Metro Hartford
RapidRoutes
Transit Priority Corridors Study

Existing Conditions and Corridor Selection

April 2021

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

NELSON NYGAARD

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1 Introduction

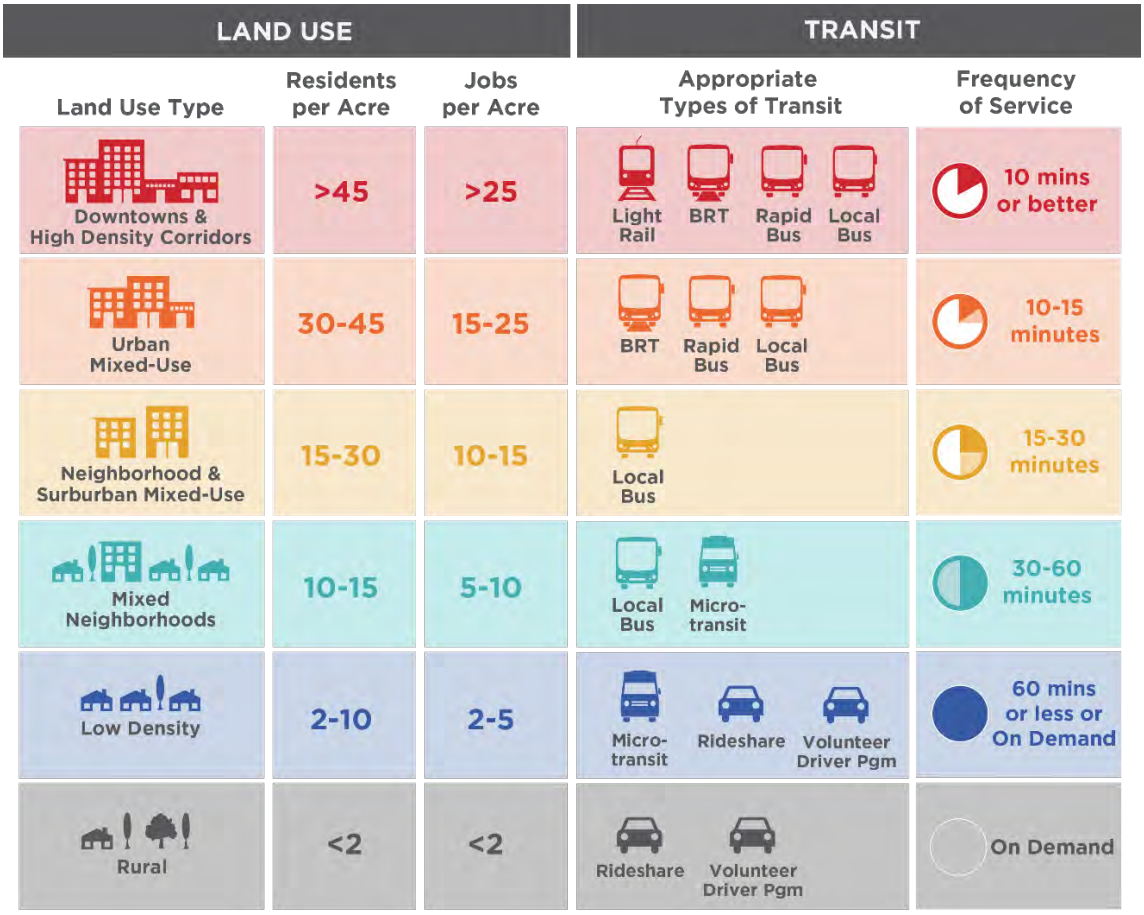
This document presents a high-level compilation of available data regarding the current and anticipated market for public transportation in Metro Hartford, focused within six priority corridors. Understanding the market for transit services is crucial as it provides insights on the density and distribution of people travelling throughout the area. It also puts equity at the center of the analysis, highlighting potential mismatches between areas of need and available transportation services. The six priority corridors were adjusted based on this review of the supply and demand for transit and consultation with the Study's Working Group. Data was sourced from the US Census, CRCOG, and CT*transit*.

2 Market Review

Figure 1 illustrates the relationship between land use and transit demand, which shows how the market for transit increases as land use intensifies and density rises. As a rule, places with very low-density land uses such as rural areas do not successfully support fixed-route transit service, though certain portions of low-density areas may be able to support demand-response services.

Fixed-route transit can be supported in suburban communities and in town centers while denser environments can support higher-capacity transit. In the City of Hartford, the densest part of the metro region, high-frequency services including bus rapid transit are supported.

Figure 1 | Land Use and Transit Demand Infographic



Source: Composite data compiled by Nelson\Nygaard from various sources

Population-Based Demand

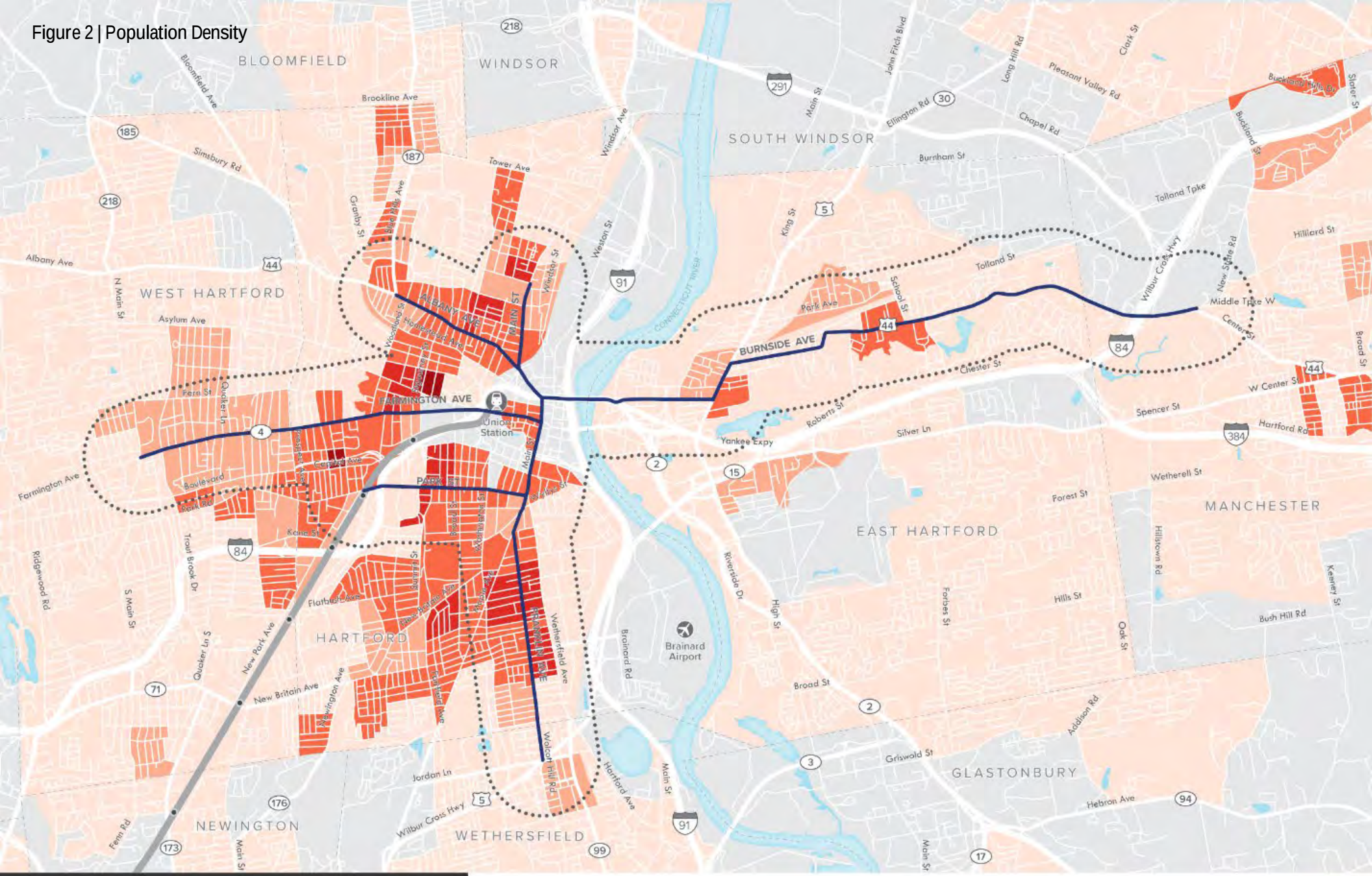
In Metro Hartford, the areas with the highest population density that support frequent transit service (15-minute service and better) are found in Hartford (Figure 2, highlighted in maroon and red), including blocks adjacent to:

- Albany Avenue and Main Street
- Farmington Avenue
- Park Street and Capital Avenue
- Franklin Avenue and New Britain Avenue

Outside of the densest sections, the metro region includes corridors and clusters of medium-density development as well as lower-density expanses. Within the medium-density areas, the following locations could support less-frequent transit service (30-minute service) (Figure 2, highlighted in salmon and pink):

- Hartford neighborhoods:
  - Blue Hills Avenue
  - Northeast and Upper Albany
  - Asylum Hill
  - Parkville and Frog Hollow
  - South End and Maple Avenue
- West Hartford Center
- East Hartford along Burnside Avenue
- Manchester along Buckland Hills Drive, and Keeney Street & West Center Street

Figure 2 | Population Density



Population Density

Potential transit demand based on population density

Potential service frequency supported based on residents per acre

- 60 mins
- 30 - 60 mins
- 15 - 30 mins
- 10 - 15 mins
- 10 mins or less

Priority Corridors

CT*fastrak* Stations

CT*fastrak* Busway

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Water

Study Area

1 Mile

Data Sources: ACS 5-Year Estimates, 2019

Relative Transit Propensity

A variety of socioeconomic characteristics speak to how likely someone is to use transit, including race, income, and vehicle ownership. Nelson\Nygaard employs a Transit Propensity Index Factor (TPI) to evaluate the collective impacts of the socioeconomic characteristics on transit demand (Figure 3). Figure 4 shows the TPI of places where the combined population and employment density is greater than or equal to two people per acre. The TPI is an equally weighted balance of the densities of the following groups of people/households:

1. Race/Ethnicity
2. Vehicle Ownership
3. Income
4. Country of Origin

In Metro Hartford, the areas that score highest on the TPI, highlighted in red, include[1]:

- All of Hartford
- Southeastern West Hartford
- Western half of East Hartford
- Western and central sections of Manchester
- Southeastern Bloomfield
- Windsor near the Connecticut River

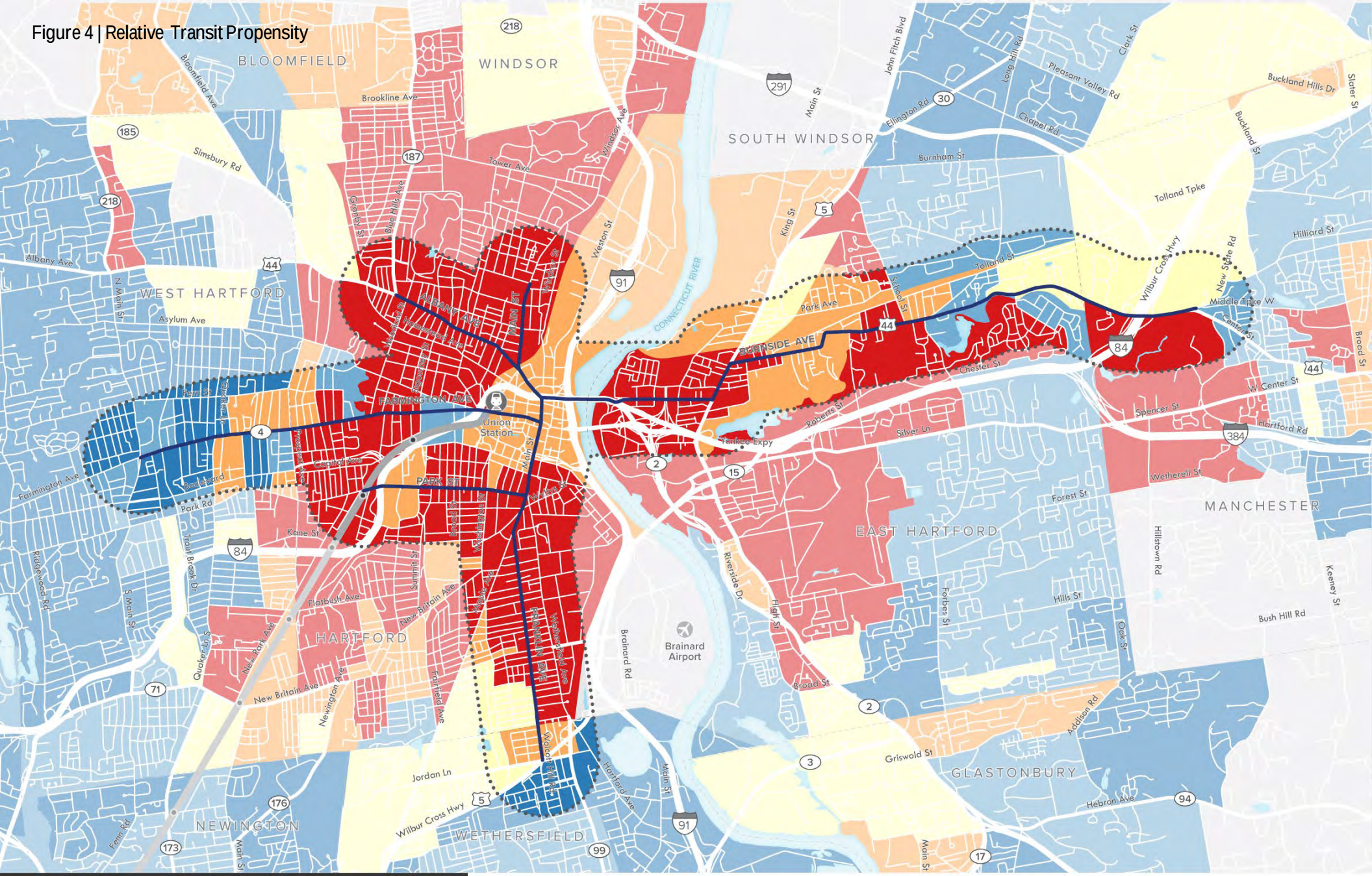
Figure 3 | Transit Propensity Index Factor

Demographic Group	Transit Propensity Index Factor
Race / Ethnicity	
Asian (not Hispanic or Latino)	1.01
Black or African-American (not Hispanic or Latino)	3.09
Hispanic or Latino	1.95
White (not Hispanic or Latino)	0.47
Other Race (not Hispanic or Latino)	2.37
Household Vehicle Ownership	
No Vehicle	9.58
1 Vehicle	1.52
More than 2 Vehicles	0.43
Household Income	
Less Than $10,000	2.77
$10,000 - $15,000	1.54
$15,000 to $25,000	1.41
$25,000 to $50,000	0.79
More than $50,000	0.41
Country of Origin	
Native Born	0.85
Foreign Born	1.66

Source: Calculations developed using 2019 American Community Survey 5-Year Estimates for Hartford County residents

[1] This assessment focuses on areas with higher densities of people and jobs. Therefore, areas with the lowest densities are not included on the map

Figure 4 | Relative Transit Propensity



Relative Transit Propensity

Likelihood to ride transit as compared to the total population

The weighted likelihood to ride transit as compared to the total population, in denser areas

🟦 0 - 0.9
🟦 0.9 - 1.1
🟨 1.1 - 1.25
🟧 1.25 - 1.5
🟥 > 1.5

Less likely — More likely

Priority Corridors

● CT*fastrak* Stations

CT*fastrak* Busway

Water

Study Area

1 Mile

Metro Hartford *RapidRoutes*

Transit Priority Corridors Study

Data Sources: ACS 5-Year Estimates, 2019

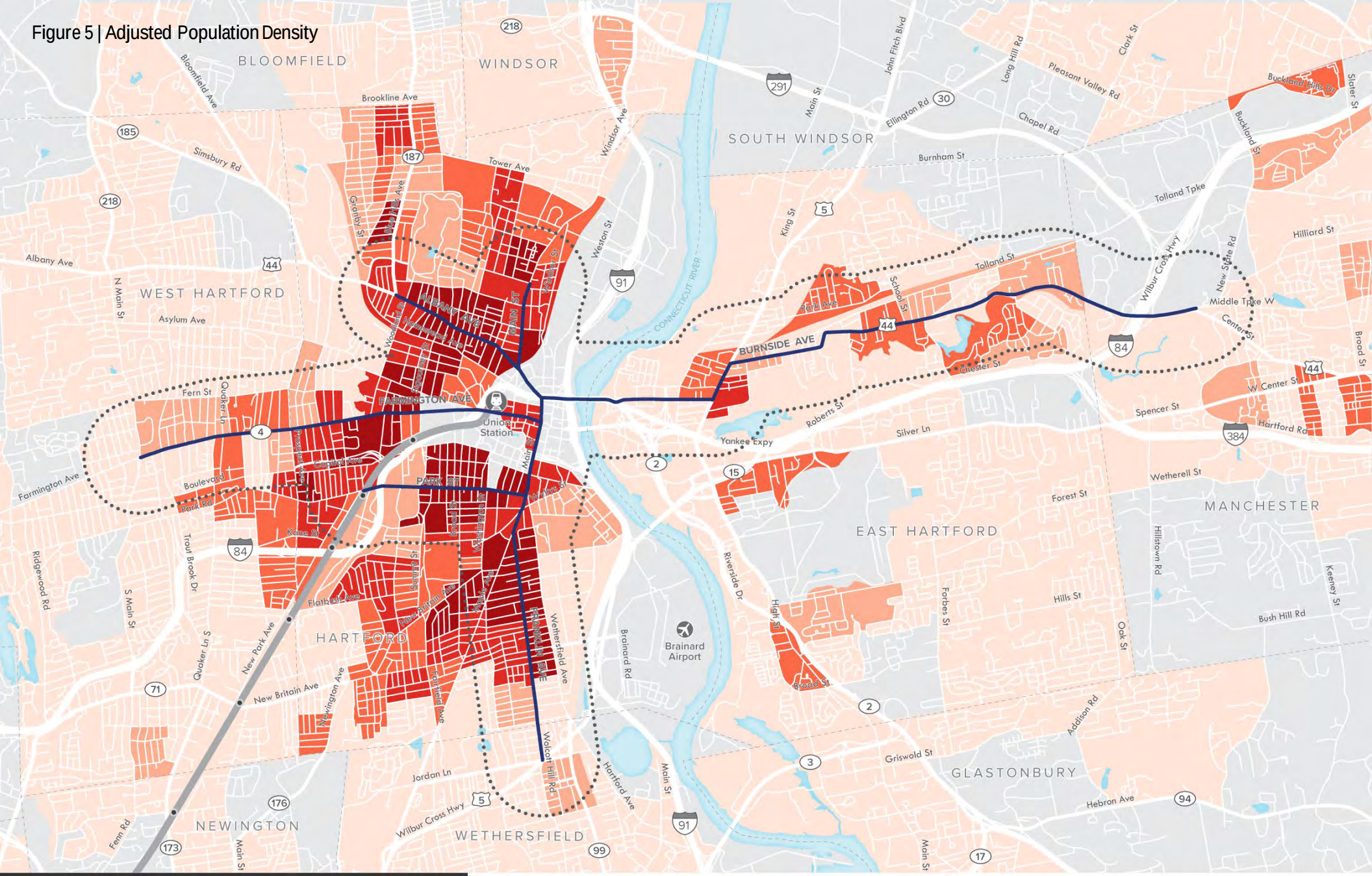
Adjusted Population-Based Demand

When demographic factors are considered in the context of population density, the effective underlying demand is higher in some areas and lower in others. Population density is weighted using the TPI to adjust the picture of demand so that this dimension becomes visible.

Areas that have a very high underlying demand for transit (Figure 5, highlighted in maroon and red) include:

- The entire core of Hartford outside the CBD
- Blue Hills Avenue
- Farmington Avenue into West Hartford
- Franklin Avenue towards Wethersfield
- East Hartford around Burnside Avenue

Figure 5 | Adjusted Population Density



Adjusted Population Density

Potential transit demand based on population density and socioeconomic characteristics

Potential service frequency supported based on residents per acre, weighted by likelihood to use transit as compared to the total population

- 60 mins
- 30 - 60 mins
- 15 - 30 mins
- 10 - 15 mins
- 10 mins or less

Priority Corridors

● CT*fastrak* Stations

CT*fastrak* Busway

Water

Study Area

1 Mile

Metro Hartford **RapidRoutes**

Transit Priority Corridors Study

Data Sources: ACS 5-Year Estimates, 2019

Employment-Based Demand

The concentration of jobs also affects transit demand since some people commute by bus. Like population density, the underlying demand for transit typically grows with an increase in employment density. As shown previously in Figure 3, an area with 2-5 jobs per acre generally supports 60-minute transit service. Areas with 5-10 jobs per acre typically support 30-minute transit service.

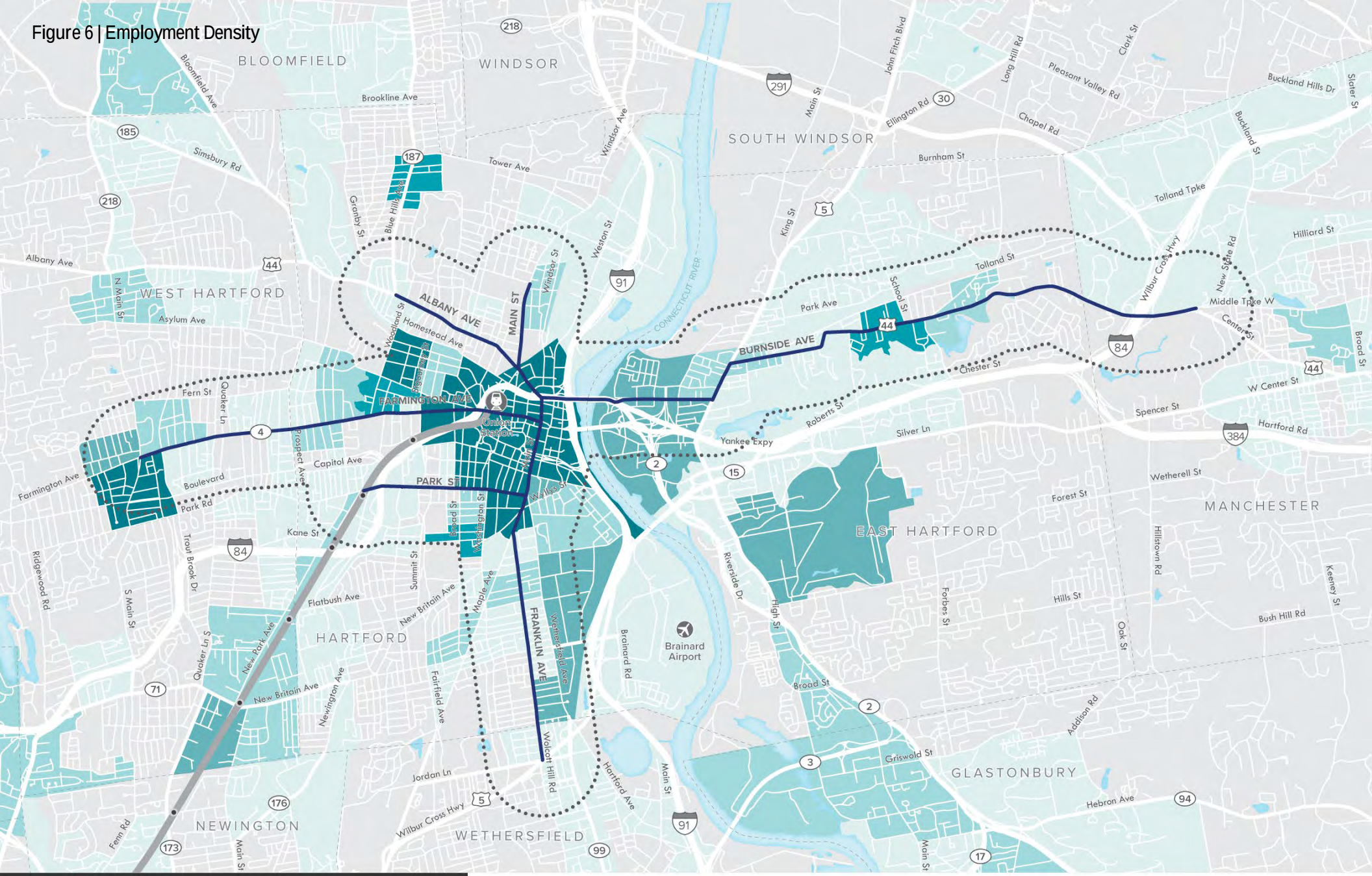
In Metro Hartford, transit-supportive employment clusters are concentrated in a few areas. Locations with the highest employment density (Figure 6, highlighted in teal and turquoise) include:

- Hartford
  - Downtown and core
  - Blue Hills Avenue & Tower Avenue
- West Hartford Center
- East Hartford Center

Outside of these areas, only a few other clusters within the metro region have significant employment density, including:

- Hartford east of Wethersfield Avenue
- West Hartford east of Route 173
- East Hartford
  - Along Connecticut Boulevard
  - South of Silver Lane and east of Main Street

Figure 6 | Employment Density



Employment Density

Potential transit demand based on employment density

Potential service frequency supported based on jobs per acre

▢	60 mins
▢	30 - 60 mins
▢	15 - 30 mins
▢	10 - 15 mins
■	10 mins or less

— Priority Corridors

● CT*fastrak* Stations

▬ CT*fastrak* Busway

Metro Hartford *RapidRoutes*

Transit Priority Corridors Study

▢ Water

⁚⁚ Study Area

1 Mile

Data Sources: LEHD WACS, 2018

Underlying Transit Demand

Population density and employment density each provide an indicator of potential transit demand, but when the two are combined and considered together, the demand in many areas will be significantly higher than when looking at each factor alone. This also captures areas with a mix of uses (residential, job centers, commercial areas) that can generate particularly high transit ridership.

When population and employment-based demand are considered together, it is clear that the underlying demand for transit is very high in central Hartford and generally declines with distance from the core, although with some exceptions.

As would be expected, the highest levels of demand are in the most densely developed areas (Figure 7, highlighted in red), which include:

- All of Hartford
- West Hartford Center
- East Hartford Center and along Burnside Avenue

2045 Underlying Transit Demand

Using CRCOG population and employment projections for 2045, a prediction of what transit demand may look like a quarter century in the future was produced.

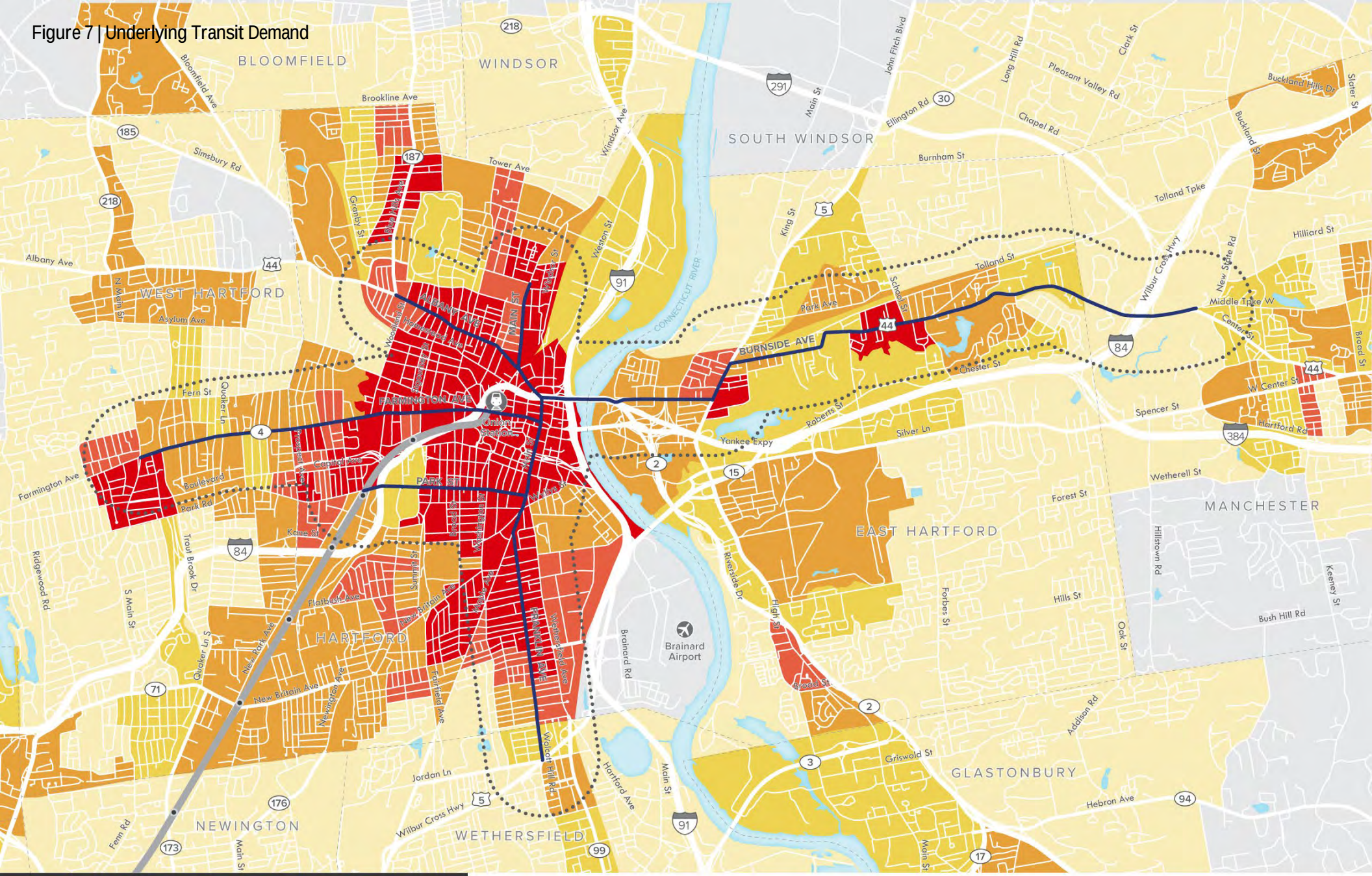
In order to compare the projected demand with today's underlying transit demand, the socioeconomic factors described previously have been used to weight the projected 2045 population and employment densities. While the current demand maps use block groups as their geographic basis, CRCOG's projections use Traffic Analysis Zones (TAZ).

Due to these factors, the comparison between 2019 and 2045 data is not an exact one, but it is a worthwhile exercise when planning for infrastructure improvements that will take time to build and are intended to benefit future residents and visitors to Metro Hartford.

In 2045, the densest parts of the region continue to be (Figure 8, shaded in red):

- All of Hartford
- East Hartford Center
- West Hartford Center

Figure 7 | Underlying Transit Demand



Underlying Transit Demand

Potential transit demand based on density of population, employment, and socioeconomic characteristics

Potential service frequency supported based on people per acre, weighted by likelihood to use transit as compared to the total population

- 60 mins
- 30 - 60 mins
- 15 - 30 mins
- 10 - 15 mins
- 10 mins or less

- Priority Corridors
- CT*fastrak* Stations
- CT*fastrak* Busway
- Water
- Study Area
- 1 Mile

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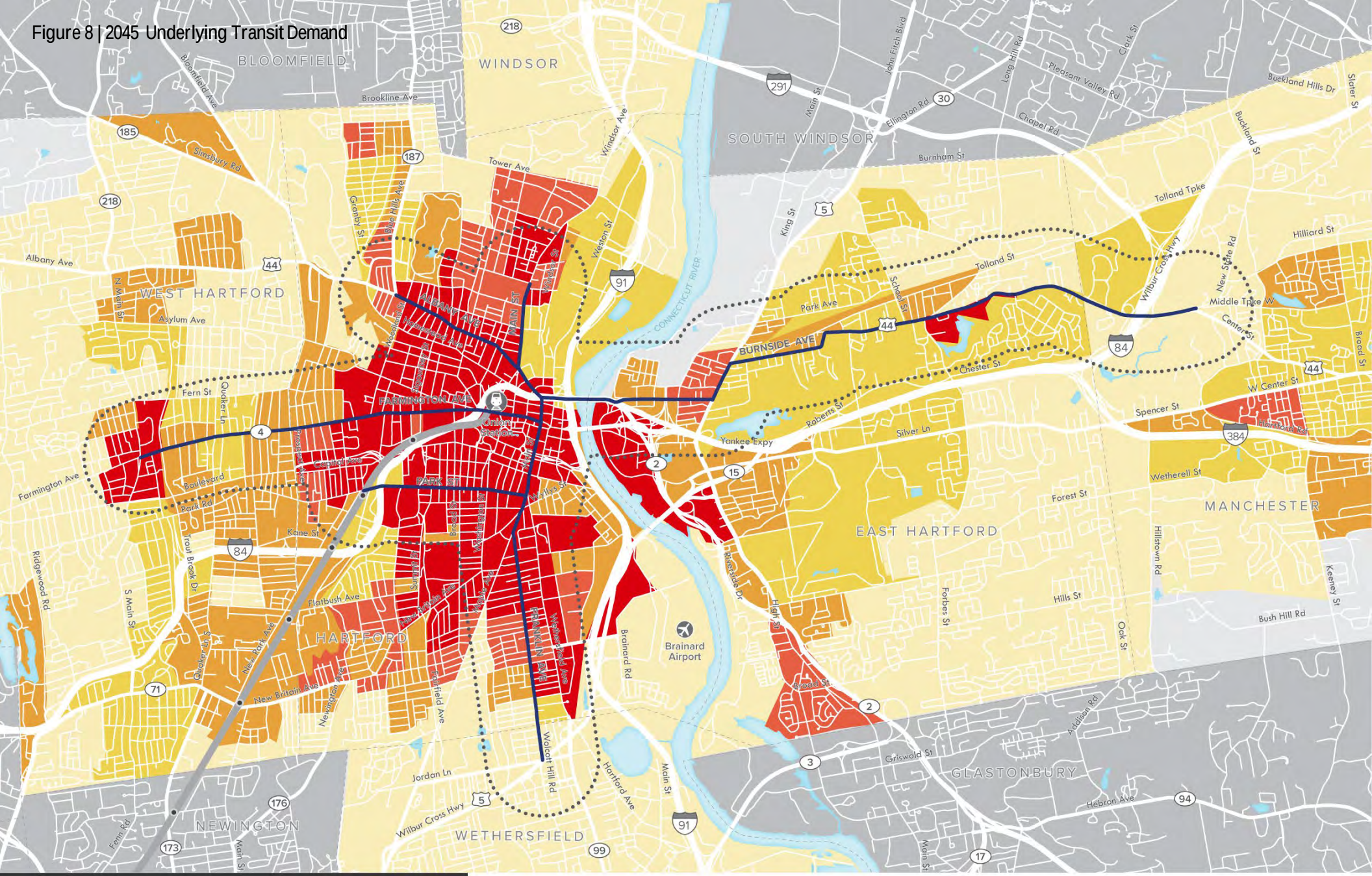
Transit Priority Corridors Study

Data Sources: ACS, 2018-2019; LEHD WACS, 2018

Figure 8 | 2045 Underlying Transit Demand



2045 Underlying Transit Demand

Potential transit demand based on projected density of population and employment in 2045 with 2019 socioeconomic characteristics

Potential service frequency supported based on people per acre, weighted by likelihood to use transit as compared to the total population

- 60 mins
- 30 - 60 mins
- 15 - 30 mins
- 10 - 15 mins
- 10 mins or less
- No Data

- Priority Corridors
- CT*fastrak* Stations
- CT*fastrak* Busway

Metro Hartford **RapidRoutes**
Transit Priority Corridors Study

- Water
- Study Area
- 1 Mile

Data Sources: ACS, 2018-2019; LEHD WACS, 2018; CRCOG projections, 2021

3 Service Review

Existing Services

See Figure 9

Routes

- The corridors are served by the most bus routes near downtown Hartford, with routes leaving and joining the corridors as they move away from the city center.
- Corridor profiles will examine the bus routes traveling along each corridor, including service hours and frequency.

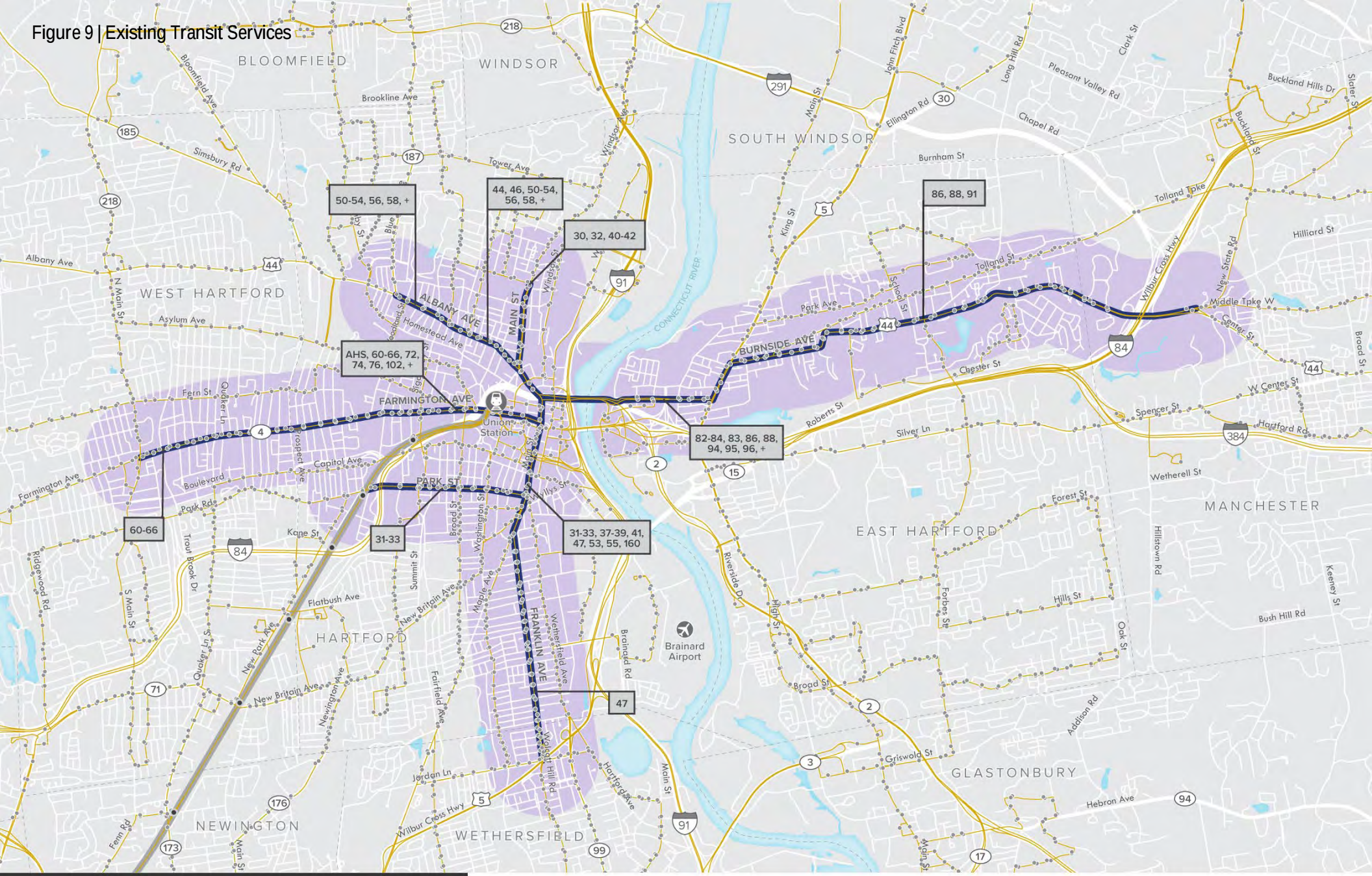
Bus Stops

- There are many bus stops closely spaced together, especially in dense, walkable areas. If transit priority measures are to be implemented, stops will need to be consolidated so that investments can effectively be made.
- Corridor profiles will examine the bus stops along each corridor, including ridership, accessibility, and amenities.

Network Design

- The bus network is characterized by a radial pattern, with almost all routes feeding into Downtown Hartford and Union Station.
- Harford, West Hartford, and Bloomfield have some routes acting as a grid
- Only a few local bus routes connect to CT*fastrak* stations.
- The CT*transit* network features many express routes that carry passengers from surrounding towns into Downtown Hartford for weekday, 9am-5pm employment.
- East Hartford routes are largely focused laterally through the city center. Access to Hartford is restricted to the Founders and Bulkeley Bridges.

Figure 9 | Existing Transit Services



Existing Transit Services

Current bus routes serving Metro Hartford

Priority Corridors

Bus Routes

CTfastrak Stations

Bus Stops

0, 00 Bus Routes serving corridors

CTfastrak Busway

+ indicates express routes

Metro Hartford RapidRoutes
Transit Priority Corridors Study

Water

Study Area

1 Mile

Data Sources: CTtransit 2019

Ridership

October 2019 data was used to determine average weekday ridership for each CT*transit* stop in Metro Hartford. In order to more clearly visualize ridership within corridors, all stops within 250 feet of each other were aggregated into single points. Average weekday ridership by aggregated stops is shown in Figure 10.

Streets with the highest ridership include:

- Park Street
- Albany Avenue
- Main Street
- Franklin Avenue
- Farmington Avenue
- Burnside Avenue
- CT*fastrak* stations

Other areas of moderate ridership include:

- Blue Hills Avenue, Hartford
- New Britain Avenue, Hartford
- Barbour Street, Hartford
- Main Street, East Hartford; south of Silver Lane

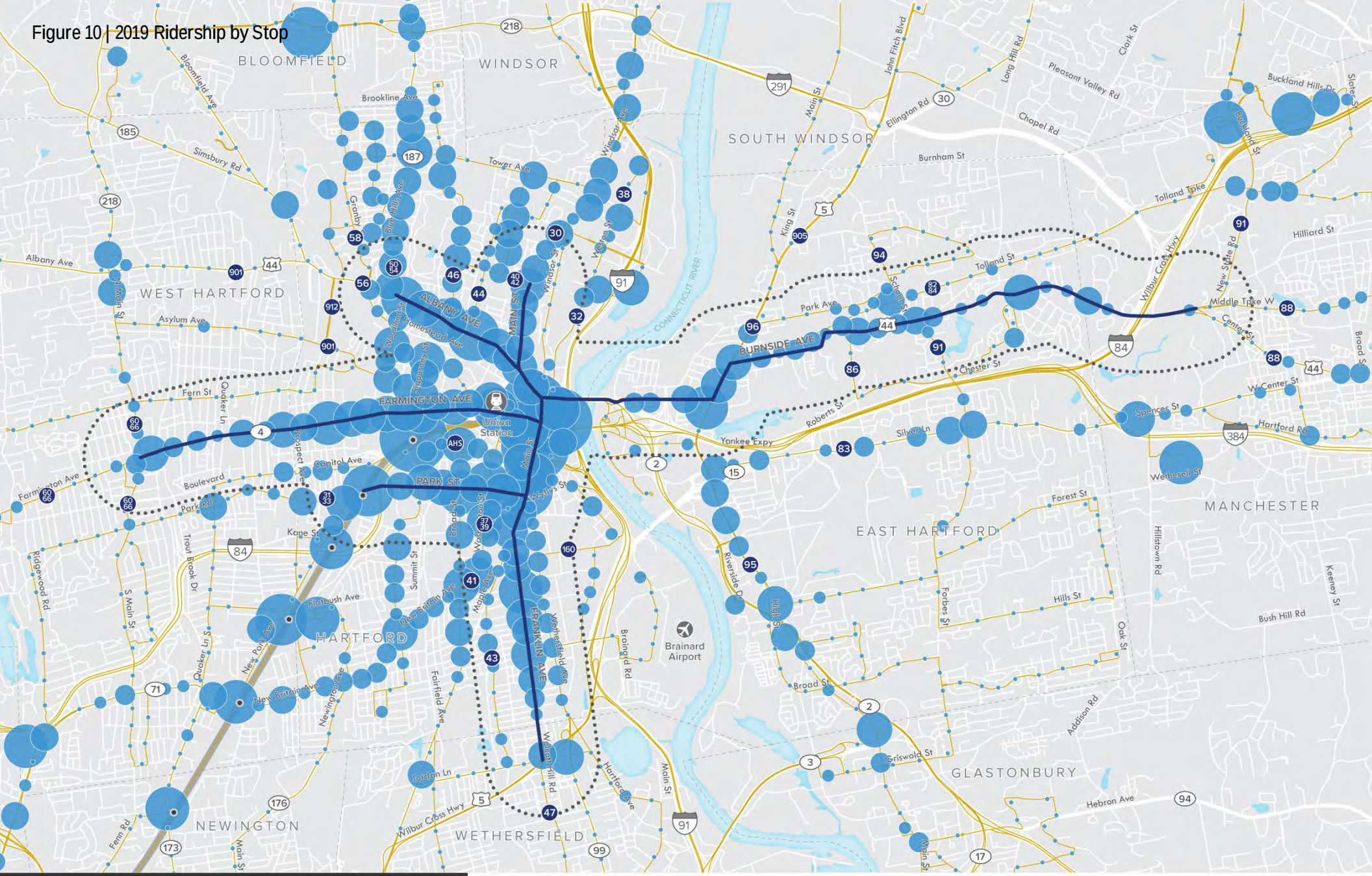
2020 Ridership

Due to the impact of COVID-19 on both the supply and demand for transit, an examination of 2020 average weekday ridership illustrates both significant decreases across the system as well as segments where ridership remained strong. These latter segments indicate populations of essential and frontline workers that continued to travel by transit, further illustrating the underlying demand.

In 2020, streets with high ridership include (Figure 11):

- Main Street just north of Downtown
- Park Street
- South end of Franklin Avenue
- Barbour Street
- Farmington Avenue
- Main Street, East Hartford; between Connecticut Boulevard and Burnside Avenue

Figure 10 | 2019 Ridership by Stop



2019 Ridership By Stop

Average weekday bus boardings by stop

Average daily boardings, by aggregated stops

Bus Routes

Bus Routes serving corridors

< 10

50 - 100

250 - 500

> 1,000

Priority Corridors

CTfastrak Stations

CTfastrak Busway

Metro Hartford RapidRoutes

Transit Priority Corridors Study

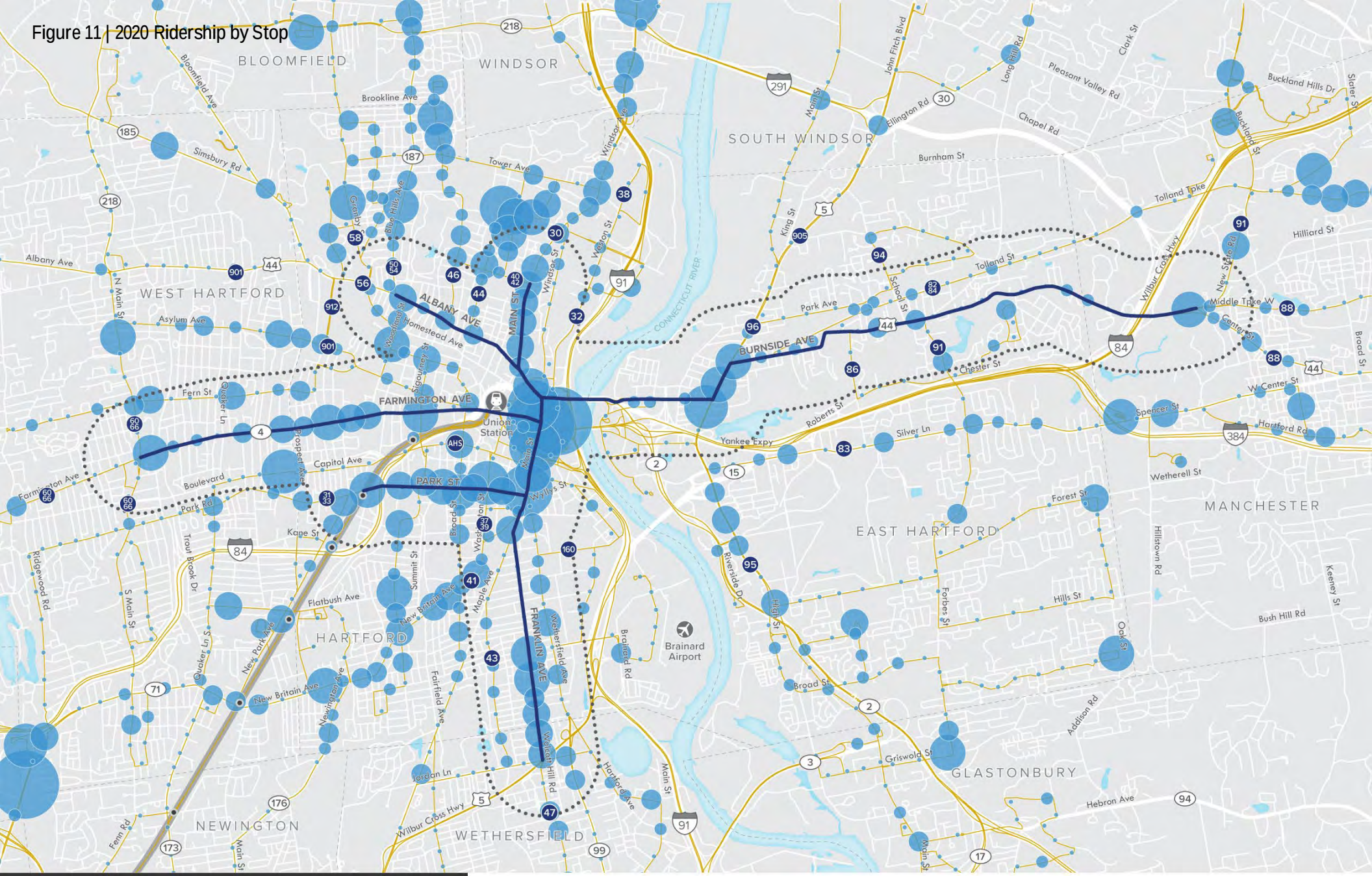
Water

Study Area

1 Mile

Data Sources: CTtransit, October 2019

Figure 11 | 2020 Ridership by Stop



2020 Ridership By Stop

Average weekday bus boardings by stop

Average daily boardings, by aggregated stops

Bus Routes

Bus Routes serving corridors

< 10

50 - 100

250 - 500

> 1,000

Priority Corridors

CTfastrak Stations

CTfastrak Busway

Metro Hartford RapidRoutes

Transit Priority Corridors Study

Water

Study Area

1 Mile

Data Sources: CTtransit, October 2020

4 Corridor Adjustment

The study began with the following six corridors, beginning in Hartford:

- **Main Street**: Asylum Avenue to Capen Street
- **Albany Avenue**: Main Street to Blue Hills Avenue
- **Burnside Avenue**: Main Street to West Center Street, Manchester
- **Park Street**: Main Street to Francis Avenue
- **Farmington Avenue**: Main Street to Main Street, West Harford
- **Franklin Avenue**: Asylum Avenue to Jordan Lane, Wethersfield

Based on the review of the existing market and service conditions, along with consultation with the Study's Working Group, adjustments to these original corridors were made (Figure 13). While the corridors generally aligned with transit supply and demand, the analyses justify modifications.

The underlying transit demand reveals that Blue Hills Avenue is a high-demand area, with population, employment, and socioeconomic densities that support high-frequency transit of 10-minutes or better. The same demand map also shows that although Burnside Avenue has areas of high demand, the original corridor continues past these and ends in a low-demand area.

Ridership by stop data shows that Main Street has high ridership past the end of the original corridor at Capen Street, continuing north to Interstate 91. Already identified as a high-demand area, Blue Hills Avenue also exhibits high bus ridership.

Additionally, Wethersfield Avenue was considered as an alternative to Franklin Avenue. A comparison of demographic and service data favored Franklin Avenue, which has significantly higher bus ridership and population within a half mile. In contrast, Wethersfield Avenue has only a slightly higher number of jobs within a half mile (Figure 12).

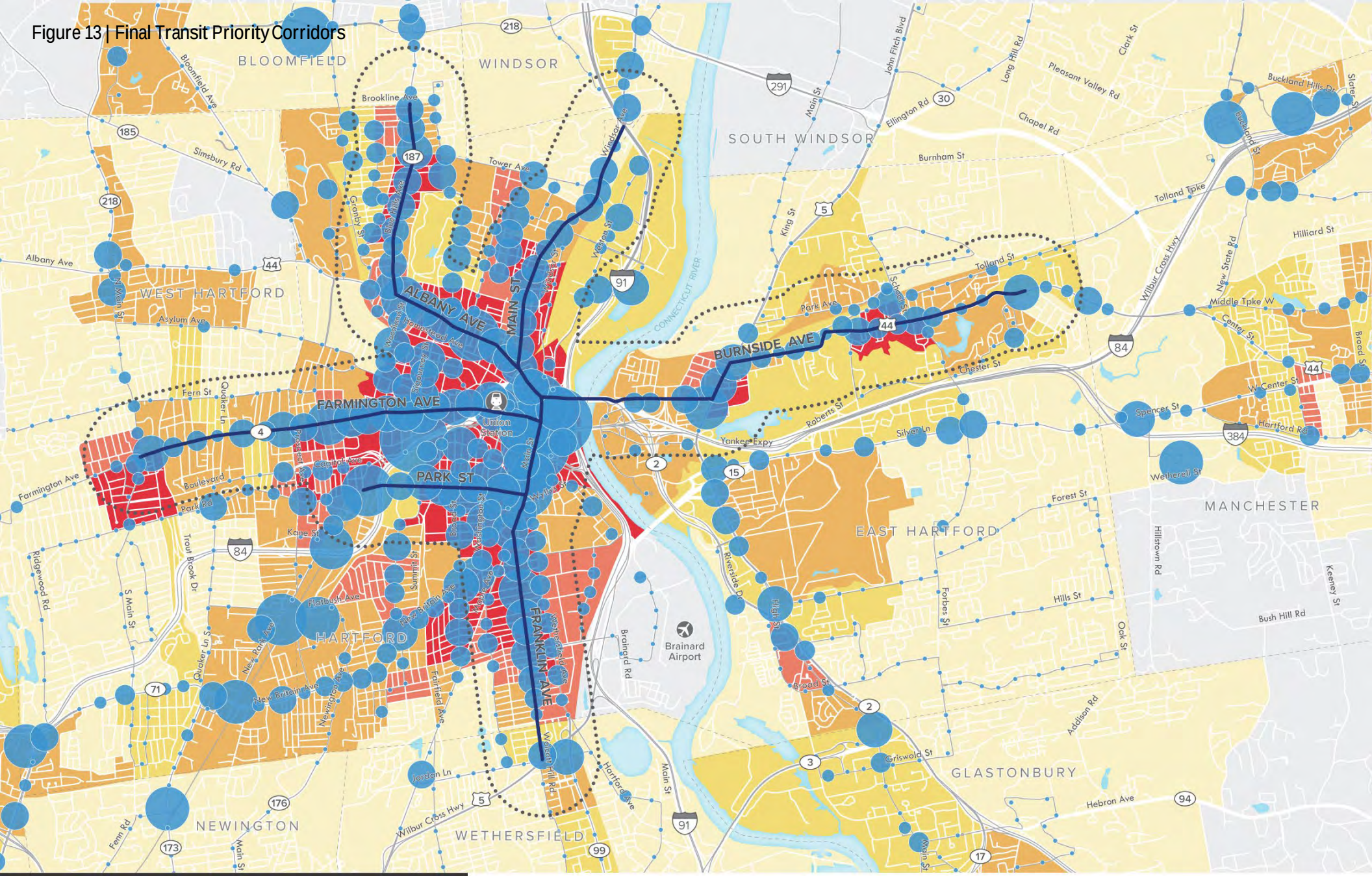
Figure 12 | Franklin Ave & Wethersfield Ave Comparison

	Franklin Avenue	Wethersfield Avenue
Population within 1/2 Mile	30,873	25,852
Employment within 1/2 Mile	32,952	33,195
Ridership (October 2019)	1,937	914

Based on these analyses, the following changes were made to the original six corridors:

- **Main Street**: segment added; *north to Interstate 91*
- **Albany Avenue**: segment added; *north along Blue Hills Avenue to Bloomfield*
- **Burnside Avenue**: segment subtracted; *east end of segment terminates at Mary Street*
- **Park Street**: no change
- **Farmington Avenue**: no change
- **Franklin Avenue**: no change

Figure 13 | Final Transit Priority Corridors



Transit Priority Corridors

Population, employment, and socioeconomic -based demand & average weekday boardings

Potential service frequency supported based on people per acre, weighted by likelihood to use transit as compared to the total population

- 60 mins
- 30 - 60 mins
- 15 - 30 mins
- 10 - 15 mins
- 10 mins or less

Bus Routes

Average daily boardings, by aggregated stops

< 10 | 50 - 100 | 250 - 500 | > 1,000

Metro Hartford RapidRoutes
Transit Priority Corridors Study

Water

Study Area

1 Mile

Data Sources: ACS, 2018-2019; LEHD WACS, 2018; CTtransit, October 2019