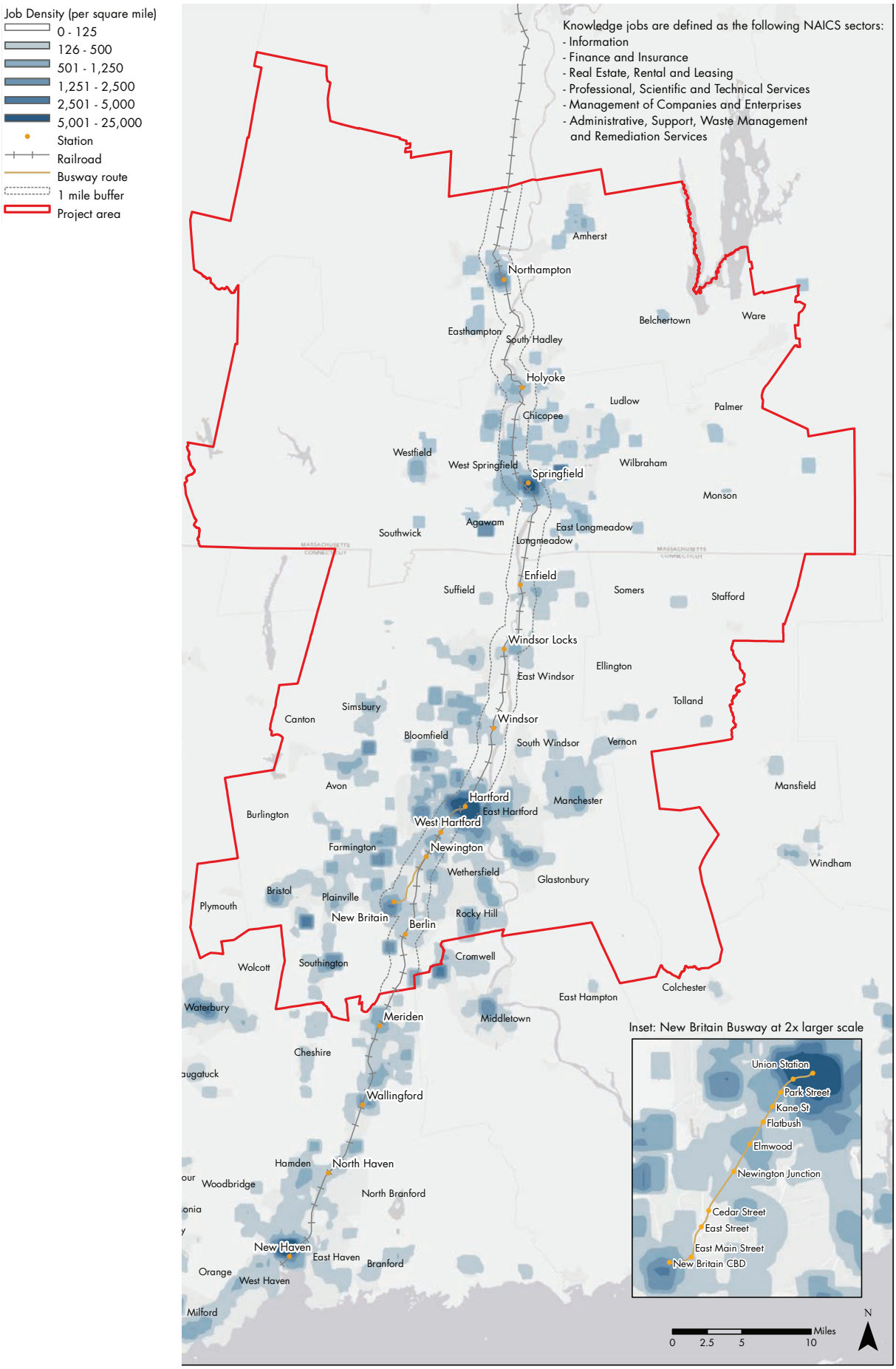
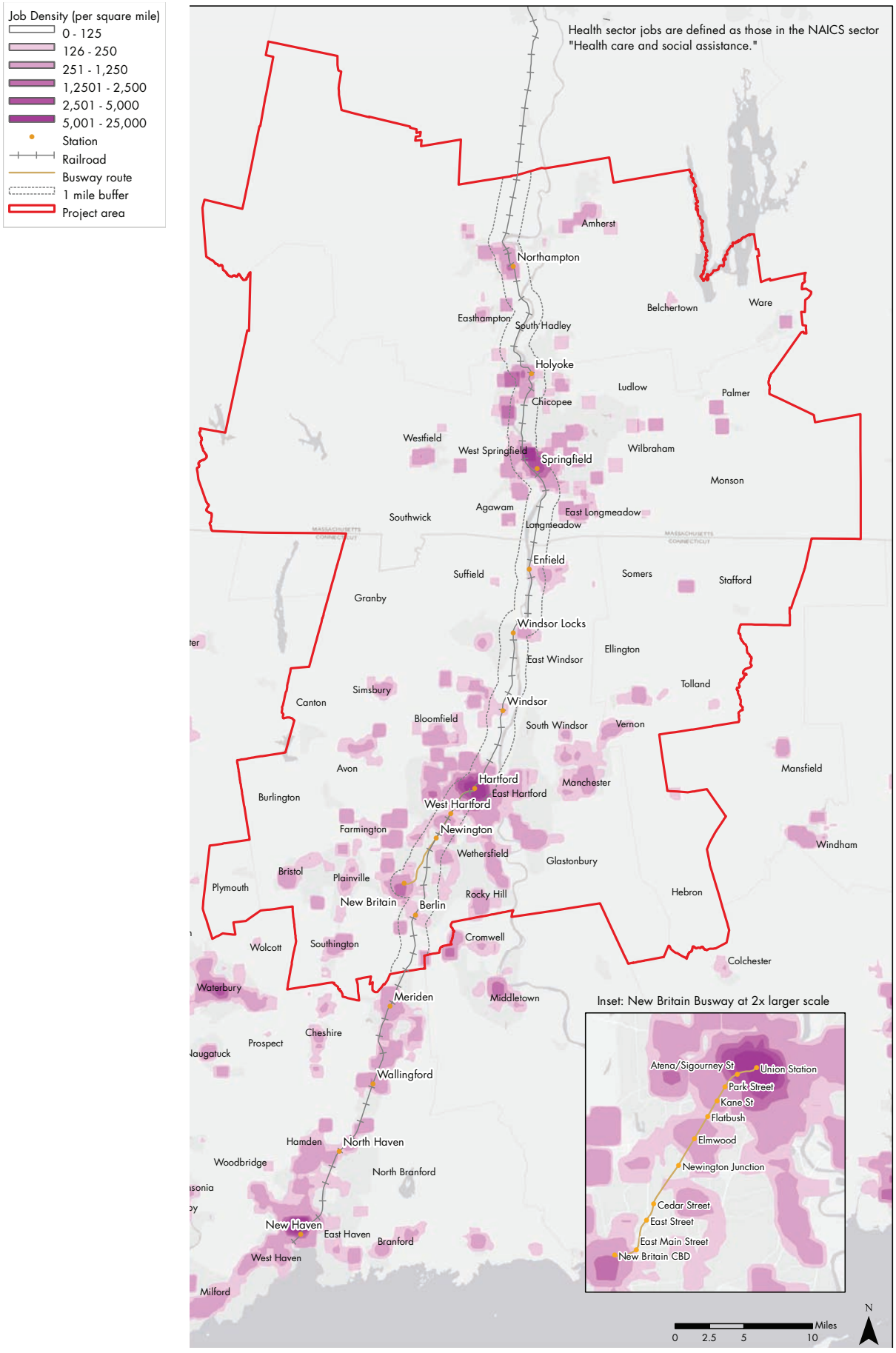
Knowledge Sector Job Density



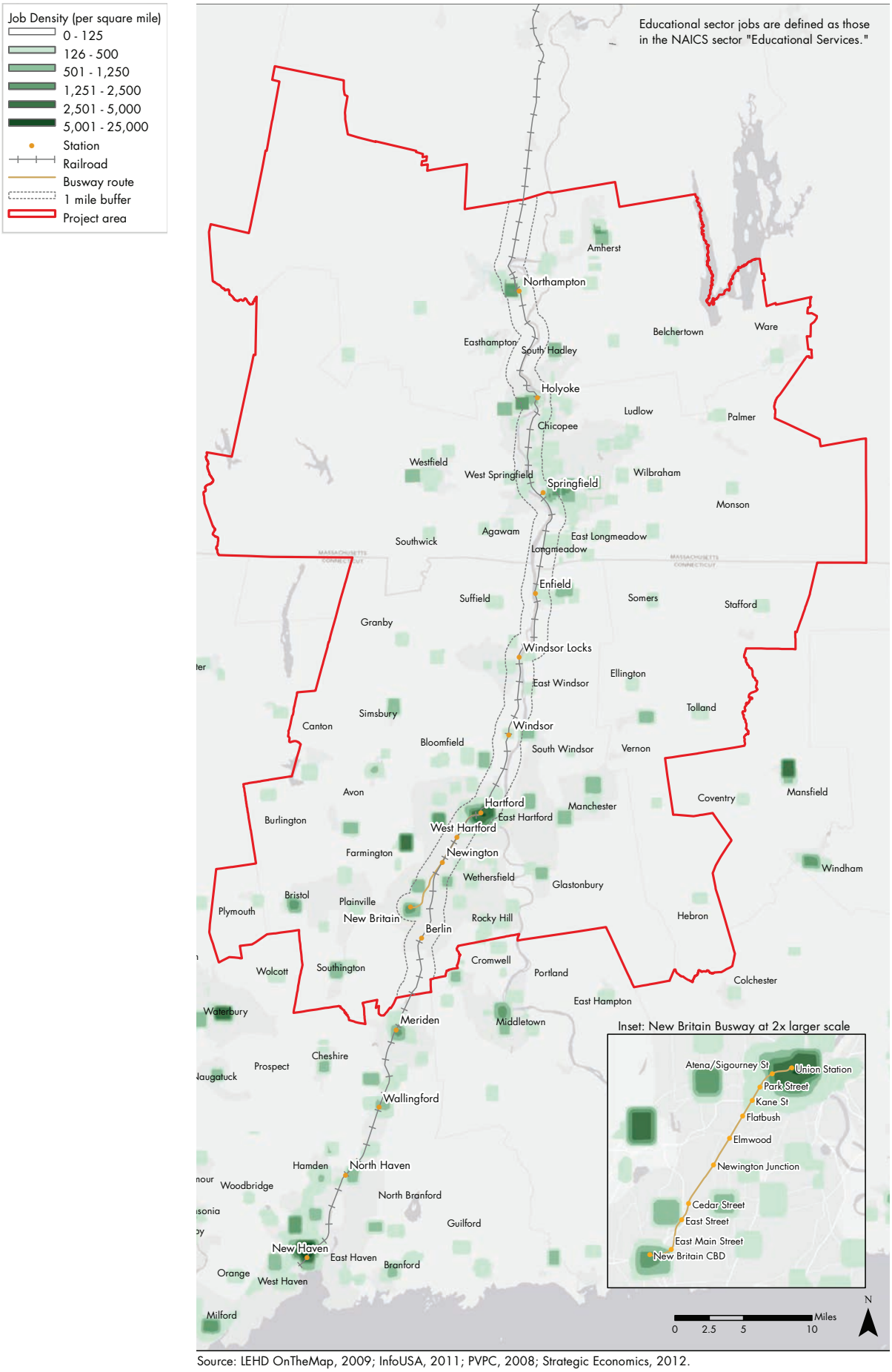
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Health Care Job Density



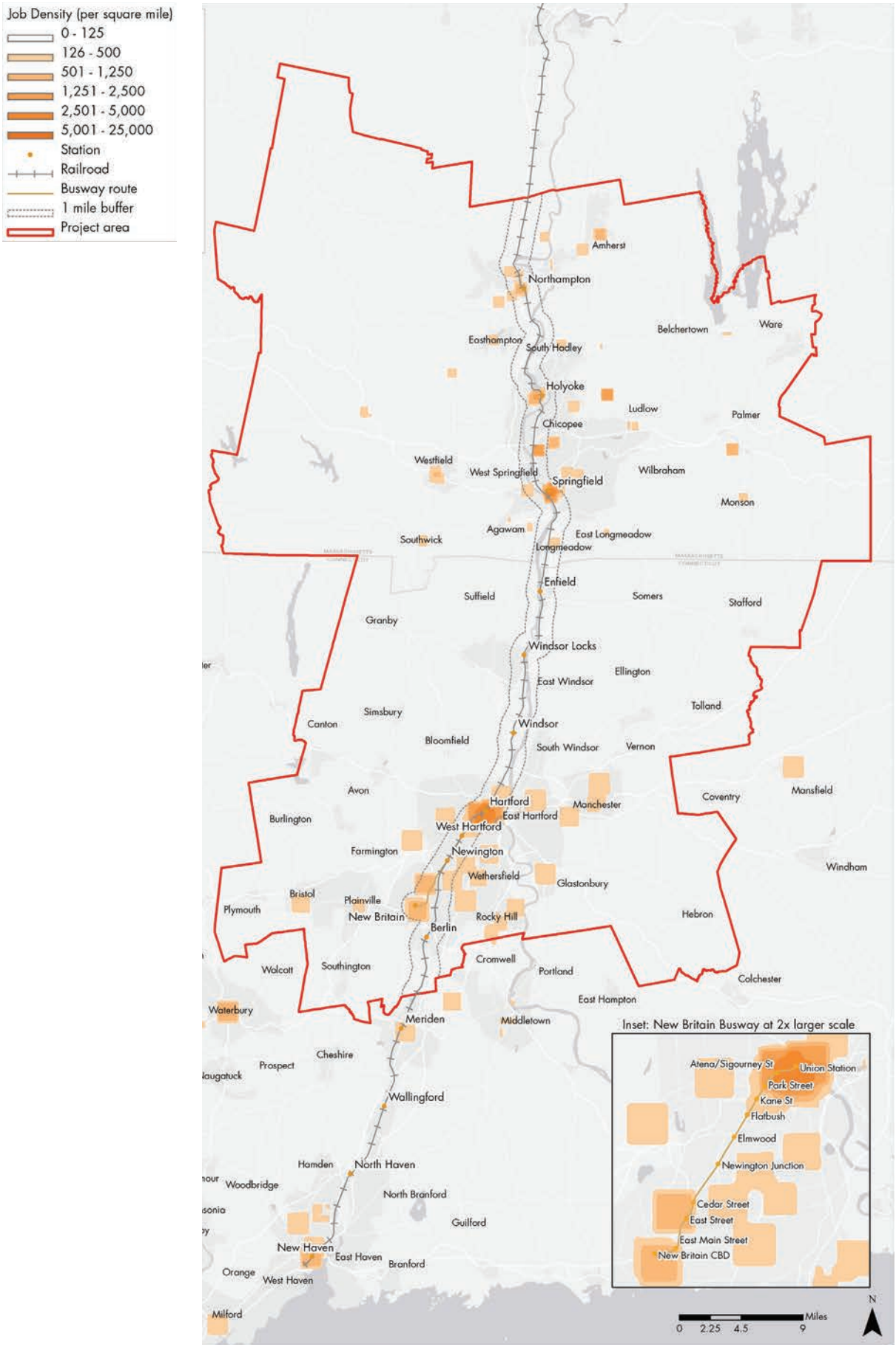
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

Educational Services Job Density



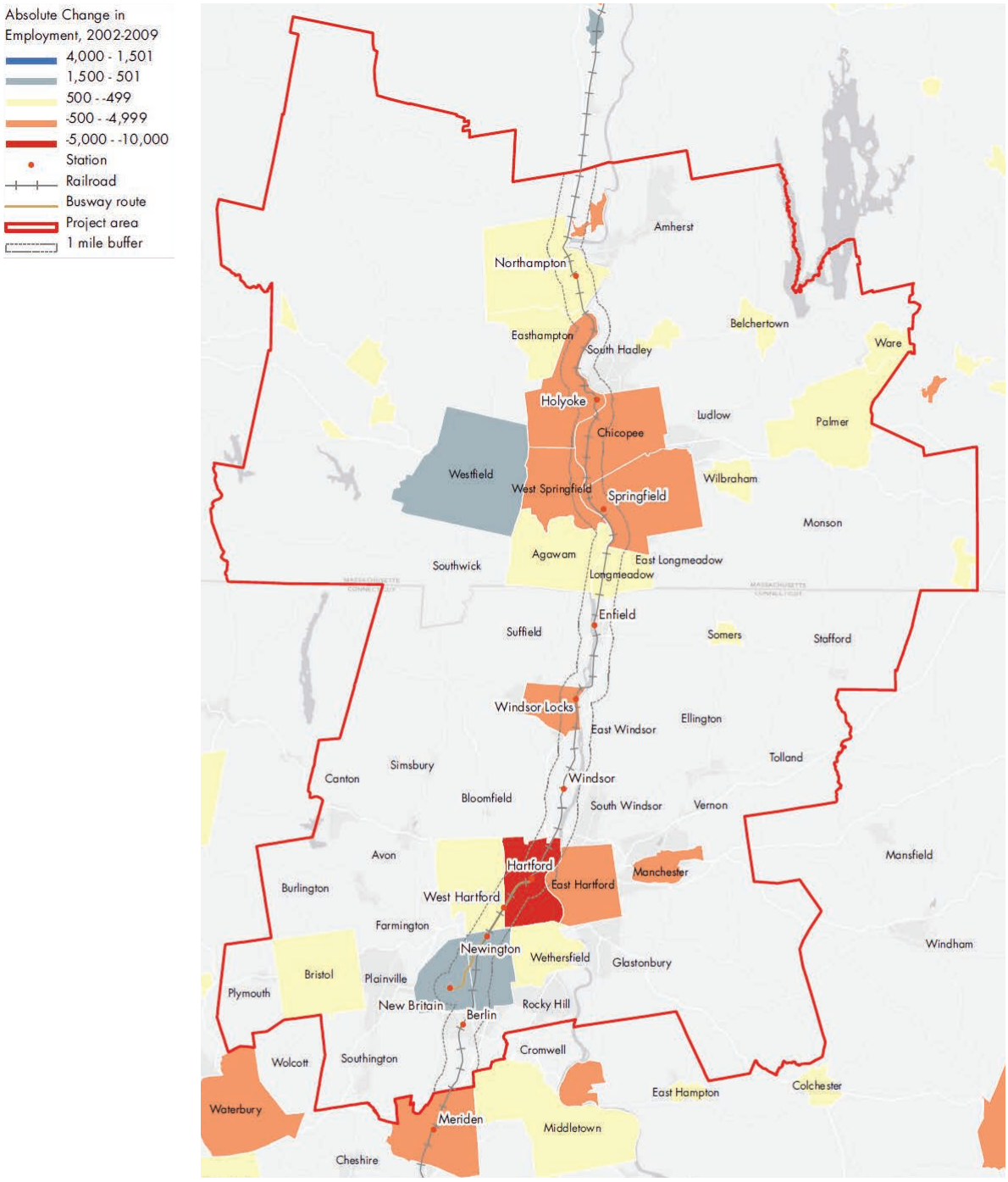
Source: LEHD OnTheMap, 2009; InfoUSA, 2011; PVPC, 2008; Strategic Economics, 2012.

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

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			
Transportation and Warehousing	30,940	29,840	28,500	28,602	28,340	28,701	28,236	28,148	26,545	25,709			
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; Adminsitrative 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 Labor and Workforce Development, 2012.

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 spill-over 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.