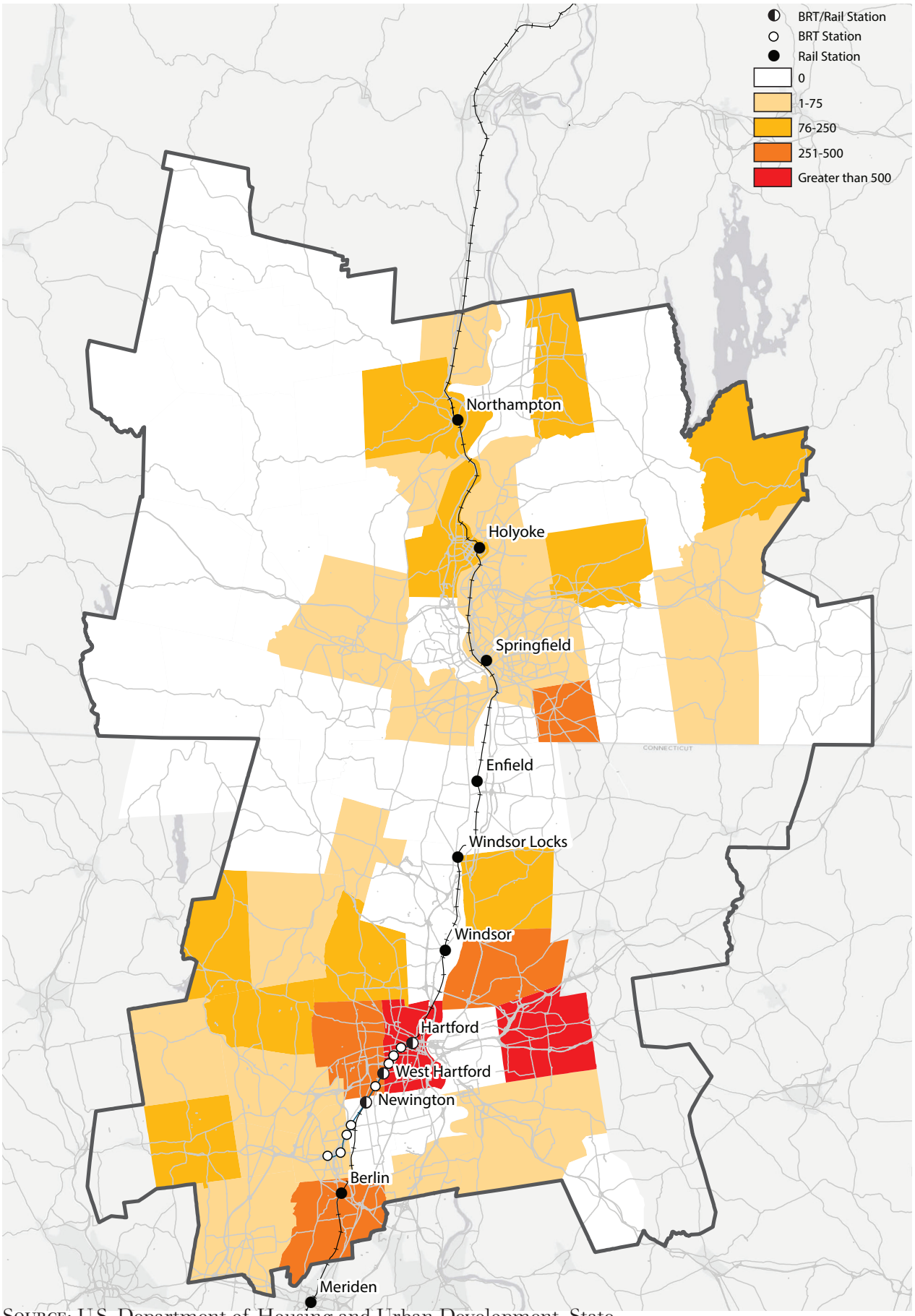
24 U.S. Department of Housing and Urban Development. (2000-2011). State of the cities data systems building permits database. Retrieved from http://www.huduser.org/portal/datasets/socds.html.

Figure 24: Median Gross Rent, 2010



Source: U.S. Census 2010

Figure 25: Multifamily Building Permits, 2000-2011



SOURCE: U.S. Department of Housing and Urban Development. State of the Cities Data Systems Building Permits Database. 2000 - 2011.

notably Manchester, centered around the connection to I-84 and nearby shopping and amenities. Hartford is the only transit-corridor community to have a significant amount of new multifamily housing construction.

The regional data on multifamily housing indicate the beginning of an upward cycle. Appendix E demonstrates that the rate of rental increase is growing, reaching 2.20 percent in 2012 for the Hartford region and 2.70 percent for the Springfield region, which rank high among peer regions. As rents are increased in response to tight supply conditions, they will eventually reach the point where new construction will become financially feasible. If demand continues to increase for multifamily rental housing, which may occur due to the growth of Baby Boomers and Echo Boomers, rents in the existing supply will eventually be bid up to the point where new construction is feasible.

SINGLE-FAMILY (OWNER)

The owner-occupied market makes up the majority of housing units in the Hartford/Springfield regions. Approximately 60 percent of all housing is owner occupied, which includes detached houses, attached townhouses, and/or condominiums. This market varies considerably in building type, including small, large, old, and new.

Owner-occupied housing is most heavily concentrated in suburban areas. Like most U.S. regions, owner-occupied homes dominate the marketplace in suburban areas of the region. High concentrations of owner-occupied housing exist in the Farmington Valley, the towns south and east of Hartford, and the towns surrounding Springfield. Owner-occupied housing predominates in areas of higher median household income, which are generally not located in the NHHS rail and CT***fastraks*** corridors.

New owner-occupied housing construction is primarily located in communities at the regional fringes. Communities to the far south of the region and along the western periphery had the most growth in owner-occupied housing, because greenfield land continues to be available for development and housing prices are generally higher.

The owner-occupied market has been severely impacted by the Great Recession. According to an analysis by UConn, median sales prices of single-family houses in the Hartford Labor Market Area (LMA) are down 15 percent from the peak in 2006 to $266,111 and in the Enfield LMA they are down 13 percent from the peak in 2006 to $182,069.[25] Prudential Connecticut Realty estimates the Hartford County median sales price at $215,000 in the second quarter of 2012.[26]

Owner-occupied condominium units are down even further in pricing, according to Connecticut state-wide data from UConn, which indicates that

25 University of Connecticut Center for Real Estate and Urban Economic Studies (2012). Single Family Indices by Town: Second Quarter, 2012. (Report.) June, 2012.

26 Prudential Connecticut Realty. (2012). The Connecticut Real Estate Market Report: Second Quarter, 2012. (Report.) Wallingford, CT: Prudential Connecticut Realty.

prices have dropped 32 percent from their peak in the third quarter of 2007.[27] Prudential Connecticut Realty estimates the Hartford County median condominium sales price at $147,500 in the second quarter of 2012.[28] The general trend in single-family house sales has been downward for the past 5-6 years since the peak in 2006. Housing prices throughout the region have declined approximately 15 percent from the peak for single-family houses and 32 percent for condominiums, although there are indications that the owner-occupied housing market is stabilizing and beginning to recover.

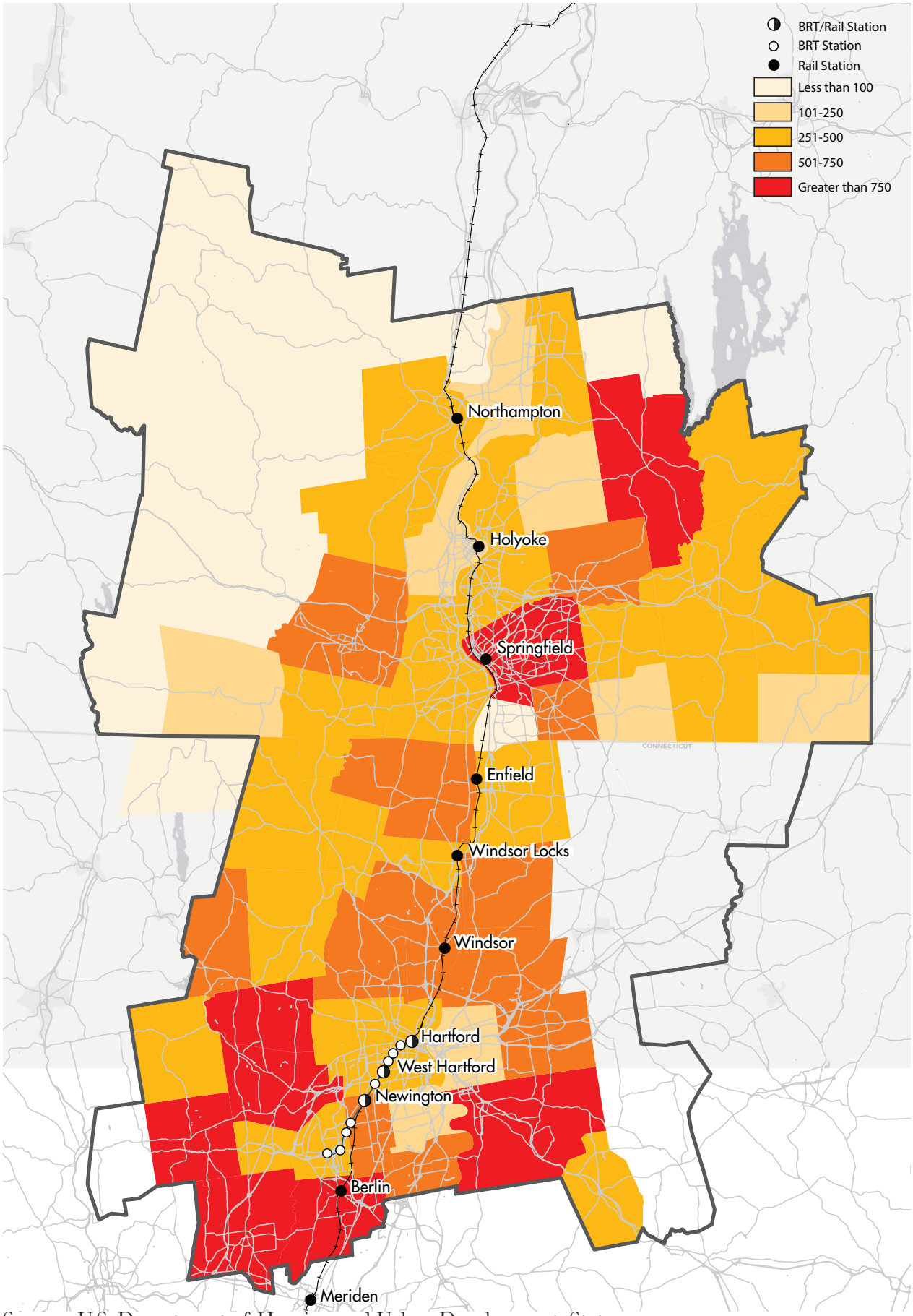
HOUSING PROJECTION

There is potential demand for approximately 9,000 to 12,000 new housing units in the transit corridors. While the corridors currently contain about four percent of the region' households, with careful planning and strategic investments, there is potential to capture future household growth in transit locations. During the next three decades, PVPC, CRCOG and CCRPA project that the region will increase by 154,000 residents, at an average annual rate of 0.33 percent annually. Using conservative assumptions, this corresponds to an increase of 60,000 households. Nationally, the demand for TOD housing is estimated at about 25 percent of all households. In the Knowledge Corridor, the study team employed a more conservative "capture rate" of TOD demand based on the existing market conditions in the region as well as the size of the planned transit system. The consultant team estimates that the region will have sufficient demand for 9,000 to 12,000 more TOD housing units (15 to 20 percent of all new households) to meet the growing demand from household types attracted to a "walkable" urban lifestyle. Realizing this potential demand will depend on creating the conditions that will accommodate new, higher-density housing development near stations, including supportive public policies like TOD-supportive zoning, as well as strategic investments in "place-making" and infrastructure to make TOD housing competitive with other available housing options.

27 University of Connecticut Center for Real Estate and Urban Economic Studies. (2012). Condominium Indices by Town: Second Quarter, 2012. (Report.) Storrs, CT: University of Connecticut.

28 Prudential Connecticut Realty

Figure 26: Single-Family Permits Issued, 2000-2011



Source: U.S. Department of Housing and Urban Development. State of the Cities Data Systems Building Permits Database. 2000 - 2011.

Residential Real Estate Feasibility Analysis

TOD occurs when developers recognize the demand for housing or commercial space in a market and when the amount prospective tenants or homeowners are willing to pay exceeds the costs that developers incur to build new structures or adaptively reuse existing structures. In the previous sections, the existing demographic and real estate market conditions were presented to describe the opportunities and constraints to TOD. In this section, a more detailed analysis of the current residential rental and homeownership markets is presented in comparison to the costs developers would incur to construct new rental or homeownership units at each station area. The resulting analysis provides a snapshot of the feasibility of TOD at each station area, given current rents/sales prices and construction costs. This data is then analyzed further to provide an estimate of how much rent or sales prices would need to increase at each station area to make TOD feasible and how many households exist in the area surrounding the station area that would be able to afford those rent or sales prices.

KEY FINDINGS

The Consulting Team found the following key observations from the real estate feasibility analysis:

- **For-sale housing is most feasible in the towns south and west of Hartford, Connecticut and in Northampton, Massachusetts**. These towns demonstrated strong for-sale housing market conditions and comparable sales approached or exceeded the costs to construct new housing. Additionally, these locations, in particular West Hartford and Newington, Connecticut had a high number of households earning enough income to afford new housing units within a three-mile trade area around the station.

- **Multifamily rental housing is most feasible in downtown Hartford.** Downtown Hartford has the highest rents in the region and a large population of households earning enough income to afford new multifamily rental housing. However, latent demand for new multifamily rental housing may also exist in the towns south and west of Hartford, as well as in Springfield, Massachusetts.

FOR-SALE HOUSING FEASIBILITY ANALYSIS

The previous section described that, within the Hartford - Springfield region, the single-family for-sale and condominium for-sale markets are stable and beginning to recover from the effects of the Great Recession, during which home sales prices plummeted across the region. New home construction hit an all-time low in Connecticut in 2011, although 2012 has shown a modest recovery. The Consulting Team also found that new housing construction

and the highest home values occur generally in the urban fringes where greenfield land is available for development, rather than the transit corridors, which are generally developed areas. Thus, many locations within the NHHS Rail and *CTfastrak* corridors did not demonstrate strong for-sale housing feasibility in the present market.

The Consulting Team used two approaches to determining for-sale TOD feasibility:

- **The Comparable Sales Approach**: The Consulting Team compared local home sales data against the cost to construct new for-sale housing.

- **The Income Approach**: The Consulting Team investigated the household income necessary to afford a new unit of for-sale housing by calculating the number of households living within a reasonable trade area that earn more than this amount of income. This approach represents the potential demand for for-sale TOD in the location, rather than the existing market conditions without transit service.

Figure 27: Estimated Costs of New Owner-Occupied and Rental Housing

Cost Category	Total Cost	Cost / Square Foot
Land Acquisition	$35,000	$29.17
Construction (Hard) Costs	$150,000	$125.00
Soft Costs	$12,500	$10.42
Period Costs	$25,500	$21.25
Builder Margin	$50,500	$42.08
Total Costs	**$273,500**	**$227.92**

Cost Category	Total Cost	Cost / Square Foot
Land Acquisition	$35,000	$31.82
Construction (Hard) Costs	$132,000	$120.00
Design & Approvals (Soft) Costs	$12,750	$11.59
Period Costs	$25,000	$21.36
Builder Margin	$30,000	$27.27
Total Costs	**$234,750**	**$212.05**

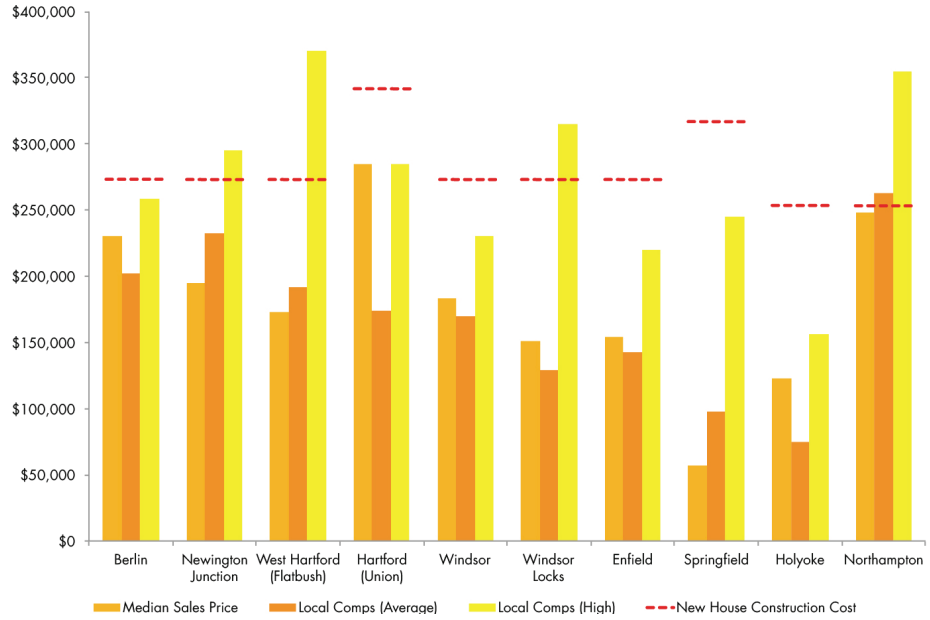
Source: CT Homebuilders and Remodelers, Jonathan Rose Companies

Comparable Sales Approach

The Consulting Team investigated the Median Sales Price, Average of Comparable Sales, and High Comparable Sale of each station area and compared against the estimated cost to construct a new unit of attached for-sale housing. For urban locations, the comparable sales are generally high-rise condominiums and a premium was added to the cost of construction to account for the higher cost of constructing such units in an urban area. The resulting graphs (Figures 28 and 29) demonstrate which station areas may have immediate for-sale TOD feasibility.

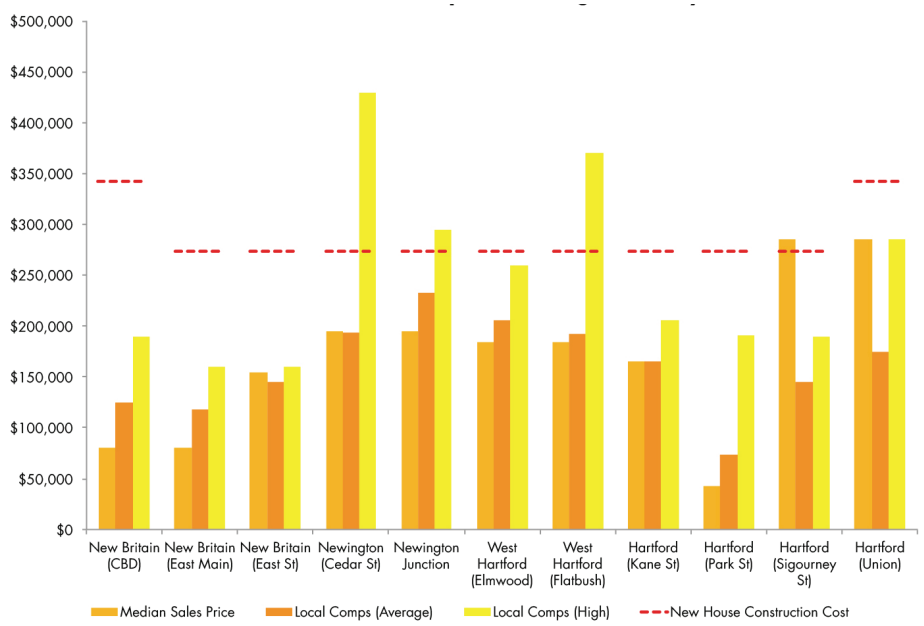
The analysis indicates that for-sale TOD is most feasible in the suburban towns south and west of Hartford. These towns have relatively higher sales prices, share of owner-occupied housing, household incomes, and number of new single-family house permits than the region as a whole. This analysis

Figure 28: NHHS and Vermonter Rail Owner-Occupied Housing Feasibility



SOURCE: MLS, Trulia.com, Craigslist.org, CT Homebuilders and Remodelers, Jonathan Rose Companies

Figure 29: CTfastrak Owner-Occupied Housing Feasibility



SOURCE: MLS, Trulia.com, Craigslist.org, CT Homebuilders and Remodelers, Jonathan Rose Companies

indicates that, with enabling zoning regulations, available land, local political support for TOD, and improved for-sale market conditions, TOD around these station areas could potentially occur from private market activity.

The analysis also indicates for-sale TOD feasibility in Hartford and Northampton, although these locations present different challenges than the suburban towns. These stations exist within a denser urban area where challenges to new development will be greater. The analysis indicates that, even with higher costs of construction, new construction of for-sale units may be feasible and there exists a population of higher-income residents willing to pay a premium to live in these locations.

The analysis indicates that the remaining stations do not currently exhibit market conditions conducive to near-term TOD feasibility. Comparable sales prices are below the cost to construct a new housing unit.

Income Feasibility Approach

Figure 30 shows the household income gap at each station area between the income necessary to afford the average existing house and a new for-sale TOD unit.

Figure 30: Owner-Occupied Income Gap

CT Fastrak Stations

Station Area	Existing Housing Household Income	New Housing Household Income	GAP
New Britain (CBD)	$35,355	$108,270	($72,915)
New Britain (East Main)	$33,099	$85,296	($52,198)
New Britain (East St)	$42,147	$85,296	($43,149)
Newington (Cedar St)	$58,474	$85,296	($26,822)
Newington Junction	$71,429	$85,296	($13,867)
West Hartford (Elmwood)	$62,623	$85,296	($22,673)
West Hartford (Flatbush)	$57,798	$85,296	($27,498)
Hartford (Kane St)	$48,840	$85,296	($36,456)
Hartford (Park St)	$18,130	$85,296	($67,167)
Hartford (Sigourney St)	$42,103	$85,296	($43,193)
Hartford (Union)	$51,976	$108,270	($56,294)

NHHS Rail Stations

Station Area	Existing Housing Household Income	New Housing Household Income	GAP
Berlin	$61,446	$85,296	($23,850)
Newington	$71,429	$85,296	($13,867)
West Hartford (Flatbush)	$57,798	$85,296	($27,498)
Hartford (Union)	$51,976	$108,270	($56,294)
Windsor	$50,487	$85,296	($34,810)
Windsor Locks	$36,682	$85,296	($48,614)
Enfield	$41,183	$85,296	($44,113)
Springfield	$26,227	$99,870	($73,643)
Holyoke	$18,610	$78,576	($59,966)
Northampton	$81,791	$78,576	$3,214

SOURCE: 2010 U.S. Census, CT Homebuilders and Remodelers, Jonathan Rose Companies

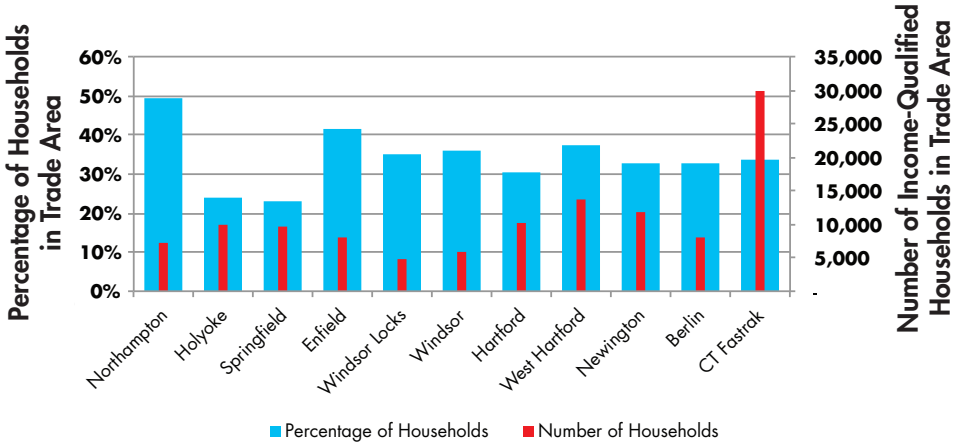
In all station areas except for Northampton there is a gap between the income needed to support the existing housing and the income needed to support new housing construction. However, an income gap is to be expected at this point in time, since there is no premium associated with the station areas, due to the current lack of transit service at most locations. In many locations, though, the income gap is substantial and will be difficult to overcome.

Although the income gap between the income required to afford existing station area housing and the income required to afford new TOD housing may appear daunting, there is a second form of analysis typical of real estate development feasibility studies, which is to analyze the number of households living within a defined "trade area" that earn enough income to afford a new housing unit. A trade area is a geographical district from which a new development would likely draw most of its consumers, which is usually a radius of several miles from the development location in which a sufficient population exists to draw from. Due to the relatively high population densities of the corridors, the Consulting Team drew a 3-mile radius around each station, although the ***CTfastrak*** corridor is considered as one trade area due

to the relatively small distances between the stations. It is important to note this area is an approximation for analytical purposes only and the actual trade area for a TOD in this region could differ substantially based on the specific housing type, geography, economic conditions, and other factors.

Figure 31 shows the percentage of households living in the trade areas of each NHHS Rail Station area and the CT***fastrak*** corridor that earn enough income to afford a new for-sale housing unit at the Station area or in the CT***fastrak*** corridor.

Figure 31: Households Able to Afford New Construction, Owners



Source: 2010 U.S. Census

These data represent substantial latent capacity among the existing population to support a new for-sale TOD. Developers will often calculate the "capture rate", which is the percentage of income-qualified households within a trade area that a new development would need to "capture" to sell all of the homes. The lower the capture rate, the more likely that the developer will find households earning enough income to afford the costs of new construction. The above analysis demonstrates that many station areas have substantial numbers of households that could afford a new for-sale TOD living within a 3-mile trade area, even if these households are not currently residing in the station areas themselves.

Several station areas show greater latent capacity for for-sale TOD than current development feasibility. Enfield, Windsor and West Hartford, in particular, have capacity within a 3-mile trade area to support for-sale TOD, although current local comparable sales in the station areas suggested that the local demand for for-sale TOD was insufficient to support new construction.

The *CTfastrak* corridor, as a whole, has a substantial number of income-qualifying households living in a 3-mile trade area around the corridor, which indicates a potential latent capacity for new for-sale housing construction. It is assumed, though, that many of these households overlap with the households captured in the Hartford, West Hartford and Newington trade areas.

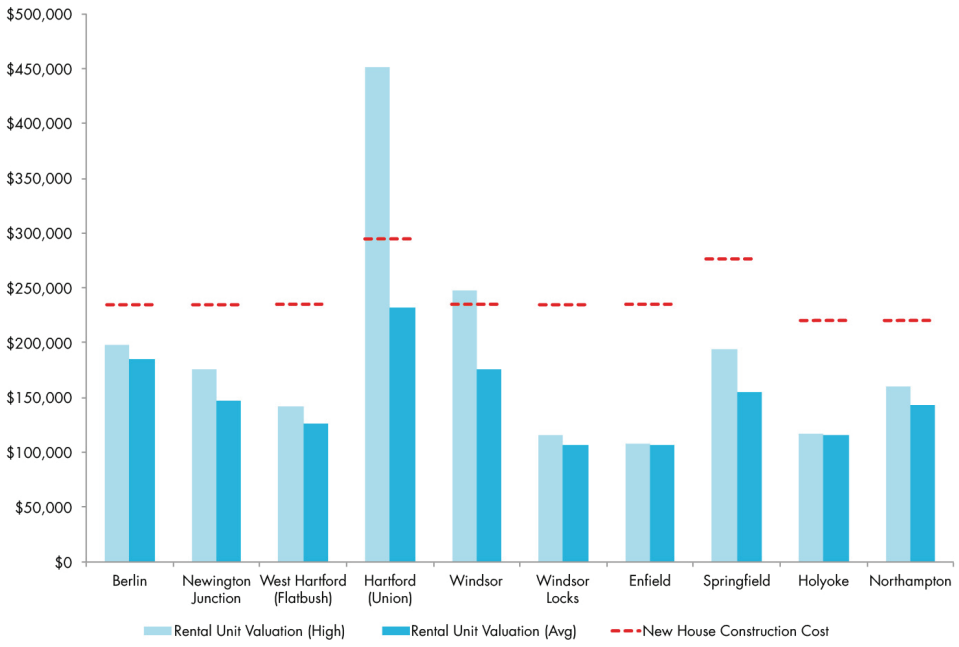
RENTAL FEASIBILITY ANALYSIS

The previous section described the multifamily rental market in the Hartford/Springfield region as turning a corner and likely to improve in the coming years. Although the existing supply of multifamily housing in the region is dated and rents are relatively low, newer multifamily developments were commanding higher rents in Hartford and Manchester, and indicators such as vacancy rates and rent levels were all pointed towards increased demand for multifamily rental housing. Additionally, regional demographic trends appear aligned with an increased demand for multifamily rental housing, particularly among Echo Boomer and Baby Boomer populations. However, rental housing is highly concentrated within the region in a few communities. In this context, the Rental Feasibility Analysis found that a few locations showed immediate multifamily rental feasibility, but a larger number of locations may become feasible over time as the demand for multifamily rental housing increases. Like the For-Sale Feasibility Analysis, the Consulting Team utilized both the Comparison Approach and the Income Approach to benchmark TOD feasibility.

Comparable Sales Approach

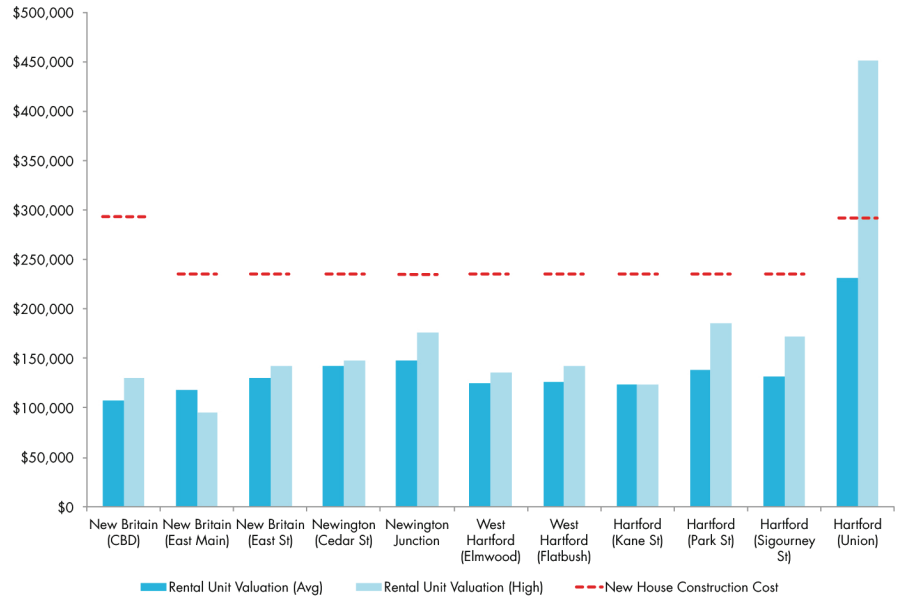
The Consulting Team investigated the Average of Comparable Rentals, and High Comparable Rental of each station area, and compared those against the estimated cost to construct a new unit of multifamily rental housing. For urban locations, the comparable sales are generally high-rise condominiums and a premium was added to the cost of construction to account for the higher cost of constructing such units in an urban area. In order to calculate the value of a rental unit against the cost of construction, the Consulting Team utilized standard real estate valuation assumptions (5 percent vacancy loss; operating expenses at 35 percent of rents; and 6 percent capitalization rate). The resulting graphs (Figures 32 and 33) demonstrate which station areas may have immediate multifamily rental TOD feasibility.

Figure 32: NHHS and Vermonter Rail Renter-Occupied Housing Feasibility



Source: MLS, Trulia.com, Craigslist.org, CT Homebuilders and Remodelers, Jonathan Rose Companies

Figure 33: CTfastrak Renter-Occupied Housing Feasibility



SOURCE: MLS, Trulia.com, Craigslist.org, CT Homebuilders and Remodelers, Jonathan Rose Companies

The analysis indicates that multifamily rental TOD is most feasible in Downtown Hartford. Downtown Hartford has emerged in the last decade as a regional center for rental housing and commands the highest market rents in the region, although it is well-noted that new Hartford rental developments require subsidy in order to become feasible. However, if rental demand continues to tighten and with the availability of $60 million from the Capital Region Redevelopment Authority for market-rate rental development in Hartford, multifamily rental construction appears likely in the coming years.

Some suburban locations are near feasible rental levels, but low supply of rental housing impedes the analysis. Windsor and Berlin both demonstrate rent levels that are near new construction-feasible levels, however neither location has a sizeable supply of existing rental properties for comparison. This is a typical challenge with the suburban station areas, where the Consulting Team was only able to locate a few comparable rentals within a 0.5 - 1 mile radius of the station, and most of the comparable rentals were either single-family houses or apartments in multifamily houses. It can be reasonably assumed in these locations that new construction would be a superior product to the existing supply, which signifies that in Windsor and Berlin the rent premium associated with a new multifamily rental development would likely be sufficient to cover the costs of construction.

The analysis indicates that the rents in many station areas are not sufficient to prove market feasibility of new multifamily rental construction. In a broad spectrum of locations, including areas of New Britain, Hartford, Enfield, and the Massachusetts municipalities, there was a larger sample of nearby rental apartments, but the rents were insufficient to cover the costs of new multifamily rental construction.

Income Feasibility Approach

The Consulting Team calculated the household income necessary to afford a new unit of rental housing and compared it against the household income necessary to afford the average rental in each station area. The Consulting Team assumed for this calculation that the rental amount would not exceed 30 percent of the household's gross income. The resulting gap between the income needed for new construction versus the income needed for existing housing represents the total amount incomes would need to increase in the station area for new multifamily rental TOD to become feasible.

Figure 34 shows the gap at each station area between the income needed to afford the average existing rental and a new rental TOD unit.

Figure 34: Renter-Occupied Income Gap

CT Fastrak Stations

Station Area	Existing Housing Household Income	New Housing Household Income	Gap
New Britain (CBD)	$34,600	$94,989	($60,389)
New Britain (East Main)	$38,200	$75,992	($37,792)
New Britain (East St)	$42,000	$75,992	($33,992)
Newington (Cedar St)	$46,000	$75,992	($29,992)
Newington Junction	$47,667	$75,992	($28,325)
West Hartford (Elmwood)	$40,500	$75,992	($35,492)
West Hartford (Flatbush)	$41,050	$75,992	($34,942)
Hartford (Kane St)	$39,900	$75,992	($36,092)
Hartford (Park St)	$44,667	$75,992	($31,325)
Hartford (Sigourney St)	$42,392	$75,992	($33,600)
Hartford (Union)	$74,992	$94,989	($19,997)

NHHS Rail Stations

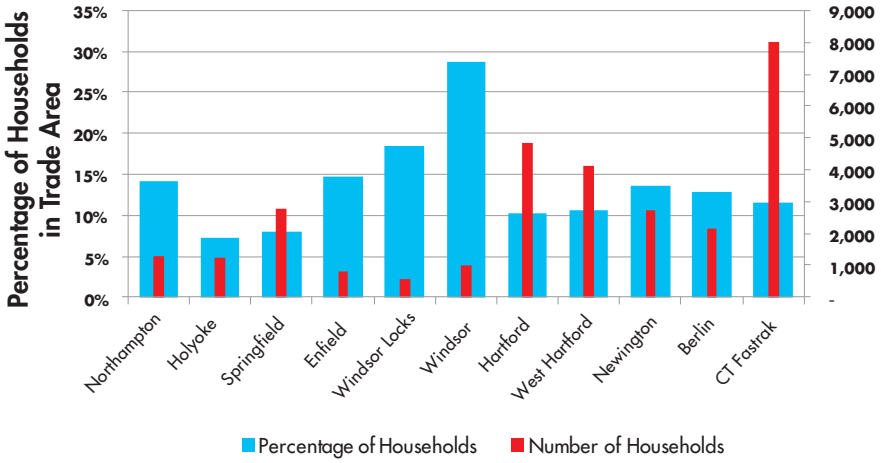
Station Area	Existing Housing Household Income	New Housing Household Income	Gap
Berlin	$60,000	$75,992	($15,992)
Newington	$47,667	$75,992	($28,325)
West Hartford (Flatbush)	$41,050	$75,992	($34,942)
Hartford (Union)	$74,992	$94,989	($19,997)
Windsor	$56,900	$75,992	($19,092)
Windsor Locks	$34,467	$75,992	($41,525)
Enfield	$34,500	$75,992	($41,492)
Springfield	$50,224	$88,889	($38,665)
Holyoke	$37,667	$71,111	($33,445)
Northampton	$46,200	$71,111	($24,911)

SOURCE: 2010 U.S. Census, CT Homebuilders and Remodelers, Jonathan Rose Companies

In general, the gap between incomes needed to afford existing rental housing and the incomes needed to afford new rental housing is substantial. The income gap ranged from a low of $15,992 in Berlin to as high as $60,389 in New Britain.

As in the For-Sale Feasibility Analysis section, the Consulting Team also calculated the number of households living within a 3-mile trade area that earn sufficient income to afford a new multifamily rental unit, shown in Figure 40. The following data present a more nuanced picture of the transit corridors, indicating pockets of latent capacity for new TOD that do not appear in the previous analysis.

Figure 35: Households Able to Afford New Construction, Rentals



SOURCE: 2010 U.S. Census

The analysis indicates that the more urban stations - Hartford, Springfield and West Hartford - have a greater number of income qualifying households in their trade areas, even though in some cases the percentage of all renting households is lower. This implies that these locations may succeed in attracting renters able to afford the higher cost of new multifamily housing.

The CTfastrak corridor, as a whole, contains a large number of income qualifying households within its trade area. TOD within this corridor could potentially appeal to a larger pool of applicants, although it is assumed that many of these households overlap with the households captured in the Hartford, West Hartford and Newington trade areas.

Some station areas show high concentrations of higher-income renting population, which may indicate demand. Windsor and Windsor Locks both had high percentages of higher-income households within the renting population in their trade areas (29 percent and 18 percent respectively), but a relatively small renting population limited the number of income qualifying households (989 and 551 respectively). However, these data indicate that higher-income renters may be congregating in these locations and construction of new multifamily housing would attract more higher-income renters.

The Real Estate Feasibility Analysis provides a snapshot of today's market conditions compared with the costs to construct new housing and offers some indications of the latent demand for new housing that may exist in the vicinity of the station areas. This analysis, however, provides only limited policy direction; it only identifies locations where TOD may occur in the short-term and quantifies the level by which sales prices and rents would need to rise in order for TOD to become feasible. As the real estate markets in the transit corridors evolve in response to the improvements to transit service, TOD feasibility will increase. Likewise, in the TOD Strategies section, policies and implementation steps are discussed that would make TOD more broadly feasible throughout the transit corridors.



Connecticut River, Enfield, CT

Regional Economic and Commercial Real Estate Analysis

Just as the housing market has mostly seen development away from city centers, office and commercial development has been lacking in most of the station areas of the Knowledge Corridor. The segment of the Knowledge Corridor that is the subject of this analysis is overseen by three regional planning orgnizations: the Capitol Region Council of Governments (CRCOG), the Central Connecticut Regional Planning Agency (CCRPA), and the Pioneer Valley Planning Commission (PVPC).

The Consulting Team analyzed historical employment growth, identifying industries of strength in the region and focusing on TOD-supportive industries. In addition, the Consulting Team also mapped the spatial patterns of TOD-supportive industries in the region to understand the extent to which the new transit corridors aligned with these important sectors. This employment data is supplemented with commercial market information gathered for the corridors to provide insight on the market potential for office development along both alignments.

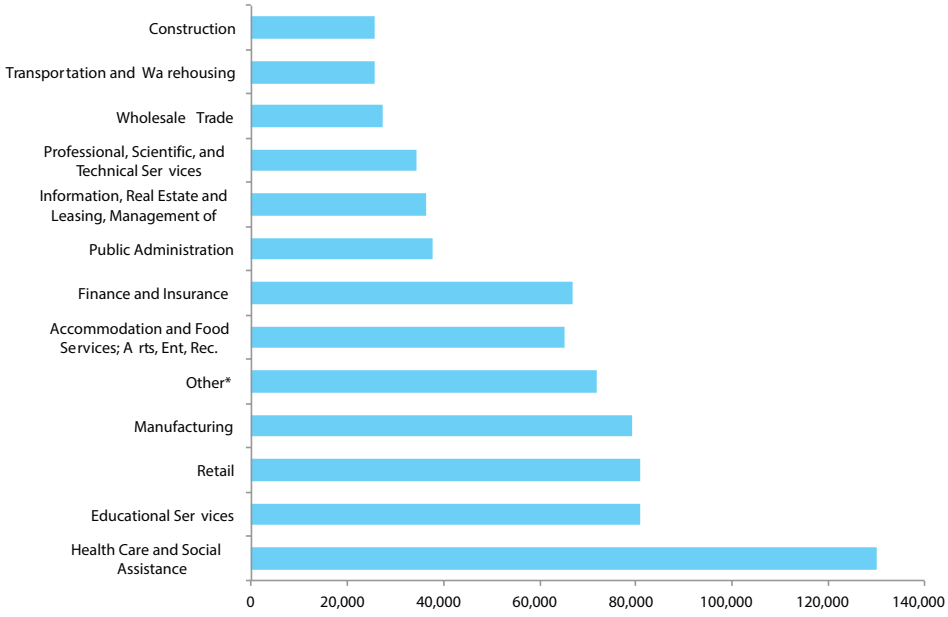
REGIONAL ECONOMIC OVERVIEW

The CRCOG/CCRPA/PVPC region's economy, which included 760,000 jobs in 2010, is diverse. The region's industry mix is diverse, with high shares of employment in sectors like health care, educational services, retail, manufacturing, and finance and insurance (Figure 36).

Employment trends in the region over the past decade reflect the nation's economic cycles. As shown in Figure 37, the region has experienced ups and downs in employment from 2001 to 2010, with dips during the economic recessions. The peaks and troughs of the cycles were less pronounced in the region compared to the United States, and employment remained in the range of 750,000 to 800,000 throughout the decade. Overall the region experienced a net job loss of about three percent from 2001 to 2010.

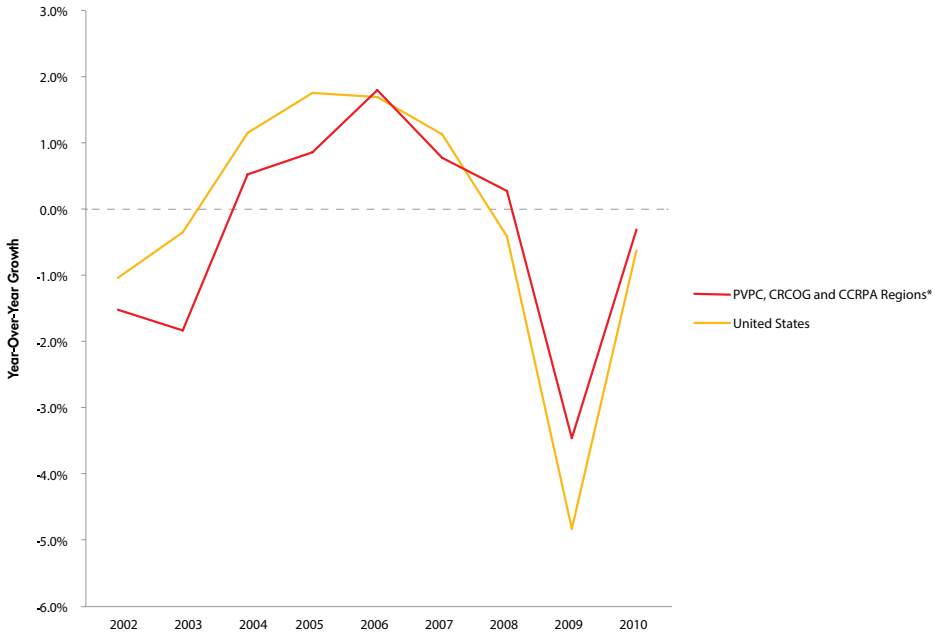
A significant amount of the region's employment losses were in Manufacturing and Other Industrial sectors. The greatest job declines from 2001 to 2010 were in manufacturing, which declined by 25 percent. Manufacturing's share of regional employment dropped from 13 percent to 10 percent. This sector fared better in the CRCOG/CCRPA/PVPC region than in the nation, where manufacturing employment dropped by about 30 percent. Other sectors with significant job declines in the region include Wholesale Trade, Construction, Utilities, Transportation and Warehousing, which declined by 17 percent combined.

Figure 36: Regional Employment by Industry, 2010



Note: Data for the CRCOG and CCRPA area is based on the boundary of the Connecticut North Central Workforce
Investment Area.
Source: Quarterly Census of Employment and Wages via: California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Mas-

Figure 37: Historical Year-Over-Year Employment Growth in the Region and U.S.



Note: Data for the CRCOG and CCRPA area is based on the boundary of the Connecticut North Central Workforce Investment Area.
Source: Quarterly Census of Employment and Wages via: California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Massachusetts Department of Labor and Workforce Development, 2012.

The Health Care and Social Assistance sector experienced significant growth from 2001 to 2010, similar to national trends. Employment in Health Care and Social Assistance jobs rose by 17 percent, making this industry the largest industry in the region. At the sub-industry level, employment growth in this industry was highest for Ambulatory Health Care Services, followed by Social Assistance, Nursing and Residential Care Facilities and Hospitals.

Though Finance and Insurance industry's employment numbers have dropped over the last decade, the sector retains a high share of total regional employment. Finance and Insurance is heavily dominated by insurance carriers, which have been present in the Hartford-Springfield region for two hundred years. In the 2001 to 2010 period, the number of Finance and Insurance jobs declined by about seven percent. These losses are not entirely a product of the global financial recession of 2008; the region experienced losses in the sector even in the early 2000s, as large insurance companies consolidated and transferred activities to other locations, in many cases resulting in worker layoffs.[29] Even as the industry has experienced declines in employment, it still plays an important role in the region, accounting for about nine percent of all jobs in 2010.

The number of jobs in Professional, Scientific, and Technical Services (PSTS) remained stable during the last decade. In spite of the magnitude of the 2008 recession, the PSTS sector was able to hold steady, and now accounts for a larger share of the region's total employment (about five percent in 2010).

ECONOMIC DRIVERS

There are a number of heavily concentrated industries that drive much of the region's economic activity. Many of these industries generate "multiplier effects" through the purchase of equipment and services from suppliers, and employee spending.[30] As shown in Appendix E, industries with the strongest concentrations, or largest location quotients[31] (LQ), in the region include: Finance and Insurance (LQ of 2.03), Health Care and Social Assistance (1.21), Other Services (1.23), Manufacturing (1.15), Educational Services (1.12), and Management of Companies and Enterprises (1.07).

Detailed analysis at the sub-industry level (three-digit NAICS codes) shown in Appendix E provides more detail on the types of businesses that are clustered in the region. The highest location-quotient sub-industries include

29 Levin, A.J. (2005). Will Consolidation of the U.S. Life Insurance Industry Continue? Federation of Regulatory Counsel, Inc. Journal, Vol. 16, ed. 2.

30 The "multiplier effect" refers to the broader economic effects generated by the recirculation of spent dollars within the regional economy. For example, a dollar paid to a manufacturer benefits not only the manufacturing company, but is also used to pay its suppliers and employees, who in turn spend on employees, other suppliers, and household goods, entertainment, etc. All industries generate multiplier effects regardless of concentration, though the more heavily concentrated industries have a relatively larger impact and are more likely to attract spending from outside the regional economy (rather than re-circulating dollars within the regional economy).

31 In this report, concentrations are measured by comparing regional industry employment concentration to national industry employment concentration, with the results expressed as a "location quotient." A location quotient above 1.0 indicates greater concentration relative to the United States. A location quotient of less than 1.0 indicates lower concentration compared to the overall U.S. economy.

Figure 38: Concentration and Growth of Industries in the Region

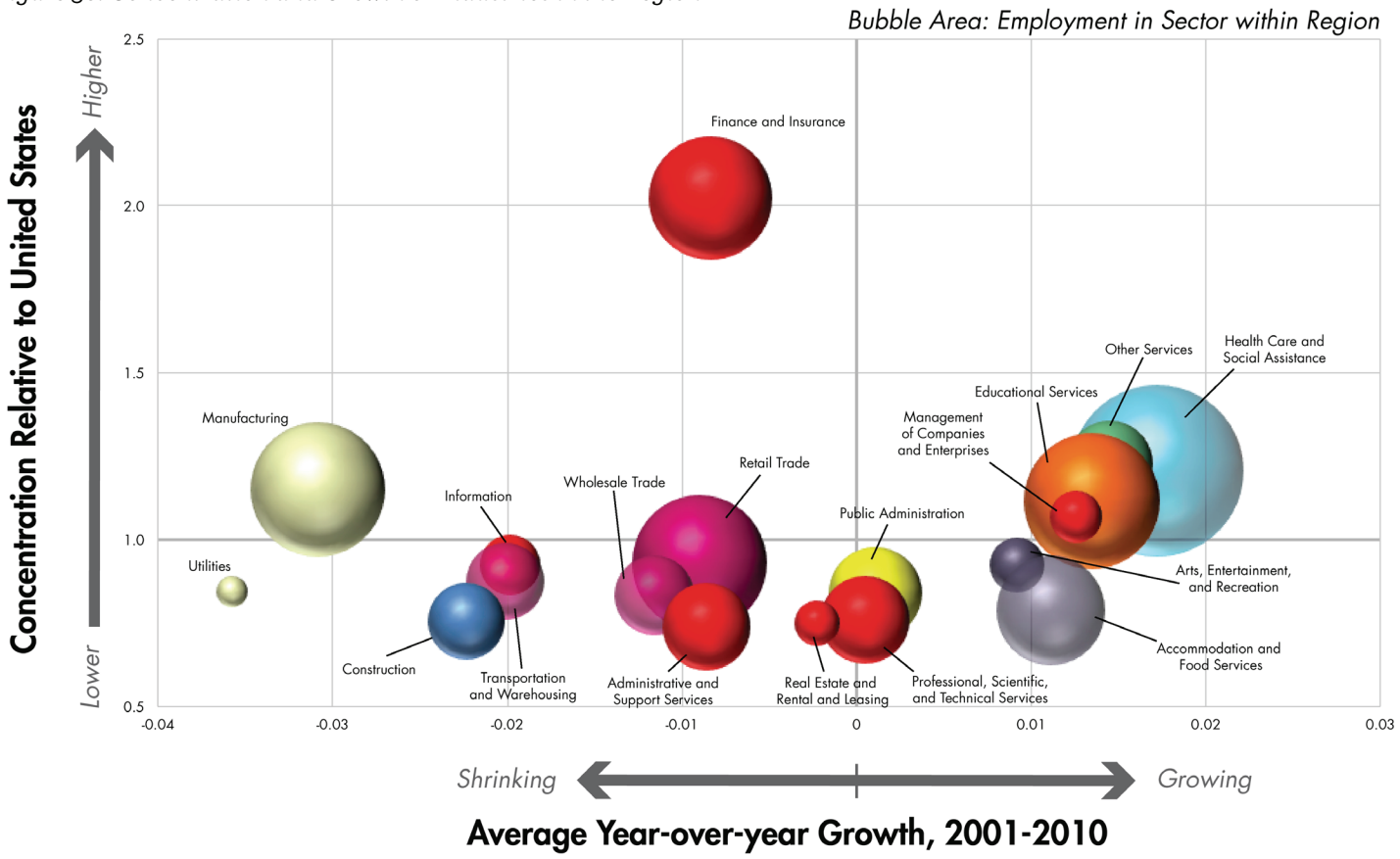
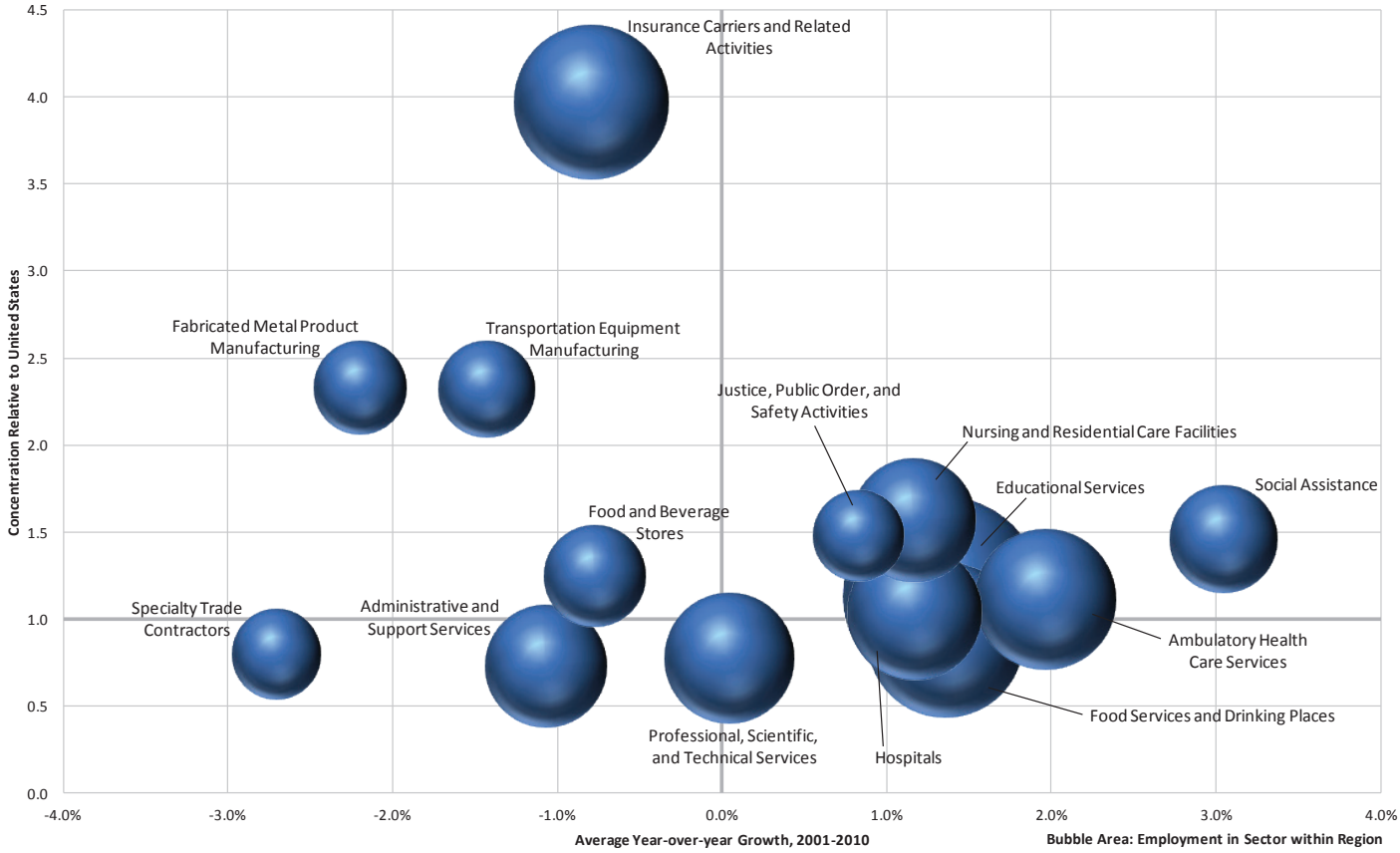


Figure 39: Concentration and Growth of Sub-Industries in the Region



Source for Figures 7 and 8: Quarterly Census of Employment and Wages via: California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Massachusetts Department of Labor and Workforce Development, 2012.

Insurance Carriers; Manufacturing of Equipment and Machinery; and Nursing and Residential Care Facilities.

Figures 38 and 39 illustrate the size, relative concentration, and historical growth trends of each industry or sub-industry in the region. The size of each "bubble" corresponds to the size of employment in the industry. The location quotient is mapped on the y-axis, while the historical growth rate from 2001 to 2010 is shown on the x-axis. Industries and sub-industries in the upper right quadrant are those that have a relatively high concentration and have shown growth in recent years, while industries/sub-industries in the lower left quadrant are industries that are not concentrated and have experienced job declines. The analysis of location quotients and growth trends lead to the following conclusions:

Insurance is the most concentrated industry in the region. As shown in Figure 38, the Finance and Insurance sector is twice as concentrated in the region compared to the United States; no other industry sector approaches this level of concentration in the region. The sub-sector "Insurance Carriers and Related Activities" has a location quotient of 4.0. The large amount of headquarters employment makes this one of the most significant industries in the region in terms of the depth and breadth of its impact on the economy. As discussed above, while this sector has not experienced growth in the last decade, it continues to be a large employer and generates higher than average wages.

Manufacturing remains an important industry in the region, even as the number of employees in this sector is in decline. According to business and economic development representatives, the region still contains a significant cluster of aerospace and precision metal manufacturers. This is supported by the employment data showing strong concentrations in Transportation Equipment Manufacturing, Fabricated Metal Product Manufacturing, and Machinery Manufacturing. Average wages in these subsectors are well above the overall regional average. This sector has an important ripple effect through the rest of the economy. It is estimated that in the State of Connecticut, the manufacturing sector generates a multiplier of 1.35 in other sectors.[32]

Educational institutions play a critical role in supporting the region's knowledge-based economy. There are many high-quality four-year colleges and universities, as well as two-year colleges and training schools present in the region, with a 1.1 location quotient (Figure 38, included in Educational Services). These institutions support the Knowledge industries in the region, and attract highly talented faculty and students from all over the country and the world, helping to foster a highly educated workforce.

Health Care and Social Assistance activities are concentrated and growing in the region. This sector has particularly high employment

32 Connecticut Business and Industry Association. (2012). Connecticut Manufacturing: Building on the Past, Creating our Future. (Report.) Hartford, CT.

concentration in Residential Care Facilities, Social Assistance, and Ambulatory Health Care Services (outpatient services and medical offices. see Figure 38). The region's strong health institutions help to support a growing bio-medical products industry in the region, which includes the manufacturing of devices and equipment,[33] as well as research and development activities in conjunction with the universities. Wages in the health care sectors are also above the average for the region.

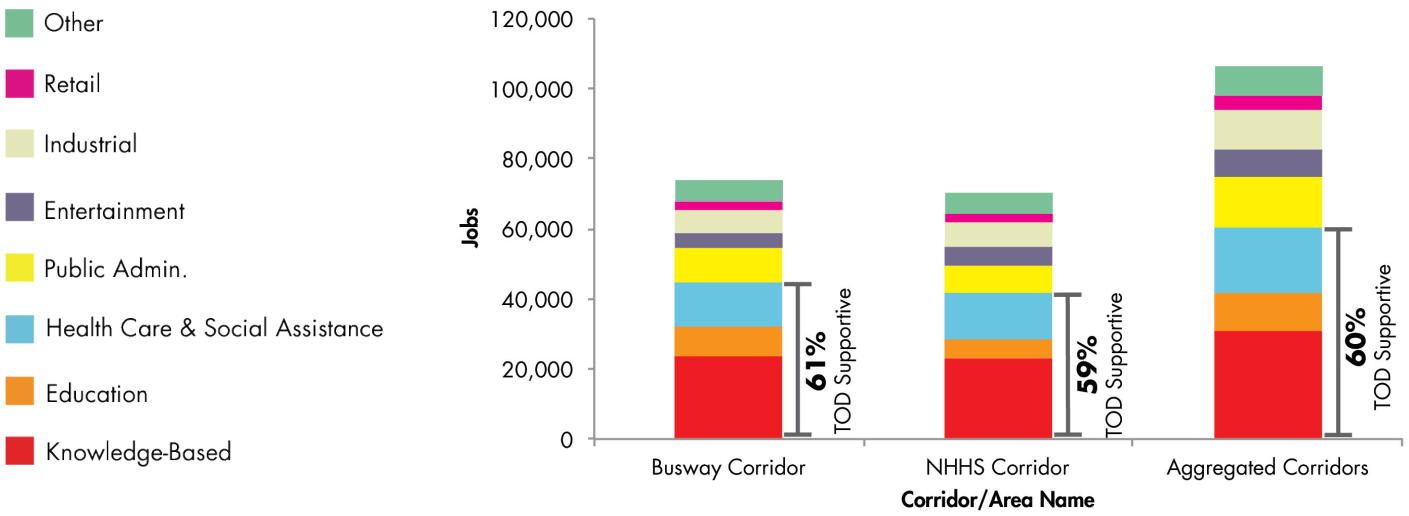
TOD -SUPPORTIVE INDUSTRIES

TOD-supportive industries currently account for almost 60 percent of total employment in the region's BRT and rail corridors. The BRT and rail corridors are defined as the area within a one-half mile radius of station areas. The employment analysis summarized above, and in Figure 40, indicates that the region has existing strengths in many of the TOD-supportive sectors, including Knowledge-based, Health Care Services, Educational Services, and Public Administration.

Approximately 19% of employment in TOD-supportive industries is already located in the transit corridors.

TOD-supportive industries, namely the Knowledge-based and Educational/ Health Services sectors, are expected to drive national employment growth over the coming decades nationally. The U.S. Bureau of Labor Statistics projects that Knowledge-based employment will increase16 percent between 2010 and 2020 and Educational and Medical Services employment will increase 33 percent, while total employment is expected to increase by 14 percent.[34] Given the region's existing strengths in these sectors, it is likely that they will continue to grow and generate demand for new space in the long term.

Figure 40: Employment on Corridors by Sector

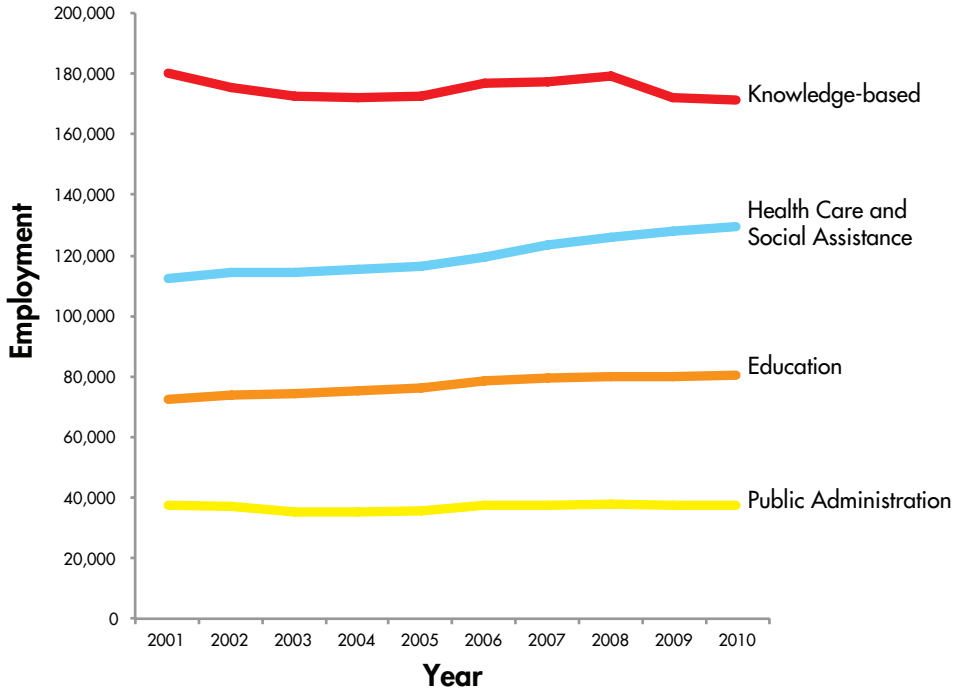


Source: LEHD, 2009; InfoUSA, 2011; PVPC, 2011; Strategic Economics, 2012.

33 Pioneer Valley Planning Commission. (2012). The Pioneer Valley Plan for Progress: The Region's Comprehensive Economic Development Strategy. (Report.) Springfield, MA.

34 Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics, 2012.

Figure 41: Employment in Region, by TOD-Supportive Industry Group



SOURCE: Quarterly Census of Employment and Wages via: California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Massachusetts Department of Labor and Workforce Development, 2012.

COMPARISON TO PEER REGIONS

In order to provide context for assessing the potential for transit-oriented development in the CRCOG/CCRPA/PVPC region, Figure 42 compares the existing conditions along the proposed transit corridors to three peer regions: Cleveland, Pittsburgh, and Charlotte. These regions were found to be similar to the CRCOG/CCRPA/PVPC region based on their size and economic characteristics. All of the peer regions are within a similar range in size, with 750,000 to 950,000 households and 800,000 to one million jobs.

Like the CRCOG/CCRPA/PVPC region, the Cleveland and Pittsburgh regions contain a strong concentration of medical and educational institutions, many of which are present in their transit corridors. The anchor institutions have been key partners, along with the local governments, transit agencies, business leaders, and nonprofits in the implementation of transit-oriented development. For example, Cleveland's new BRT line that opened in 2008 connected the region's major employment centers along Euclid Avenue. Two of the major employers on the corridor, Cleveland Clinic hospital and Cleveland State University, redesigned their campuses to better integrate with the transit street, and the Cleveland Clinic partnered with University Hospital to rebrand the corridor as the "HealthLine."

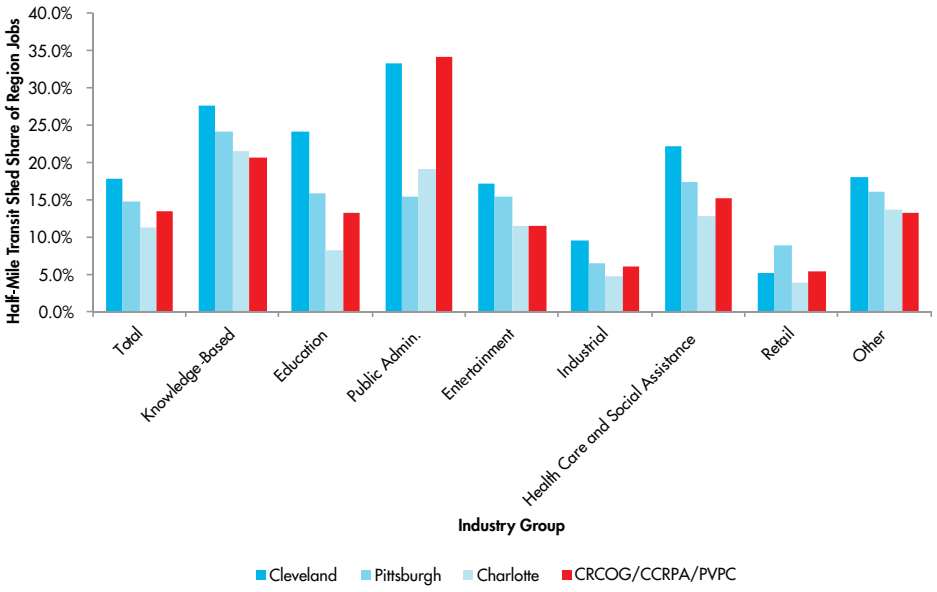
Charlotte, meanwhile, has a strong concentration of knowledge-based jobs like the CRCOG/CCRPA/PVPC region, specifically in the finance sector. The region's recently opened light rail corridor, the Blue Line, effectively connects the city's major employment hub containing the knowledge-based jobs, known as the Uptown. After opening in 2007, the light rail station areas in and adjacent to the Uptown district experienced a significant amount of new transit-oriented development projects.

Figure 42: Demographic Comparison of Peer Regions

	Cleveland, OH	Pittsburgh, PA	Charlotte, NC	CRCOG/CCRPA/ PVPC
Population	2,178,737	2,287,344	1,947,783	1,905,323
Households	894,256	972,914	744,957	741,624
Employment	965,633	1,058,237	833,989	761,093

The similarities between the CRCOG/CCRPA/PVPC and peer regions show that the Hartford-Springfield rail and BRT corridors have many of the characteristics that have led to success in implementation of TOD in other places. Specifically, the share of regional jobs near transit is similar to other peer regions, as shown in Figure 43. Cleveland, Pittsburgh, and Charlotte have similar "capture rates" of jobs near transit, ranging from 11 percent in Charlotte to 18 percent in Cleveland. For all of the regions, the share of knowledge-based jobs near transit is similar, ranging from 21 percent in the CRCOG/CCRPA/PVPC region to almost 28 percent in Cleveland. However, the percentage of public administration jobs is the highest in the CRCOG/CCRPA/PVPC region, largely due to the fact that the corridors encompass a state capital. The share of jobs in the educational services and health care services in the CRCOG/CCRPA/PVPC region is average compared to peer regions. Another promising indicator is the similarity in types of jobs that are located near transit. The Knowledge Corridor has a strong concentration of knowledge-based and health care jobs much like the peer regions. The industry mix in the Knowledge Corridor is very similar to Cleveland.

Figure 43: Share of Employment Near Transit Compared to Peer Regions

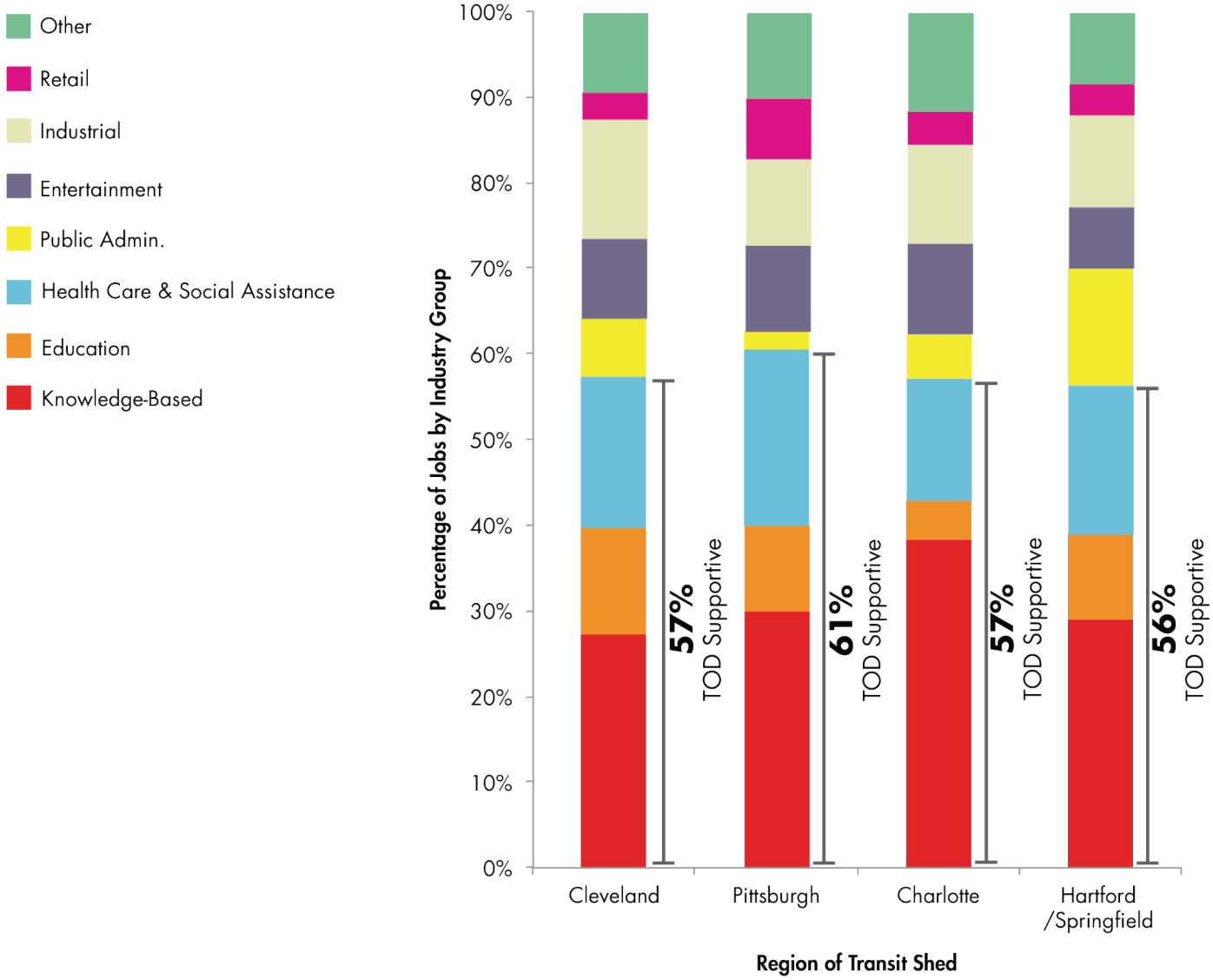


Source: LEHD, 2009; InfoUSA, 2011; PVPC, 2011; Strategic Economics, 2012.

Cleveland Health Line BRT



Figure 44: Mix of Jobs Near Transit



Source: LEHD, 2009; InfoUSA, 2011; PVPC, 2011; Strategic Economics, 2012.

SPATIAL PATTERNS IN EMPLOYMENT

The transit investments will connect the region's densest regional employment centers in Hartford and Springfield by rail, and other major employers and institutions in the region will be connected to Hartford by the BRT. As shown in Figure 40, the transit corridors are estimated to contain about 107,000 jobs, corresponding to 13 percent of the region's total employment. The spatial distribution of jobs in the region, and for various sectors, is shown in Appendix C.

More important for TOD potential, many of the region's transit-supportive jobs are located near transit. As shown in Appendix E, approximately 19 percent of employment in TOD-supportive industries are already located in the transit corridors. The corridor is particularly strong in attracting public administration and knowledge-based jobs, capturing 34 percent and 21 percent of jobs in those sectors, respectively.

The region is anticipated to have continued, modest growth over the next three decades. According to long-term projections by CRCOG, CCRPA and PVPC, the region is forecast to add approximately 89,000 jobs[35] by 2040, at an average annual growth rate of 0.40 percent.

COMMERCIAL REAL ESTATE MARKET CONDITIONS

The Consulting Team looked at two major commercial sectors in the region: (1) Office, which is the major employer and business tax revenue base in the region; and (2) Governmental and Anchor Institutions, which are the major governmental offices, as well as public and private institutions, such as universities and colleges. The Consulting Team chose these sectors based on research into TOD, which indicates that access to high-density employment is a main driver for new development along transit corridors,[36] and these sectors are traditionally associated with high-density employment.

Office Sector

The location of knowledge sector employment is highly correlated with the location of commercial offices in the region, because knowledge sector industries locate in office buildings. Appendix C shows a significant concentration of knowledge sector employment in Hartford and Springfield, but also a large amount of employment in suburban areas west and north of Hartford, in and around Northampton, and in further outlying towns such as Bristol and Southington. Employment patterns also follow the major highways, with concentrations of office employment along the I-91, I-84 and Rte. 2 corridors in Connecticut, and along the I-91 and I-90 corridor in Massachusetts.

Recent trends in the Hartford / Springfield office market indicate high vacancy rates, stationary rental rates, and little new construction. According to data from Cushman Wakefield[37]:

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35 For purposes of the employment projections, the approximate CRCOG,CCRPA and PVPC region is defined as the non-jurisdictional boundaries of Hartford, Tolland, Hampden, and Hampshire Counties.

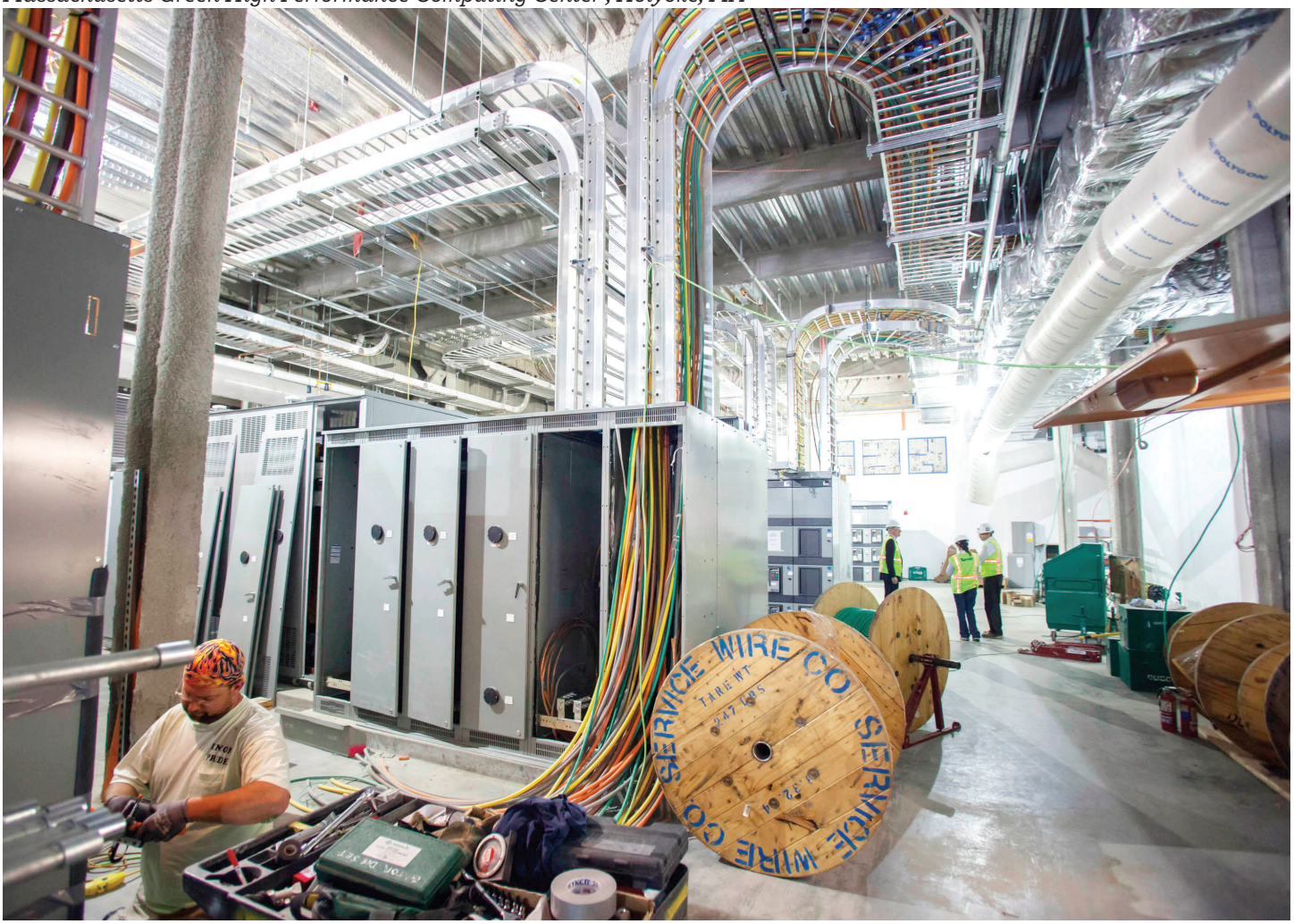
36 Center for Transit-Oriented Development. (2011). Rails to Real Estate: Development Patterns Along Three New Transit Lines. (Report.) Oakland, CA.

37 Cushman & Wakefield. (2012). Market Beat Office Snapshot, Hartford, CT., 1Q

AETNA, Hartford, CT



Massachusetts Green High Performance Computing Center , Holyoke, MA



- Office vacancy rates in the region have remained stationary at around 20% for over a year and direct vacancy rates have risen from around 16% in 2007 to close to 18.4% in Q1 2012. Direct vacancy is the amount of office space that is unleased, whereas total vacancy factors in leased vacant space.

- Office asking rents have been nearly stationary at approximately $19-20 per square foot in hte Hartford region and at $14-18 per squrae foot in the Springfield region.[38]

- Only 31 percent of the Hartford region's total office square footage is located in the Hartford CBD and 38 percent of the Springfield region's total office square footage is located in the Springfield CBD.

- There is only 13,000 Square Feet (less than 0.01% of total) of new space under construction in the Hartford region the first quarter of 2012 and 36,500 (less than 0.01% of total) completed in 2011.

The downtown Hartford office market, in particular, suffers from significant market challenges, but may be poised for a comeback in coming years:

- The recent sale of CityPlace I, a Class A property 98% occupied by credit-worthy tenants for $112 per square foot indicates the infeasibility of new office construction, which costs upwards of $300 per square foot, according to stakeholder interviews. However, this transaction also indicates an increase in commercial transactions and other downtown properties are expected to transact in the near future, which indicates a growing investor appeal.[39]

- Values of the largest downtown Hartford office towers declined by at least 15% over the past five years.

- Downtown Hartford office vacancy is currently 27% and absorption of space has been negative for over one year.

- Major employers in the downtown market continue to shed employees, led by The Hartford, which has cut 2,200 jobs in Connecticut, or about 17 percent of its home-state workforce, from the Third Quarter of 2008 to October, 2011.

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38 Macmillan, Douglas. (2012.) Greater Springfield's Office and Industrial Marketplace Reflects on a Year of Increased Activity. (Article.) New England Real Estate Journal.

39 Bordonaro, Greg. (2012.) Office Market Rebound. (Article.) Hartford Business Journal. Com. http://www.hartfordbusiness.com/apps/pbcs.dll/article?AID=/20121001/PRINTEDITION/309289962 (Accessed October 10, 2012)

However, there are actions underway to reduce downtown Hartford's inventory of vacant office space. There is interest from the State of Connecticut in consolidating state agency offices out of the older structures along Bushnell Park and into newer, vacant buildings in downtown Hartford.[40] The second part of this plan would be to then redevelop the structures along Bushnell Park as market-rate housing, which would reduce downtown Hartford's inventory of vacant office space. Additionally, the University of Connecticut recently announced it would relocate its West Hartford campus to downtown Hartford in an effort to fill vacant office space.[41] The long-term result of these efforts to reduce office vacancy will be to match demand and supply, which will lead to healthier market conditions and substantial market improvement in coming years.

Much of the office space in the region is located in areas not accessible to the new transit service. Automobile-oriented regions such as the Farmington Valley, Manchester and Glastonbury, and interior sections of Windsor and Bloomfield contain significant concentrations of office space and employment. In addition to the regional sprawl of office space, the trend over the past 30 years has been construction of new office space in suburban areas of the region and away from the transit corridors. According to a report from Connecticut Economic Research Center (CERC) describing employment gain/loss by town from 1980 to 2004, the greatest change in Hartford County occurred in the following towns:

- Farmington gained 12,723 jobs (78 percent increase)
- Manchester gained 9,275 jobs (48 percent increase)
- Glastonbury gained 8,406 jobs (125 percent increase)
- Hartford lost 28,536 jobs (20 percent decrease)
- East Hartford lost 16,855 jobs (36 percent decrease)
- Windsor Locks lost 1,958 jobs (12 percent decrease)[42]

Many NHHS Rail and *CTfastrak* station areas have lost employment since 1980. The data indicate that many of the towns where stations will be located lost employment, including Hartford, New Britain, West Hartford, and Windsor Locks, while the greatest growth in employment occurred in towns not connected to transit. In the near term, these trends discourage the feasibility of new commercial space in the station areas, because the long-term trend of firms moving away from the locations where transit service will run has resulted in a depressed demand for office space in the transit corridors.

Both NHHS Rail and *CTfastrak* corridors connect to significant employment nodes in the major urban centers. Analysis of employment at the NHHS rail and *CTfastrak* stations indicates that the *CTfastrak* system connects to more employment centers, particularly in Hartford and New Britain, and indicates little employment at any of the NHHS rail stations outside of Hartford and Springfield.

40 Ibid.

41 Megan, Kathleen and Gosselin, Kenneth R. (2012.) UConn to Move its West Hartford Operation to Downtown Hartford. (Article). The Hartford Courant.

42 Connecticut Economic Research Council, Inc. (2006.) Employment Growth in Connecticut's Towns Since 1980. (Report). Connecticut Economic Research Council, Inc.

UConn Health Center, Farmington, CT



Central Connecticut State University, New Britain, CT



GOVERNMENT AND ANCHOR INSTITUTIONS SECTOR

The Government and Anchor Institutions Sector consists of employers with a different set of objectives than traditional Office Sector employers, that is for- and non-profit businesses. The Government and Anchor Institution sectors tend to be more committed to a particular location than Office Sector employers, because of their deep ties to particular communities and large capital investment in campuses. These institutions are more likely than Office Sector employers to respond to policy and social objectives, such as TOD, which make them critically important to the future development of the transit corridors.

- The **Government Sector** consists of state government offices, which are generally concentrated around the state capital with smaller state offices located in other urban centers.

- The **Anchor Institutions Sector** includes education and health institutions, such as colleges, community colleges, universities, and hospitals. This sector also includes major regional corporations, such as Aetna, MassMutual, and the Hartford.These institutions often have a long history and significant real estate investment in one location, with a social mission of serving the local community.

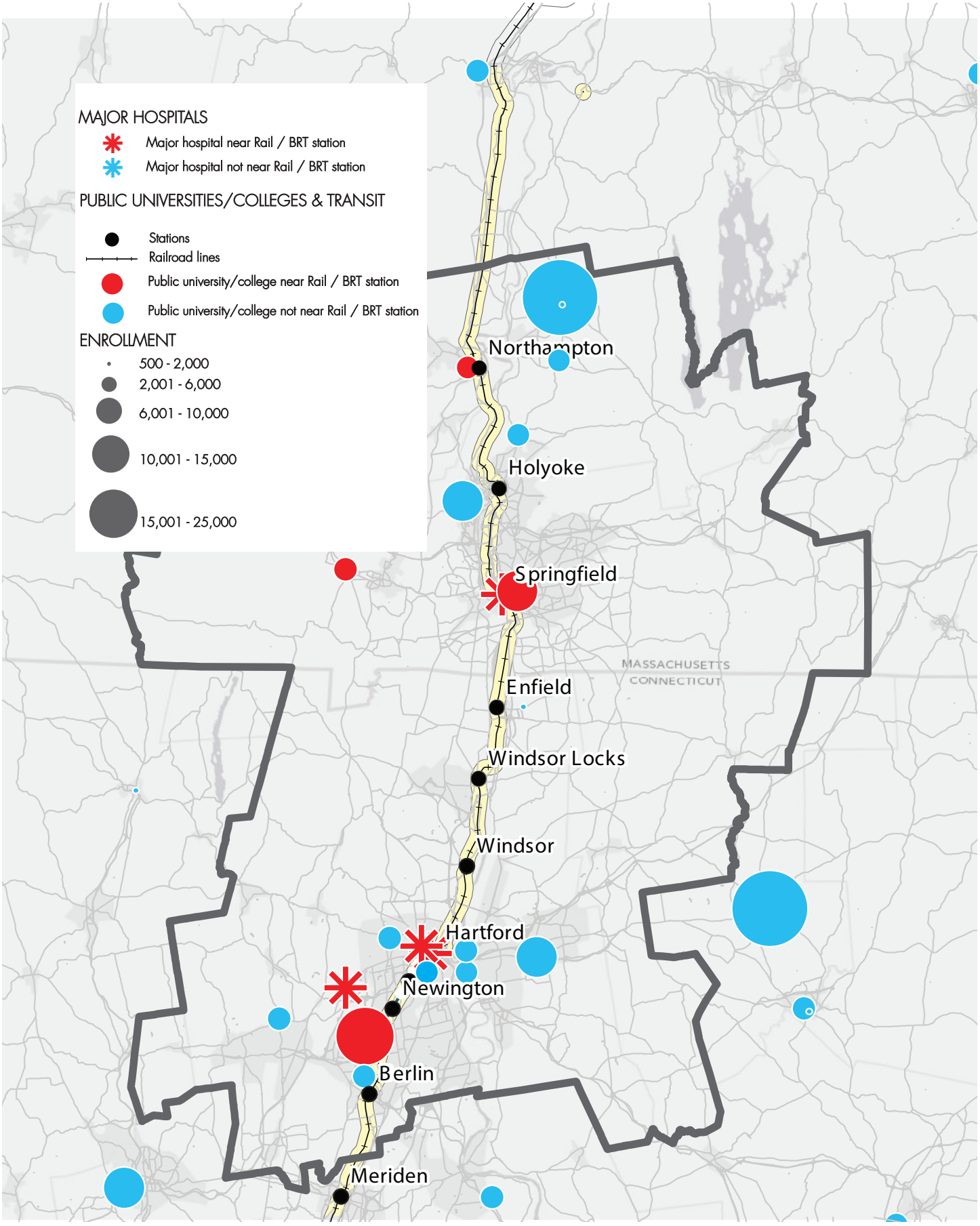
The Government Sector is concentrated in downtown Hartford, but a substantial amount of State of Connecticut leased office space is found in non-transit-oriented locations. The Government Sector is particularly concentrated in Harford, which is the center of Connecticut state government, and in adjacent municipalities. As of 2005, the Government Sector constituted 25 percent of the City of Hartford's employment, making it the City's largest employer[43].

Although the Government Sector contributes greatly to the amount of employment at the Station areas, as described in earlier sections of this report, there are significant concentrations of Government employment that are not transit-oriented. As shown in Figure 45, most Connecticut leased state government offices are not located within a half-mile of a future station stop and many are instead located adjacent to I-91 or I-84. These government offices account for several hundred thousand square feet of regional office space and thousands of jobs.

Health-related anchor institutions are heavily concentrated in Hartford and Springfield, constitute primary employers in both cities, and are expanding. Within the transit corridors, Hartford and Springfield both contain large hospital complexes: Hartford Hospital and St. Francis Hospital in Hartford and Baystate Medical Center and Mercy Hospital in Springfield, which are significant employers. There are smaller hospitals in New Britain and Northampton. Hartford Hospital employs over 7,000 and has a medical staff of over 1,000 active staff physicians, St. Francis Hospital in Hartford employs over 4,000. Baystate Health System employs 10,000 and Mercy

43 Connecticut Economic Resource Center. (2012.) 2012 Hartford Town Profile. (Report). Connecticut Economic Resource Center.

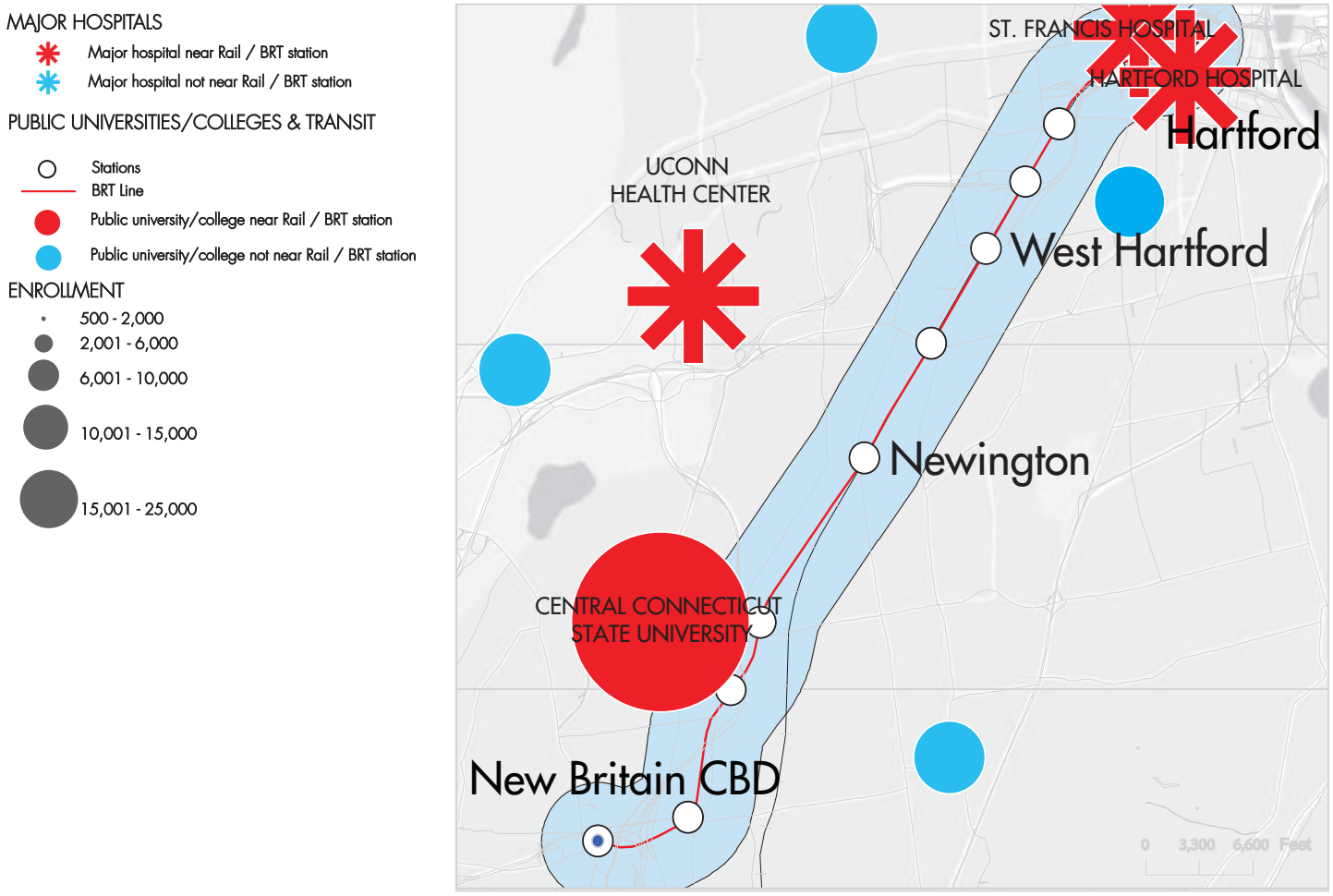
Figure 45: Major Regional Anchor Institutions



Hospital employs 3,000 in Springfield.[44] Appendix C indicates these major concentrations of health sector employment in Hartford and Springfield, but also indicates smaller concentrations of health sector employment near the New Britain, Enfield, Holyoke, and Northampton station areas.

The UConn Health Center is an important, growing node of health sector employment and bioscience, which will be linked to the *CTfastrak* corridor. The UConn Health Center in Farmington, which will be connected to the ***CTfastrak*** via a local loop at the Elmwood Station in West Hartford, is quickly becoming a regional health and bioscience node. The UConn Health Center complex will soon expand to include the new home of Jackson

Figure 46: Major CTfastrak Anchor Institutions



Laboratories, an independent, non-profit genetics research firm employing 1,400 and 200 Ph.D. scientists that is constructing a new 189,000 square foot laboratory and office facility on a 17-acre parcel at the UConn Health Center. Groundbreaking occurred in January, 2013 with full completion of the new facility in 2014.[45]

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44 (http://www.harthosp.org/AboutUs/HartfordHospitalToday/HartfordHospitalStatistics/default.aspx, Accessed 10/2/2012); ("Free Hospital Look-Up: Saint Francis Hospital and Medical Center." www.ahadataviewer.com. Accessed 12/3/2012); (http://www.westernmassedc.com/boston_area_industrial_clusters/healthcare/, Accessed 10/2/2012); (http://baystatehealth.org/Baystate/Main+Nav/About+Us, Accessed 10/2/2012)

45 The Jackson Laboratory. (2012). The Jackson Laboratory for Genomic Medicine: revealing the complex causes of disease and growing Connecticut's bioscience economy." (Website). http://www.jax.org/news/archives/2012/ct-progress-report.html. Accessed 10/2/2012.

As described earlier, Health and Social Services is a rapidly growing sector, particularly around hospitals. It is expected that this sector will expand in the future as the regional population ages and as the country's bioscience needs increase. The expansion of this sector in and around station areas could become a major driver of transit-oriented development.

While the largest education-related anchor insitutions are outside of the transit corridors, there are also a significant number of smaller educational institutions located near the transit corridors. The two largest universities in the region - the University of Connecticut in Storrs, CT and University of Massachusetts in Amherst, MA - are located outside of the transit corridors (Figure 46). However, the NHHS and Vermonter rail service and *CT**fastrak*** will stop within walking distance of several colleges and universities, including:

Trinity College (Hartford)
Central Connecticut State University (New Britain)
Smith College (Northampton)
Springfield College (Springfield)

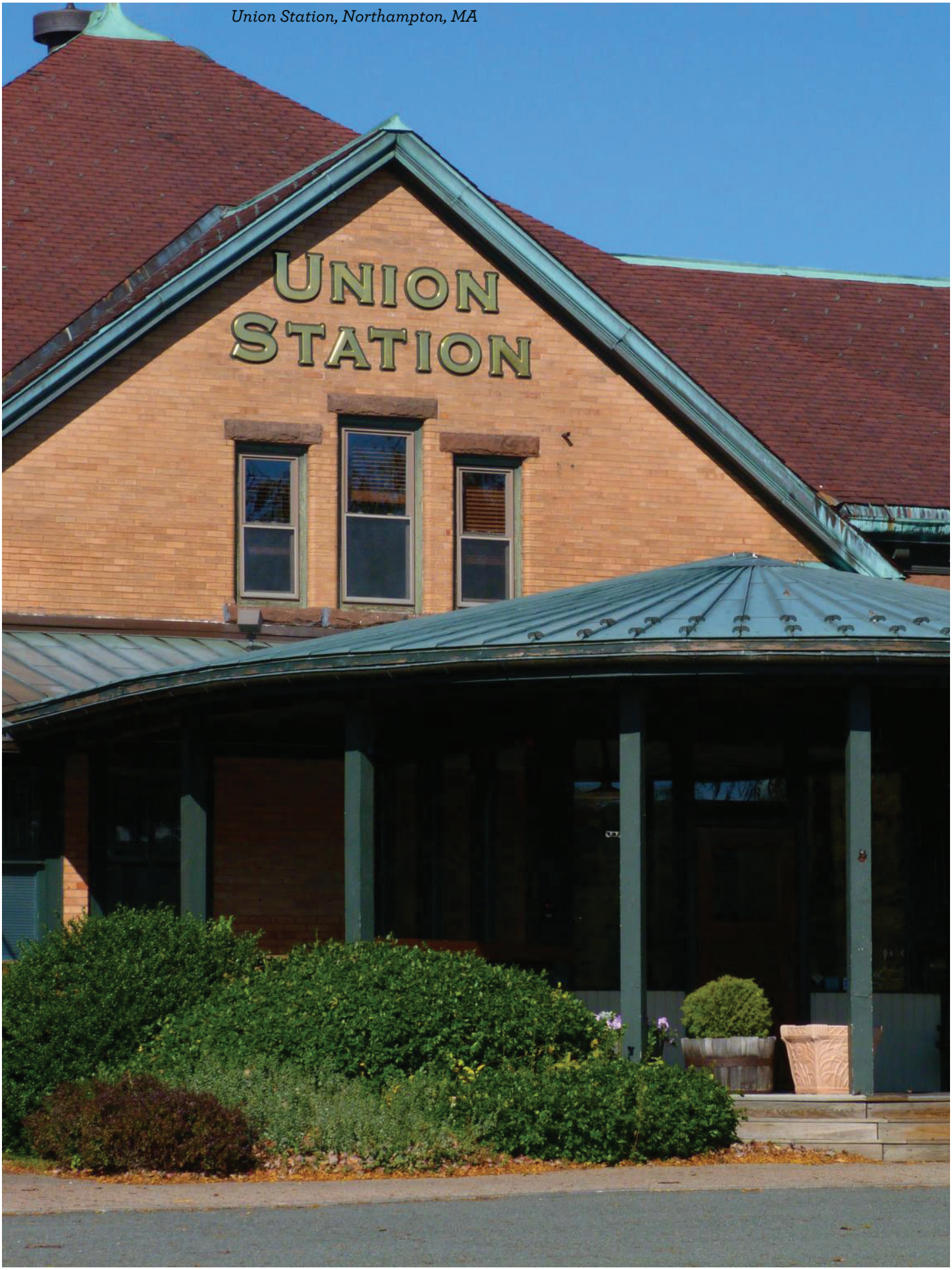
The NHHS rail and *CT**fastrak*** will also stop within a few miles of several colleges and universities, including:

The University of Hartford (West Hartford)
St. Joseph's College (West Hartford / Hartford)
The University of Connecticut School of Law (Hartford)
Goodwin College (East Hartford)
Asnuntuck Community College (Enfield)
Western New England College (Springfield)
Springfield Community Technical College (Springfield)

The colleges and universities within walking distance of the new transit stops stand out as the most easily connected to the new transit services, though greater connections could also be formed with colleges and universities located within a few miles of the station areas.

CONCLUSION

This concludes the market analysis section of the report, which has described the region's existing economic, demographic and real estate conditions. In the next section, a set of policy and strategy recommendations are presented, which will build upon the market analysis findings to lead to implementation of TOD in the station areas. These recommendations are rooted in the region's economic, demographic and real estate strengths.



Union Station, Northampton, MA

2. TOD Opportunities and Strategies for the Knowledge Corridor

Regional TOD Opportunities and Strategies

Station Area Implementation

Regional TOD Opportunities and Strategies Summary

REGIONAL OPPORTUNITIES AND STRATEGIES - GOVERNMENT

Direct state economic development resources to station area locations. Form linkages between the provision of state financial assistance to private companies, in the form of tax credits or low-interest loans, to expansion within or relocation to a station area.

Reinforce state government presence in new and existing buildings on the transit corridors. Form linkages between state government office leasing procedures and station area locations. Investigate partnerships with private developers to construct new office space within the station areas to be occupied by government offices.

Prioritize station areas for other forms of state financial assistance. While both states have already embedded transit adjacency into some of their grant and loan programs, the priority for TOD locations could be expanded or added. Below is a limited listing of the key program areas that would most benefit the station areas:

- Affordable housing financing
- Market-rate housing financing (single-family and multifamily)
- Brownfields funds
- Historic rehabilitation funds and tax credits
- Land acquisition and redevelopment financing
- Regional magnet school construction

Provide technical assistance to municipalities along the transit corridors to create TOD master plans for each station. Work with local municipalities to establish a TOD master plan for each station area to determine the appropriate zoning and investment needed. To facilitate this, local planning staff will need outside assistance, either in the form of state or MPO staff expertise or funding for planning firms to conduct station area master plans. Some of this work has already begun supported by a variety of funding sources, such as the HUD Sustainable Communities Regional Planning Grant and the State of Connecticut TOD Pilot Program.

Direct MPO discretionary funds to station areas. MPOs should support infrastructure investments at station areas with their discretionary funds.

REGIONAL OPPORTUNITIES AND STRATEGIES - ANCHOR INSTITUTIONS

Encourage and explore opportunities to relocate or expand components of the state university systems to station areas. Review state university system master plans and investigate opportunities to relocate university departments or campuses to station areas. Work with institutions currently located within station areas to design existing or future facilities to create a TOD-supportive environment, such as by implementing pedestrian-friendly design elements. Consider prioritizing station areas for future expansion of the state university systems, including:

- Central Connecticut State University
- University of Connecticut Health Center
- University of Connecticut
- University of Massachusetts

Engage regional anchor institutions in a dialogue about how their future expansion can be transit oriented. Reach out to regional anchor institutions to review their expansion plans and investigate opportunities for expansion within the station areas. Listed below are key institutions to engage due to their regional economic importance and proximity to station areas:

- Hartford Hospital
- St. Francis Hospital
- Mercy Hospital
- Baystate Health Systems
- Trinity College
- Smith College
- Major regional corporations, such as Aetna, MassMutual and The Hartford.

Consider anchor institutions in the final system design for local bus connections to the CT*fastrak*, NHHS Rail and Vermonter transit systems. There are also anchor institutions that are within a short, but not walkable distance of the transit corridors. These institutions should be connected through seamless local shuttle or bus connections with operational schedules timed to coincide with arrivals and departures on the main transit lines. They include:

- University of Hartford
- St. Joseph's College
- Asnuntuck Community College
- Goodwin College

Convene a partnership between the region's research hospitals and its universities. Establish a dialogue between the region's research institutions, particularly in the biosciences industry. Work with regional economic organizations, such as the Hartford Springfield Economic Partnership and the Metro Hartford Alliance to facilitate these connections.

Investigate opportunities for research or business incubator space within the station areas closest to the region's research institutions to reinforce the transit connections between institutions. Station areas should be considered as priority locations for state- or institution-supported research or business incubator space. An example of incubator space, the Massachusetts Green High Performing Computing Center, already exists in the Holyoke station area. This will lead to opportunities for station areas to develop as research hubs along the transit corridors and further connect the region's research industries.

Regional TOD Opportunities and Strategies

This section provides recommendations about opportunities, strategies and tools for implementing TOD along the planned transit corridors in the Knowledge Corridor region. The strategies have been organized by the scale of implementation, which range from policies at the regional level to the individual station areas.

REGIONAL AND CORRIDOR IMPLEMENTATION

At the regional level, state and regional governing entities can take steps to implement strategies that will improve the demand for TOD at the station areas. These steps are not specific to any station area, but rather represent an approach to directing more investment into station areas. Based on the market analysis findings, this investment is most likely to come from state government or from the region's anchor institutions. Below, we summarize the opportunities to enhance existing programs, create new programs, and forge connections that will support demand for TOD in the Knowledge Corridor.

STATE AND REGIONAL GOVERNMENT INVESTMENT

The state governments of Connecticut and Massachusetts, along with CRCOG, CCRPA and PVPC, play an important role in building regional demand for TOD by directing their resources to the station areas. These resources are diverse and span many agencies, departments and funding programs. They encompass everything from decisions of where to place state administrative facilities, such as offices and schools, to where to invest transportation, housing and economic development funds. By prioritizing the station areas when making decisions related to these resources, the effects of the investment in the transit by the states will be magnified. Since the near-term prospect for private residential and commercial development is limited in many station areas, states can take the lead and begin to change the character of the station areas —making future, complementary development more likely.

Coordinating the many different state and regional funding sources and decisions that could potentially be utilized to support TOD in the station areas may be challenging.

Step One: Catalog and inventory the various state and regional investment opportunities that exist in the region.

The first step to implementing this strategy is to catalog and inventory the various state and regional investment opportunities that exist in the region. The regional strategies matrix (Figure 47) shows some of the key "levers" that exist, describes existing initiatives within the region that are already targeting the station areas, and offers suggestions for further utilization of these levers as TOD generators. Included in Appendix E are detailed descriptions of the key levers. In developing a catalog of state and regional levers, it is important to think broadly about what resources could be targeted toward the station areas. State and regional levers can be much more than just financial assistance to housing developments. There are many

Figure 47: Regional Strategies Matrix

Strategy	Tools	Lead Actors	Description	Examples from other regions	Existing CT Program	Existing MA Program	Opportunities for Enhancement
Regional TOD Planning	Develop regional land use scenarios that establish a vision for TOD at the regional and corridor scales.	Regional Planning Organizations (RPOs)	Development of regional land use scenarios that designate corridors and station areas as key places to accommodate future housing and job growth in the CRCOG and PVPC region.	Arlington County, VA	CRCOG regional transportation and land use planning	PVPC regional transportation and land use planning	Allocate a greater percentage of future regional growth to the transit corridors, working closely with local jurisdictions.
	Technical assistance	RPOs Community Partners	Provide technical assistance to municipalities on TOD planning and implementation.	Delaware Valley Regional Planning Commission	State of Connecticut technical assistance to City of Meriden; technical assistance workshops; CRCOG Model Sustainable Land Use Code initiative.		Create a framework for providing state or regional technical assistance to individual municipalities to assist with station area planning. Establish a state TOD Coordinator to coordinate delivery of technical assistance.
	Zoning Incentives for affordable housing near transit	State governments; Municipalities	Encourage affordable housing in TOD and infill locations with inclusionary zoning policies or affordable housing statutes.	State of California Affordable Housing Density Bonus Program	Incentive Housing Zones; C.G.S. 8-30g	M.G.L. Chapter 40R; M.G.L Chapter 43D Expedited Permitting	C.G.S. 8-30g permits developers to override local municipal zoning restrictions in municipalities with less than 10% of their total housing stock being affordable housing and are controversial. Consider revisions to the statute that would target station areas.
TOD Project Financing	Direct funding and financing for real estate development in transit areas	State governments	Provide direct financing to TOD projects, infrastructure, environemntal clean-up, and other site costs.	Portland TOD Program	DECD CHAMP; Capital Region Development Authority		Existing funding programs for affordable and mixed income housing prioritize TOD locations. Other regions have successfully created funding sources set aside solely for supporting TOD, such as Portland, OR.
	Provide funding and financing for affordable housing in Station Areas to ensure equitable development patterns and maximize benefits of transit to lower income communities.	State housing agencies; community development financial institutions; philanthropy	Allocate or prioritize funding sources for affordable housing TOD, including gap financing for projects. Both SHFAs already award projects in locations near transit, but these criteria could be tightened and/or a "Basis Boost" added to help infill projects pencil out given higher acquisition costs.	City of Denver TOD Fund	DECD CHAMP; CHFA programs	Housing Development Incentive Program; M.G.L. Chapter 40R	Provide greater weight in Qualified Allocation Plan / Selection Criteria to proposals in a TOD area. Provide 30% basis boost in LIHTC financing for projects in a TOD area. Prioritize CDBG and HOME investments to TOD areas.
	Tax-Increment Financing	State governments	Review existing tax-increment financing statutes and study mechanisms to improve utilization. Make tax-increment financing available to all municipalities with station areas.	Dallas Region Transit-Oriented Development Tax-Increment Financing District	Stamford South End redevelopment district	Commercial Area Transit Node Housing Program; DHCD programs	While both states enable tax-increment financing, it is rarely used. Additionally use of tax-increment financing is not currently enabled in many station areas, due to lack of redevelopment designation. Study existing state statutes compared to other states and identify mechanisms to increase utilization.
	Arts and innovation center funding	State governments; Municipalites; Public and Private Foundations	Allocate or prioritize funding sources for arts and innovation centers as part of TOD at station areas. These types of investments can act as a catalyst for future company formation or expansion at the station areas.		Billings Forge development in Hartford; Connecticut Innovation Centers	Massachusetts High Performing Computing Center in Holyoke, MA	Prioritize TOD location in allocating criteria for arts and innovation funds.

Strategy	Tools	Lead Actors	Description	Examples from other regions	Existing CT Program	Existing MA Program	Opportunities for Enhancement
Economic Development and Job Creation	Prioritize station areas for allocation of business incentive programs	State governments	Award assistance to firms that locate or expand in new station areas	Illinois Business Location Efficiency Incentive Act	CT Innovations Economic Development Assistance Economic and Manufacturing Assistance	Economic Development Incentive Programs	Existing state business incentives do not prioritize TOD locations. Enact a priority for funding to companies that expand in or relocate to station areas.
	Set up regional bioscience business incubators connected to the region's university and hospital research institutions	State governments; Anchor Institutions	Establish better connections between the region's research universities and research hospitals, including creation of bioscience business incubators to improve the flow of research to company formation.	University City Science Center, Philadelphia, PA			Establish bioscience business incubators located within station areas adjacent to key research institutions.
	Reinforce state government presence on transit lines	State governments	Prioritize transit locations for leasing or buying state agency office space in order to create a stronger presence and support revitalization and new development in station areas.		State of Connecticut is consolidating state agency offices in vacant buildings in Downtown Hartford		Review opportunities to relocate or expand state offices within station areas. Incorporate TOD locations as a formal criteria for state office leasing / construction decisions.
	Encourage state universities to locate or expand in station areas.	RPOs, State University Systems	Conduct outreach to state universities; encourage relocation or expansion to TOD locations; engage actively with campus planning processes at TOD locations.	Cleveland Health Line	UConn Hartford is relocating to downtown Hartford	UMass has established a Pioneer Valley Life Sciences Institute in Springfield	RPOs can coordinate with state government to prioritize TOD locations for expansion / relocation of elements of the state university systems.
	Encourage private universities and colleges to expand in station areas.	RPOs; Municipalities	Conduct outreach to private universities and colleges; encourage relocation or expansion in TOD locations; engage directly with campus planning processes at TOD locations.				RPOs can lead an outreach process to the region's private colleges and universities to understand their future expansion plans and encourage them to expand in station areas.
	Encourage hospitals to expand in station areas	RPOs; Municipalities					RPOs can lead an outreach process to the region's hospitals to encourage them to incorporate TOD locations into their future expansion plans.
Transportation and Infrastructure Improvements	Target infrastructure upgrades to TOD areas to make the station areas more competitive for new development	RPOs; Utility Companies	Establish competitive funding to finance placemaking improvements like bike infrastructure, streetscapes, and public space improvement. Include such improvements in regular MPO transportation improvement programs using STP and CMAQ funding. Work with utilities companies to plan for needed upgrades in station area locations.	Atlanta Regional Commission Livable Centers Initiative; San Francisco Bay Area Sustainable Communities Strategy	CT is apportioned approximately $128 million in STP funding annually and $44 million in CMAQ funding.	MassWorks TOD and Infrastructure and Housing Support Program. Massachusetts is apportioned approximately $150 million annually in STP funding and $63 million in CMAQ.	Commit STP and CMAQ allocations to infrastructure improvements at the regional level, prioritizing station areas. Note that there are some limitations on CMAQ funding such as number of years for which it is eligible for some purposes.
	Incorporate regional anchor institutions into final service plans for local bus shuttles and connector routes.	RPOs; ConnDOT; MassDOT	Review opportunities to connect other regional anchor institutions, such as UConn or University of Hartford, with the CTfastrak or NHHS rail corridors via coordinated shuttle bus or BRT service.		CTfastrak service plan already includes connecting services to CCSU and the UConn Health Center.	PVTA already runs frequent bus connections between Amherst and Northampton, MA	Review feasibility of rapid connections to other regional anchor institutions, such as UConn, the Five Colleges, etc.

forms of financial assistance, state policies and regulations, and real estate facility decisions that could potentially be harnessed to support TOD. For example, the states have spent millions of dollars building new community colleges or renovating existing ones in recent years. The State of Connecticut took an important step towards supporting TOD by relocating one of them, Gateway Community College, to a transit-oriented location in downtown New Haven. Doing so brings thousands of new pedestrians and potential transit users, which in turn builds demand for TOD in that location.

Step Two: Develop a coordinated strategy to target multiple levers on the station areas and create a State TOD Coordinator.

The second step is to develop a coordinated strategy to targeting multiple levers on the station areas, combining them in tandem to create a bigger impact. In the matrix, some levers are state policies and some are financing programs. For the most part, most of the levers are existing programs that state and regional governing bodies are already implementing. However, all levers share one common feature: They are controlled by a branch of state or regional government. The challenge is to coordinate multiple levels of government to comprehensively direct these resources to the station areas. To facilitate that goal, one of the key recommendations is creation of a TOD Coordinator within state government, which would be focused on working with different government agencies and departments to assemble these levers. However, CRCOG, CCRPA and PVPC are also well-positioned to take action by advocating for focusing state government levers on the station areas.

ANCHOR INSTITUTION INVESTMENT

Anchor institutions represent one of the primary competitive advantages for the Knowledge Corridor, a region rich with anchor institutions, including large regional hospitals, nationally-acclaimed colleges and universities, and other large sources of employment that provide stability and define the region. While most of these regional anchor institutions are not directly adjacent to the station areas, they represent a real opportunity as some of the most likely sources of job growth and commercial expansion in station areas.

Similar to many parts of the country, the opportunities for institution-led development in the Knowledge Corridor are primarily driven by the "Eds and Meds," such as universities and colleges, hospitals, and research institutions. This is due to the central role educational and medical services play in our modern society. National factors such as the ever greater importance of higher education in securing stable employment and the aging and longevity of the population are contributing to significant job growth in these industries, which takes the form of campus expansion and partnerships by educational and medical institutions. As Dr. Eugenie L. Birch, co-director of the Penn Institute for Urban Research and one of the panelists at a Reinventing Older Communities session on anchor institutions put it: "Universities are the factories of the 21st Century."[46] Much like factories once provided the base of a local economy, export income and a multitude of job opportunities, hospitals and universities today are critical to urban economies, providing employment and purchasing capital while drawing income from outside areas into the local economy.

46 Chakrabarti, Prabal. (2012). Anchors Aweigh: Why Do Anchor Institutions Matter? Cascade:, No. 81, Fall 2012.

In the Knowledge Corridor, there are multiple opportunities for regional anchor institutions to support TOD in the station areas. This is, in part, because anchor institutions have more to offer cities than just occupying space. According to Carolyn Adams of Temple University: "Universities and medical facilities provide an institutional infrastructure that promotes innovation by training symbolic analysts and producing new knowledge. Their function of educating students increases the quality of human capital in the region, thereby increasing productivity and attracting firms, while their research activities help firms gain competitive advantages."[47] Around the country, anchor institutions have benefitted their local economies in the following ways[48]:

- **Direct development of real estate**, e.g. construction of new classroom space or outpatient facility. Direct expansion creates construction jobs as well as permanent educational, medical, and property maintenance jobs.

- **Indirect development of real estate**, e.g. partnerships with local developers to build student housing. Many anchor institutions are looking to the private market for their student housing needs, which can add to the local tax base and create a local student population to support retail development.

- **Support and creation of new businesses**. Anchor intuitions, particularly those with robust research facilities, often lead to spin-off company formation when professors and/or graduates find a market application to their research. Many high-growth regions, such as Silicon Valley, the Boston Metropolitan Area, and the Research Triangle region of North Carolina, had their genesis in the powerful universities and research hospitals located there, which led the research and innovation that later resulted in high levels of new company formation and job creation that has occurred in those areas.

- **Support the local economy through workforce development**. Universities, in particular, play the critical role in today's economy of educating the workforce. Among their greatest output are highly-educated and trained graduates sought after by employers, which attracts firms to the region. The key, however, to this benefit is making the local area an attractive place for graduates to remain after graduation by providing jobs, affordable places to live, and an urban environment attractive to a young, single population.

47 Adams, Carolyn. The Meds and Eds in Urban Economic Development. Journal of Urban Affairs, Volume 25, Number 5, pages 571-588.

48 Webber, Henry S., Karlstrom, Mikael, and Richman, Harold. (2009). Why Community Investment is Good for Nonprofit Anchor Institutions: Understanding Costs, Benefits, and the Range of Strategic Options. (Report.) Chicago, IL: Chapin Hall at the University of Chicago.

- **Support the local economy through purchasing power**. Anchor institutions purchase enormous amounts of goods and services as do their clientele (ie. students, employees, etc.). This purchasing power can support many local businesses and jobs. Many examples exist of universities, including Yale University, that have pledged to purchase a specified percentage of their goods and services from local purveyors.

- **Revitalize neighborhoods**. Anchor institutions can impact their surrounding neighborhoods by partnering with the local municipality to improve local schools, setting up security watches, offering incentives to their faculty to live in the surrounding neighborhood, and underwriting community assets like grocery stores. An example of this strategy is the West Philadelphia Initiatives sponsored by the University of Pennsylvania, which include a university-supported public charter school serving the surrounding neighborhood, targeted employee housing incentives, security guards and cleaning services deployed throughout the neighborhood, and technical assistance for local small businesses provided by the Wharton School of Business.

Direct engagement and cooperation with the institutions is necessary to determine how government bodies and institutions can work together to implement some or all of the above strategies. The Consulting Team recommends that government bodies meet with the local anchor institutions to better understand their long-term plans. As these anchor institutions become better connected to transit, they will become potential sources of jobs for populations that are currently unable to access them, especially within the Hartford region. This will allow the transit and station areas to be leveraged as a part of workforce development strategies, and will also build demand for new housing development at other station areas in the transit network. While some opportunities may present themselves more immediately, these should be largely considered long-term strategies.

These two key strategies - leveraging government investment and engaging anchor institutions - are regional strategies utilized primarily to increase demand for TOD at the station areas. They require action by state or regional government bodies to adopt policies to direct state investment to the station areas and to engage the region's anchor institutions. Whether through state financial subsidies or construction of a new university facility, these investments will result in the creation of markets at the station areas that do not currently exist. This, in turn, will encourage secondary private-market investment in the station areas.

The next section describes the strategies and recommendations applicable to the station areas themselves. As opposed to the regional strategies described above to increase demand for TOD, the station area strategies are primarily utilized to streamline the creation of a new supply of TOD at the station areas.

Station Area TOD Opportunities and Strategies

TOD implementation at the station area scale can consist of a wide variety of activities, including enacting TOD-supportive land use policies, making strategic infrastructure investments, or subsidizing new development projects. Often, a combination of these strategies and tools are needed to facilitate TOD in any given station area. While each station area in the Knowledge Corridor region is unique, many of them can be grouped based on their similarities as they relate to implementation. The Consulting Team employed a typology framework, organizing station areas into "place types" based on their existing development and market conditions, which influence the potential for TOD. This framework then allows for the development of strategies and tools that are appropriate for each "place type".

TYPOLOGY FRAMEWORK

The typology framework examines the current physical, economic, and demographic characteristics of each station area (defined as a half-mile radius of the planned rail or BRT station), and then groups them into categories based on their similarities. For each station area in the region, the Consulting Team evaluated **Market Characteristics** and **Land Use Context,** which together describe the "readiness" of each station area for TOD. The metrics underlying the market and land use factors are explained in more detail below.

MARKET CHARACTERISTICS

The strength of the real estate market in a particular station area is a critical element to consider when designing a TOD implementation strategy. station areas with weaker market conditions may require intervention from the public sector to attract private investment, while those exhibiting strong market dynamics may need to significantly modify land use policies in order to enable TOD to occur. Moderate market areas may only require strategic infrastructure investments and regulatory incentives in order to unlock the potential for TOD.

To quantify the market characteristics of each station area, the Consulting Team utilized the residential market data including comparable residential sales and rentals within one mile of the station. The sales price and rent averages at each station area were indexed on a relative scale ranging from 0 to 100, with the score of 100 given to the station area with the highest sale or rent value within the corridor. Thus the typology ranks each station areas in comparison with the other station areas within the Knowledge Corridor region. This approach is not predictive of the financial feasibility of new development in any given category, but rather it provides a relative sense of how any individual area performs relative to the region. Based on this analysis, stations were sorted into three categories of market strength:

- **Stronger**: These station areas have stronger market conditions where there is potential for new development to occur without significant investments from the public sector.

- **Emerging**: These station areas have moderate market conditions where new development is not currently feasible, but may become viable in the short to medium term with careful planning and strategic public investments.

- **Limited**: These station areas currently have weak market conditions and rents and/or sales prices do not support new TOD in the short to medium term. In these locations, careful phasing of improvements can help to build value over time, making private development possible in the long term.

LAND USE CONTEXT

In addition to market characteristics, the land use context at each station area is a fundamental factor to consider in TOD implementation. Typically, station areas with more people, a mix of uses, and pedestrian-friendly streets have higher levels of transit ridership, rely less on auto travel, and are more attractive to development. As density and the mix of uses decline, reliance on auto travel increases, and higher density TOD becomes more challenging to implement. The Consulting Team examined three components of land use context: density, land use mix, and walkability.

- **Density**: Higher density supports TOD by providing more opportunities for retail, employment and other amenities within a walkable district that will attract new residents and employers to the station area. Conversely, station areas with low employment and residential densities offer fewer amenities to future TOD residents and employees. To measure density, the Consulting Team calculated the sum of population and employment per acre in the half-mile radius around each station and scored each station area on a scale from 0 to 100.

- **Land Use Mix**: Mixed-use places offer the opportunity for residents and workers to bike or walk instead of drive to buy groceries, eat out, or meet with friends because the goods or services they seek are in close proximity. Typically, mixed use districts can achieve higher levels of transit ridership and pedestrian/bike activity, in part because locations with higher density support more local retail and service destinations, though the types of retail and services tend to be different depending on the land use mix. Single-use places, on the other hand, can inhibit walking and biking because of the lack of diversity of activities. For example, a business district that lacks retail and residential uses is often vacated on evenings and weekends, which makes it less appealing for future TOD projects. To calculate land use mix, the Consulting Team calculated the average mixture of uses across both corridors by determining the percentage of the half-mile radius land

area around each station devoted to residential, commercial or industrial uses and created a 0 to 100 scale of the deviation of each station area from the average mixture of uses across the corridor. The Consulting Team utilized this methodology after noting that the corridor average mixture of uses is balanced (54 percent residential/31 percent commercial/15 percent industrial) and deducing that any station area that is widely divergent from the average has an excessive concentration of one use.

- **Walkability**: The existence of a pedestrian-friendly street pattern can be an important factor in attracting residents and employees that are interested in a walkable, urban lifestyle with less dependence on auto travel. The Consulting Team calculated the Walk Score of each station area using "Street Smart" Walk Score. Each station was ranked on a scale from 0 to 100 based on the Walk Score.

The Knowledge Corridor is home to a wide range of land use contexts:


Hartford, CT

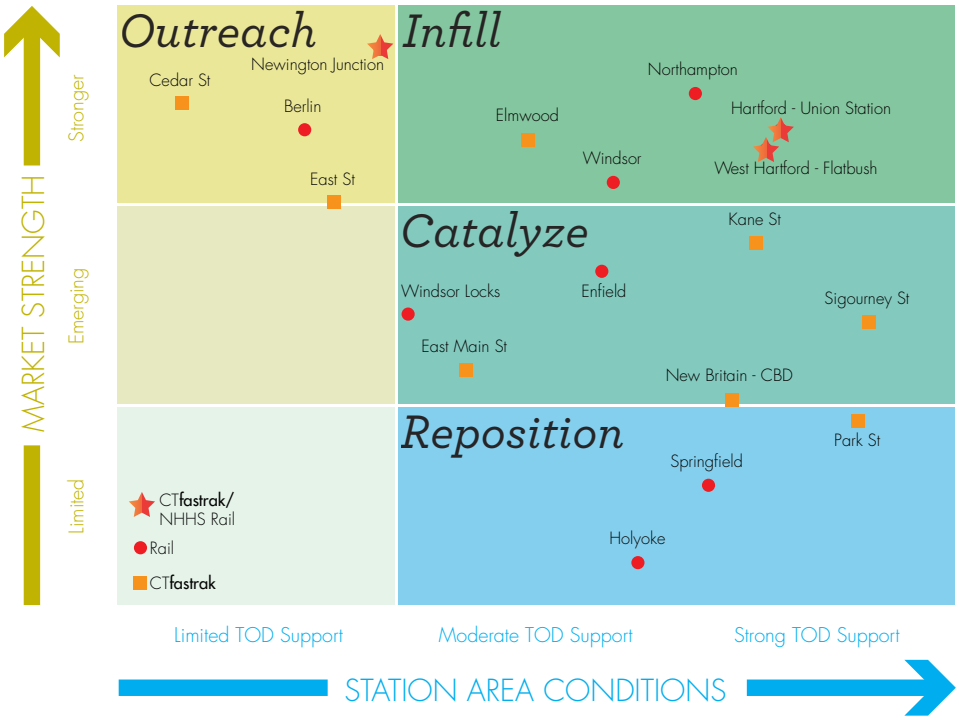

Holyoke, MA


Berlin, CT

The existing land use contexts in the Knowledge Corridor's station areas varies considerably ranging from high-density, compact built forms in downtown Hartford and Springfield to large masses of former industrial buildings in Holyoke to low-density, single-family houses on half-acre lots in Berlin and Newington.

The juxtaposition of the Market Characteristics and Land Use Context provides the framework to evaluate the existing conditions for TOD for all the station areas in the Knowledge Corridor region. Figure 48 illustrates how each station area scores in terms of the two axes, with Market Characteristics shown on the Y axis and Land Use Context on the X axis.

Figure 48: Station Area Typologies



Generally speaking, there are few stations in the region that have strong market and land use characteristics to support TOD, indicating that the opportunities for private development will be confined to a smaller geography in the short term. Most of the region's station areas will require significant investments from a combination of private sector, public sector, and institutional partners to realize TOD in the medium to long term.

KNOWLEDGE CORRIDOR STATION AREA TYPOLOGIES

By identifying station areas that naturally cluster together on these two axes, the Consulting Team generated implementation place types, grouping the station areas with similar needs and opportunities. These place types are: Infill, Outreach, Catalyze, and Reposition.



- **Infill**: These station areas have the strongest likelihood of near-term TOD, due to their stronger market conditions and supportive urban form. These station areas are generally built-up and are not likely to offer large tracts of land for redevelopment; rather, new TOD will largely consist of infill development building on the historical development patterns and filling out underutilized sites. The infill stations include Northampton, and station areas in and around Hartford, underscoring the fact that the near term TOD opportunities will likely be in places that have an existing base of residents and employees on which to build. Since private developers are more likely to lead TOD at these station areas, the policy focus is on appropriate zoning policies and enhancing infrastructure within the station area to better support new TOD.



- **Outreach**: These station areas also have a relatively strong market demand for new development, but the station area urban form is less supportive of TOD. In these station areas, the prevailing existing development is suburban and automobile-oriented, which will inhibit pedestrian and bicycle connections to the stations from surrounding TODs. In many cases zoning regulations do not permit mixed-use or higher-density TOD, which may dissuade developers from pursuing TOD in these station areas, despite the stronger market conditions. TOD in outreach stations is likely be lower in intensity, including products like attached townhouses, small-lot single-family houses, and potentially small scale apartment projects if regulations allow. The implementation approach for these station areas is to conduct planning and visioning activities to gain public support for TOD, and modify land use regulations to allow for a broader range of development consistent with TOD.



- **Catalyze**: These station areas occupy a middle ground, where market conditions are not strong enough to support TOD in the near term, but the urban environment is conducive to TOD. In these types of places, the implementation of TOD-supportive zoning regulations alone is not likely to be enough

to spur private-sector development due to soft demand. The participation of public and/or anchor institutions can help to unlock the private market in these locations. Some examples of implementation strategies include working with hospitals, universities, or government agencies to either expand or create a new presence in the area, thereby generating more activity, or providing economic incentives to encourage larger businesses to locate in the station area.



- **Reposition**: These station areas have a common legacy of historical buildings in an urban context, ranging from industrial mills in Holyoke and Park Street to downtown centers in Springfield and New Britain, which have experienced decades of slow decline. While the existing development patterns are somewhat supportive of TOD, these locations will generally require significant repositioning to attract new development and regain vibrancy. A combination of policies and strategies will be needed to promote TOD, including introducing new "demand drivers", offering significant incentives to developers, and making strategic infrastructure and "place-making" investments to attract private capital.

The following pages contain case study examples of development within each of the station area typologies. In each of these locations, the market characteristics and land use contexts were similar to station areas in the Knowledge Corridor before government action was taken to develop TOD. The case studies demonstrate the positive outcomes that can result from government action to support TOD, and offer valuable lessons for successful development within each Knowledge Corridor typology.

Additionally, detailed descriptions of the existing conditions of each station area and the unique attributes that are supportive of TOD (e.g. existing station area TOD master plan) are described in Appendix A.

CASE STUDY - Infill

360 State Street

NEW HAVEN, CONNECTICUT



360 State Street is an example of how an active municipality partnered with a creative developer can pioneer high density, mixed-use, infill development alongside rail improvements. This redevelopment of a 1.6 acre brownfields site that had been a parking lot was the result of a competitive RFP issued by the City of New Haven in 2006, which requested proposals for a development that would serve as a gateway for the downtown and complement the new State Street Metro-North/Shore Line East Station train station that opened across the street in 2002.

Using a series of planning and design charrettes, the developer, Becker + Becker, was able to establish an appropriate program, scale, unit mix, architectural character, and sustainable elements with community support. This process led to, among other things, the seeking out of a grocery store as an anchor tenant in an underserved community. When this search yielded no viable options, the developer launched its own food co-op model, which has been tremendously successful.

360 State Street features 500 high-end residential apartments comprising 50 affordable and 450 market rate units; 20,000 square feet of amenities including a fitness center, library, screening room, yoga studio, game room, party room, catering kitchen, business center, and art gallery; a half-acre green roof and swimming pool; a bike shop and bike storage room; a 500-car public parking garage with electric car charging stations and a Zipcar sharing program; and the aforementioned 25,000 SF community-owned food co-operative, Elm City Market.

360 State Street was a success in part due to public support that enabled the developer to leverage an enormous amount of private investment capital. The City of New Haven contributed the land and a streetscape improvement grant, while various state agencies contributed HOME, Housing Trust Fund, Urban Act Grant, and energy efficiency funding. 360 State Street also demonstrates the impact that new mass transit service, located directly across the street, and a local anchor institution can have. The site upon which 360 State Street was constructed had sat vacant for more than four decades, but in 2006 when the City of New Haven issued its RFP, the improved access to mass transit and the expansion of Yale University together provided the conditions necessary for redevelopment of the site.

CASE STUDY - Outreach

Clarendon Station

ARLINGTON COUNTY, VIRGINIA



The evolution of the Clarendon Station area demonstrates the value of community outreach, long-term planning, and benefits of understanding the unique context different suburban station areas. Clarendon is one of five Washington Metropolitan Area Transit Authority (WMATA) Orange Line stations along Wilson and Clarendon Boulevards in Arlington County, Virginia. At the time of the station's opening in 1979, the surrounding commercial corridor was in decline despite being surrounded by stable residential neighborhoods.

Arlington County undertook a planning process in the 1960s to 1980s to understand how new transit investments could leverage growth while supporting the existing high quality of life. A large-scale community engagement process was undertaken to learn the community's vision for the new stations while also publicizing the potential benefits of the new transit. This process resulted in the creation of a General Land Use Plan (GLUP) for the entire corridor, based on priorities of mixed-use, high-density redevelopment near stations, quality pedestrian environments, and preservation of existing residential neighborhoods. The GLUP clarified which station areas were best suited for higher intensity development, and for residential or commercial emphases.

"Sector plans" were created for the quarter mile area surrounding each station. These plans described the stations' envisioned character, intensity, public infrastructure needs, use mix, and urban design standards. The plans were primarily implemented through the use of incentive zoning; the GLUP retained relatively low-density zoning, but site plan review was used to examine each proposed development project for compatibility with the sector plan. Projects in compliance with the sector plan – including delivery of public improvements – were then approved for higher densities. The public sector also encouraged TOD through strategic infrastructure investments and WMATA public-private development partnerships.

Clarendon was classified as an "urban village" since it was located between stations better suited for higher-intensity office and retail uses. The sector plan created a very small, highly-targeted area near the station for investments and higher-density employment. This vision – which has been revisited and updated as necessary – has largely been fulfilled. Today, the immediate blocks surrounding the Clarendon station feature a walkable area of offices, high-density residences, and retail offerings. Between 1984 and the first quarter of 2011, 1.1 million square feet of office, over half a million square feet of retail, and over 2,300 housing units were constructed in the Clarendon sector plan area.



CASE STUDY - Catalyze

Metro Green

STAMFORD, CONNECTICUT

Stamford has been one of the primary economic centers of Connecticut for decades, yet even with its close proximity to New York City, excellent transportation connections, and high-density commerical development, the area to the south of the train station had suffered from disinvestment for years. Metro Green, a premier mixed-income, LEED certified, transit-oriented community, has been a catalyst for the burgeoning residential and commercial development in the South End neighborhood, providing much needed affordable housing to the City of Stamford and serving as a model for smart growth development in the state.

Metro Green, developed by Jonathan Rose Companies and Malkin Properties, is located one block from the Metro North Stamford Railroad Station. The multi-phased community will include upon completion 255 mixed-income residences and a 350,000 square foot commercial tower on a mixed-use, transit-oriented site. Currently, the site contains 90 units affordable to households with incomes ranging from 25% to 60% of Area Median Income and 10 market-rate units. At the time of the completion of the first phase, the market was only able to support affordable housing, but the quality of the units, which led to a fully occupied first phase, demonstrated feasibility for the addition of market rate units. Two and a half years later, by the time the second phase of Metro Green had been completed, the private real estate market had generated 1,000 of new market-rate apartments in the South End neighborhood. In the third phase, expected to be completed in 2015, over 50% of the apartments will be unrestricted market-rate units.

By encouraging new residents to move in and changing the dynamic of what can be supported in the neighborhood, affordable housing at Metro Green has helped to redefine the Stamford station area. To now walk the neighborhood, it is impossible not to be struck by the transformation: new retail, art galleries, and other developments have sprouted throughout the formerly-industrial neighborhood. The Metro Green example demonstrates that affordable housing can provide a foothold for new investment in an historically dis-invested area, establishing demand for new housing and changing the appearance of the neighborhood. Later phases and/or other developments build on the success of the affordable housing and attract private investment capital, which slowly establishes a stronger real estate market in the location.

CASE STUDY - Reposition

Hope VI

ELIZABETH, NEW JERSEY



The Housing Authority of the City of Elizabeth (HACE), New Jersey partnered with Jonathan Rose Companies to serve as the program manger to create and implement a multiphased, multi-year HOPE VI Revitalization Plan in Elizabethport, an historic urban neighborhood. Elizabeth, NJ is an industrial city just outside New York City and the Elizabethport neighborhood suffered from a large supply of aging public housing and weak real estate conditions. Using a HUD mixed-finance strategy, the Elizabethport redevelopment plan included a mix of housing types affordable to a broad range of household incomes. The redevelopment of the neighborhood created 550 for-sale and rental units based on a thoughtful, organic in-fill planning strategy intended to mend the fabric of the neighborhood. Revitalization of the obsolete port neighborhood was realized through the full participation of public housing residents and the surrounding community in important decisions that defined the future of their community as a safe, well designed, mixed-income neighborhood.

Jonathan Rose Companies assisted HACE with the negotiation of complex development agreements in compliance with HUD regulations, and developed the financial strategy that was implemented for brownfield redevelopment, infrastructure improvements, acquisition, development and asset management of the various components within the HOPE VI Revitalization Plan.

Using a traditional neighborhood design strategy, the project created a series of pedestrian-friendly streets and civic spaces to encourage people to walk. Redevelopment of scattered brownfield and blighted sites, as well as an environmentally challenged waterfront, reconnected the community to their history and a new marina. Revitalization of the neighborhood-commercial corridors also helped to re-establish neighborhood services and a sense of community with the goal of reducing vehicle miles traveled for daily goods and services.

While the HOPE VI program has since been discontinued, HUD continues to make financing available through its Choice Neighborhoods program for large-scale redevelopment of public housing developments in urban areas. These funding programs enable a transformative change in the neighborhood by replacing aging, obsolete public housing units with new housing inspired by traditional neighborhood forms and available to a mixture of incomes, which promotes diversity. The Choice Neighborhoods program also requires applicants to identify partnerships with local educational institutions and employers, often including anchor institutions, to ensure the redevelopment not only improves the housing stock but also expands opportunities for residents to access quality education and employment.

STATION AREA TOD IMPLEMENTATION

The Consulting Team developed recommendations for policies and strategies that can be implemented within the station areas, organized by typology, to encourage TOD. These implementation strategies can be placed into six major categories:

- **Planning and Visioning**
- **Zoning and Land Use Regulation**
- **New Development**
- **Neighborhood Revitalization**
- **Local Transportation and Infrastructure**
- **Economic Development**

The accompanying matrix shown in Figure 49 summarizes the major strategies and tools, and identifies the lead implementers, existing programs and potential funding sources. Figure 50 shows the applicability of each tool and strategy to the Place Types and individual station areas. A full description of the strategies and tools can be found below.

Planning and Visioning

Station area planning, visioning, and technical assistance are important first steps in order to establish common objectives, goals, and priorities for TOD in each community. These activities can also help educate the community on the potential benefits of TOD, thereby building political support from residents, businesses, elected leaders, and other stakeholders. Station area plans that provide a clear policy direction can also help to attract investment by reducing uncertainty and risk to developers. Ongoing technical assistance to local jurisdictions will also be important in order to build the capacity of towns and cities to implement TOD.

Zoning and Land Use Regulation

There is no "one size fits all" standard for density, land use mix, or project design for new transit-oriented development. Successful, new TOD can include compact single-family homes, rowhouses, multi-story apartment buildings or towers. However, TOD-supportive zoning and land use regulations should be in place in all station areas to ensure that the mix of uses and densities are appropriate from the perspective of the community, and respond market realities.

Some potential TOD-supportive zoning tools to explore in the Knowledge Corridor include the following:

- Modifying zoning to permit multi-family and/or rental housing in areas that currently prohibit that use;
- Increasing height limits or FARs at key locations where higher density development can be feasible;
- Reducing parking requirements in high-density downtowns and mixed-use districts;

- Allowing mixed-use development, either in buildings with ground-floor retail uses or in a mix of single-use buildings clustered closely together, depending on market factors; and

- Transferring development rights from suburban and ex-urban locations to the station areas.

In addition to zoning tools, streamlining entitlements and project review processes can also help to accelerate the market for TOD, particularly in locations that have emerging or stronger real estate markets. Reducing the amount of time it takes to get a project approved result in cost savings to developers, and makes the community more attractive for new development.

Finally, cities and towns may wish to implement parking management at station areas to foster an environment that is more conducive to walking, biking, and transit ridership. Parking management may include a combination of strategies including reduced parking requirements, imposing parking fees and meters, starting car-sharing and bike-sharing programs, and creating shared parking districts. Revenues from parking fees and meters are often used to fund alternative transportation facilities and programs like providing transit passes to employees and students or building secure bike parking facilities.

New Development

Many of the station areas in the Knowledge Corridor are not perceived as strong locations for new development. There is a need for the region to attract new development types in transit areas that can signal to the market that TOD can be successful. Developers tend to be risk-averse and will continue to build projects they know can be successful. However, providing encouragement and incentives to develop these relatively untested projects and building types can help encourage the market in the right direction. These strategies can take many forms, ranging from assisting with parcel assembly, providing direct subsidies to new projects. These activities are typically led by cities or redevelopment agencies, but state agencies could also play an important role in providing financial assistance to private development. One example of this strategy is the allocation of $60 million dollars by the Capital Region Development Authority to support new rental housing projects in downtown Hartford.

Many of the station areas are rich in historic buildings, giving them a unique identity and character. But much of the region's historic building stock is vacant or in need of significant reinvestment. The redevelopment or reuse of historic buildings can revitalize neighborhoods, generate additional property revenues to the city, and increase the appeal of these areas for TOD. The City of Hartford is currently pursuing this strategy in its support of the proposed restoration and adaptive re-use of the Bank of America tower, an iconic modernist structure in downtown, into 286 units of housing and utilizing, in part, federal and state historic tax credits.

Figure 49: Station Area Strategies Matrix

Strategy	Tools	Description	Lead Actors	Connecticut	Massachusetts
Planning and Visioning	Station area plans	Complete station area plans that set clear development standards, align with the community vision, guide the type and location of new development, identify and prioritize future investments, and provide guidance to cities and towns on implementation.	Cities/towns; community members; landowners; stakeholders	TOD Pilot Program; RPO plans; local funds	RPO plans; local funds
	Community education and outreach	Build community support for walkable, transit-oriented districts through outreach and education activities that demonstrate the potential economic, environmental, and health benefits of TOD.	Cities/towns; Sustainable Knowledge Corridor Consortium partners; developers; community-based organizations; public health agencies; universities and colleges; Living Cities; Community Foundations	TOD Pilot Program; local funds; developers; foundations	Regional planning grants; local funds; developers; foundations
	Technical assistance	Build capacity at the regional and local level through workshops, training sessions, webinars, etc. to plan for and implement TOD.	CRCOG; PVPC; CCRPA; ConnDOT; MassDOT; CT DECD; MA DHCD; other community partners	HUD Office of Sustainable Communities; Inter-Agency Taskforce	HUD Office of Sustainable Communities; DHCD Training; MassDevelopment
Zoning and Land Use Regulations	TOD-supportive zoning	Modify existing zoning regulations as appropriate to support TOD. Strategies will vary by station area, but may include: permitting multi-family housing in station areas; increasing height limits or FARs; reducing parking requirements; allowing mixed-use development; transfer of development rights.	Cities/towns	Incentive Housing Zones; C.G.S. 8-30g	Chapter 43D Expedited Permitting; PVPC Expedited Permitting Handbook; Chapter 40R
	Entitlements process	Expedited entitlements, permitting, and review processes for TOD projects to lower the cost of development and reduce risk for developers.	Cities/towns	Incentive Housing Zones	Chapter 43D Expedited Permitting; PVPC Handbook; Chapter 40R
	Parking management	Parking management may include a combination of strategies including reduced parking requirements, imposing parking fees and meters, and creating parking districts. Parking reductions can help to make private development more feasible, and helps to support transit ridership. Revenues from parking pricing can help to fund alternative transportation facilities and programs (transit, bike, and pedestrian).	Cities/towns; ConnDOT; MassDOT; CRCOG; PVPC	Parking revenues; local and regional transportation funds	Parking revenues; local and regional transportation funds
New Development	Site assembly	Assembly of fragmented and small parcels to reduce holding costs and risks to developers.	Cities/towns; redevelopment agencies		
	Financing market-rate housing	Apply existing multi-family and single-family housing programs to TOD residential projects (including market-rate development); provide loan guarantees to private market-rate development in TOD areas.	States	CHFA Mortgage Programs; Downpayment Assistance Program; Capital Region Development Authority Fund	Housing Development Incentive Program; Urban Renewal Grant; MassHousing Single-Family Loans/BuyCities
	Reuse of historic buildings	Identify existing historic buildings in station areas suitable to convert to multi-family housing or commercial uses.	Cities/towns; redevelopment agencies; CDCs; developers	State Historic Tax Credit; Federal Historic Tax Credit	State Historic Preservation Tax Credit; Urban Renewal Grant; Federal Historic Tax Credit

Strategy	Tools	Description	Lead Actors	Connecticut	Massachusetts
Neighborhood Revitalization	Brownfields cleanup	Identify brownfield sites in station areas; prioritize these areas for cleanup to support development	Cities/ towns; redevelopment agencies; state brownfield authorities; DECD; MassDevelopment; U.S. EPA	CT Brownfield Redevelopment Authority/DECD Brownfield Loans; EPA grants	Brownfields Tax Credit/ Remediation Loans/Site Assessment; EPA grants
	Acquisition of vacant/ blighted properties	Purchase and hold blighted and/or tax delinquent properties that may be suitable for redevelopment in the short to medium term. Interim uses may include community gardens, farmers markets, food trucks, etc.	Cities/towns; redevelopment agencies; CDCs		
	Affordable and mixed income housing	Add stronger TOD preference to LIHTC QAP; target existing affordable housing funds to TOD areas; redevelop existing public housing development projects to revitalize neighborhoods.	Housing authorities; redevelopment agencies; nonprofits; cities and towns; private developers; states	HUD Choice Neighborhoods; DECD CHAMP; LIHTC; Capital Region Development Authority Fund; Housing Tax Credit Contribution; CDBG/HOME	HUD Choice Neighborhoods; Urban Renewal Grant; Housing Development Incentive Program; LIHTC; CDBG/HOME
Local Transportation and Infrastructure	Last mile shuttles	Enhance coverage, quality, and frequency of local bus connections from new BRT and rail stations to major destinations outside of the immediate station area.	CRCOG; PVPC; CCRPA; CT Transit; PVTA; other regional transit agencies; economic development organizations; major employers; anchor institutions	Parking revenues; local and regional transportation funds; private employers; anchor institutions	Parking revenues; local and regional transportation funds; private employers; anchor institutions
	Pedestrian and bicycle acess	Enhance pedestrian and bicycle paths and facilities to foster walking and biking as an access mode to the BRT and rail stations.	CRCOG; PVPC; CCRPA; ConnDOT; MassDOT; cities and towns	Parking revenues; local and regional transportation funds	Parking revenues; local and regional transportation funds
	Infrastructure improvements	Make strategic investments in streetscaping and "place-making" features at station areas to enhance the attractiveness of station areas for new development and promote the brand of the new transit corridors; Improve basic infrastructure (water, sewer, gas, etc.) to accommodate new, higher-density development in station areas.	Cities and towns; business districts; DECD; MassDevelopment; CRCOG; PVPC; ConnDOT; MassDOT; Utility Companies	Parking revenues; local and regional capital and facilities programs; utilities fees; development impact fees; business improvement districts; Tax Increment Financing (TIF)	Tax exempt bonds; Parkland Acquisition and Renovation for Communities; local and regional capital and facilities programs; utilities fees; development impact fees; business improvement districts; TIF
Economic Development	Economic development incentive programs	Target existing economic development incentive programs to station areas	States	DECD Economic Development & Manufacturing Assistance; CT Innovations programs	State Economic Development Incentive Program (EDIP)
	Anchor institutions	Encourage anchor institutions to expand in transit areas.	Large employers; universities and colleges; hospitals; States; cities / towns; CRCOG; CCRPA; PVPC	Private employers and anchor institutions	Private employers and anchor institutions

Source: JRCo; MassInc.org

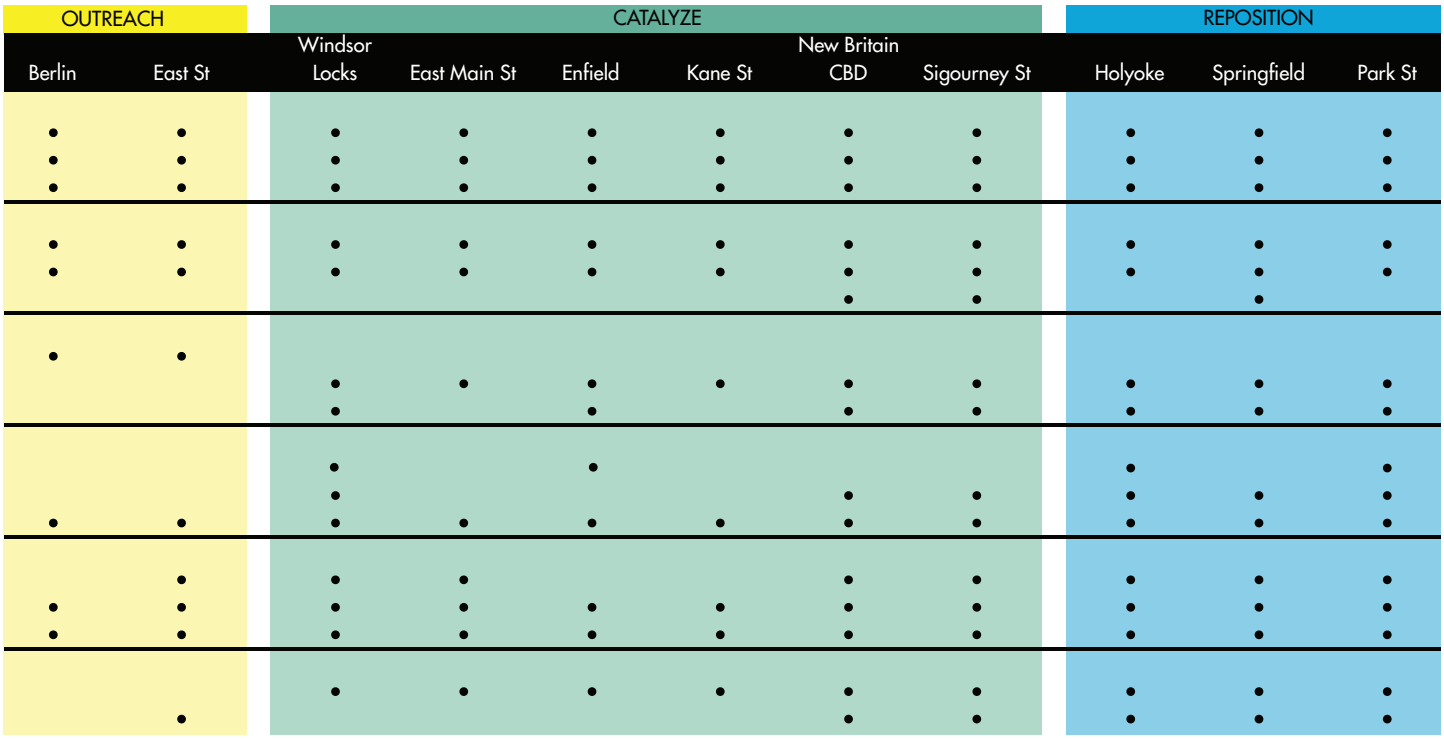
Figure 50: Implementation Strategies by Place Type and Station Area

	INFILL					OUTREACH	
Strategies and Tools	Elmwood	Windsor	Northampton	Hartford Union St	West Hartford	Cedar St	Newington Junction
Planning and visioning							
Station area plans	•	•	•	•	•	•	•
Community education and outreach	•	•	•	•	•	•	•
Technical assistance	•	•	•	•	•	•	•
Zoning and land use regulations							
TOD-supportive zoning	•	•	•	•	•	•	•
Entitlements process	•	•	•	•	•	•	•
Parking management			•	•	•		
New development							
Site assembly			•	•			•
Financing market-rate housing	•	•	•	•	•		
Reuse of historic buildings		•	•	•			•
Neighborhood revitalization							
Brownfields cleanup	•	•			•	•	
Acquisition of vacant/ blighted properties							
Affordable and mixed-income housing	•	•	•	•	•	•	•
Local transportation and infrastructure							
Last mile shuttles	•		•		•	•	
Pedestrian and bicycle acess	•	•	•	•	•	•	•
Infrastructure improvements	•	•	•	•	•	•	•
Economic Development							
Economic development incentive programs				•			
Anchor institutions			•	•		•	

Neighborhood Revitalization

The station areas grouped in the Catalyze and Reposition place types generally face challenges to implementing TOD due to a concentration of blighted and abandoned properties which deter investment, drive down property values, and depress local revenues. One commonly used strategy to address this at the municipal level is through the acquisition and redevelopment of these properties. In Michigan, the Genessee County Land Bank has been actively engaged in acquiring and renovating vacant residential properties, often as for-sale affordable housing, to promote neighborhood stabilization. The Land Bank also supports the conversion of vacant lots into community gardens and pocket parks.

Some of the former industrial districts contain brownfields, which are properties with real or perceived contamination that require remediation to redevelop or reuse. It is important to develop a plan to address these brownfield properties in order to unlock the potential for TOD. This includes a thorough review of existing environmental documents, additional testing, and a cleanup plan. The U.S. EPA provides varying levels of technical and financial assistance for brownfield redevelopment and sustainable development. There are also a variety of existing state programs that provide financial and technical assistance, including the Connecticut's Brownfield Redevelopment Authority and Department of Economic and Community Development grants, as well as Massachusetts' Brownfields Tax Credits, remediation loans, and site assessments. The City of Holyoke has taken advantage of the EPA Brownfields program, recently receiving $200,000 in grants to clean up the former Mountain Road Firing Range site, to be converted eventually into open space and single-family housing. Holyoke also received assistance from the state to clean up a former brownfield that is now the home of the Massachusetts Green High-Performance Computing Center.



Affordable housing and mixed-income housing development in transit locations is another example of a neighborhood revitalization strategy that accomplishes multiple objectives:

1) Preserving the affordability of the transit corridor to low-income households to ensure they benefit from the increased transportation options; and

2) Establishing higher-density development in station areas that currently lack the ability to attract private development.

By broadening the income mixes for new developments, potential developers might be able to access Targeted Financial Incentives and other financing tools for closing the gap between market prices and cost of construction in station areas with longer term outlooks for TOD potential. High quality affordable housing and mixed-income projects, such as Metro Green in Stamford, CT, are able to prove the capabilities of an area to developers and potential residents. This strategy is one that needs to be tailored to the individual station and will require a more refined survey of housing markets and affordable housing needs at the local level. The character, age and value of housing, rent/own mix, and quantity and location of existing affordable housing will inform how the strategy is applied. In some places, there may not be much existing affordable housing in the transit station area, and the development of new affordable units may be deemed appropriate. Meanwhile, other station areas, such as Springfield and Holyoke, may have a concentration of existing affordable housing, and the introduction of more market-rate units may be desirable. The HUD Choice Neighborhoods planning and implementation grants are targeted towards the transformation of distressed neighborhoods with an emphasis on the preservation and rehabilitation of

public, HUD-assisted housing units, fostering stronger connections to schools, public facilities, transportation, and jobs.

Local Transportation and Infrastructure

Transit-oriented development supports transportation choices, which include transit use, walking, and bicycling. Investments in pedestrian and bicycle infrastructure could further bolster the ridership on the BRT and rail corridors. Promoting bicycle travel can also make it easier to access major destinations that are beyond the half-mile radius of the station area. Similarly, providing last-mile shuttles to these destinations will maximize the effectiveness of the new BRT and rail investments and add value to the transit locations.

Deficient infrastructure is a critical barrier to new development in the older communities along the transit corridors. Many of the station areas require upgrades in basic utilities, stormwater, and wastewater infrastructure to be able to accommodate higher density development. This is a high-cost expense that cannot be realistically borne solely by new development. Providing regional and state funds to address the infrastructure challenges will be a vital component to implementing TOD in the Knowledge Corridor.

Economic Development

As described earlier, coordinating the expansion of anchor institutions within station areas is a key regional strategy for supporting TOD in the Knowledge Corridor. University or hospital expansions create a powerful driver of demand for ancillary real estate, such as student housing, retail and medical offices. Within the Knowledge Corridor, there are currently several important near-term opportunities for CRCOG, CCRPA and PVPC to partner with anchor institutions to expand within station areas. Further information on the region's anchor institutions is included in Appendix E.

- **Central Connecticut State University (CCSU)**: CCSU's 12,000 students make it second to only the University of Connecticut in terms of public institution enrollment in the state. Due to the size of the institution and its proximity to the Cedar Street and East Street stations, CCSU represents one of the best opportunities for anchor institution-led TOD. Currently, CCSU is a school that is mostly comprised of in-state students living off-campus and/or commuting, a situation that the university would like to address by building student housing on-campus. To that end, the CCSU is planning a significant expansion in the Cedar Street station area. The expansion, called the East Campus, is planned to include 300-plus units of student housing, a new fitness center and playing fields, facilities for the Fine Arts Department, a day care facility, and a 1,000-space parking garage. There may also be opportunities for additional university-sponsored developments, including retail and/or additional student housing. An important element of CCSU's plan is a pedestrian connection from the East Campus back to the main campus that bridges Route 9,

Central Connecticut State University East Campus Plan, New Britain, CT



to ensure the two campuses function as one. The East Campus plan, which is scheduled to begin within a short time period, will transform the Cedar Street station area, currently characterized by vacant and under-utilized sites. To ensure that the East Campus plan is consistent with TOD principles, city staff, CRCOG, CCRPA and the state should be engaged in the planning process. It will be important to put into place a land use plan that permits higher-density, mixed-use development on adjacent parcels, and to create a strong pedestrian and bicycle network to connect the campus to the transit station, while minimizing the visual and design impacts of the parking garage. The East Campus expansion will also better connect CCSU to the CT***fastrak*** system, which could create demand for student housing at other stations along the line, due to the rapid, frequent transit connection. It also creates opportunities to integrate CCSU with other educational institutions accessible by transit, such as Trinity College, UConn Health Center, UConn School of Business, and the UConn Hartford campus.

- **University of Connecticut (UConn)**: The addition of other UConn programs to downtown Hartford and other station areas could further support TOD at the station areas and the expansion of the CT***fastrak*** and NHHS rail systems as an option for students to travel between institutions. Currently located in West Hartford, the UConn Hartford satellite campus will soon relocate its 2,100 students and 60 faculty members, including the UConn School of Social

Work, to downtown Hartford. This move will further expand the number of students in downtown Hartford and build demand for multi-family student housing. Additionally, the UConn School of Medicine, located at the UConn Health Center in Farmington, consists of 3,000 graduate students and will be accessible via a shuttle connection to CT***fastrak***. The addition of rapid transit could be a significant benefit to medical students, who will be able to travel between UConn Health Center, Hartford Hospital and St. Francis Hospital on a one-seat ride.

- **University of Massachusetts**: The creation of a satellite University of Massachusetts campus in downtown Springfield has been discussed, potentially to include a school for physician's assistants, which would meet the growing need for a skilled health care workforce and complement the existing Pioneer Valley Life Sciences Institute in Springfield. This move is strongly encouraged, as it could support multifamily housing and encourage the expansion of the health sector in downtown Springfield.

CONCLUSIONS

The Regional TOD Strategies and Station Area TOD Strategies sections demonstrate some of the implementation strategies that exist to lay the groundwork for TOD in station areas. The strategies include multiple levels of government as well as many of the region's prominent non-profit insititions and employers. Achievement of a paradigm shift away from the region's past patterns of sprawl development to an infill, TOD pattern will require coordination between these many actors.

These TOD implementation strategies reinforce a concept recently described in a report released by the MassINC's Gateway Cities Initiative. In it, Alan Mallach, Benjamin Forman, and Margaret Keaveny identify "transformative redevelopments" as a key to the future vibrancy of Massachusett's Gateway Cities. Transformative redevelopments are defined as investments that can bridge the existing market gap and "restore the healthy function of private markets."[49] Many of the TOD implementation strategies presented in this section, such as support of anchor institution expansion, would provide opportunities for transformative redevelopment in the station areas.

Even without the power of transformative redevelopments, there is opportunity to capitalize on the modest growth in demand projected in the region. As described earlier, the Consultant Team estimates that over the next 25 years there will be demand for 9,000 to 12,000 new TOD housing units and 50,000 new jobs in TOD-supportive employment sectors. The strategies presented in this section describe steps that government bodies can take to ensure that the station areas are well-positioned to absorb this demand. Relatively small steps taken today will ensure the station areas are attractive to substantial TOD investment in the future.

49 Forman, B., Keaveny, M. & Mallach, A. (2013). Transformative Redevelopment: Strategic State Policy for Gateway City Growth and Renewal. (Report.) MassINC.

Corridor TOD Implementation Maps

The previous Regional TOD Strategies and Station Area TOD Strategies sections described the steps government bodies in the Knowledge Corridor can take to build regional demand for TOD, through targeting state investments and engaging anchor institutions, as well as the steps to encourage new supply of TOD at the station areas through adopting policies consistent with each station's typology. In this final section, the Consulting Team presents these findings in graphic corridor maps for the NHHS Rail/ Vermonter corridor and the *CTfastrak* corridor. These maps summarize the recommendations contained within the TOD Strategies section of the report and serve as a snapshot guide of the opportunities to develop TOD in the region. These maps represent the short-term (less than 5 year) opportunties. Additional opportunties are likely to evolve as transit and rail service is established, and the market for TOD in the BRT and rail corridors strengthens.

Figures 51 and 52 summarize the recommendations of the Consulting Team for short-term TOD in the following categories:

- **Station area typology**
- **Recommended density of new TOD;**
- **Recommended use or mixture of uses; and**
- **Presence of anchor institutions and/or opportunities for state investment.**

By laying out the type, density, and major assets of the station areas, the opportunities for TOD in the corridors can be viewed holistically, with stations ranging from lower density, mostly residential town centers with service-based commercial to large employment centers and regional destinations with broader development opportunities. The corridor plan symbols are as follows:

Density:
Low – Two or less stories, including townhome-style residential
Moderate – Three to five stories
High – Greater than five stories

Land Uses
R – Residential uses (although this may include smaller service based retail such as shops and restaurants)
MX – Mix of residential and commercial uses, which may include commercial office

The station area color corresponds to its typology as shown in Figure 48. The remaining symbols denote where regionally-important anchor institutions and/or state investment opportunities exist.

Figure 51: NHHS/Vermonter Rail Corridor Map

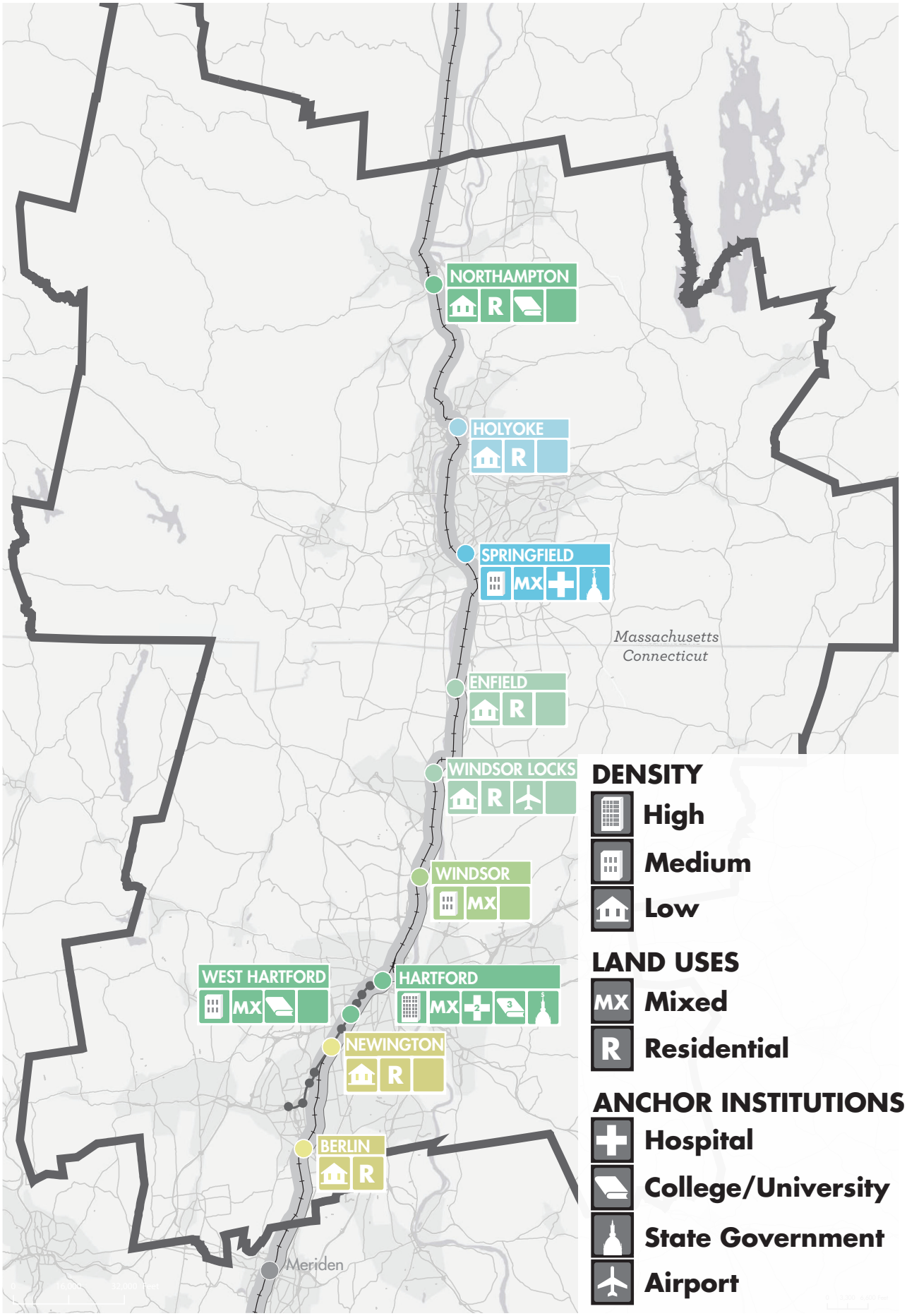
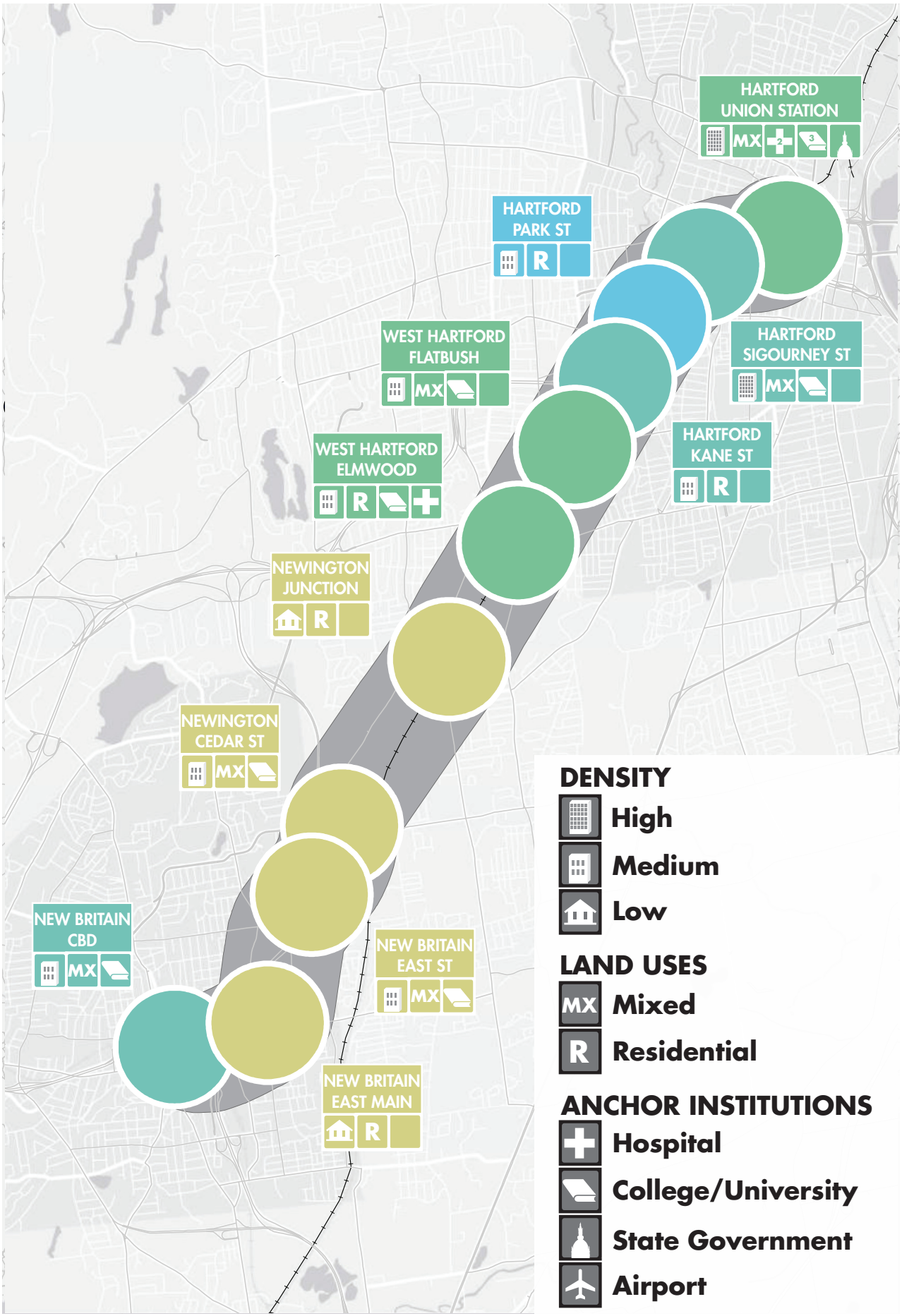


Figure 52: CTfastrak Corridor Map



Downtown, Hartford, CT



Appendices

A: Station Area Profiles

B: Civic Engagement Approach

C: Employment Maps

D: Data Sources

E: Addional Regional and Corridor Analysis Materials

Appendix A

Station Area Profiles

Appendix A Introduction

Appendix A contains Station Area Profiles, which present descriptions of the existing conditions and the TOD-supportive attributes of each rail and bus rapid transit station area. The profiles begin with a table that provides an overview of station area conditions, market potential, and other factors, and compares these site-specific data to data for the entire corridor. The table is followed by a brief narrative, which describes opportunities and challenges facing the station area.

The colors that appear behind the name of each station area correspondsto the colors used in Figure 7 to describe in which phase the transit improvements will be completed.

Two factors, Walkability Rating and Daily Boardings, are categorized as low, medium or high. In addition, profile narratives describe development opportunities as short, medium and long-term. For the purpose of the profiles, these low-medium-high classifications, and short, medium and long-term classifications, are defined as follows.

Walkability Rating
As has been noted throughout this report, the existence of a pedestrian-friendly street pattern can be an important factor in attracting residents and employees that are interested in a walkable, urban lifestyle with less dependence on auto travel. The Consulting Team calculated the Walk Score of each station area using "Street Smart" Walk Score. Each station was ranked on a scale from 0-100 based on the Walk Score. Low, medium and high walkability is defined based on the following ranges in walk scores:

- Low—Walk Score of less than 70;
- Medium—Walk Score of 70 to 84; and
- High—Walk Score of 85 or above.

Daily Boardings
Low, medium and high classifications reflect the projected number of daily boardings at one station as compared to others in the corridor, and are defined as follows:

- Low—Daily Boardings of less than 500;
- Medium—Daily Boardings of 500 to 1,000; and
- High—Daily Boardings of more than 1,000.

Short, Medium and Long Development Opportunities
Transit-oriented development generally takes place over several decades. The Station Area Profile narratives often refer to short, medium and long-term development opportunities. While it is impossible to predict with certainty when development may occur in specific locations, these time horizons are roughly defined as follows:

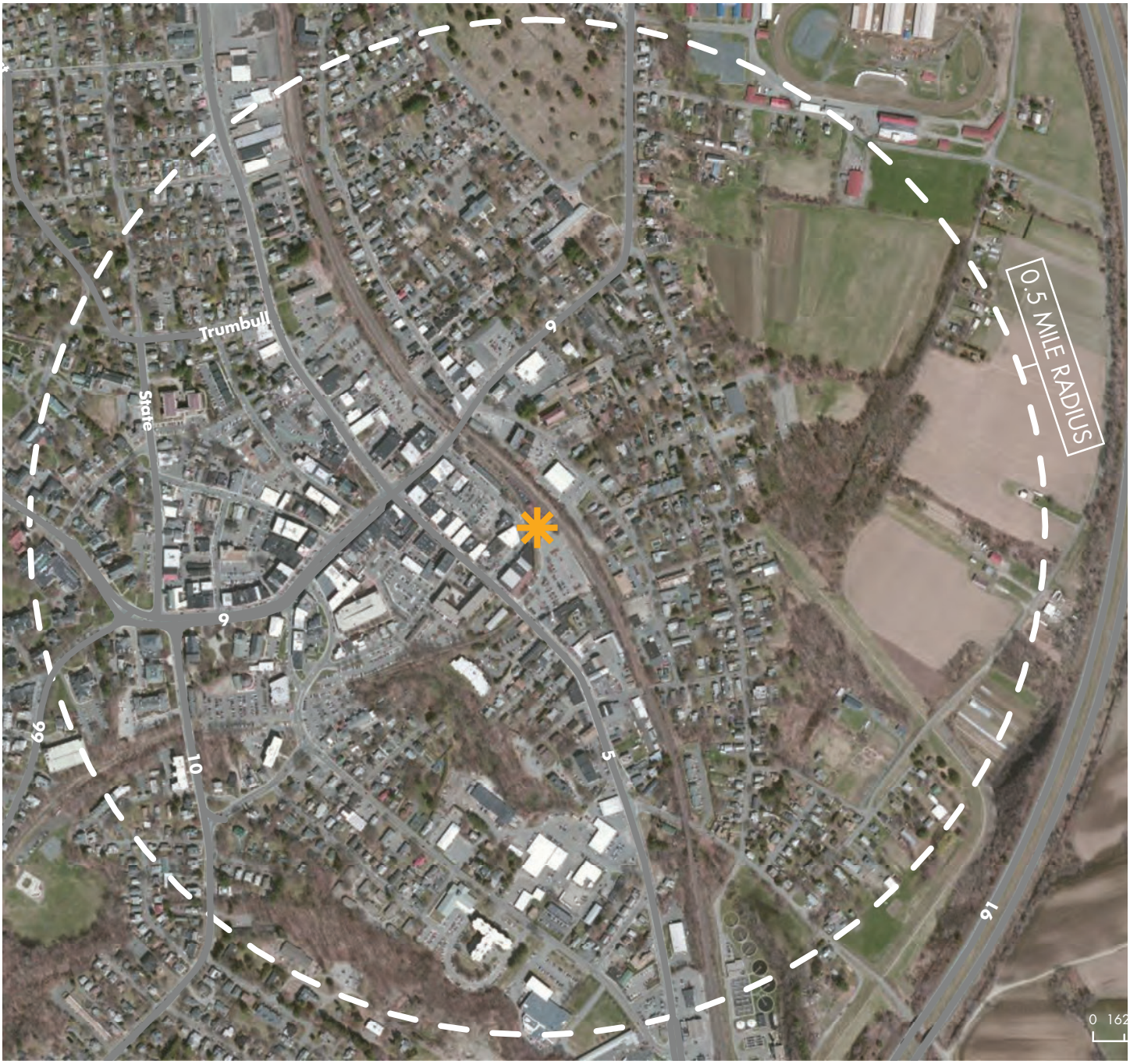
- Short-term—less than 5 years;
- Medium-term—5 to 10 years; and
- Long-term—11 years or more.

The Station Area Profiles for the eighteen stations in the CTfastrak, NHHS Rail, and Vermonter corridors follow.

Northampton, MA







Northampton, MA

SERVICE: AMTRAK VERMONTER

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	High	Medium
Persons / Acre	12.85	18.39
% Commercial / Mixed Land Use	13%	30%
% Industrial Land Use	1%	11%
% Residential Land Use	86%	58%
Market Potential		
Employment	6,465	70,867
Median Residential Sales Price	$263,067	$167,746
Median Gross Residential Rent	$825	$885
Other		
Population	4,272	30,892
Households	2,230	14,348
% Renter Households	78%	75%
% TOD Supportive Jobs	53%	70%
Daily Boardings (2030)	Low	7,669

Amtrak's Vermonter train service, running from St. Albans, Vermont to Washington, D.C., will be restored to Northampton. The station is planned to have two southbound and two northbound trains daily by 2030. The station is to be located at the edge of the city's downtown, a highly walkable mixed-use district within a half-mile of Smith College. The land area is primarily residential, but includes a significant amount of retail, primarily in the downtown district.

While the station area is fairly built out, there may be opportunities for smaller scale infill development on selected sites. The market conditions in the station area are strong, particularly for ownership housing, which indicates potential for new residential and mixed-use projects in the Northampton station area. The nearby presence of Smith College as well as the frequent shuttle connections from Northampton to UMass, Amherst College and other nearby colleges, as well as Northampton's vibrant downtown area, provides opportunities for student housing in the station area, which is an ideal use for TOD areas because it requires little parking and units tend to be small, thus generating a big impact within a smaller building footprint.






Pine
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Mosher
Bridge
Maple
Nick Cosmos
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Cabot
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Winter
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Main
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Holyoke, MA

SERVICE: AMTRAK VERMONTER

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Medium	Medium
Persons / Acre	10.01	18.39
% Commercial / Mixed Land Use	16%	30%
% Industrial Land Use	34%	11%
% Residential Land Use	49%	58%
Market Potential		
Employment	5,037	70,867
Median Residential Sales Price	$75,031	$167,746
Median Gross Residential Rent	$500	$885
Other		
Population	3,837	30,892
Households	1,611	14,348
% Renter Households	89%	75%
% TOD Supportive Jobs	46%	70%
Daily Boardings (2030)	Low	7,669

The Holyoke station will also have Amtrak's Vermonter service with four daily trains. Currently, the station area contains a mix of uses, including multifamily and single-family residential neighborhoods, industrial buildings, vacant properties, and retail. Holyoke's downtown, the target of several revitalization projects, is only three blocks from the station, across two of the city's canals. The new Massachusetts Green High Performance Computing Center, a major new infrastructure investment, is also located in close proximity.

While the station area has vacant sites and buildings available for development or reuse, the market conditions are currently weak, with median housing values and rents below those of the NHHS corridor. New development in the station area is likely to require assistance from the public sector, and many of those revitalization strategies have been identified in the recently completed downtown redevelopment plan.

Due to a large presence of public housing within the station area, the Holyoke station will also uniquely benefit from a large-scale redevelopment of public housing. Public housing redevelopment over the last 20 years through the HOPE VI program has a proven positive impact on communities, reducing crime, increasing opportunities for residents to move into the middle class, and attracting a diverse spectrum of households. A transformative redevelopment of public housing near the Holyoke station will begin to create a stronger real estate market and attract new residents to the station area.

Springfield, MA







Springfield, MA

SERVICE: AMTRAK VERMONTER, NHHS RAIL

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	High	Medium
Persons / Acre	26.37	18.39
% Commercial / Mixed Land Use	56%	30%
% Industrial Land Use	15%	11%
% Residential Land Use	29%	58%
Market Potential		
Employment	13,263	70,867
Median Residential Sales Price	$97,700	$167,746
Median Gross Residential Rent	$588	$885
Other		
Population	4,493	30,892
Households	2,619	14,348
% Renter Households	95%	75%
% TOD Supportive Jobs	63%	70%
Daily Boardings (2030)	High	7,669

This existing Amtrak station in Springfield's downtown district will have frequent commuter rail service with connections to Hartford and New Haven. The station area is a significant employment center, with many government, medical, and educational institutions nearby such as Mercy Medical Center and Springfield Technical Community College. The NHHS rail is projected to have strong daily ridership at Springfield in 2030, with between 25 and 32 trains per day arriving every half hour during peak times.

The market conditions in the station area are weaker than the overall NHHS corridor. However, Downtown Springfield's strong employment base and robust transit service positions it well to attract development in the longer term, likely led by government and anchor institutions. The following long-term opportunities exist at the Springfield station, which could be catalytic for downtown Springfield and the corridor as a whole:

- Location of a new casino in downtown Springfield. As discussed in further detail in the Anchor Institutions section of the report, an appropriately-designed casino adjacent to the Springfield station and open to the surrounding downtown area would transform downtown Springfield into an entertainment center. Over time, this will increase its attractiveness as a place to live and stay overnight, boosting the residential and hotel markets.

- Creation of a University of Massachusetts branch campus in downtown Springfield. While Springfield is the largest city near the University of Massachusetts, there is currently little impact of this nationally-regarded research institution on downtown Springfield. The creation of a branch campus in downtown Springfield, particularly one that specializes in the skills in demand among Springfield employers, such as finance, insurance and health care, would create a market for student housing, improve students' access to employment at Springfield companies, and build Springfield's attraction for other employers looking for a skilled workforce.

- Expansion of Baystate Medical and/or Mercy Hospital towards the station area. Currently, both Baystate Medical and Mercy Hospital are among Springfield's largest employers but are just outside the station area. Future expansion of these institutions should be encouraged towards the station area, which could redevelop vacant and under-utilized sites and provide demand for ancillary uses, such as retail or out-patient facilities.

Lastly, similar to Holyoke, the Springfield station area would benefit from the redevelopment of existing public housing. The Consulting Team recommends pursuit of HUD Choice Neighborhoods Initiative planning grant funds to investigate opportunities to redevelop the public housing within the station area.

Springfield, MA










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Main
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Enfield, CT

SERVICE: NHHS RAIL

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Low	Medium
Persons / Acre	9.19	18.39
% Commercial / Mixed Land Use	22%	30%
% Industrial Land Use	25%	11%
% Residential Land Use	53%	58%
Market Potential		
Employment	777	70,867
Median Residential Sales Price	$142,211	$167,746
Median Gross Residential Rent	$911	$885
Other		
Population	3,845	30,892
Households	1,671	14,348
% Renter Households	82%	75%
% TOD Supportive Jobs	56%	70%
Daily Boardings (2030)	Low	7,669

The Enfield station will be located on the western border of the Thompsonville neighborhood, on the Connecticut River. The station will be adjacent to a large multifamily residential complex, with low density residential neighborhoods, industrial uses, and small-scale retail nearby.

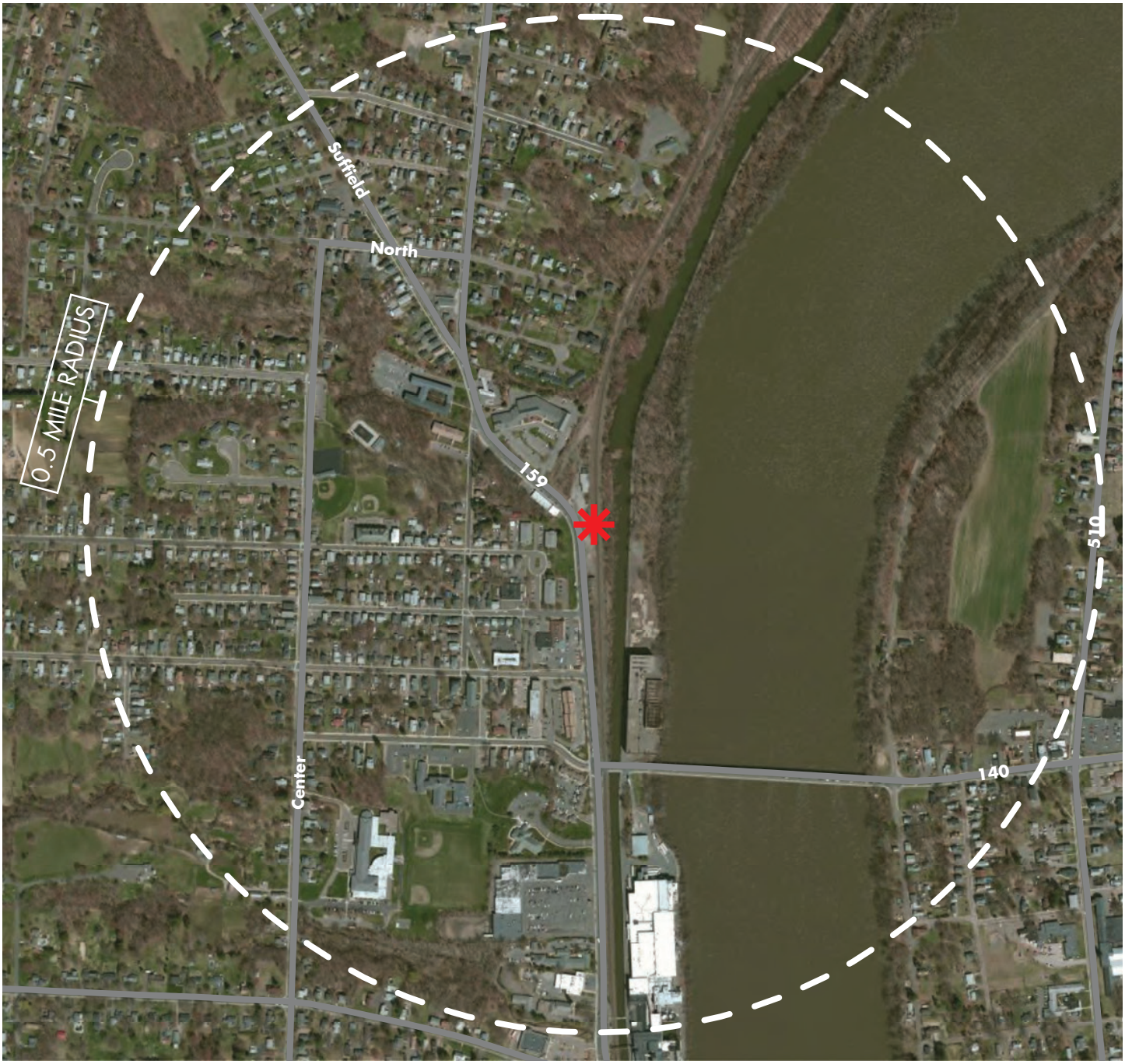
The Enfield station area's rents and sales prices show some potential for market-rate residential development, most likely rental apartments or lower density ownership housing. Given the existing mix of uses and community character, it is a less likely location for new commercial development. The Enfield station area, however, is geographically constrained, due to the presence of the Connecticut River, which limits development to the west of the station. Additionally, the station area is already largely built-out. Thus development sites within the station area may be small in number. However, there is a large vacant site along the river adjacent to the station, which may provide the best opportunity for new development.

Enfield is preparing for the future by conducting a Thompsonville Zoning Study intended to result in revised zoning within the town's Thompsonville Village District. The goal of this work is to support revitalization of the district as well as future transit-oriented development and redevelopment.

Windsor Locks, CT







Windsor Locks, CT

SERVICE: NHHS RAIL

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Low	Medium
Persons / Acre	6.18	18.39
% Commercial / Mixed Land Use	9%	30%
% Industrial Land Use	2%	11%
% Residential Land Use	88%	58%
Market Potential		
Employment	977	70,867
Median Residential Sales Price	$128,815	$167,746
Median Gross Residential Rent	$866	$885
Other		
Population	2,130	30,892
Households	891	14,348
% Renter Households	52%	75%
% TOD Supportive Jobs	35%	70%
Daily Boardings (2030)	Low	7,669

In Windsor Locks, planning is underway to relocate the current Amtrak station into the town center. The surrounding area consists of low-density single-family neighborhoods, with two small shopping centers nearby. Heavy industrial uses, some of which are vacant, are present along the Connecticut River. This station area will offer connections via shuttle bus to Bradley International Airport, which is approximately two miles away.

The market conditions at the station area are weaker than the corridor as a whole, posing a challenge for new development projects at this location in the short term. However, the town of Windsor Locks has taken a important first step by commissioning a development feasibility study of the station area, which will prepare it for new development. The Windsor Locks station area contains a large, formerly-industrial structure that provides an ideal opportunity for adaptive re-use. Additionally, there will be a fast connection to Bradley Airport, which may appeal to businesses that benefit from adjacency to both the airport and the transit connection, such as firms that consult to national and regional corporations.






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Windsor, CT

SERVICE: NHHS RAIL

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Medium	Medium
Persons / Acre	5.03	18.39
% Commercial / Mixed Land Use	20%	30%
% Industrial Land Use	3%	11%
% Residential Land Use	72%	58%
Market Potential		
Employment	1,217	70,867
Median Residential Sales Price	$169,900	$167,746
Median Gross Residential Rent	$1,005	$885
Other		
Population	1,311	30,892
Households	616	14,348
% Renter Households	49%	75%
% TOD Supportive Jobs	57%	70%
Daily Boardings (2030)	Low	7,669

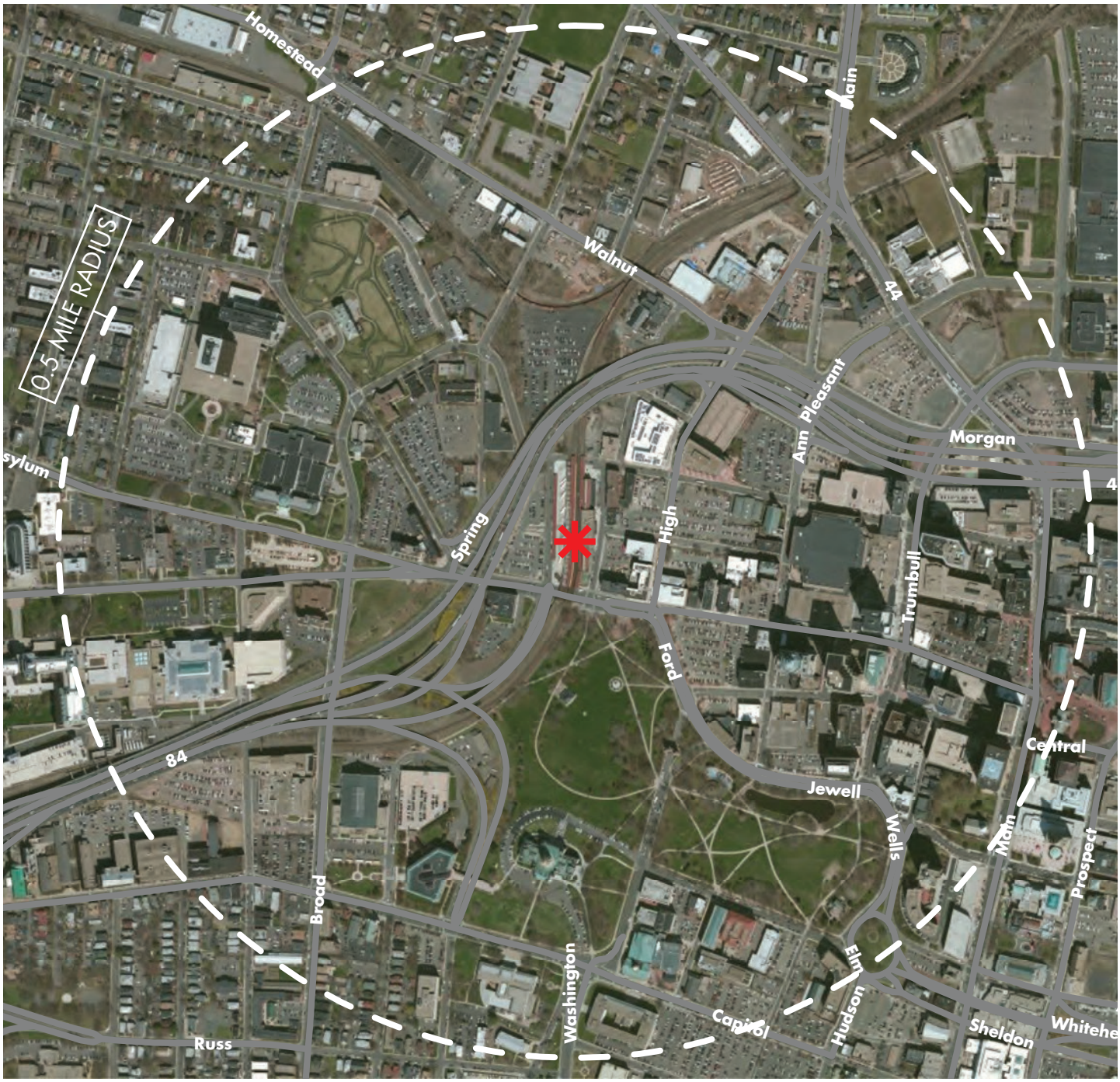
The Windsor Amtrak station will serve the NHHS rail project. The station is immediately surrounded by a cluster of small to medium size commercial development and town services. The majority of the station area consists of single-family homes and forested trails.

Windsor's market conditions are fairly strong, indicating potential for market-rate development in the station area. Given the low-density, small town character of the station area, it is probable that new development will consist of lower density ownership housing and rental apartments, with a small amount of supporting retail. Windsor also benefits from a recently-completed adaptive re-use of a former factory into condominiums in the station area, which established a market for new residential real estate.

Windsor is currently undertaking a multi-faceted TOD planning and facilitiation program, which will identify the best opportunities for redevelopment, analyze the local market for existing and new development, and formulate a station area plan. When the new transit is completed, Windsor should immediately appeal to developers as a location for low- and medium-density mixed residential and retail developments.






Homestead
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Trumbull
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Jewell
Central
Wells
Main
Prospect
Broad
Elm
Washington
Hudson
Capitol
Sheldon
Russ

Hartford, CT

SERVICE: NHHS RAIL, CTFASTRAK, AMTRAK

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	High	Medium
Persons / Acre	84.91	18.39
% Commercial / Mixed Land Use	71%	30%
% Industrial Land Use	5%	11%
% Residential Land Use	20%	58%
Market Potential		
Employment	38,681	70,867
Median Residential Sales Price	$174,333	$167,746
Median Gross Residential Rent	$1,112	$885
Other		
Population	4,030	30,892
Households	2,050	14,348
% Renter Households	95%	75%
% TOD Supportive Jobs	84%	70%
Daily Boardings (2030/2015)	High (NHHS) High (CTfastrak)	7,669

The existing Hartford Amtrak/Union Station depot will be expanded and connected to both NHHS rail (as well as existing Vermonter service), and *CT**fastrak***. The station is in the central business district, adjacent to the State Capitol, and has a high Walk Score due to the proximity of a variety of amenities nearby. This station area contains a large proportion of the employment along the NHHS corridor, most of which are in TOD-supportive industries. Most of the land area in the station area is commercial, including insurance firms, government offices, and educational institutions, with a smaller share of residential uses. Connecting NHHS rail, *CT**fastrak***, the Vermonter, and many bus lines, this station area is poised to become the region's busiest transit center.

Over the last fifteen years, downtown Hartford has emerged as a center for rental development and entertainment in the region. Thousands of new rental units have been constructed and absorbed, though often requiring government support to overcome the considerable expense of building in the downtown location. Presently, downtown Hartford's housing market is among the strongest on the NHHS corridor, with rents and housing prices above the median. Due to these market factors, as well as the employment concentrations and amenities within walking distance, this station area is more likely to receive transit-oriented development in the short to medium term. There are a number of transformative opportunities present at the Hartford station which make it a catalytic site for the entire region:

- The Capital Region Development Authority has been allocated $60 million to support creation of new rental housing in downtown Hartford. There are already several projects in pre-development which together comprise over one thousand new units, most notably the proposed adaptive re-use of the iconic Bank of America tower at 777 Main Street into 285 units, 80 percent of which would be market-rate and 20 percent of which would be affordable.

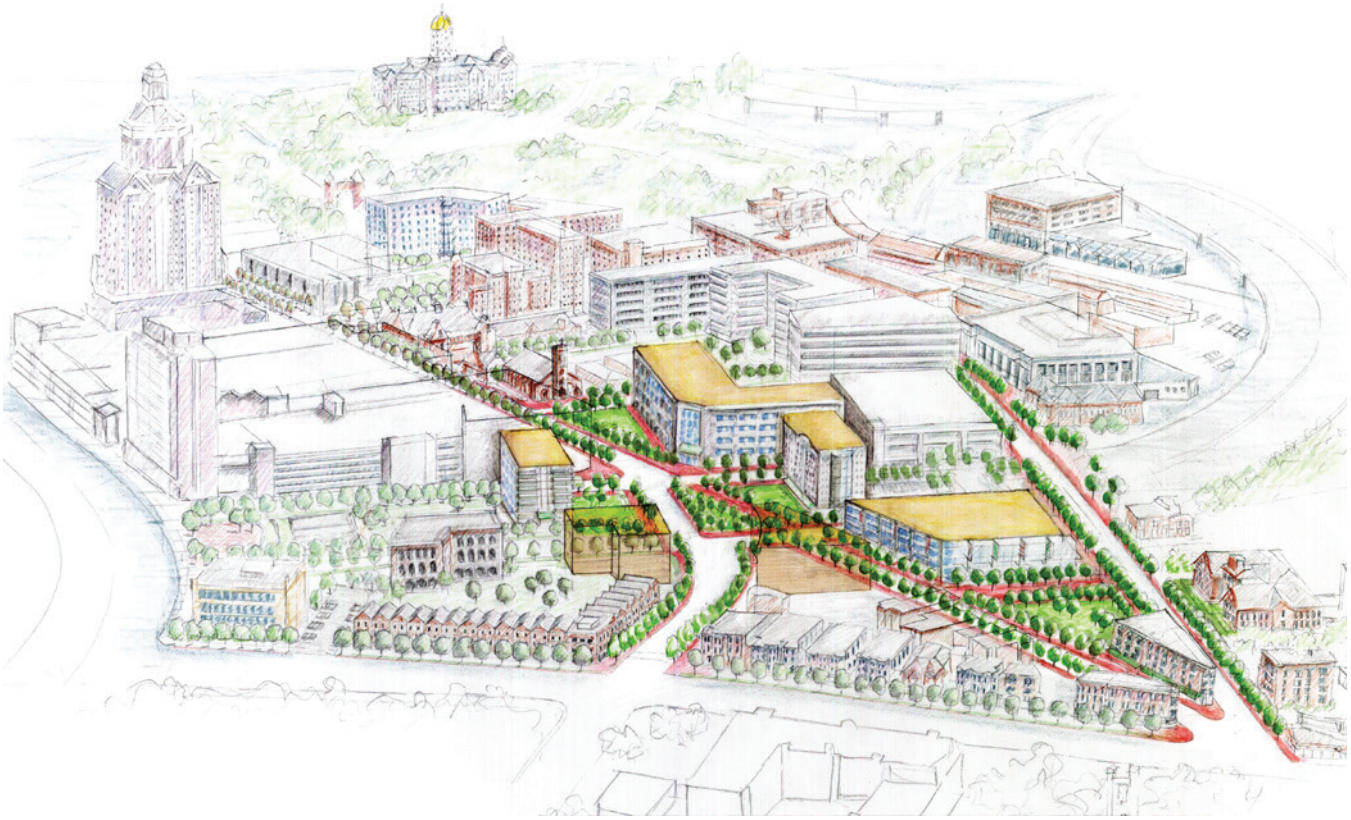
- The nearby presence of Hartford Hospital and St. Francis Hospital continues to provide a growth sector in the Hartford economy, and the CT***fastrak*** line will connect these research institutions with the expanding UConn Health complex in Farmington via a one-seat ride. The impact of this connection may be to expand Hartford's research and development economy, as downtown Hartford will serve as the junction between the anchor institutions and the connection to the growing biotech sector in New Haven. Over time, if the Connecticut biotech industry continues to grow, downtown Hartford may be central place to its growth.

- The recent announcement of the relocation of UConn Hartford's campus from West Hartford to downtown Hartford will increase demand for student housing in downtown Hartford and build greater connections between students, professors, businesses, and employers in the downtown area.

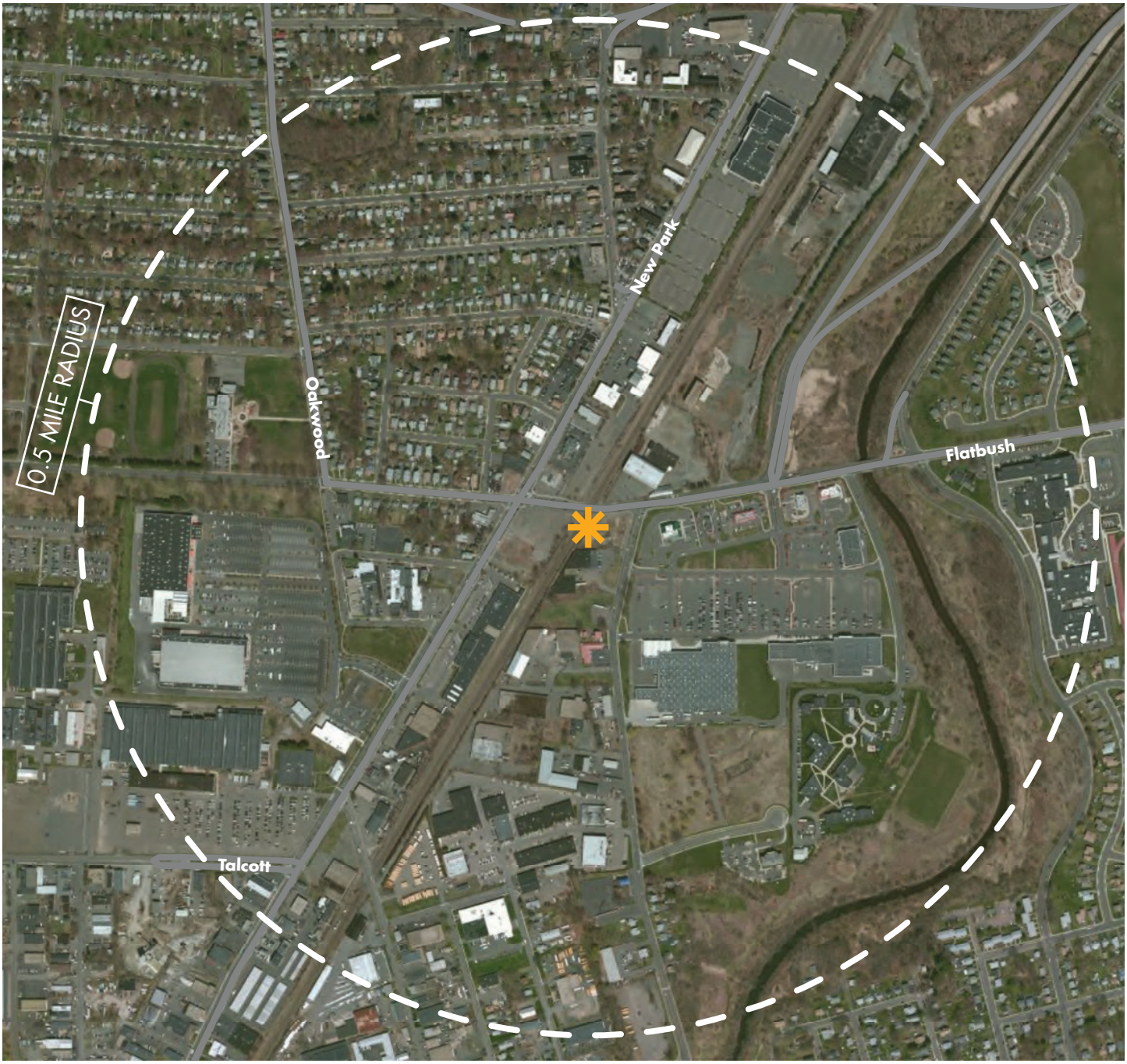
- The potential relocation of additional State of Connecticut offices to vacant downtown Hartford office space, and the proposed redevelopment of historic office buildings along Bushnell Park currently occupied by State of Connecticut offices into market-rate housing, will both support downtown Hartford's residential population, grow its retail market, and reduce vacancy in its office market to healthy, sustainable levels.

These significant opportunities make Hartford a critical station area within the NHHS rail and *CT**fastrak*** corridors, the development of which could also improve the demand for real estate in station areas surrounding Hartford. If downtown Hartford grows into a 24/7 destination and a center for innovation, it will create a presence on the national scale that will benefit all station areas on the transit corridors.

Hartford, CT - 2009 CRCOG Regional Plan



West Hartford, CT



West Hartford, CT

SERVICE: NHHS RAIL, CTFASTRAK

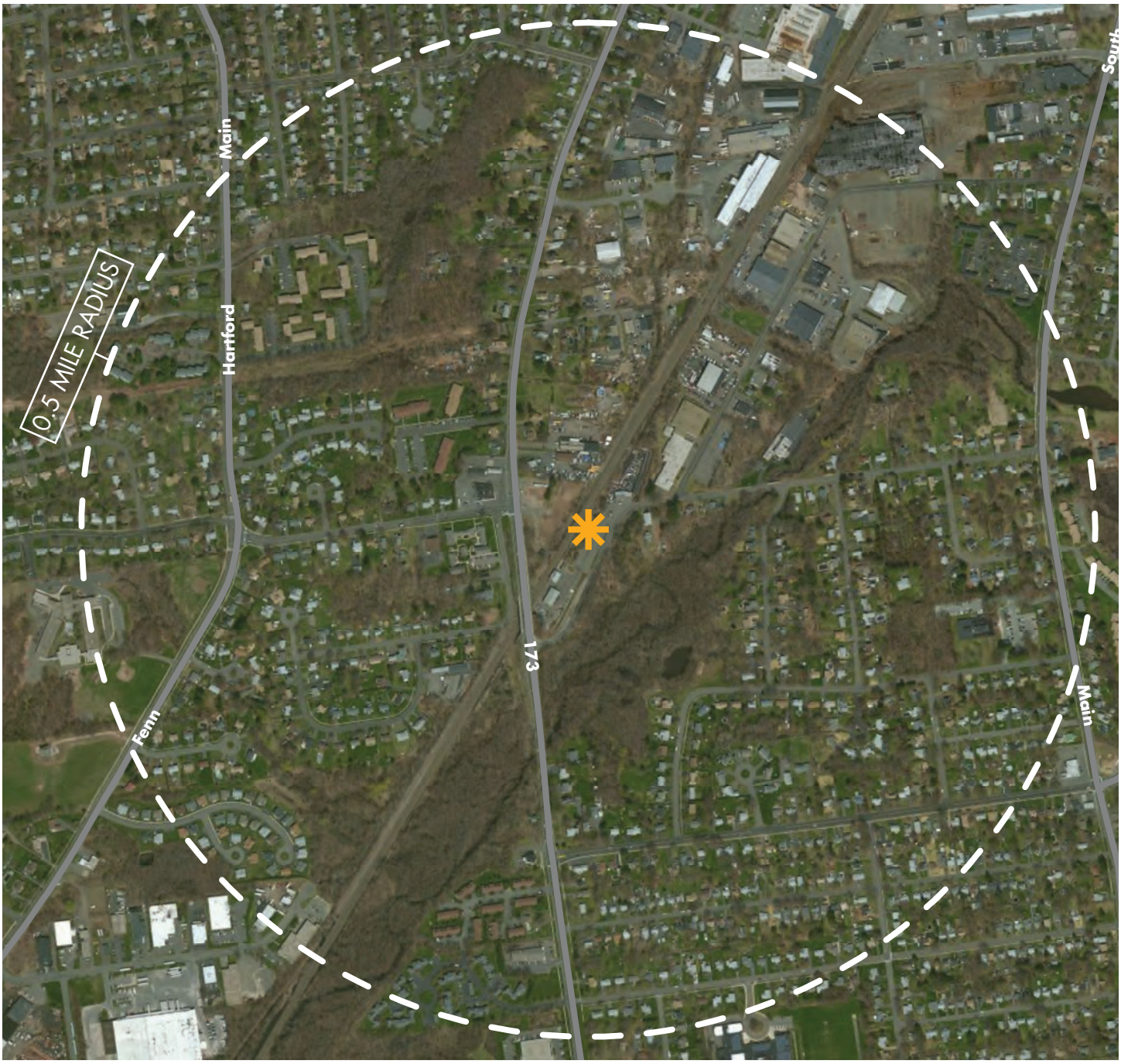
Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Medium	Medium
Persons / Acre	9.48	18.39
% Commercial / Mixed Land Use	36%	30%
% Industrial Land Use	15%	11%
% Residential Land Use	48%	58%
Market Potential		
Employment	2,192	70,867
Median Residential Sales Price	$191,660	$167,746
Median Gross Residential Rent	$992	$885
Other		
Population	2,576	30,892
Households	909	14,348
% Renter Households	52%	75%
% TOD Supportive Jobs	23%	70%
Daily Boardings (2030/2015)	Low (NHHS), Low (CTfastrak)	7,669

The West Hartford Flatbush Ave. *CT**fastrak*** and NHHS stations will be located near each other on a busy arterial road in a neighborhood containing a mix of residential, industrial and commercial uses in the southeast corner of West Hartford, adjacent to the Hartford border. The station area is near the intersection of two commercial corridors and adjacent to two large shopping centers anchored by Walmart, Home Depot, and BJ's Wholesale Club. There are also several manufacturing and light industrial facilities, and a surrounding neighborhood of older single-family and multi-family units.

Despite a stronger housing market in this area, TOD development potential is limited by the built-out, low-density, automobile-oriented design of the existing development and high-capacity streets. A strong redevelopment vision will be required to encourage a walkable, mixed-use environment that promotes transit-oriented development in this area. The West Hartford station, though, has a number of strengths that may support new mixed-use development, including an established retail market, relatively close access to Trinity College, which is about a mile away, an established residential neighborhood, and the location within West Hartford, which is a highly desirable town within the region.






0.5 MILE RADIUS
Main
Hartford
Fenn
173
Main
South

Newington, CT

SERVICE: NHHS RAIL, CTFASTRAK

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Low	Medium
Persons / Acre	6.5	18.39
% Commercial / Mixed Land Use	13%	30%
% Industrial Land Use	39%	11%
% Residential Land Use	48%	58%
Market Potential		
Employment	1,197	70,867
Median Residential Sales Price	$232,220	$167,746
Median Gross Residential Rent	$1,061	$885
Other		
Population	2,072	30,892
Households	898	14,348
% Renter Households	18%	75%
% TOD Supportive Jobs	25%	70%
Daily Boardings (2030/2015)	Low (NHHS), Low (CTfastrak)	7,669

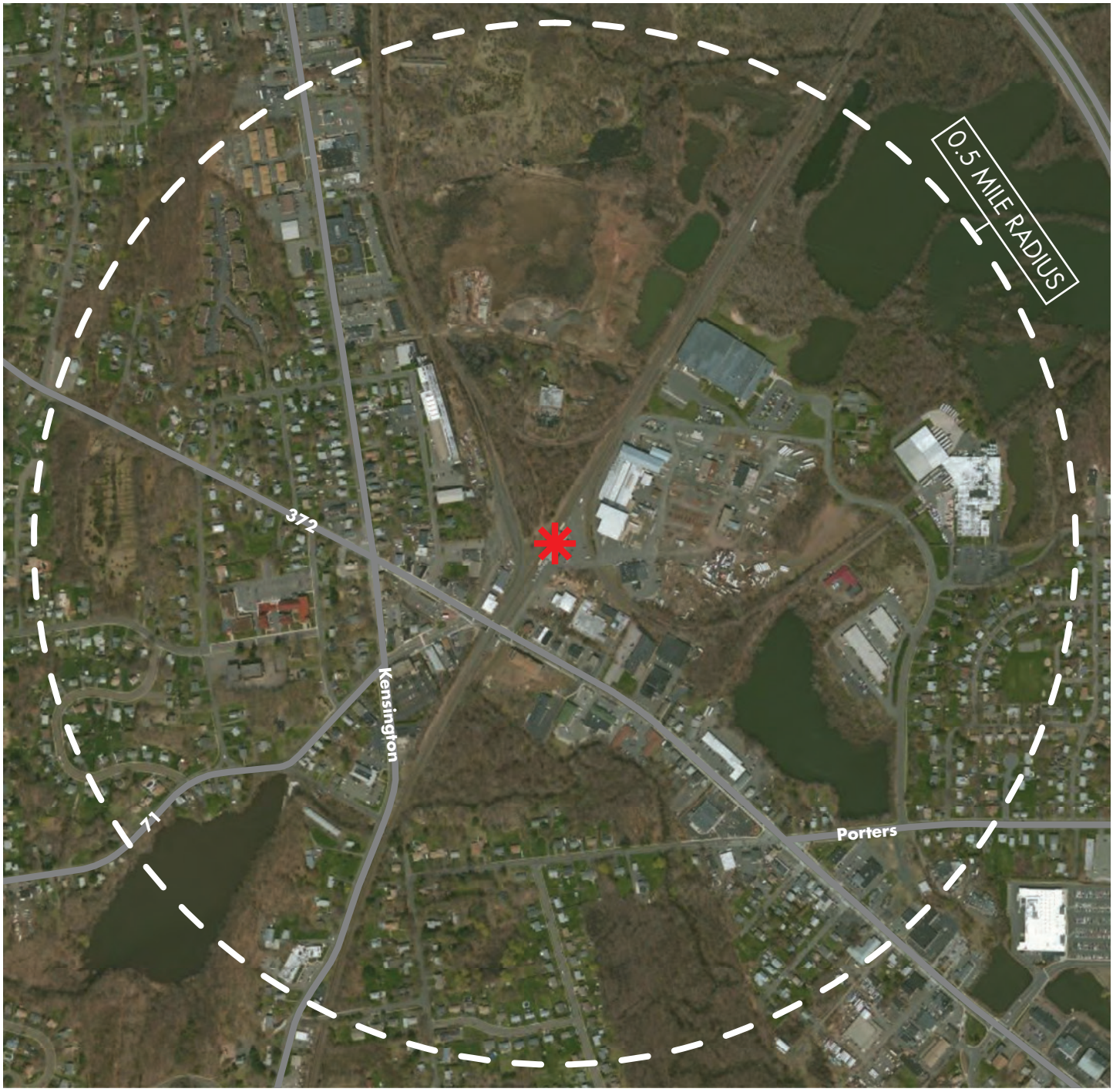
The Newington / Newington Junction station is located on a busy arterial road near the northern border with West Hartford at the intersection of two stable residential areas. The station area is immediately surrounded by low-density commercial development and a municipal park; however, the larger surrounding area is primarily low-density, single-family housing with a few multi-family apartment complexes. There are currently few stores or services located within walking distance.

Because of the high housing values in this area, there is an opportunity to attract new lower-density rental or for-sale housing development, which could help to support new retail as well. Newington is conducting some early-stage TOD concept planning for this area.

Berlin, CT







Berlin, CT

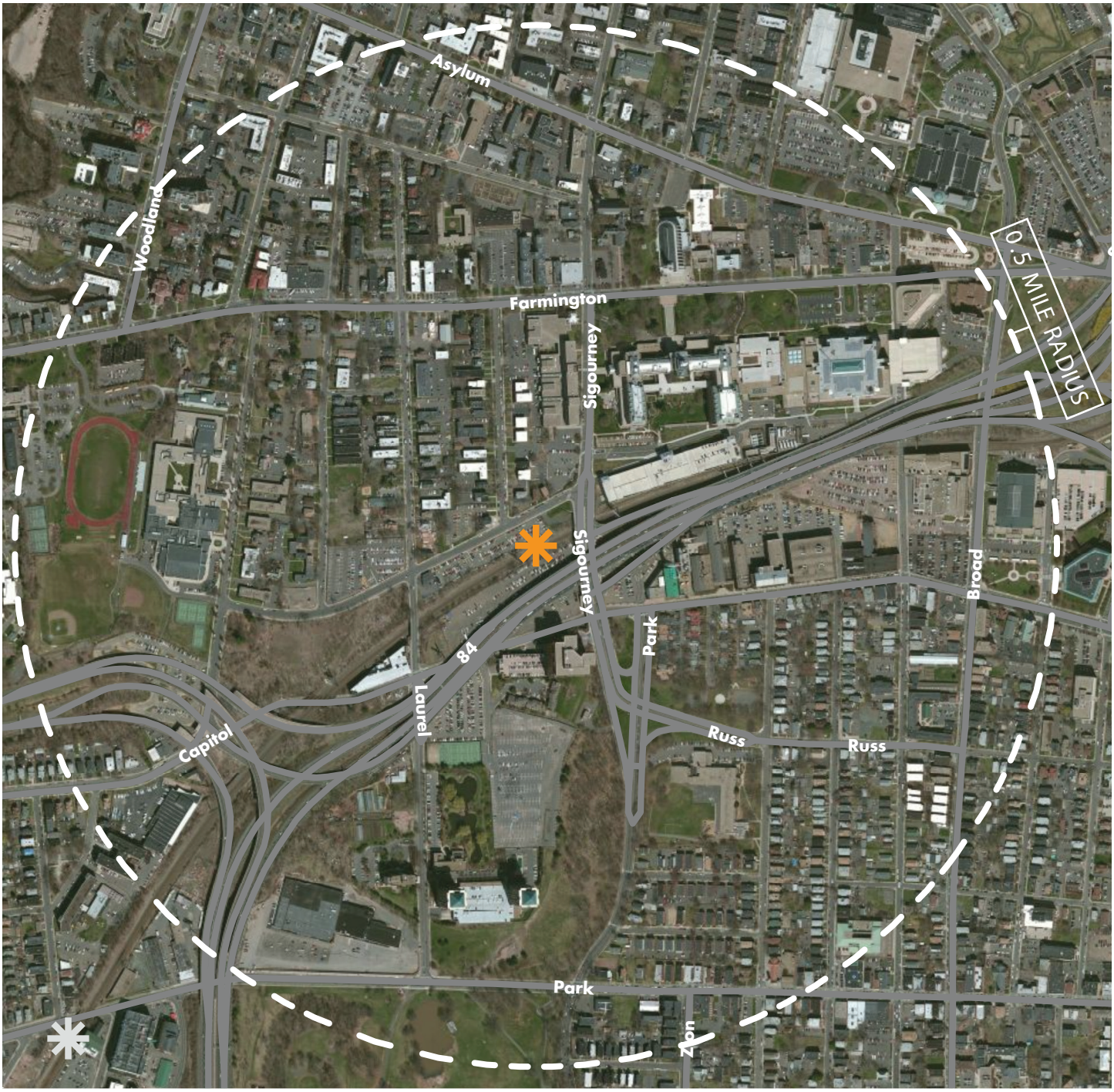
SERVICE: NHHS RAIL

Category	Station Area	NHHS Corridor
Station Area Conditions		
Walkability Rating	Low	Medium
Persons / Acre	4.97	18.39
% Commercial / Mixed Land Use	N/A	30%
% Industrial Land Use	N/A	11%
% Residential Land Use	N/A	58%
Market Potential		
Employment	1,050	70,867
Median Residential Sales Price	$202,518	$167,746
Median Gross Residential Rent	$991	$885
Other		
Population	1,451	30,892
Households	658	14,348
% Renter Households	34%	75%
% TOD Supportive Jobs	38%	70%
Daily Boardings (2030)	Low	7,669

The Berlin station is located at the center of the Kensington neighborhood off a small commercial arterial street. The surrounding area includes small food establishments, a post office and a pharmacy, and is located adjacent to a stable single-family residential neighborhood. The existing station is immediately surrounded by industrial and commercial buildings.

The Berlin station is located within an affluent area and is the last NHHS rail stop before the train continues into the New Haven region. As such, Berlin could potentially benefit strongly from access to both the New Haven and Hartford markets. The rail could unlock the potential for new lower-density rental or for-sale housing developments, including multi-family units to serve young professionals, empty-nesters, and/or retiring seniors with an interest in living near transit. Berlin has been working to revitalize its downtown near the train station, and recently received a state grant to improve pedestrian safety and calm traffic in this area.

Sigourney Street - Hartford, CT



Sigourney Street

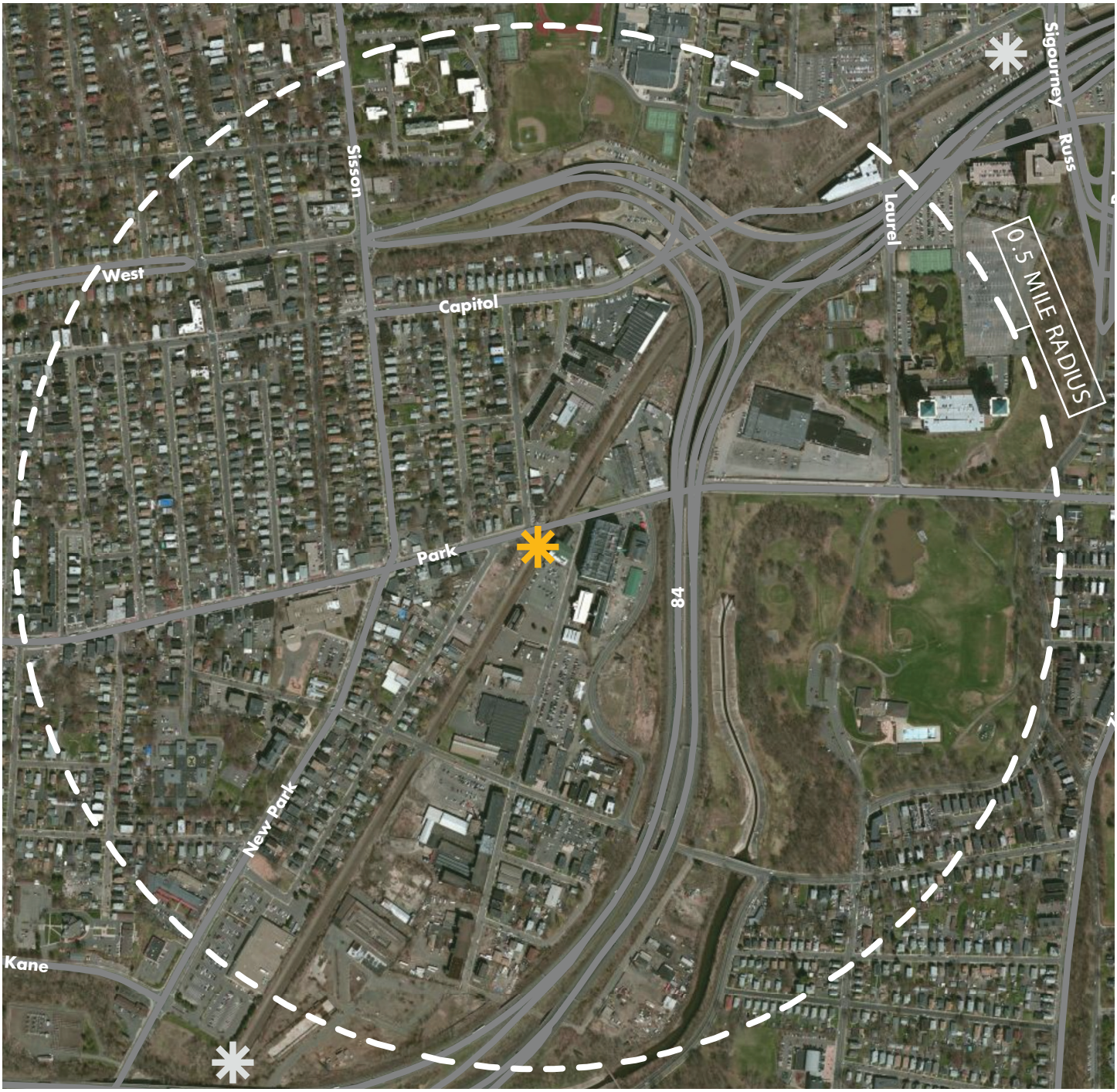
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	Medium	Low
Persons / Acre	57.85	21.61
% Commercial / Mixed Land Use	47%	35%
% Industrial Land Use	3%	19%
% Residential Land Use	50%	46%
Market Potential		
Employment	19,016	73,990
Median Residential Sales Price	$144,950	$160,869
Median Gross Residential Rent	$777	$930
Other		
Population	10,085	43,299
Households	4,696	17,744
% Renter Households	94%	78%
% TOD Supportive Jobs	88%	75%
Daily Boardings (2015)	High	8,337

The Hartford Sigourney Street *CTfastrak* station will be located less than a mile from Union Station, on the west side of Interstate 84. The station area is fairly walkable, containing a mix of commercial and residential uses, mostly multi-family apartments. There are several large-scale employers in the study area, including Aetna headquarters and St. Francis Hospital.

The existing real estate market is not favorable to attracting new development, commanding lower housing prices and rents than the *CTfastrak* corridor. However, there is an opportunity to work with the large employers present in the station area, such as Aetna and the Hartford, which may be interested in pursuing transit-oriented development in this station area by targeting employer-assisted housing or redeveloping vacant or under-utilized sites.

Park Street - Hartford, CT



Park Street

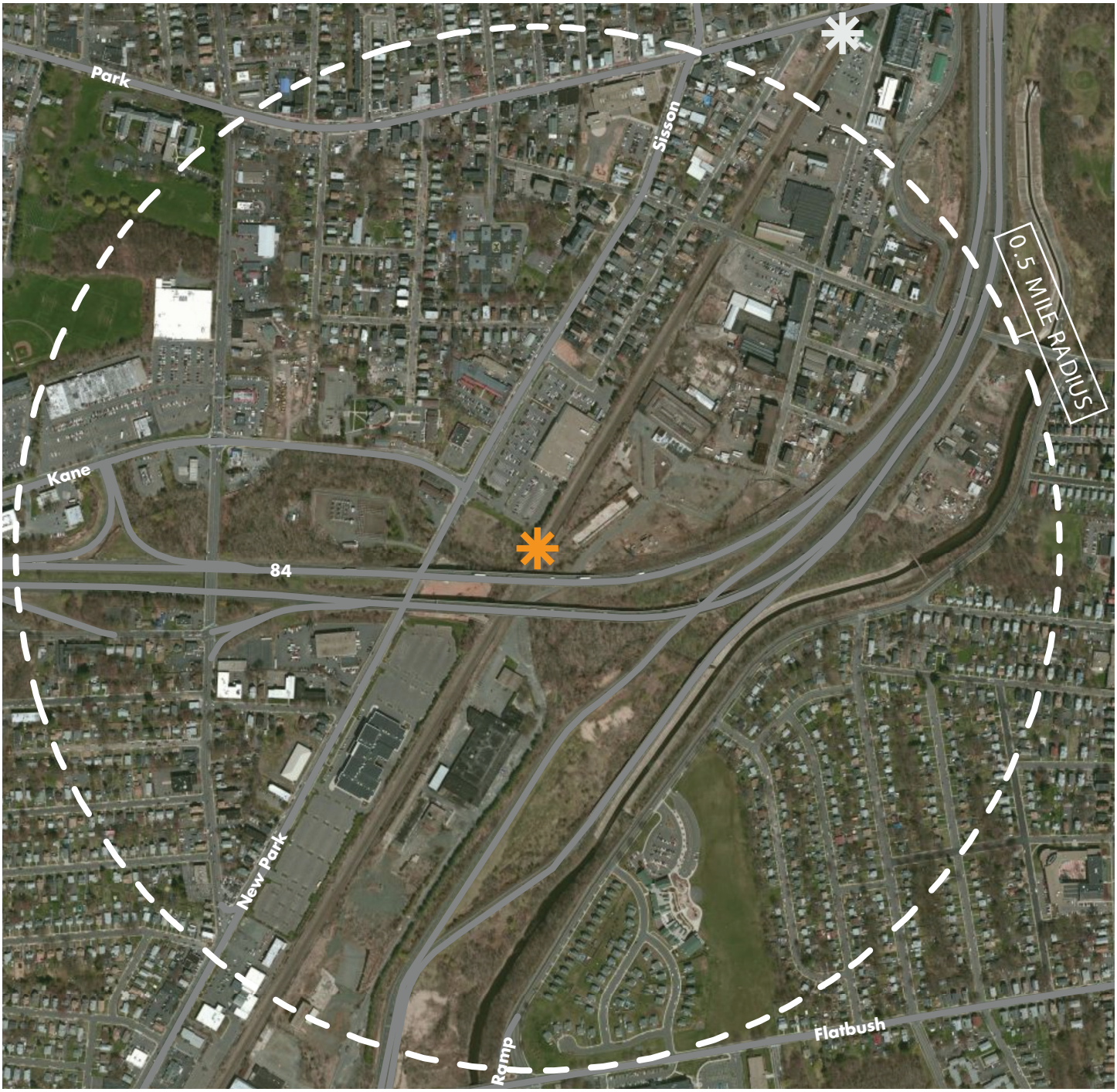
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	High	Low
Persons / Acre	20.94	21.61
% Commercial / Mixed Land Use	27%	35%
% Industrial Land Use	14%	19%
% Residential Land Use	59%	46%
Market Potential		
Employment	2,138	73,990
Median Residential Sales Price	$73,600	$160,869
Median Gross Residential Rent	$842	$930
Other		
Population	8,395	43,299
Households	3,455	17,744
% Renter Households	90%	78%
% TOD Supportive Jobs	59%	75%
Daily Boardings (2015)	Medium	8,337

The Hartford Park Street *CT**fastrak*** station will be located on a busy arterial near Interstate 84, and situated in an older, downtown-adjacent neighborhood containing single-family homes, multifamily units, parks, and neighborhood-serving retail. Several large, multi-story former industrial buildings have been converted to alternative housing and commercial uses, and adjacent lots may serve as potential development opportunities in the future. The existing residential neighborhood features traditional walkable design, but Interstate 84 and parkland create barriers to the east.

Short-term development potential is limited due to low rents and sales prices. Given the presence of the existing neighborhood and the barriers of Interstate 84 and Pope Park to the east, future development will likely consist of smaller-scale residential and commercial uses that enhance the existing neighborhood. Park Street is an excellent location for new affordable and mixed-income development, which will bring new investment and expand the appeal of the station area to a more diverse population.

Kane Street - Hartford, CT



Kane Street

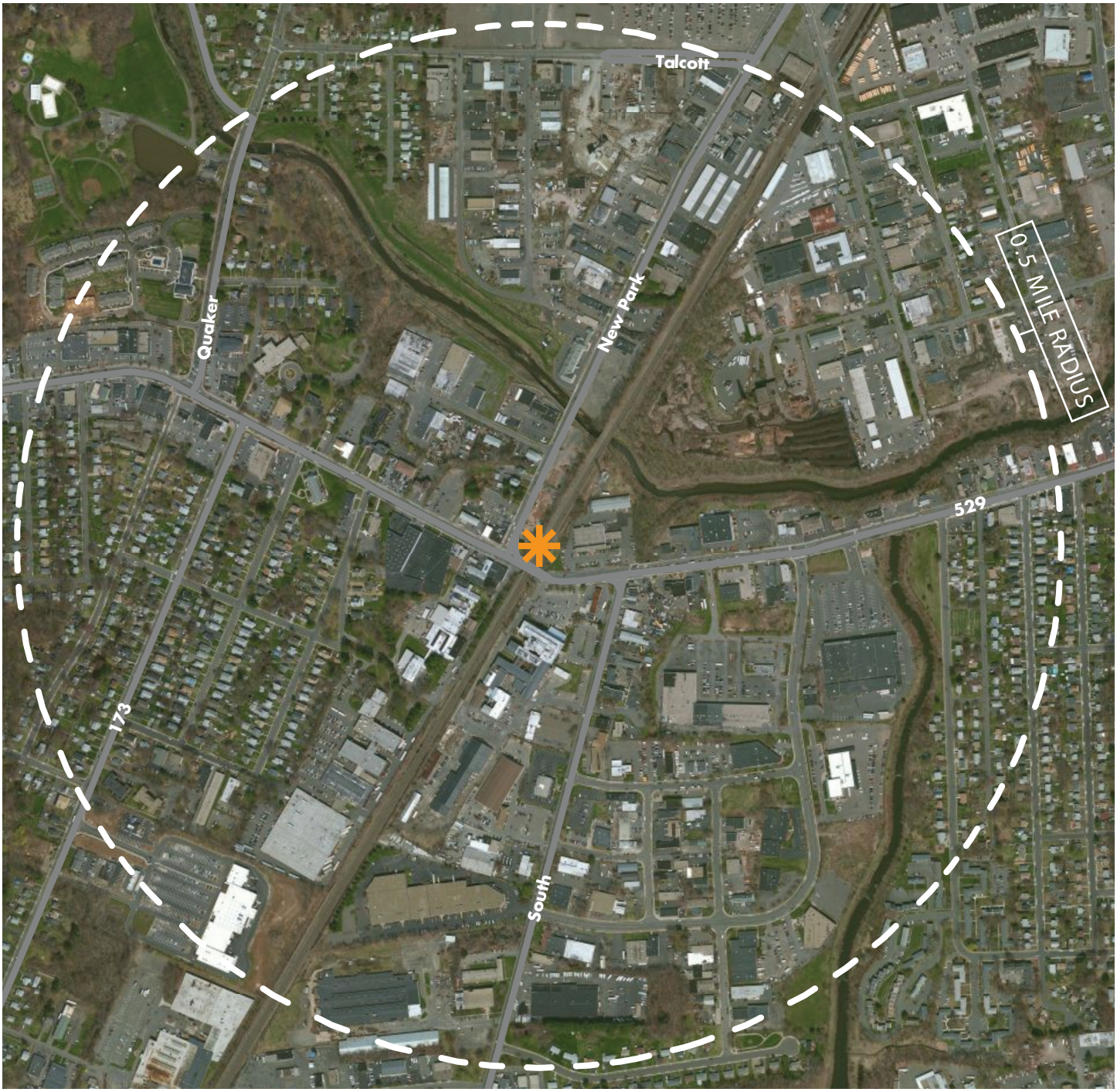
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	Medium	Low
Persons / Acre	14.86	21.61
% Commercial / Mixed Land Use	33%	35%
% Industrial Land Use	22%	19%
% Residential Land Use	45%	46%
Market Potential		
Employment	2,495	73,990
Median Residential Sales Price	$165,000	$160,869
Median Gross Residential Rent	$882	$930
Other		
Population	4,979	43,299
Households	1,756	17,744
% Renter Households	69%	78%
% TOD Supportive Jobs	50%	75%
Daily Boardings (2015)	Low	8,337

The Hartford Kane Street *CTfastrak* station will be located near the intersection of two major arterial roads lined by commercial establishments including two medium size shopping centers and several auto-oriented light industrial establishments. The remaining area is surrounded by older single-family homes and small-scale multi-family housing largely located within a well-connected network of streets.

The Kane Street area's rent and sales prices are comparable to the *CTfastrak* corridor as a whole, but the station area is largely built out with automobile-oriented commercial uses on a major arterial with surrounding low-density neighborhoods. Converting the auto-oriented commercial centers to mixed-use, transit-supportive environment will require investments in place-making and pedestrian infrastructure to encourage transit-oriented development. Similar to Park Street, Kane Street is also an excellent location for affordable or mixed-income developments.

Elmwood - West Hartford, CT



Elmwood

SERVICE: CTFASTRAK

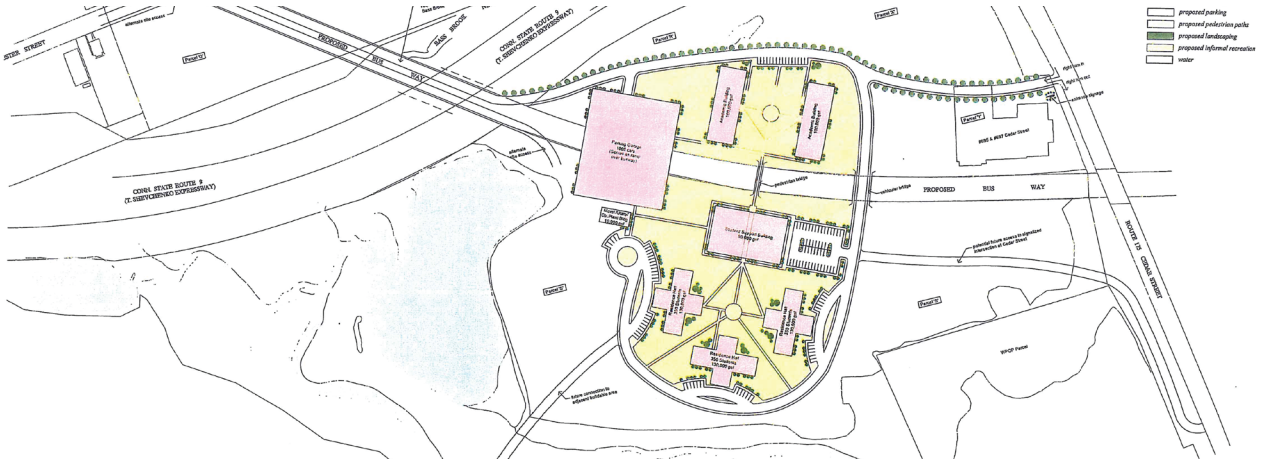
Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	Medium	Low
Persons / Acre	11.16	21.61
% Commercial / Mixed Land Use	34%	35%
% Industrial Land Use	39%	19%
% Residential Land Use	26%	46%
Market Potential		
Employment	3,695	73,990
Median Residential Sales Price	$206,020	$160,869
Median Gross Residential Rent	$956	$930
Other		
Population	1,920	43,299
Households	827	17,744
% Renter Households	58%	78%
% TOD Supportive Jobs	29%	75%
Daily Boardings (2015)	Medium	8,337

The West Hartford Elmwood *CTfastrak* station will be located in an area dominated by small and medium sized light industrial businesses, with many oriented towards the automobile needs. The station area also contains retail and food services, and some single-family residential units.

The station area features a relatively strong market, which may provide opportunities for medium-density development in this area, including residential and office uses, potentially by redeveloping the existing low-density industrial land uses and introducing a street network more conducive to TOD.

One example of the potential for new redevelopment is the recent ground-breaking of a 47-unit apartment building that will include 15 units of affordable housing.


0.5 MILE RADIUS
Barbour
Ella Grasso
Fenn
175
9
9


proposed parking
proposed pedestrian paths
proposed landscaping
proposed informal recreation
water
PROPOSED BUS WAY
CENTRAL STATE ROUTE 9
(T. CHERVENKO EXPRESSWAY)
STATE STREET
ROUTE 15 - CEDAR STREET

Cedar Street

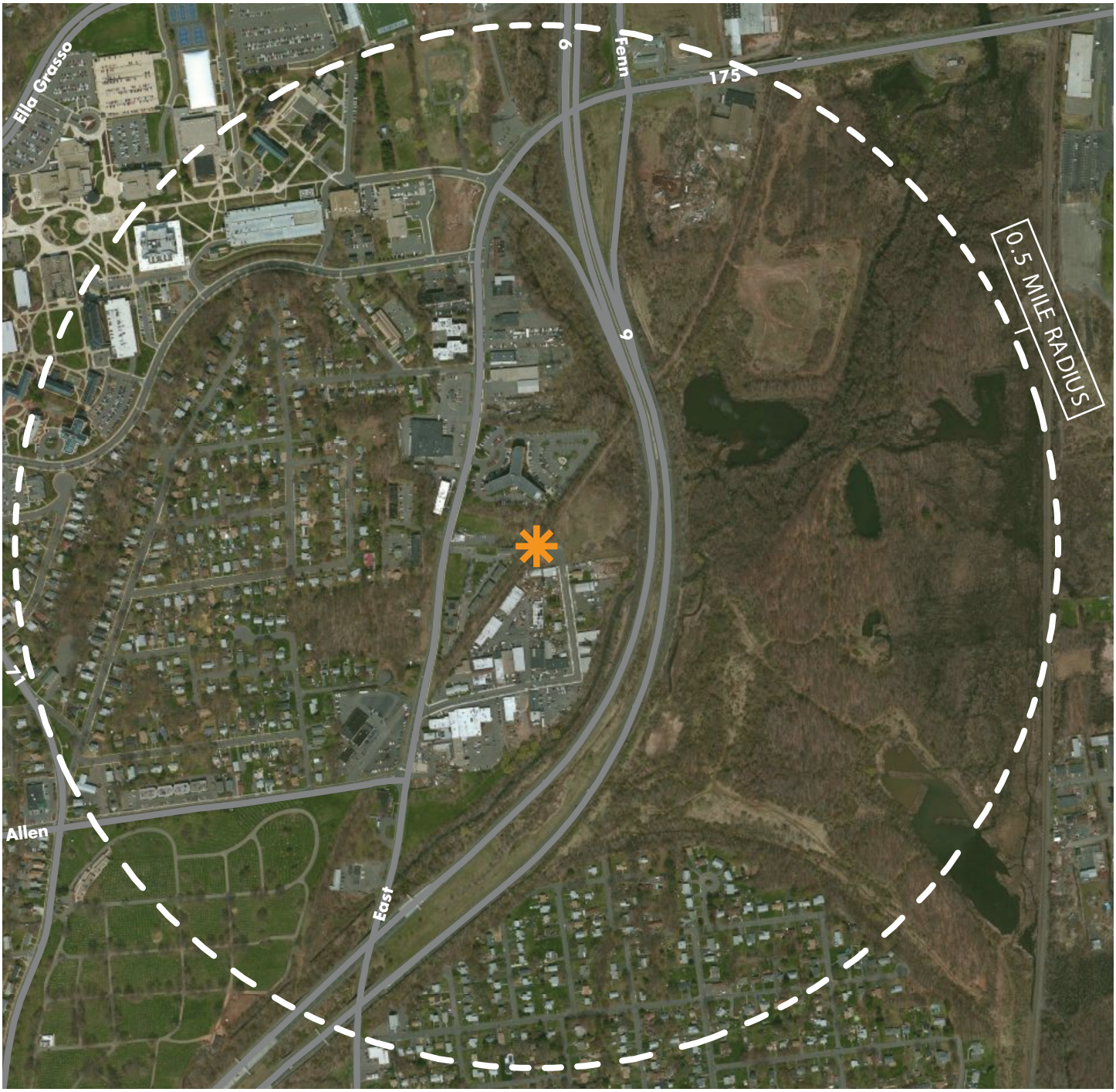
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	Low	Low
Persons / Acre	3.93	21.61
% Commercial / Mixed Land Use	56%	35%
% Industrial Land Use	32%	19%
% Residential Land Use	13%	46%
Market Potential		
Employment	606	73,990
Median Residential Sales Price	$193,673	$160,869
Median Gross Residential Rent	$1,092	$930
Other		
Population	1,369	43,299
Households	264	17,744
% Renter Households	44%	78%
% TOD Supportive Jobs	14%	75%
Daily Boardings (2015)	Low	8,337

The Newington Cedar Street *CTfastrak* station will be located just east of the Central Connecticut State University (CCSU) campus and its large concentration of students and employees. Other features include some small retail businesses and a large amount of open space.

CCSU owns much of the land surrounding the Cedar Street station and has strong potential to lead university-directed TOD in the area. CCSU has plans for a major expansion of its campus in and around the Cedar Street and East Street stations, including residence halls containing up to 300+ beds, an expanded Department of Athletics facility, new Department of Fine Arts facilities, a day care center, and a 1,000-space parking garage. An expansion of this size will transform the station area and, with careful planning, generate opportunities for additional private housing, retail and office development in the surrounding parcels. Regional and municipal government should implement a partnership with CCSU to suport this ambitious plan and identify ways to maximize its benefit to the surrounding station areas. A redevelopment plan for the station area incorporating CCSU's plans would be highly beneficial. The Cedar Street and East Street stations will also both serve CCSU via new circulator bus routes.

East Street - Newington, CT



East Street

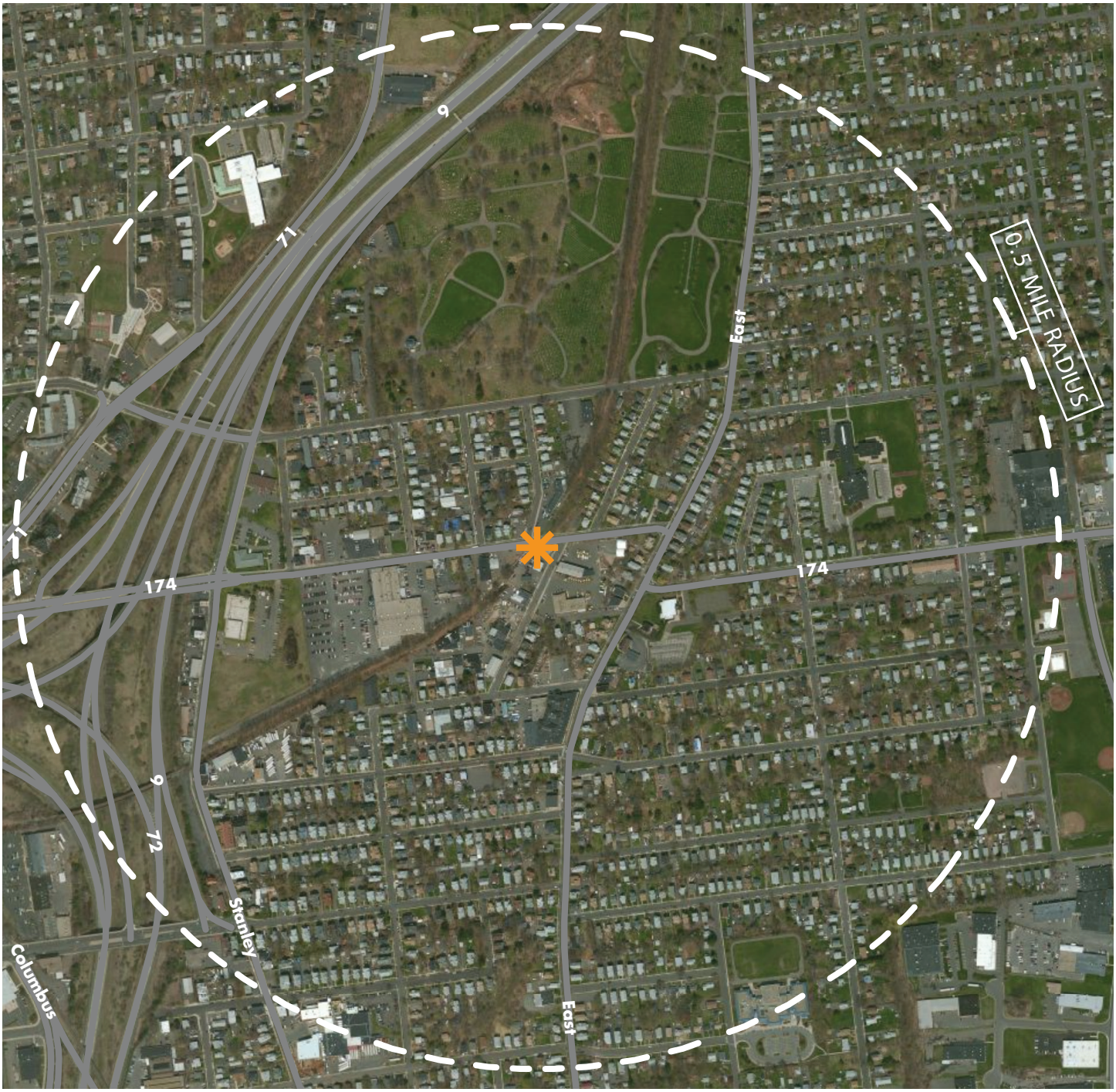
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	Low	Low
Persons / Acre	9.48	21.61
% Commercial / Mixed Land Use	13%	35%
% Industrial Land Use	1%	19%
% Residential Land Use	85%	46%
Market Potential		
Employment	1,609	73,990
Median Residential Sales Price	$145,080	$160,869
Median Gross Residential Rent	$1,061	$930
Other		
Population	3,158	43,299
Households	959	17,744
% Renter Households	51%	78%
% TOD Supportive Jobs	79%	75%
Daily Boardings (2015)	Low	8,337

The New Britain East Street *CT**fastrak*** station will be located southeast of the Central Connecticut State University (CCSU) campus and its large concentration of students and employees. However, the East Street station area is not a pedestrian-friendly environment, and the connections to CCSU are weak, in spite of its proximity. The stop is immediately adjacent to a mix of larger multifamily residential buildings, a community of single-family homes, and light industrial uses.

Unlike the Cedar Street station, East Street is situated within a weaker market, built-out area with less potential for CCSU to influence the market. Development potential is limited, but there may be demand for university-related uses over time. See Cedar Street for a detailed description of the CCSU expansion potential.

East Street - New Britain, CT



East Main Street

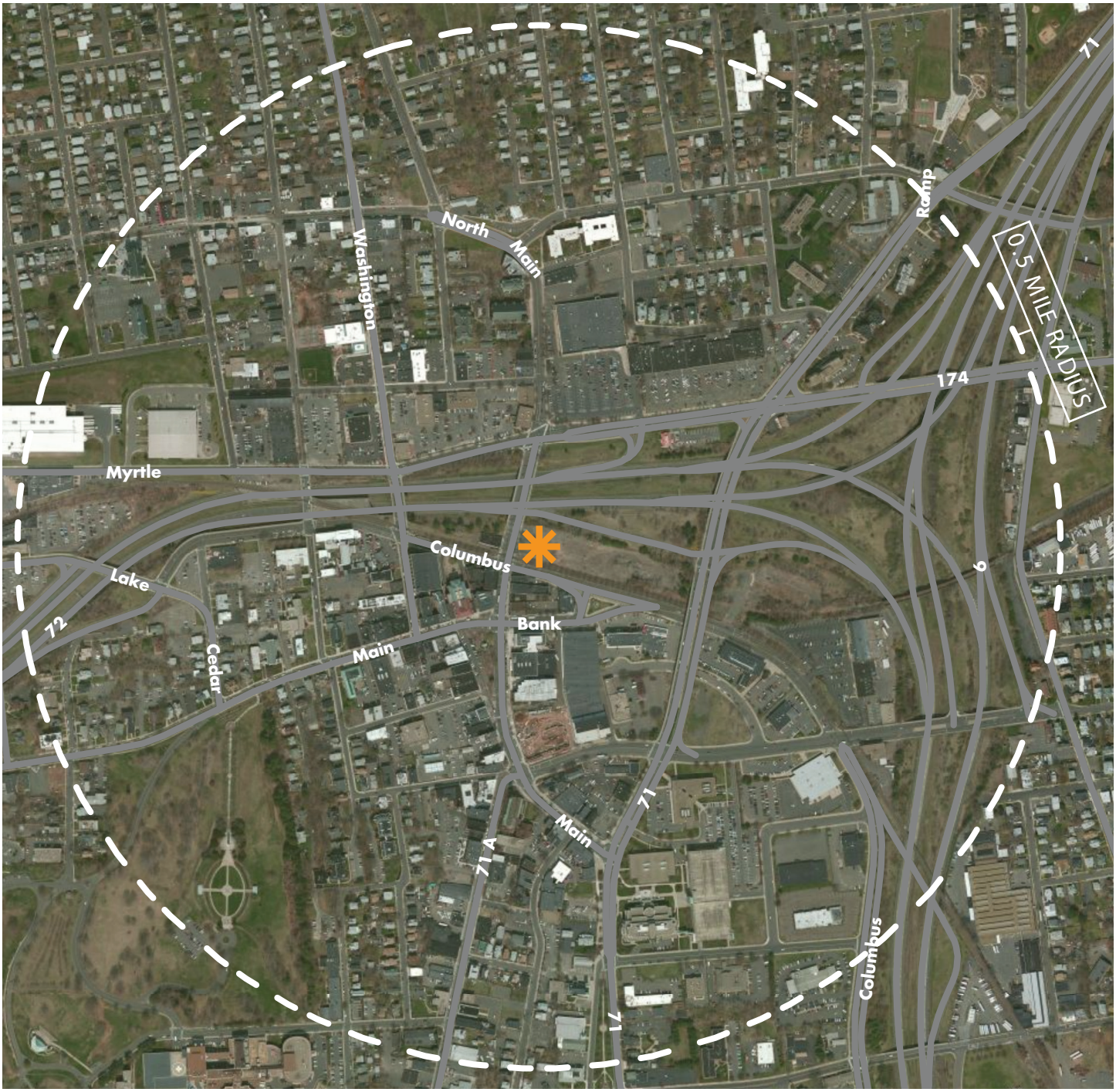
SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walk Score	Low	Low
Persons / Acre	15.92	21.61
% Commercial / Mixed Land Use	10%	35%
% Industrial Land Use	11%	19%
% Residential Land Use	79%	46%
Market Potential		
Employment	1,423	73,990
Median Residential Sales Price	$118,150	$160,869
Median Gross Residential Rent	$776	$930
Other		
Population	6,583	43,299
Households	2,607	17,744
% Renter Households	79%	78%
% TOD Supportive Jobs	79%	75%
Daily Boardings (2015)	Low	8,337

The New Britain East Main Street *CT**fastrak*** station area is largely an older residential area including single-family and smaller multifamily homes, with a few small businesses, schools, and a medium size auto dealer distributed throughout. Fairview Cemetery and Connecticut Route 9 occupy much of the station area to the north of the station. The street connectivity is good, but few amenities are within easy walking distance.

The East Main Street area is a relatively weak market without major employers or other significant drivers of demand for transit-oriented development in the short term. However, over time, there may be potential for lower density housing or employment uses.

New Britain CBD - New Britain, CT



New Britain

SERVICE: CTFASTRAK

Category	Station Area	CTfastrak Corridor
Station Area Conditions		
Walkability Rating	High	Low
Persons / Acre	24.02	21.61
% Commercial / Mixed Land Use	38%	35%
% Industrial Land Use	28%	19%
% Residential Land Use	34%	46%
Market Potential		
Employment	6,893	73,990
Median Residential Sales Price	$124,867	$160,869
Median Gross Residential Rent	$679	$930
Other		
Population	5,187	43,299
Households	2,349	17,744
% Renter Households	91%	78%
% TOD Supportive Jobs	70%	75%
Daily Boardings (2015)	High	8,337

The Downtown New Britain *CT**fastrak*** station area is a traditional smaller downtown, featuring a walkable street grid and a concentration of retail and service businesses. Residential uses are located beyond the downtown core, and are mostly single-family. The station area includes The Hospital of Central Connecticut and the CCSU Institute of Technology and Business Development.

As the terminus of the line, Downtown New Britain is projected to have 1,582 daily *CT**fastrak*** boardings in 2015. New Britain already has excellent physical character to support TOD, but the low rent/sales prices and vacancies in the area are market challenges that must be overcome. Institutional partnerships and public reinvestment in the public realm could help to attract new development and/or the reuse of existing historic buidings.

One example of public reinvestment underway is the downtown streetscape project, which will significantly enhance and support the pedestrian link between downtown New Britain and the CT***fastrak*** station. The City is completing a Downtown Streetscape Master Plan and associated design standards for streetscape and pedestrian improvements that is already being implemented utilizing a variety of funding sources.

Appendix B

Civic Engagement Approach

Objectives of the Civic Engagement Process

The primary objective of the civic engagement process was to provide insight, perspectives and information that are not always available from data driven resources. The information gathered from the civic engagement process directly informed the Knowledge Corridor Market Study. Another objective of the civic engagement process was to build awareness and consensus on the goals for the region and for transit-oriented development in particular, as well as on the assets, opportunities, challenges, and strategies for achieving the goals.

Participants

Because of the technical content for a market analysis of the knowledge corridor, civic engagement focused on facilitating input from two primary sources - an Advisory Committee that met at benchmarks in the development of the final deliverable, and interviews with experts in the industry to directly inform the Study. Community members were invited to participate in December 2012 public meetings and the March 2013 Consortium meeting.

1) **Advisory Committee**: A committee consisting of approximately 15 individuals in the Hartford-Springfield region recognized for their knowledge of economic conditions, real estate markets, public policy and government programs, for- and non- profit industries, and/or trends in higher education and industry growth. A list of Advisory Committee members is provided in this section.

2) **Stakeholder Experts**: Individuals and/or institutions with specific expertise in market analysis and economic development conditions in the region.

3) **Community Members**: Those interested in providing input into and furthering a vision and set of goals for the future of the region as a livable, affordable, and economically sustainable region. Invited participants included residents, business owners, workers, non-profit organizations, anchor educational institutions, policy makers, public and elected officials.

Civic Engagement Schedule

Meetings with the participants in the civic engagement process were scheduled to coincide with the development of the final deliverable for this project. The objective was to gather relevant, focused information from experts, provide an opportunity to present the draft findings as they were developed for review, input, and consensus-building, as well as to communicate and construct a narrative to ensure that the final document is consistent with the goals and objectives of the client. In addition, the civic engagement helped to shape a community vision for transit oriented development.

Advisory Committee Meeting Dates and Main Agenda Topics

The Advisory Committee reviewed and advised on the study as it was developed. Committee members recommended other participants who might also

provide focused information to inform the study. They also provided assistance on outreach and communication strategies for the stakeholder workshops.

Advisory Committee Meeting Dates and Main Agenda Topics:

Meeting 1: May 3, 2012
Existing Conditions – Initial Data Analysis Summaries (Tasks 1, 2)
Meeting 2: August 15, 2012
Data Analysis Summaries –Market Findings for the Region, Corridor and Station Areas (Tasks 3, 4)
Meeting 3: December 11, 2012
Synthesizing Data and Analysis – Strategies for Transit-Oriented Development in the Knowledge Corridor (Tasks 5, 6)

Stakeholder Expert Interviews
Interviews with stakeholder experts occured during Tasks 2-4, although some continued at subsequent stages. The purpose of the interviews was to obtain targeted information and data, as well as a practical understanding of market and industry trends, needs, and objectives, and how the transit corridor might facilitate economic development and market growth in the region. A list of the stakeholders interviewed in the study is included in this appendix.

Community Member Presentations and Workshops
The team participated in workshops with Community Members to address three distinct phases of the project:
- Introduction to Transit-Oriented Development and the Study; Challenges and Opportunities for TOD
- Creating a Shared Vision: Strategies for Transit-Oriented Development
- Synthesis: Policies and actions for Transit-Oriented Development

Community Meeting Dates and Main Agenda Topics:

December 11-12, 2012 (4 meetings):
Hartford region: The Consulting Team presented the main economic, demographic and real estate market analysis findings and discussed the proposed strategies. The Consulting Team presented to the following groups:
- Local planning commissioners and officials,
- Local elected and appointed municipal officials, and
- The Hartford-Springfield Economic Partnership.

Springfield region. The Consulting Team held a similar meeting with public officials in the Springfield Region.

March 6, 2013:
The Consulting Team presented its key findings to the Sustainable Knowledge Corridor Consortium.

The consulting team also developed an electronic presentation for the client to use at other meetings to expand the outreach. The electronic presentation was developed in coordination with the Client for its use in presenting the Market Study findings to its constituents and is accompanied by a narrative to assist the client in communicating the findings. These meetings will be important to begin to shape a shared vision for transit-oriented development in the station areas.

Knowledge Corridor Market Study Advisory Committee Members

Michael Graney (Western Massachusetts Economic Development Council)
John Shemo (Metro Hartford Alliance)
Doug Fischer (Northeast Utilities)
Judy Resnick (Connecticut Business and Industry Association)
Margaret Nareff / Martin Estey (Hartford Consortium for Higher Education)
Todd Andrews (Goodwin College)
Kevin McCaffrey (Mount Holyoke College)
Kip Bergstrom (Connecticut Department of Economic and Community Development)
Mike Vedovelli (Massachusetts Office of Business Development
Tom Maziarz (Connecticut Department of Transportation)
Lyle Wray (Capitol Region Council of Governments)
Tim Brennan (Pioneer Valley Planning Commission)
Robert Fusari (Real Estate Services of Connecticut)
Betsy Crum (Connecticut Housing Coalition)
Kevin Kennedy (Springfield Redevelopment Authority)

Knowledge Corridor Market Study Stakeholder Interviewees

Real Estate Stakeholders:
Abe Naparstek, Forest City Enterprises
David Fink, Partnership for Strong Communities
Geoff Sager, Metro Realty
Jason Rudnick, Centerplan
John Kuppens, Winn Residential
Marc Levine, Marc S. Levine Real Estate Interests
Mike Goman, Goman & York

Connecticut Homebuilders and Remodelers Association (CTHBRA) Developers Council:
Bill Ethier, CTHBRA
Bill Ferrigno, Sunlight Construction Company
Liz Verna, Verna Developers
George LaCava, Trilacon Development
Ken Boynton, Boynton Construction
John Carrier, JFC Endeavors Inc.
Terence Beaty, Prudential CT Realty
Joanne Carroll, JMC Resources

The Simon Konover Company:
Carol Martin
Marie Mazzotta
Lucy Carlson
Newt Brainard

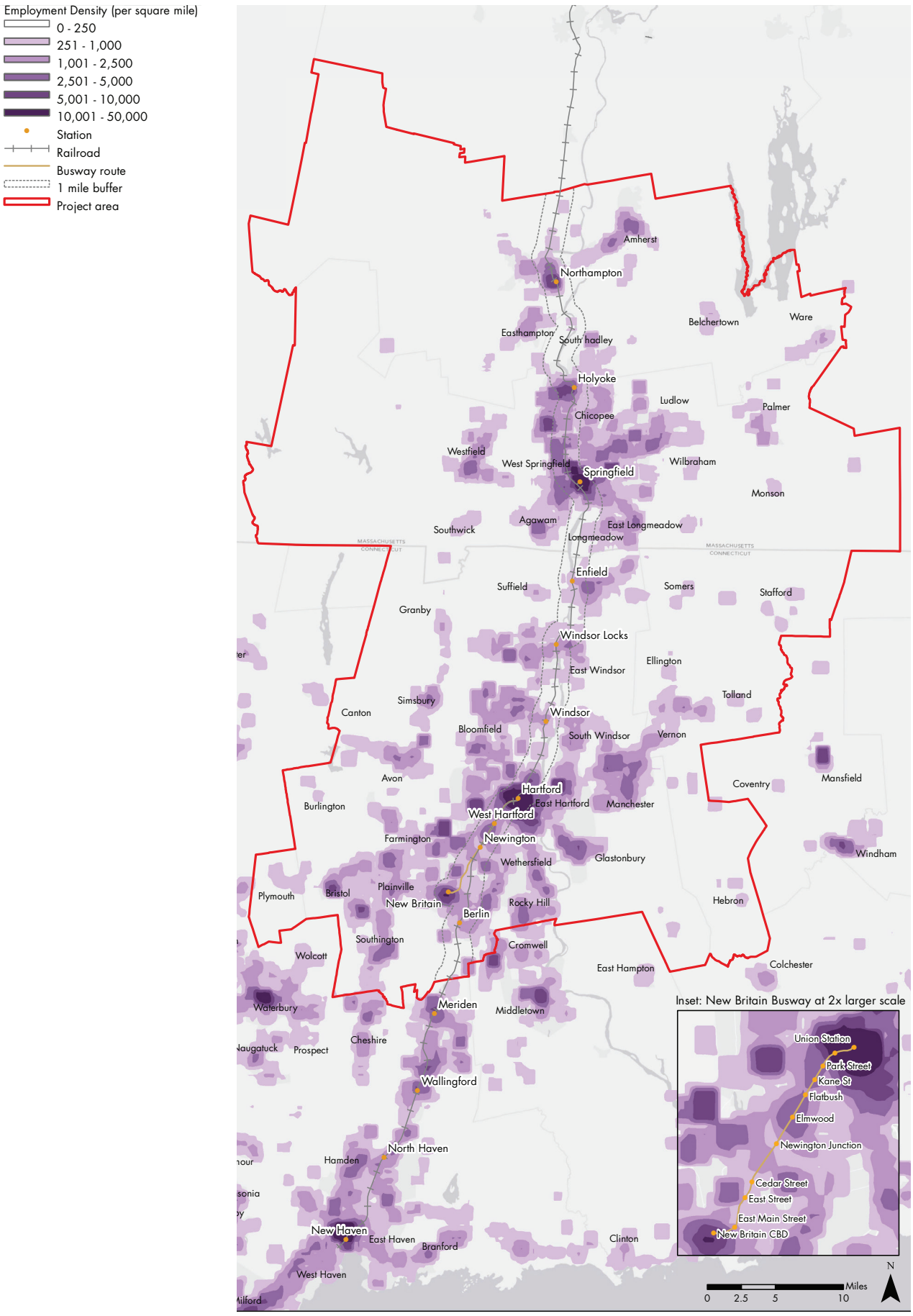
Commerce / Industry Stakeholders:
Barbara Fernandez, Connecticut Department of Economic and Community Development
Mary Holz-Clause, University of Connecticut
Marla Michel, University of Massachusetts, Amherst
Susan Winkler, Connecticut Insurance and Financial Services
Eric Nakajima, MA Executive Office of Housing and Economic Development
Neal Beup, United Technologies
Alissa DeJonge, Connecticut Economic Research Center
Dr. Robert Nakosteen, University of Massachusetts
John Shemo, Metro Hartford Alliance

Education Stakeholders:
Margi Nareff, Hartford Consortium for Higher Education
Neal Abraham, Five Colleges, Inc.

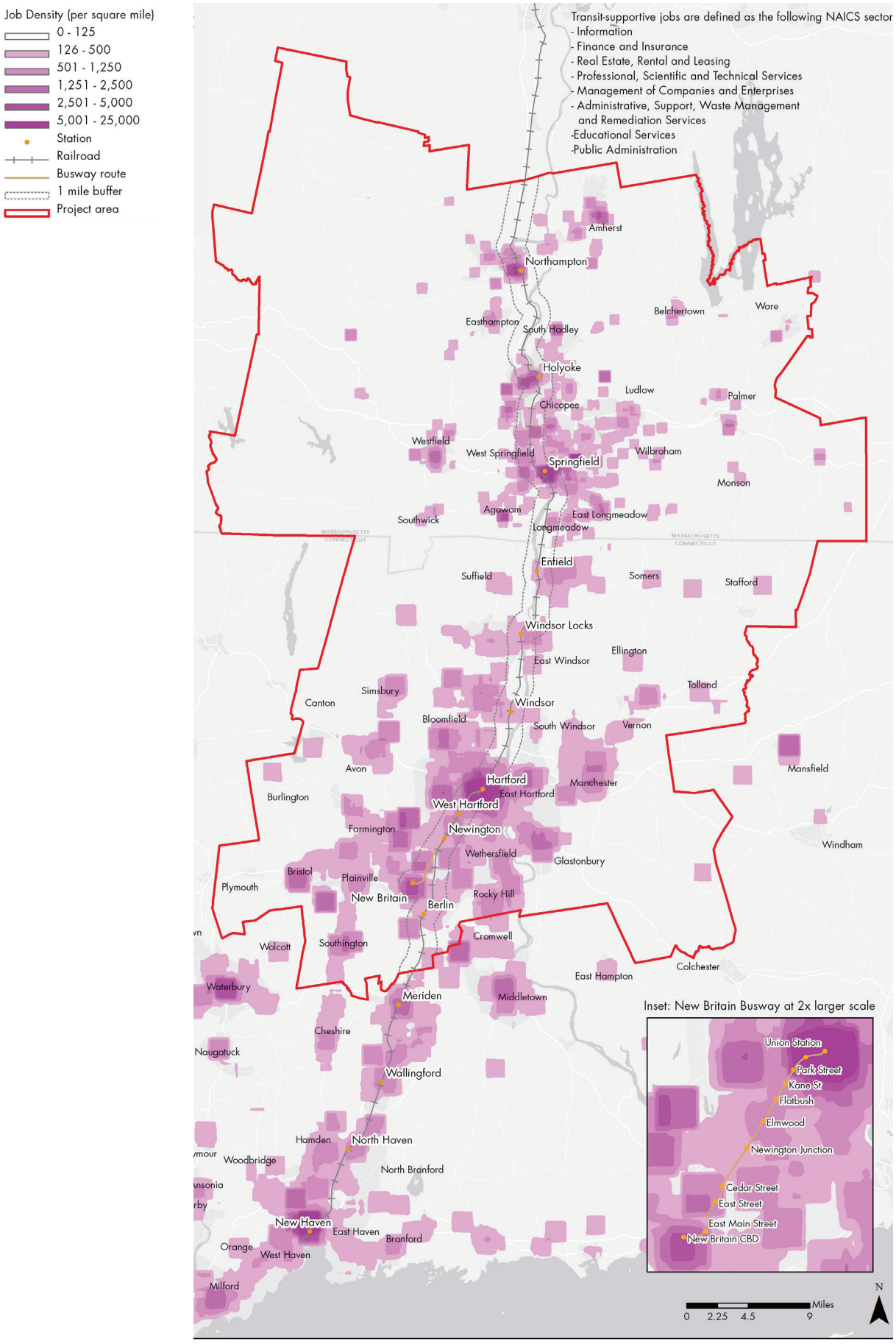
Appendix C

Employment Maps

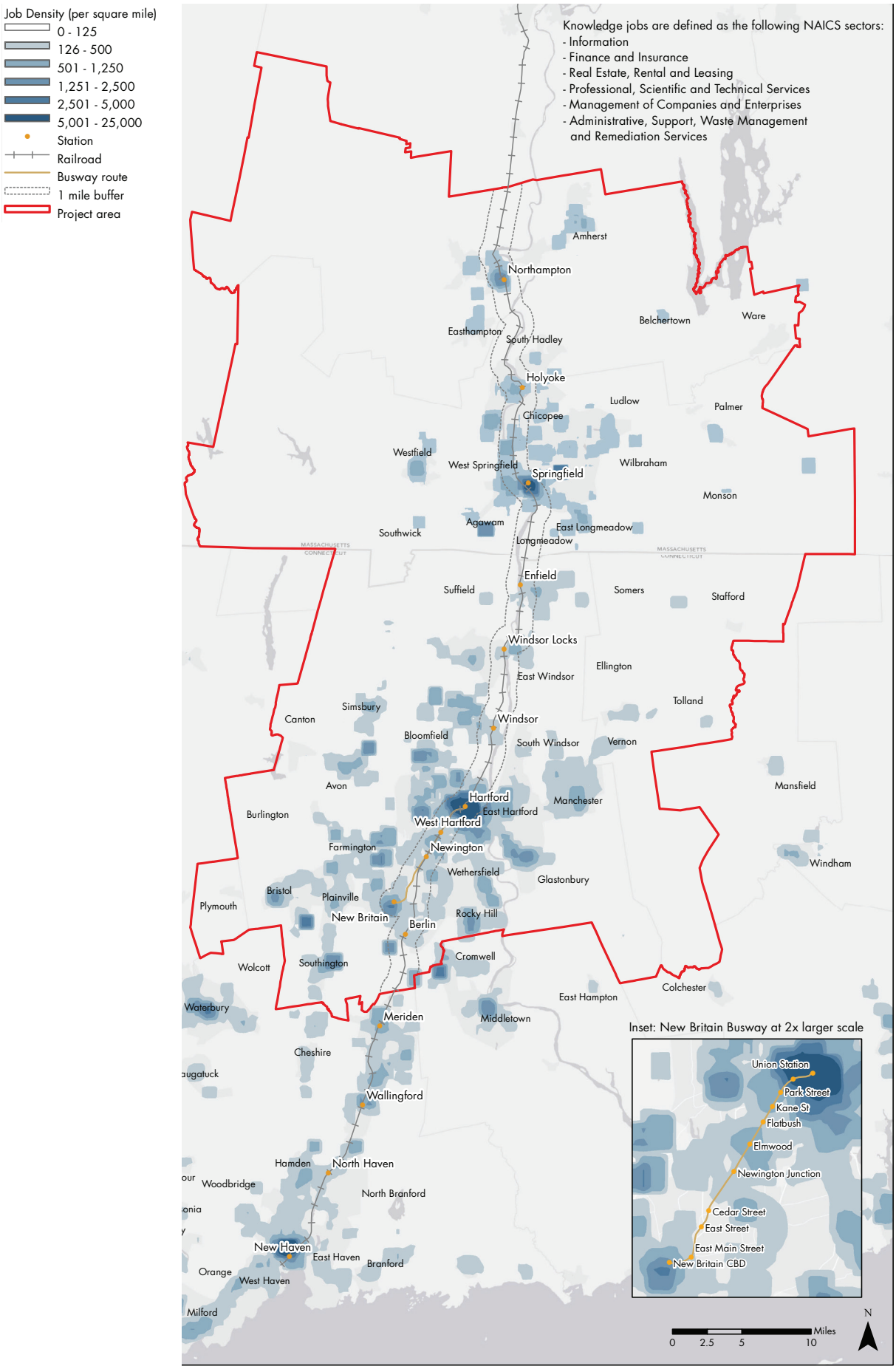
Total Employment Density in the Region



TOD-Supportive Job Density

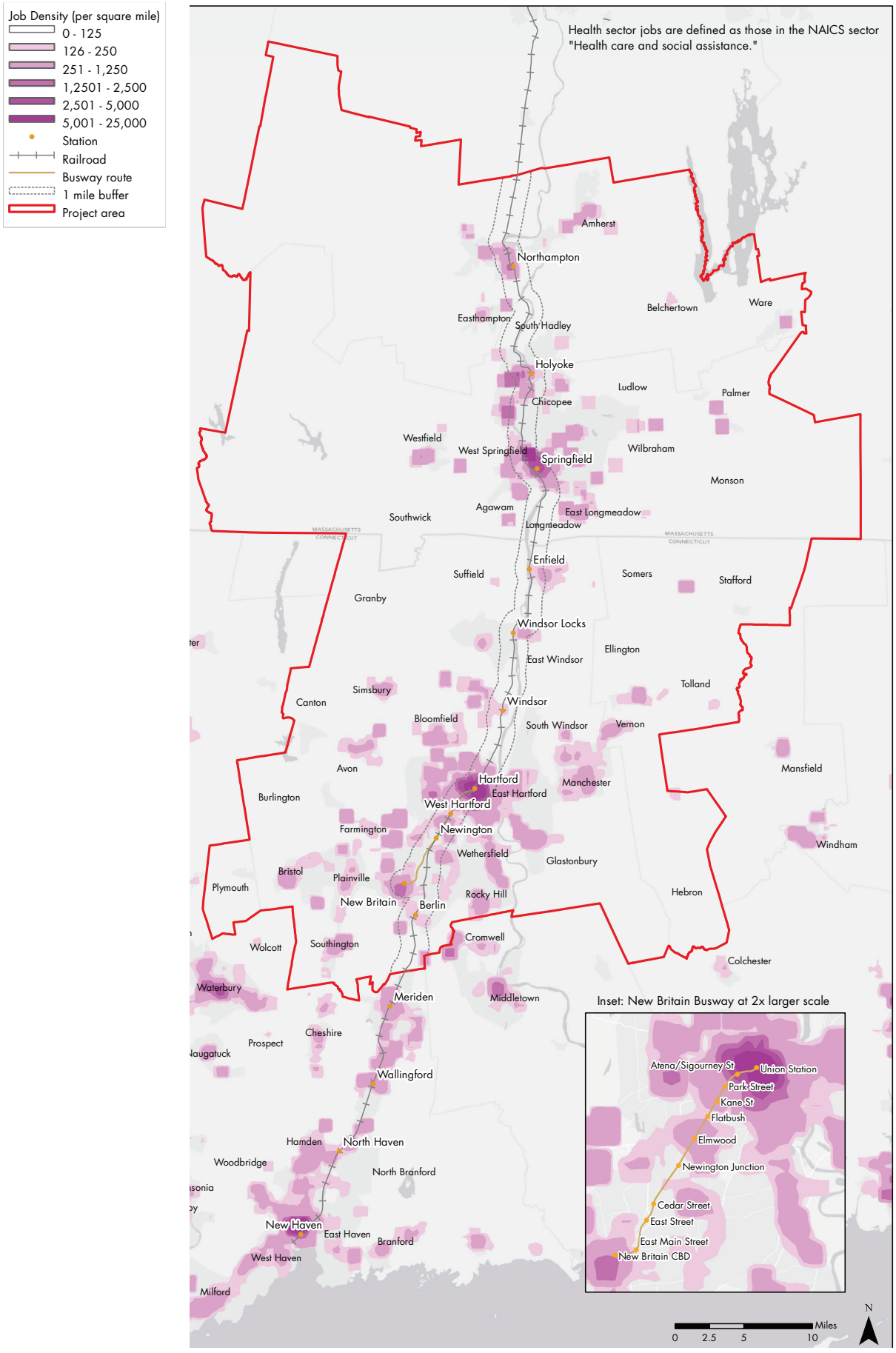


Knowledge Sector Job Density



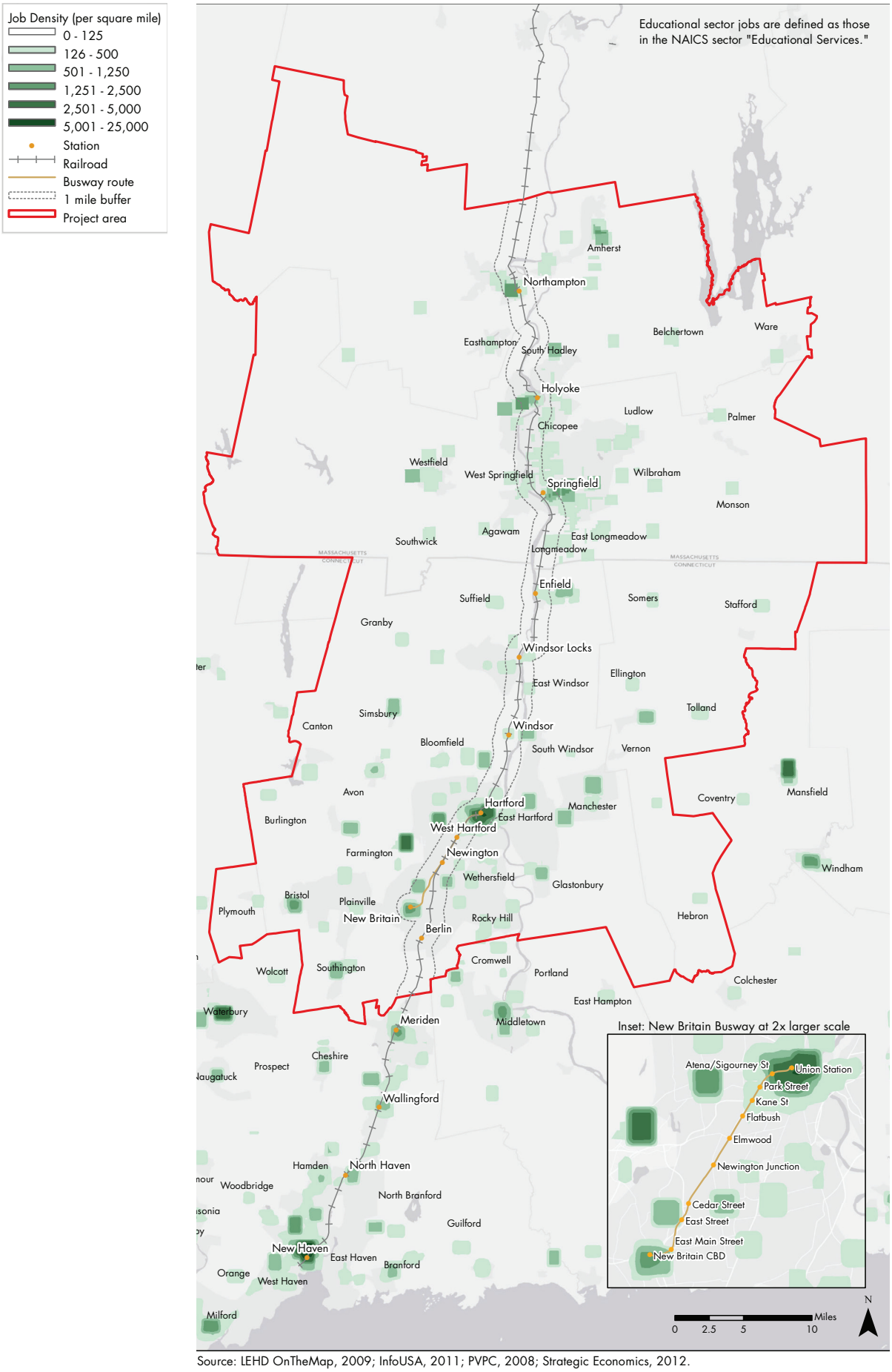
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Health Care Job Density



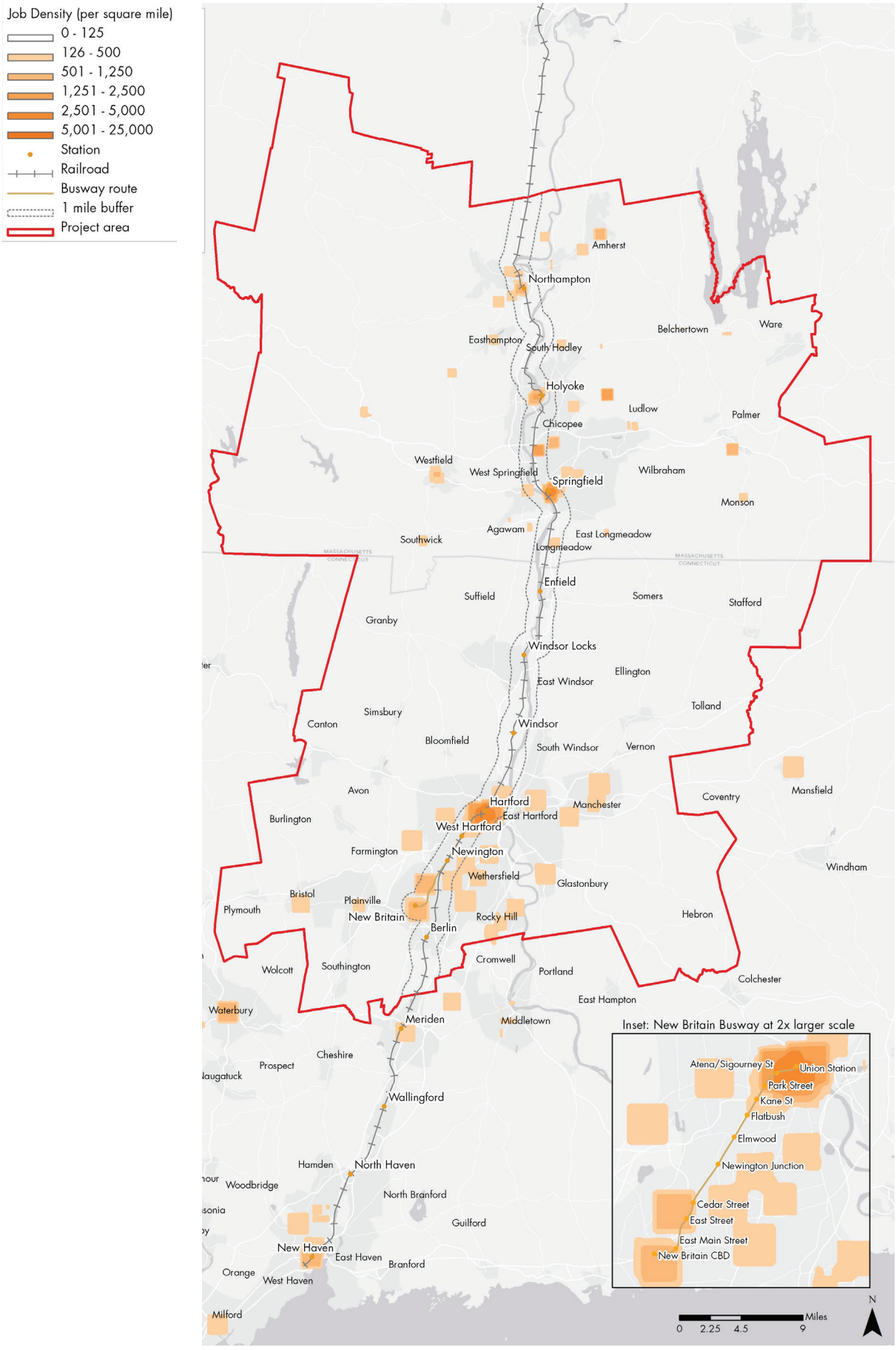
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Educational Services Job Density



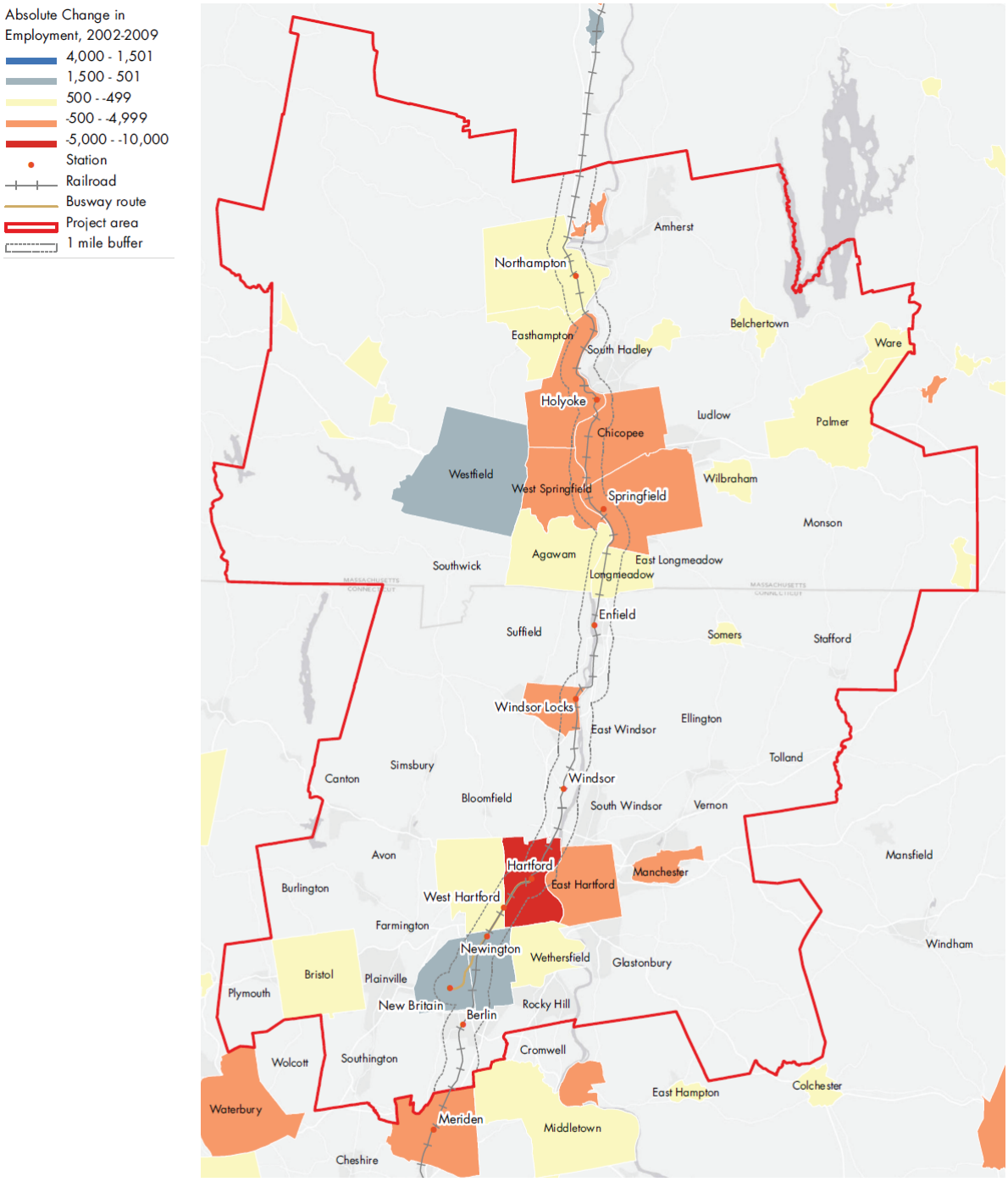
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Public Administration Job Density



Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Job Growth by City, 2002-2009



Source: Connecticut Department of labor, 2012; Massachusetts Office of Labor and Workforce Development, 2012; Strategic Economics, 2012.

Appendix D: Data Sources

To conduct the analysis, the Consulting Team relied on the following sources of data:

Employment data:
Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics (2012) – Regional employment data presented in this report is based on annual average data from the US Bureau of Economic Analysis' Quarterly Census of Employment and Wages. The geography of this regional employment data roughly corresponds to the Capitol Region Council of Governments (CRCOG), Central Connecticut Regional Planning Agency (CCRPA) and Pioneer Valley Planning Commission (PVPC) regions. It includes Hampden and Hampshire Counties in Massachusetts (including Springfield, Holyoke, and Northampton) and the Connecticut North Central Workforce Investment Area (including all of the towns on the Knowledge Corridor).This data is considered highly reliable for gauging employment distribution and trends because it is one of the most comprehensive, directly-reported, and geographically diverse sources of employment data, since it is based on businesses' reporting for unemployment insurance purposes. One limitation of the data is that – since it only includes workers covered by unemployment insurance – it does not include self-employed workers, armed forces personnel, sole proprietors, domestic workers, unpaid family workers, and workers covered by the railroad unemployment insurance system. Furthermore, the data is useful for analyzing high-level employment trends, but is unavailable below the city level due to suppressions to safeguard employer privacy.

Longitudinal Employer-Household Dynamics, U.S. Census (2009) – Industry-level location-based data presented for Connecticut in this report – such as that presented in maps and station area or corridor profiles – comes from the U.S. Census' Longitudinal Employer-Household Dynamics (LEHD) database. The data is produced via statistical modeling incorporating numerous existing government data sources. LEHD's advantages are that the data is easily-accessible, available at small geographies, and includes a variety of outputs such as total employment, commute flows, worker incomes, etc. Its disadvantages are that the data becomes less reliable at the smallest geographies, outputs are presented in broad categories (such as 2-digit NAICS code industries only), and changes in the modeling methodology over time limit its usefulness for constructing comparative time-series.

ReferenceUSA (2011) – Industry-level location-based data presented for Massachusetts in this report – such as that presented in maps and station area or corridor profiles – comes from ReferenceUSA data purchased by the Pioneer Valley Planning Commission (PVPC) from Infogroup. This data was used because Massachusetts does not provide data to the U.S. Census for the LEHD due to strict confidentiality laws in the state. Infogroup collects data on businesses nationwide, primarily for the purpose of selling data to business-to-business marketers seeking specific sales targets. Infogroup's data collection process incorporates telephone directories, public resources, internet research, and direct calling of businesses. The ReferenceUSA data provided by PVPC was further reviewed and "cleaned" by PVPC and CTOD staff. ReferenceUSA data's advantages are that it is available at the business-level geography, is

available when other sources do not exist, and contains significant business-level detail beyond just location and employment counts. The disadvantage of the data set is that there may be some errors and inconsistencies in the establishment-level data.

CRCOG, CCRPA, and PVPC Projections (2012) – Projections from PVPC, the CRCOG and CCRPA were used to estimate anticipated total growth in employment and population to 2040. These projections are the official source used for planning purposes by the respective metropolitan planning organizations.

Real Estate Feasibility Analysis:
The Consulting Team gathered data on current and recently sold and rented houses and apartments from *Trulia*, the *MLS* (Multiple Listing Service) and *Craigslist.com*. MLS data was accessed by visiting the William Raveis Real Estate website (www.raveis.com) and listing all relevant house and apartment listings within a 0.5-mile radius around the station area, although due to the lack of listings at some station areas the radius was expanded to 1 mile. Apartment listings were also gathered from Craigslist.com, a website commonly used for apartment listings that is not affiliated with the MLS. Apartment listings were considered only if the location could be reasonably discerned to be within a 0.5- to 1-mile distance from the station area. The data was sorted into three categories:

- Median Sales Price: Derived from 2012 Trulia sales data aggregated by the zip code closest to each station area.

- Average Local Comp: The average of all comparable sales or rents within a 0.5- to 1-mile buffer.

- High Local Comp: The highest comparable sales or rent value found within a 0.5- to 1-mile buffer. This amount was considered, because new construction generally appeals to the higher end of a local market, due to its superior condition and amenities.

Construction cost data was gathered from a number of sources, including:

- Two members of the Connecticut Homebuilders and Remodelers Association who wish to remain anonymous, due to the confidential nature of the data;

- Development proformas for new rental developments in Connecticut; and

- Jonathan Rose Companies' own in-house proformas for Connecticut rental developments.

The Consulting Team used this data to generate cost assumptions for the following unit types:

- For-Sale: Attached, 1,200-square foot for-sale townhouse unit.

Cost Category	Total Cost	Cost / Square Foot
Land Acquisition	$35,000	$29.17
Construction (Hard) Costs	$150,000	$125.00
Soft Costs	$12,500	$10.42
Period Costs	$25,500	$21.25
Builder Margin	$50,500	$42.08
Total Costs	**$273,500**	**$227.92**

- Rental: 1,100-gross square foot rental flat unit within a multifamily structure.

Cost Category	Total Cost	Cost / Square Foot
Land Acquisition	$35,000	$31.82
Construction (Hard) Costs	$132,000	$120.00
Design & Approvals (Soft) Costs	$12,750	$11.59
Period Costs	$25,000	$21.36
Builder Margin	$30,000	$27.27
Total Costs	**$234,750**	**$212.05**

The study team added a 25 percent adjustment to account for urban construction conditions in Hartford, Springfield, and New Britain, based on the Consulting Team's experience, and adjusted the Massachusetts costs down by approximately 10 percent per the 2012 R.S. Means location adjuster.

Appendix E

Additional Regional and Corridor Analysis Materials

Regional Employment Trends by Industry, 2001 - 2010

Regional Employment Trends by Industry, 2001-2010

Industry Group	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Share 2001	Share 2010	% Change 2001-2010
Health Care and Social Assistance	111,589	114,037	113,905	114,871	115,911	119,332	123,303	126,356	128,404	130,045	14%	17%	17%
Educational Services	71,679	73,478	73,710	75,090	76,239	78,844	79,966	80,455	80,562	80,809	9%	11%	13%
Retail	87,668	87,375	85,480	86,524	86,462	85,672	85,210	84,627	80,403	80,722	11%	11%	-8%
Manufacturing	105,410	98,245	92,197	91,977	91,927	91,582	91,110	89,658	81,828	79,105	13%	10%	-25%
Other*	73,062	72,028	71,625	73,072	73,909	72,929	72,728	73,356	70,154	71,752	9%	9%	-2%
Accommodation and Food Services; Arts, Ent, Rec.	59,294	59,320	60,871	61,741	63,319	64,442	65,632	65,346	64,625	65,208	8%	9%	10%
Finance and Insurance	71,924	71,493	70,144	68,216	67,775	68,130	68,308	68,378	66,502	66,645	9%	9%	-7%
Public Administration	37,614	37,074	34,846	34,368	35,025	37,691	37,804	38,622	37,923	37,779	5%	5%	0%
Information, Real Estate and Leasing, Management of Companies	38,610	36,446	35,732	35,531	35,626	37,876	38,328	39,967	38,072	36,244	5%	5%	-6%
Professional, Scientific, and Technical Services	34,242	33,219	32,777	32,477	33,526	35,444	36,116	35,442	33,963	34,263	4%	5%	0%
Wholesale Trade	30,351	28,827	28,593	29,077	29,012	29,768	29,652	29,730	27,636	27,218	4%	4%	-10%
Transportation and Warehousing	30,940	29,840	28,500	28,602	28,340	28,701	28,236	28,148	26,545	25,709	4%	3%	-17%
Construction	31,705	30,829	29,798	30,642	31,591	32,011	32,161	30,701	26,850	25,594	4%	3%	-19%
Total	784,088	772,211	758,178	762,188	768,662	782,422	788,554	790,786	763,467	761,093	100%	100%	-3%

* Includes Agriculture; Mining; Administrative Support and Waste Management and Remediation; Utilities; Other Services

Source: Quarterly Census of Employment and Wages via California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Massachusetts Department of Labo

Concentration of Industries in the Region, 2012

NAICS	Industry	Location Quotient*
52	Finance and Insurance	2.03
81	Other Services (except Public Administration)	1.23
62	Health Care and Social Assistance	1.21
31-33	Manufacturing	1.15
61	Educational Services	1.12
55	Management of Companies and Enterprises	1.07
44-45	Retail Trade	0.93
71	Arts, Entertainment, and Recreation	0.92
51	Information	0.92
48-49	Transportation and Warehousing	0.87
22	Utilities	0.84
92	Public Administration	0.84
42	Wholesale Trade	0.84
72	Accommodation and Food Services	0.79
54	Professional, Scientific, and Technical Services	0.76
23	Construction	0.76
53	Real Estate and Rental and Leasing	0.75
56	Administrative and Support and Waste Management and Remediation Services	0.74
11	Agriculture, Forestry, Fishing and Hunting	0.33
21	Mining, Quarrying, and Oil and Gas Extraction	0.05

Highly Concentrated Sub-industries in the Region, 2012

NAICS	Industry	Location Quotient*
52	**Finance and Insurance**	**2.03**
524	Insurance Carriers and Related Activities	3.97
62	**Health Care and Social Assistance**	**1.21**
621	Ambulatory Health Care Services	1.11
623	Nursing and Residential Care Facilities	1.57
624	Social Assistance	1.45
31-33	**Manufacturing**	**1.15**
322	Paper Manufacturing	1.53
332	Fabricated Metal Product Manufacturing	2.32
333	Machinery Manufacturing	1.47
335	Electrical Equipment, Appliance, and Component Manufacturing	1.34
336	Transportation Equipment Manufacturing	2.32
339	Miscellaneous Manufacturing	1.28
61	**Educational Services**	**1.12**
611	Educational Services	1.13
55	**Management of Companies and Enterprises**	**1.07**
551	Management of Companies and Enterprises	1.08

* The location quotient measures the ratio between a region's share of employment in a sector and the national share of employment in that sector to describe relative industry concentration. A location quotient above 1.0 indicates greater concentration relative to the United States. A location quotient of less than 1.0 indicates lower concentration compared to the overall U.S. economy. Source: Quarterly Census of Employment and Wages via: California Employment Development Department, 2012; US Bureau of Labor Statistics, 2012; Connecticut Department of Labor, 2012; Massachusetts Department of Labor and Workforce Development, 2012.

Hartford, Springfield Rental Growth

Asking Rent Growth	Hartford	Springfield
5-Year Annualized Rate	1.80%	N/A
3-Year Annualized Rate	1.20%	N/A
1-Year Annualized Rate	2.20%	2.70%
Q3 2011	0.70%	0.50%
Q4 2011	0.70%	0.90%
Ranking in Northeast (1-Year) of 23	5	5
Ranking in U.S. (1-Year) of 200	25	23

Vacancy Rate	Hartford	Springfield
5-Year Annualized Rate	4.80%	N/A
3-Year Annualized Rate	4.90%	N/A
1-Year Annualized Rate	4%	2.80%
Q3 2011	3.50%	3%
Q4 2011	3.30%	2.50%
Ranking in Northeast (1-Year) of 15	10	5
Ranking in U.S. (1-Year) of 82	15	9

Source: U.S. REIS Service, LLC. Hartford Market Report. First Quarter, 2012; REIS Service, LLC. Springfield Market Report. First Quarter, 2012.

The following is a detailed review of the Knowledge Corridor anchor institutions most likely to support TOD at the station areas:

Central Connecticut State University (CCSU)
*CT**fastrak*** (Cedar Street / East Street)
Central Connecticut State University's 12,000 students make it second to only UConn in terms of public institution enrollment in the state. Due to the size of the institution and its location within the Station areas of Cedar Street and East Street, CCSU represents one of the best opportunities for Institution-based Transit Oriented Development within the Knowledge Corridor. Currently, CCSU is a school that is mostly comprised of in-state students (97% of undergraduates) who either live off-campus or are commuters (79%), a situation that the university would like to modify over time by expanding the amount of on-campus student housing.

The school has developed plans for a large expansion, called the East Campus, towards the Cedar Street station area, potentially to include 300-plus units of student housing, a new fitness center and playing fields, facilities for the Fine Arts Department, a day care facility, and a 1,000-space parking garage. There may also be opportunities for additional university-sponsored development, including retail and/or additional student housing. An important element of CCSU's plan is a pedestrian connection from the East Campus back to the main campus that bridges Route 9, to ensure the two campuses function as one. During an interview with university officials, the study team learned that this expansion plan is already well-funded and ready to proceed within a short time period.

The CCSU East Campus expansion plan will transform the Cedar Street station area, which is currently largely vacant or minimally-developed. Municipal and state officials should investigate the possibilities to expand upon the impact of this plan, including higher-density, mixed-use zoning of parcels adjoining the East Campus, opportunities to attract university-related private development, and creation of a direct pedestrian connection to the Cedar Street station and/or creation of a new station within the East Campus. The East Campus expansion will also better connect CCSU to the CT***fastrak*** system, which could create demand for student housing at other stations along the line, due to the rapid, frequent transit connection. It also creates opportunities to coordinate CCSU's educational offerings with those at other educational institutions accessible by transit, such as Trinity College, UConn Medical School, UConn Business School, and the UConn Hartford campus.

Trinity College
CT***fastrak*** / NHHS Rail (West Hartford - Flatbush)
Trinity College is one of the nationally-recognized private liberal arts colleges located within the Knowledge Corridor with a current enrollment of 2,041 full-time undergraduate students. Trinity College is located a little more than one mile from the West Hartford - Flatbush CT***fastrak*** / NHHS rail station, which will be within easy biking distance for college faculty and students. Trinity has a long history of interaction with its surrounding South Hartford neighborhood, including a Center for Urban and Global Studies, an

Office of Community Relations, and a partnership with the Hartford Public Schools that resulted in the creation of the Hartford Magnet Trinity College Academy, a grade 6 through 12 college preparatory school with an emphasis on the sciences and visual / performing arts.

The addition of transit within access of Trinity College could lead to opportunities for the college to impact the station area. While Trinity College is a smaller school, it could consider the Flatbush Avenue station area for off-campus expansion, potentially in partnership with municipal bodies and/or private developers. Trinity College could also investigate opportunities to link the college, via transit, to other institutions or off-campus resources for its student body, such as downtown Hartford or New Haven. Government bodies should also investigate opportunities to better connect Trinity College to the Flatbush Avenue station via bike lanes and/or wayfinding along the Flatbush corridor.

University of Connecticut
*CT**fastrak*** / NHHS Rail (Hartford Union Station)
While its main campus is located in Storrs and not currently accessible to either transit corridor, UConn nonetheless could support development of the station areas through its satellite campuses and departments located within the transit corridors, which include:

UConn Hartford Campus: Currently located in West Hartford, the UConn Hartford satellite campus will soon relocate its 2,100 students and 60 faculty members, including the UConn School of Social Work, to downtown Hartford. This move will further expand the number of students in downtown Hartford and build demand for multifamily student housing.

UConn School of Business: The UConn School of Business has a presence in downtown Hartford with its Connecticut Graduate Business Learning Center, which houses the part-time and Executive MBA programs. In total, there are 62 Executive MBA and 1,271 part-time MBA students.

UConn School of Medicine: Located at the UConn Health Center, which is further described below, the UConn School of Medicine consists of 3,000 graduate students and will be accessible via a shuttle connection to CT***fastrak***. The addition of rapid transit could be a significant benefit to UConn School of Medicine students, who will be able to travel between UConn Health Center, Hartford Hospital and St. Francis Hospital on a one-seat ride, which opens up greater living options than currently exist.

The addition of other UConn programs to downtown Hartford or other station areas could further support TOD at the station areas and the expansion of the *CT**fastrak*** and NHHS rail systems as an option for students to travel

between institutions. However, the decision of which programs to consider for relocation should be made with thought to the synergies that could be created from the connections to transit. An example is the UConn School of Business in downtown Hartford, which is a natural presence, given the concentration of financial and insurance firms. Relocation of additional School of Business students or departments to downtown Hartford should be considered.

FIVE COLLEGES
Smith College
Mt. Holyoke College
Amherst College
Hampshire College
University of Massachusetts – Amherst
Vermonter (via Shuttle), Northampton, Amhearst, South Hadley, MA
The "Five Colleges" of Massachusetts, currently served by a bus line, will be connected by shuttle services to the new rail station at Northampton. While Amherst will be losing its existing Amtrak station, students in this area will have access to more frequent service and a quicker connection to New York City. University of Massachusetts, one of the biggest universities in the region, is home to many research departments in fields complementary to the Knowledge Corridor (engineering, computer sciences, and molecular/microbiology). While the other colleges are all smaller private liberal arts schools, together they represent over 10,000 students, many of whom will take advantage of the improved transit connections.

The creation of a satellite University of Massachusetts campus in downtown Springfield has been discussed, potentially to include a school for physician's assistants, which would meet the growing need for a skilled health care workforce and complement the existing Pioneer Valley Life Sciences Institute in Springfield. This move is strongly encouraged, as it could support the growth of a market for multifamily housing in downtown Springfield and encourage the expansion of the health sector in downtown Springfield.

Asnuntuck Community College
Capital Community College
NHHS Rail (Hartford Union Station)
The region's major universities and colleges are going to remain the centerpieces of education and research, but the role of community colleges should not be discounted. Community colleges provide the technical skills that build the skillset of individuals for whom university education is not the right fit. These are the places where people, such as those later in life who wish to make career transitions into emerging fields, are able to get training for positions without acquiring the debt burden associated with the rapidly escalating costs of university education.

UConn Health Center
*CT**fastrak*** (Elmwood)
The renovation and expansion of the UConn Health Center in Farmington is going to become a cornerstone of the Knowledge Corridor. In 2011, the Cen-

ter received over $90 million in biomedical research grants which support the work of 451 scientists. With the collaboration of UConn and Jackson Labs for Genomic Medicine representing an investment of $1.1 billion in the state, the Center is going to help to define the Corridor as a place for innovation, and allow for the development of supportive businesses and start-ups. Unfortunately, the location of the Health Center is not directly connected with the transit corridors, but will be accessible by a shuttle to the BRT line. Still, the Center is going to be an important tool for economic development.

St. Francis Hospital
*CT**fastrak*** (Hartford Sigourney Street)
As a 556 bed teaching hospital, St. Francis is the biggest hospital within the city of Hartford, and is located only a mile from Union Station. In addition to this, the hospital will be connected to the CTfastrak line with a shuttle from Sigourney Street that will also connect it to the UConn Health Center and Hartford Hospital. This makes this hospital particularly well connected to both transit systems, which will enable its physicians to reach both hospital complexes. The hospital recently added a 10-story addition, the John T. O'Connell Tower, which expanded its operating capacity and added orthopedic beds to the Connecticut Joint Replacement Institute. As the hospital considers future expansion possibilities, it could investigate locations that will be accessible to the CT***fastrak*** system, including suburban outpatient facilities.

Hartford Hospital
*CT**fastrak*** (Hartford Union Station)
Hartford Hospital, which employs 7,000 people as well as a medical staff of over 1,000 physicians, will be connected to the CT***fastrak*** and NHHS rail systems via a shuttle line that will feature a one-seat ride to St. Francis Hospital and the UConn Health Center. Hartford Hospital stands out as a significant research hospital in the Hartford region, supporting in 2011 250 community benefit research projects totaling $16.7 million. In an interview, Kip Bergstrom, Deputy Commissioner of the Connecticut Department of Economic and Community Development, stated that as the biotech research economy at the UConn Health Center continues to expand, it will soon use up its existing available property and the natural expansion space will be in the area adjacent to Hartford Hospital, due to the ease of connection between both institutions provided by the CT***fastrak*** system. Due to these factors, Hartford Hospital provides an excellent opportunity for TOD and economic development centered around the life-sciences industries.

Regional Corporations
*CT**fastrak*** / NHHS Rail
(Hartford Union Station and Springfield)
Although not generally considered in the traditional anchor institution literature, which focuses on eds and meds, Hartford and Springfield are both home to multiple large, national corporations in the financial services and insurance fields. As the historic home of the insurance business, these corporations have been located in Hartford and Springfield for many decades and embody for many the regional identity, such as Aetna, The Hartford, MassMutual, and Travelers among others. Aside from expansion of their real

estate holdings, which is unlikely, corporate anchors can support TOD in the station areas by providing employer-assisted housing programs targeted to the station areas, purchasing policies that benefit local small businesses, and incentives for employees to use transit.

Casino
NHHS Rail / Vermonter
TBD, MA
Many cities with struggling or shrinking downtown centers have increasingly turned to casino development as an economic revitalization strategy, including New Orleans, Cleveland, Baltimore, and Cincinatti. The appeal for many cities is clear - they are large scale developments that employ many people and, unlike their counterparts in the suburbs, create opportunities for spillover into local restaurants and hotels. Yet most of these jobs are part-time and low paying, and as more and more municipalities pursue these strategies, they chase smaller and more local markets. Casino development is largely a zero-sum game, and the more this strategy is pursued in a region the less the impacts on tourism are felt across the board. Gamblers who live in Northampton might currently go to Mohegan Sun, but once a closer Casino opens, they will go there and stop making the longer trip.

Currently the city and state are reviewing proposals for a Casino in Springfield. The respondents included Ameristar, MGM Resorts International, Penn National Gambling, and Mohegan Sun with locations ranging from Downtown Springfield and within the Station Area of the Amtrak Station to a site twenty miles away in Palmer, MA. The downtown proposals would represent a significant change to the downtown station area, changing the employment picture for the Station Area and furthering a shift towards a downtown defined by tourism.